



STOCK

PRÉCISION



STOCK

Depuis plus de 125 années, la Firme Robert Stock AG vous offre un assortiment d'outils de coupe de très « Haute Performance » particulièrement très étendu.

Le premier foret hélicoïdal réalisé en Allemagne a été fabriqué par la firme Stock en 1891. C'est à partir de ce moment là qu'a débutée la fabrication des outils de coupe en Allemagne!



Aujourd'hui encore la firme Stock offre et vend, dans le monde entier, un assortiment d'outils de perçage, de filetage, de fraisage, d'alésage et de chanfreinage, standardisés et fabriqués en HSS, HSS-CO, en acier fritté PM, en carbures métalliques, en Cermet et en PCD, mais aussi une multitude d'outils spéciaux.

Afin de compléter notre assortiment, nous fabriquons aussi les attachements d'outils, les meubles de stockage et de gestion d'outils et offrons toutes les prestations de service pour outils c'est - à - dire la réfection, le réaffûtage et les revêtements.



Plus de 125 années d'outils de précision Made in Germany!



1901



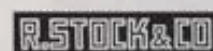
1908



1921



1953



1954



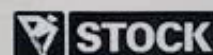
1956



1968



1969



1976





STOCK

OUTILS DE PRÉCISION

Ce catalogue remplace tous les catalogues précédents. Toute reproduction d'un extrait quelconque de ce catalogue par quelque procédé que ce soit est strictement interdite.

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OUTILS DE FRAISAGE SUPER F-UT

Fraises carbure de haute capacité

Information technique à partir de la page 518

Conseils d'utilisation à partir de la page 513



FORETS HELICOÏDAUX

HSS, HSS-Co, M42 et HSS-E-PM

Information technique à partir de la page 190

Conseils d'utilisation à partir de la page 176



OUTILS DE PERÇAGE

CW monobloc

Outils de forage

Système d'outils à plaquettes interchangeables

Information technique à partir de la page 63

Conseils d'utilisation à partir de la page 26



OUTILS DE TARAUDAGE

Information technique à partir de la page 362

Conseils d'utilisation à partir de la page 348



SYSTÈMES DE STOCKAGE D'OUTILS

TSC mini, midi et maxi

Information technique à partir de la page 778



OUTILS DE FRAISAGE

CW monobloc, M42 et HSS-E-PM

Information technique à partir de la page 584

Conseils d'utilisation à partir de la page 566



ATTACHEMENTS D'OUTILS

Hydraulique, thermique et mécanique

Information technique à partir de la page 748



OUTILS D'ALESAGE/ CHANFREINAGE

Inclus outils d'ébavurage

Information technique à partir de la page 694

Conseils d'utilisation à partir de la page 690



Programme de vente

Référence	Page	Norme	Surface	Désignation	Matière de coupe	Type
51122	238	DIN 338	TiAIN nano	Forets hélicoïdaux courts	HSS-Co	V66 Ti
51132	261	Norme usine	TiAIN nano	Forets hélicoïd. à queue cylind.renforcée	HSS-E-PM	V-PM
51158	251	DIN 338	TiAIN nano	Forets hélicoïdaux courts	HSS-Co	V97
51159	204	DIN 1897	TiAIN nano	Forets hélicoïdaux extra-courts	HSS-Co	V97
51184	134	DIN 6539	TiAIN nano	Forets hélicoïdaux extra-courts	CW monobloc	N
51720	108	Norme usine	AlTiN	Microforets SuperV-M en CW	CW monobloc	SuperV-M
51764	97	Norme usine	AlTiN	Forets avec trous d'huile, type SuperV	CW monobloc	SuperV-T
51765	98	Norme usine	AlTiN	Forets avec trous d'huile, type SuperV	CW monobloc	SuperV-T
51766	99	Norme usine	AlTiN	Forets avec trous d'huile, type SuperV	CW monobloc	SuperV-T
51767	100	Norme usine	AlTiN	Forets avec trous d'huile, type SuperV	CW monobloc	SuperV-T
51768	101	Norme usine	AlTiN	Forets avec trous d'huile, type SuperV	CW monobloc	SuperV-T
51770	76	DIN 6537K	AlTiN nano	Forets avec trous d'huile, type SuperV	CW monobloc	SuperV-VA
51771	78	DIN 6537K	AlTiN nano	Forets avec trous d'huile, type SuperV	CW monobloc	SuperV-VA
51772	87	DIN 6537L	AlTiN nano	Forets avec trous d'huile, type SuperV	CW monobloc	SuperV-VA
51773	89	DIN 6537L	AlTiN nano	Forets avec trous d'huile, type SuperV	CW monobloc	SuperV-VA
51776	72	DIN 6537K	TiAIN nano	Forets avec trous d'huile, type SuperV	CW monobloc	SuperV-IK-U
51781	83	DIN 6537L	TiAIN nano	Forets avec trous d'huile, type SuperV	CW monobloc	SuperV-IK-U
51787	68	DIN 6537L	TiAIN nano	Forets sans trou d'huile, type SuperV	CW monobloc	SuperV-U
51789	91	Norme usine	TiAIN nano	Forets avec trous d'huile, type SuperV	CW monobloc	SuperV-IK-U
51871	66	DIN 6537K	TiAIN nano	Forets sans trou d'huile, type SuperV	CW monobloc	SuperV-U
51873	64	DIN 6537K	TiAIN nano	Forets sans trou d'huile, type SuperV	CW monobloc	SuperV-U
51876	74	DIN 6537K	TiAIN nano	Forets avec trous d'huile, type SuperV	CW monobloc	SuperV-IK-U
51881	85	DIN 6537L	TiAIN nano	Forets avec trous d'huile, type SuperV	CW monobloc	SuperV-IK-U
51887	70	DIN 6537L	TiAIN nano	Forets sans trou d'huile, type SuperV	CW monobloc	SuperV-U
51889	92	Norme usine	TiAIN nano	Forets avec trous d'huile, type SuperV	CW monobloc	SuperV-IK-U
51893	95	Norme usine	TiAIN nano	Forets avec trous d'huile, type SuperV	CW monobloc	SuperV-IK-U
51997	105	Norme usine	AlTiN	Microforets SuperV-NX à haute perfor. en CW avec can. de lub. int.	CW monobloc	SuperV-IK-NX
51998	106	Norme usine	AlTiN	Microforets SuperV-NX à haute perfor. en CW avec can. de lub. int.	CW monobloc	SuperV-IK-NX
51999	107	Norme usine	AlTiN	Microforets SuperV-NX à haute perfor. en CW avec can. de lub. int.	CW monobloc	SuperV-IK-NX
52360	743	Norme usine	poli	Outils d'ébavurage	CW monobloc	SuperE-U
52365	651, 742	Norme usine	AlTiN nano	Ebavureur avant et arrière 90°	CW monobloc	SuperAD-90
53050	368	DIN 371	TiCN	Tarauds pour filetage métrique ISO	HSS-E-PM	Intensiv Synchro
53051	369	DIN 376	TiCN	Tarauds pour filetage métrique ISO	HSS-E-PM	Intensiv Synchro
53052	438	DIN 374	TiCN	Tarauds pour filetage métrique ISO fin	HSS-E-PM	Intensiv Synchro
53053	362	DIN 371	TiCN	Tarauds pour filetage métrique ISO	HSS-E-PM	Produktiv Synchro
53054	363	DIN 376	TiCN	Tarauds pour filetage métrique ISO	HSS-E-PM	Produktiv Synchro
53055	437	DIN 374	TiCN	Tarauds pour filetage métrique ISO fin	HSS-E-PM	Produktiv Synchro
53393	645, 736	Norme usine	AlTiN	Fraises à ébavurer 60°	CW monobloc	SuperAF-60
53394	646, 737	Norme usine	AlTiN	Fraises à ébavurer 60°	CW monobloc	SuperAF-60
53395	647, 738	Norme usine	AlTiN	Fraises à ébavurer 90°	CW monobloc	SuperAF-90
53396	648, 739	Norme usine	AlTiN	Fraises à ébavurer 90°	CW monobloc	SuperAF-90
53397	649, 740	Norme usine	AlTiN	Fraises à ébavurer 120°	CW monobloc	SuperAF-120
53398	650, 741	Norme usine	AlTiN	Fraises à ébavurer 120°	CW monobloc	SuperAF-120
53620	478	~DIN 371	AlCrN	Tarauds à refouler avec rainures de lubr. p. filetage métrique ISO	HSS-E-PM	Durativ
53621	479	~DIN 371	AlCrN	Tarauds à refouler avec rainures de lubr. p. filetage métrique ISO	HSS-E-PM	Durativ
53622	480	~DIN 376	AlCrN	Tarauds à refouler avec rainures de lubr. p. filetage métrique ISO	HSS-E-PM	Durativ
53640	397	DIN 371	TiCN	Tarauds pour filetage métrique ISO	HSS-E-PM	Produktiv H
53641	412	DIN 371	TiCN	Tarauds pour filetage métrique ISO	HSS-E-PM	Produktiv HD
53642	398	DIN 371	TiCN	Tarauds pour filetage métrique ISO	HSS-E	Produktiv H
53643	416	DIN 376	TiCN	Tarauds pour filetage métrique ISO	HSS-E-PM	Produktiv HD
53661	404	DIN 371	TiCN	Tarauds pour filetage métrique ISO	HSS-E	Intensiv H
53662	420	DIN 371	TiCN	Tarauds pour filetage métrique ISO	HSS-E-PM	Intensiv HD
53665	424	DIN 376	TiCN	Tarauds pour filetage métrique ISO	HSS-E-PM	Intensiv HD
53666	382	DIN 371/DIN 376	TiCN	Tarauds pour filetage métrique ISO	HSS-E-PM	Intensiv HDX
53667	377	DIN 371/DIN 376	TiCN	Tarauds pour filetage métrique ISO	HSS-E-PM	Produktiv HDX
53668	381	DIN 371/DIN 376	AlTiN	Tarauds pour filetage métrique ISO	HSS-E-PM	Intensiv HX
53669	376	DIN 371/DIN 376	AlTiN	Tarauds pour filetage métrique ISO	HSS-E-PM	Produktiv HX
53670	383	DIN 371	TiCN	Tarauds pour filetage métrique ISO	HSS-E-PM	HCX
53733	364	~DIN 371/~DIN 376	AlTiZrN	Tarauds pour filetage métrique ISO	HSS-E	Produktiv N-X
53746	370	~DIN 371/~DIN 376	TiAIN	Tarauds pour filetage métrique ISO	HSS-E	Intensiv N-X
53778	436	DIN 374	AlTiZrN	Tarauds pour filetage métrique ISO fin	HSS-E	Produktiv N-X
53780	435	DIN 374	TiAIN	Tarauds pour filetage métrique ISO fin	HSS-E	Intensiv N-X
53787	471	DIN 5156	AlTiZrN	Tarauds pour filetage BSP	HSS-E	Produktiv N-X
53788	466	DIN 5156	TiAIN	Tarauds pour filetage BSP	HSS-E	Intensiv N-X
53810	486	Norme usine	TiCN	Fraises à fileter avec chanfrein p. filetage métrique ISO	CW monobloc	TMC SP
53820	487	Norme usine	TiCN	Fraises à fileter avec chanfrein p. filetage métrique ISO fin	CW monobloc	TMC SP
53830	490	Norme usine	TiCN	Fraises à fileter sans chanfrein p. filetage métrique ISO	CW monobloc	TM SP
54080	664	Norme usine	TiAIN	Minifraises à rainurer (3 dents)	M42	N
54180	665	Norme usine	TiAIN	Minifraises à rainurer (3 dents)	M42	N
54201	616	Norme usine	TiAIN	Fraises de pré-finition, multicoupe	CW monobloc	NH
54205	615	Norme usine	TiAIN	Fraises de pré-finition, multicoupe	CW monobloc	NH
54206	614	DIN 6527L	TiAIN	Fraises deux tailles à bords rayonnés	CW monobloc	NH

Programme de vente

Référence	Page	Norme	Surface	Désignation	Matière de coupe	Type
54207	619	Norme usine	TiAlSiN	Fraises pour matériaux durs, multicoupe	CW monobloc	H
54221	618	Norme usine	TiAlN	Fraises de pré-finition, multicoupe	CW monobloc	NH
54225	617	Norme usine	TiAlN	Fraises de pré-finition, multicoupe	CW monobloc	NH
54227	620	Norme usine	TiAlSiN	Fraises pour matériaux durs, multicoupe	CW monobloc	H
54275	680	DIN 327	TiAlN	Fraises à bout hémisphérique	M42	N
54276	681	Norme usine	TiAlN	Fraises à bout hémisphérique	M42	N
54294	662	DIN 844L	TiAlN	Fraises à rainurer (3 dents)	M42	N
54300	642	Norme usine	TiAlSiN	Fraises à copier, à bout hémisphérique	CW monobloc	N
54301	643	Norme usine	TiAlSiN	Fraises à copier, à bout hémisphérique	CW monobloc	N
54302	638	Norme usine	TiAlSiN	Fraises à copier, à affûtage torique	CW monobloc	N
54303	639	Norme usine	TiAlSiN	Fraises à copier, à affûtage torique	CW monobloc	N
54304	636	Norme usine	TiAlSiN	Fraises à copier, à affûtage torique	CW monobloc	H
54305	637	Norme usine	TiAlSiN	Fraises à copier, à affûtage torique	CW monobloc	H
54306	640	Norme usine	TiAlSiN	Fraises à copier, à bout hémisphérique	CW monobloc	H
54307	641	Norme usine	TiAlSiN	Fraises à copier, à bout hémisphérique	CW monobloc	H
54404	594	Norme usine	TiAlN	Fraises pour clavettes (2 dents)	CW monobloc	N
54424	603	Norme usine	TiAlN	Fraises à rainurer (3 dents)	CW monobloc	N
54444	611	Norme usine	TiAlN	Fraises deux tailles (4 dents)	CW monobloc	N
54496	621	DIN 6527L	TiAlN	Fraises d'ébauche	CW monobloc	NF
54497	622	DIN 6527L	TiAlN	Fraises d'ébauche	CW monobloc	NF
54519	590	DIN 6527L	TiAlN	Fraises pour clavettes (2 dents)	CW monobloc	N
54520	589	DIN 6527K	TiAlN	Fraises pour clavettes (2 dents)	CW monobloc	N
54521	592	DIN 6527L	TiAlN	Fraises pour clavettes (2 dents)	CW monobloc	N
54522	612	DIN 6527L	TiAlN	Fraises deux tailles à bords rayonnés	CW monobloc	N
54523	599	DIN 6527L	TiAlN	Fraises à rainurer (3 dents)	CW monobloc	N
54524	608	DIN 6527L	TiAlN	Fraises deux tailles (4 dents)	CW monobloc	N
54526	613	DIN 6527L	TiAlN	Fraises deux tailles à bords rayonnés	CW monobloc	N
54531	633	DIN 6528	TiAlN	Fraises à bout hémisphérique	CW monobloc	N
54541	628	DIN 6527L	TiAlN	Fraises à bout hémisphérique	CW monobloc	N
54551	521	DIN 6527L	TiAlN	Fraises N SuperF-UT	CW monobloc	SuperF-UT N
54552	525	Norme usine	TiAlN	Fraises N SuperF-UT	CW monobloc	SuperF-UT N
54556	541	DIN 6527L	TiAlN	Fraises VA SuperF-UT	CW monobloc	SuperF-UT VA
54558	535	DIN 6527L	AlTiN nano	Fraises VA-X SuperF-UT	CW monobloc	SuperF-UT VA-X
54559	536	DIN 6527L	AlTiN nano	Fraises VA-X SuperF-UT	CW monobloc	SuperF-UT VA-X
54560	532	DIN 6527L	AlTiN+	Fraises Ti SuperF-UT	CW monobloc	SuperF-UT Ti
54561	533	DIN 6527L	AlTiN+	Fraises Ti SuperF-UT	CW monobloc	SuperF-UT Ti
54562	523	Norme usine	TiAlN	Fraises N SuperF-UT	CW monobloc	SuperF-UT N
54563	524	Norme usine	TiAlN	Fraises N SuperF-UT	CW monobloc	SuperF-UT N
54564	528	Norme usine	TiAlN	Fraises N-3 SuperF-UT	CW monobloc	SuperF-UT N-3
54565	529	Norme usine	TiAlN	Fraises N-3 SuperF-UT	CW monobloc	SuperF-UT N-3
54566	526	DIN 6527L	TiAlN	Fraises N-F SuperF-UT	CW monobloc	SuperF-UT N-F
54567	527	DIN 6527L	TiAlN	Fraises N-F SuperF-UT	CW monobloc	SuperF-UT N-F
54568	539	DIN 6527L	AlTiN nano	Fraises VA-XF SuperF-UT	CW monobloc	SuperF-UT VA-XF
54569	540	DIN 6527L	AlTiN nano	Fraises VA-XF SuperF-UT	CW monobloc	SuperF-UT VA-XF
54570	546	Norme usine	poli	Fraises Al-F SuperF-UT	CW monobloc	SuperF-UT Al-F
54571	547	Norme usine	poli	Fraises Al-F SuperF-UT	CW monobloc	SuperF-UT Al-F
54572	550	DIN 6527L	TiAlSiN	Fraises H SuperF-UT	CW monobloc	SuperF-UT H
54573	551	DIN 6527L	TiAlSiN	Fraises H SuperF-UT	CW monobloc	SuperF-UT H
54574	537	DIN 6527L	AlTiN nano	Fraises VA-X IK SuperF-UT	CW monobloc	SuperF-UT VA-X IK
54575	538	DIN 6527L	AlTiN nano	Fraises VA-X IK SuperF-UT	CW monobloc	SuperF-UT VA-X IK
54576	534	DIN 6527K	AlTiN nano	Fraises VA-X SuperF-UT	CW monobloc	SuperF-UT VA-X
54579	530	Norme usine	TiAlN	Fraises N-5 SuperF-UT	CW monobloc	SuperF-UT N-5
54580	531	Norme usine	TiAlN	Fraises N-5 SuperF-UT	CW monobloc	SuperF-UT N-5
54590	518	DIN 6527L	TiAlSiN	Fraises SuperF-UT NX	CW monobloc	SuperF-UT NX
54591	519	DIN 6527L	TiAlSiN	Fraises SuperF-UT NX	CW monobloc	SuperF-UT NX
54700	644	DIN 6527L	AlTiN+	Fraises à pilote	CW monobloc	N
54815	671	DIN 844K	TiAlN	Fraises d'ébauche et de finition	M42	NF
54816	675	DIN 844K	TiAlN	Fraises d'ébauche (4 arêtes de coupe frontale)	M42	NR
54825	673	DIN 844K	TiAlN	Fraises d'ébauche (3 arêtes de coupe frontale)	HSS-E-PM	NRf
54836	679	DIN 844L	TiAlN	Fraises d'ébauche (4 arêtes de coupe frontale)	M42	NR
54845	677	DIN 844K	TiAlN	Fraises d'ébauche (4 arêtes de coupe frontale)	HSS-E-PM	NRf
54847	669	DIN 844L	TiAlN	Fraises deux tailles à arêtes de coupe multiples	M42	N
55017	151	Norme usine	TiCN	Forets à une lèvre SuperT-NX	CW	SuperT-NX
55018	150	Norme usine	TiCN	Forets à une lèvre SuperT-NX	CW	SuperT-NX
55020	157	Norme usine	AlTiN+	Forets à une lèvre en CW monobloc TBE	CW monobloc	TBE-VHM
55021	161	Norme usine	AlTiN+	Forets à une lèvre en CW monobloc TBE	CW monobloc	TBE-VHM
55022	152	Norme usine	TiCN	Forets à une lèvre SuperT-NX	CW	SuperT-NX
55023	153	Norme usine	TiCN	Forets à une lèvre SuperT-NX	CW	SuperT-NX
55024	155	Norme usine	AlTiN+	Forets à une lèvre en CW monobloc TBE	CW monobloc	TBE-VHM
55026	159	Norme usine	AlTiN+	Forets à une lèvre en CW monobloc TBE	CW monobloc	TBE-VHM
55027	143	Norme usine	AlTiN nano	Forets à une lèvre SuperT-AL	CW monobloc	SuperT-AL
55028	144	Norme usine	AlTiN nano	Forets à une lèvre SuperT-AL	CW monobloc	SuperT-AL

Programme de vente

Référence	Page	Norme	Surface	Désignation	Matière de coupe	Type
55029	145	Norme usine	AlTiN nano	Forets à une lèvre SuperT-AL	CW monobloc	SuperT-AL
56011	129	Norme usine	TiAIN	Plaquettes interchangeables pour SuperV-AP mini	CW monobloc	SuperV-AP maxi
61112	207	DIN 1897	TiN	Forets hélicoïdaux extra-courts	HSS-Co	VX
61115	220	DIN 338	sommet rev. TiN	Forets hélicoïdaux courts	HSS	N
61116	218	DIN 338	TiN	Forets hélicoïdaux courts	HSS	N
61118	197	DIN 1897	TiN	Forets hélicoïdaux extra-courts	HSS	N
61120	257	Norme usine	TiN	Forets hélicoïd. à queue cylind.renforcée	HSS-Co	NX
61121	259	Norme usine	TiN	Forets hélicoïd. à queue cylind.renforcée	HSS-Co	NX
61124	243	DIN 338	TiN	Forets hélicoïdaux courts	HSS	V70
61131	205	DIN 1897	TiN	Forets hélicoïdaux extra-courts	HSS-E-PM	V-PM
61136	268	DIN 340	TiN	Forets hélicoïdaux longs	HSS	N
61150	277	DIN 340	TiN	Forets hélicoïdaux longs	HSS	V70
61158	247	DIN 338	TiN	Forets hélicoïdaux courts	HSS-Co	V70
61175	294	Norme usine	TiN	Forets NC	HSS	N
61220	202	DIN 1897	TiN	Forets hélicoïdaux extra-courts	HSS-Co	NX
61221	230	DIN 338	TiN	Forets hélicoïdaux courts	HSS-Co	NX
61222	272	DIN 340	TiN	Forets hélicoïdaux longs	HSS-Co	NX
61223	236	DIN 338	TiN	Forets hélicoïdaux courts	HSS-Co	V66 Ti
61232	253	DIN 338	TiN	Forets hélicoïdaux courts	HSS-E-PM	V-PM
61602	325	DIN 333	TiN	Forets à centrer sans méplat	HSS	N
61880	82	DIN 6537L	TiN	Forets avec trous d'huile, type SuperV	CW monobloc	SuperV-IK-F
61888	63	DIN 6539	TiN	Forets sans trou d'huile, type SuperV	CW monobloc	SuperV-F
62327	727	DIN 334	TiN	Fraises à chanfreiner 60°	HSS	
62347	729	DIN 335	TiN	Fraises à chanfreiner 90°	HSS	
62399	733	DIN 335	TiN	Coffrets de fraises à chanfreiner 90°	HSS	
63010	411	~DIN 371	TiCN	Tarauds pour filetage métrique ISO	CW monobloc	H
63013	481	~DIN 371	TiCN	Tarauds à refouler à canaux de lubrif. et avec rainures de lubr. métr. ISO	CW monobloc	Durativ
63033	365	DIN 371	TiN	Tarauds pour filetage métrique ISO	HSS-E	Produktiv N
63046	371	DIN 371	TiN	Tarauds pour filetage métrique ISO	HSS-E	Intensiv N
63048	373	DIN 376	TiN	Tarauds pour filetage métrique ISO	HSS-E	Intensiv N
63119	476	~DIN 371	TiN	Tarauds à refouler avec rainures de lubr. p. filetage métrique ISO	HSS-E	Durativ
63120	475	~DIN 371	TiN	Tarauds à refouler avec rainures de lubr. p. filetage métrique ISO	HSS-E	Durativ
63121	483	DIN 371	TiN	Tarauds à refouler sans rainures de lubr. p. filetage métrique ISO	HSS-E	Durativ
63122	477	~DIN 376	TiN	Tarauds à refouler avec rainures de lubr. p. filetage métrique ISO	HSS-E	Durativ
63123	484	~DIN 376	TiN	Tarauds à refouler sans rainures de lubr. p. filetage métrique ISO	HSS-E	Durativ
63133	385	DIN 371	TiN	Tarauds pour filetage métrique ISO	HSS-E	Produktiv N
63138	388	DIN 376	TiN	Tarauds pour filetage métrique ISO	HSS-E	Produktiv N
63146	390	DIN 371	TiN	Tarauds pour filetage métrique ISO	HSS-E	Intensiv N
63148	394	DIN 376	TiN	Tarauds pour filetage métrique ISO	HSS-E	Intensiv N
63173	444	DIN 374	TiN	Tarauds pour filetage métrique ISO fin	HSS-E	Intensiv N
63176	413	DIN 371	TiN	Tarauds pour filetage métrique ISO	HSS-E	Produktiv HD
63177	417	DIN 376	TiN	Tarauds pour filetage métrique ISO	HSS-E	Produktiv HD
63201	428	DIN 371	AlTiN	Tarauds pour filetage métrique ISO	HSS-E	GG
63641	399	DIN 371	TiN	Tarauds pour filetage métrique ISO	HSS-E-PM	Produktiv H
63643	402	DIN 376	TiN	Tarauds pour filetage métrique ISO	HSS-E-PM	Produktiv H
63662	421	DIN 371	TiN	Tarauds pour filetage métrique ISO	HSS-E-PM	Intensiv HD
63665	425	DIN 376	TiN	Tarauds pour filetage métrique ISO	HSS-E-PM	Intensiv HD
63674	405	DIN 371	TiN	Tarauds pour filetage métrique ISO	HSS-E	Intensiv H
63675	408	DIN 376	TiN	Tarauds pour filetage métrique ISO	HSS-E	Intensiv H
64080	595	Norme usine	TiAIN	Minifraises à rainurer (3 dents)	CW monobloc	N
64180	596	Norme usine	TiAIN	Minifraises à rainurer (3 dents)	CW monobloc	NH
64478	606	DIN 6527L	TiAIN	Fraises à rainurer (3 dents)	CW monobloc	NH
64495	625	DIN 6527L	TiAIN	Fraises d'ébauche	CW monobloc	NRf
64497	626	DIN 6527L	TiAlSiN	Fraises d'ébauche	CW monobloc	HR
64522	598	DIN 6527K	TiAIN	Fraises à rainurer (3 dents)	CW monobloc	N
64523	601	DIN 6527L	TiAIN	Fraises à rainurer (3 dents)	CW monobloc	N
64525	610	DIN 6527L	TiAIN	Fraises deux tailles (4 dents)	CW monobloc	N
64532	634	DIN 6527L	TiAIN	Fraises à bout hémisphérique	CW monobloc	N
64535	635	Norme usine	TiAIN	Fraises à bout hémisphérique	CW monobloc	N
64542	629	DIN 6527L	TiAIN	Fraises à bout hémisphérique	CW monobloc	N
64545	631	Norme usine	TiAIN	Fraises à bout hémisphérique	CW monobloc	N
64550	520	DIN 6527K	TiAIN	Fraises N SuperF-UT	CW monobloc	SuperF-UT N
64551	522	DIN 6527L	TiAIN	Fraises N SuperF-UT	CW monobloc	SuperF-UT N
64557	542	DIN 6527L	TiAIN	Fraises VA SuperF-UT	CW monobloc	SuperF-UT VA
64558	552	Norme usine	TiAIN	Fraises FS SuperF-UT	CW monobloc	SuperF-UT FS
64559	553	Norme usine	TiAIN	Fraises FS SuperF-UT	CW monobloc	SuperF-UT FS
64567	543	DIN 6527L	TiAIN	Fraise VA-IK SuperF-UT	CW monobloc	SuperF-UT VA-IK
64570	604	DIN 6527K	TiAIN	Fraises à rainurer (3 dents)	CW monobloc	NH
64571	607	DIN 6527L	TiAIN	Fraises à rainurer (3 dents)	CW monobloc	NH
64604	659	DIN 327	TiAIN	Fraises à rainurer (3 dents)	M42	N
64640	653	DIN 327	TiAIN	Fraises pour clavettes (2 dents)	M42	N
64641	661	DIN 844K	TiAIN	Fraises à rainurer (3 dents)	M42	N

Programme de vente

Référence	Page	Norme	Surface	Désignation	Matière de coupe	Type
64667	667	DIN 844K	TiAIN	Fraises deux tailles à arêtes de coupe multiples	M42	N
64670	655	DIN 844K	TiAIN	Fraises pour clavettes (2 dents)	M42	N
64671	657	DIN 844L	TiAIN	Fraises pour clavettes (2 dents)	M42	N
67011	114	Norme usine	TiAIN nano	Plaquettes interchangeables pour SuperV-AP mini	CW monobloc	SuperV-AP mini U
67012	117	Norme usine	AlTiN nano	Plaquettes interchangeables pour SuperV-AP mini	CW monobloc	SuperV-AP mini VA
71106	199	DIN 1897	poli	Forets hélicoïdaux extra-courts	M42	N
71108	194	DIN 1897	traité vapeur	Forets hélicoïdaux extra-courts	HSS	N
71109	196	DIN 1897	traité vapeur	Forets hélicoïdaux extra-courts	HSS	N
71110	190	DIN 1897	poli	Forets hélicoïdaux extra-courts	HSS	N
71111	192	DIN 1897	poli	Forets hélicoïdaux extra-courts	HSS	N
71112	206	DIN 1897	traité vapeur	Forets hélicoïdaux extra-courts	HSS-Co	VX
71113	210	Norme usine	poli	Forets hélicoïdaux extra-courts	HSS	V72
71114	209	Norme usine	poli	Forets hélicoïdaux extra-courts	HSS	V72
71115	215	DIN 338	traité vapeur	Forets hélicoïdaux courts	HSS	N
71116	212	DIN 338	poli	Forets hélicoïdaux courts	HSS	N
71117	226	DIN 338	poli	Forets hélicoïdaux courts	HSS	H
71119	214	DIN 338	poli	Forets hélicoïdaux courts	HSS	N
71122	234	DIN 338	poli	Forets hélicoïdaux courts	HSS-Co	V66 Ti
71123	232	DIN 338	listels niturés	Forets hélicoïdaux courts	HSS-Co	V66
71124	239	DIN 338	poli	Forets hélicoïdaux courts	HSS	V70
71126	241	DIN 338	poli	Forets hélicoïdaux courts	HSS	V70
71128	248	DIN 338	poli	Forets hélicoïdaux courts	HSS	V72
71129	250	DIN 338	poli	Forets hélicoïdaux courts	HSS	V72
71130	264	DIN 339	traité vapeur	Forets pour perçage par canon	HSS	N
71135	266	DIN 340	traité vapeur	Forets hélicoïdaux longs	HSS	N
71136	265	DIN 340	poli	Forets hélicoïdaux longs	HSS	N
71145	282	DIN 1869	listels niturés	Forets hélicoïdaux extra-long, série 1	HSS	V63
71146	285	DIN 1869	listels niturés	Forets hélicoïdaux extra-long, série 2	HSS	V63
71147	287	DIN 1869	listels niturés	Forets hélicoïdaux extra-long, série 3	HSS	V63
71148	224	DIN 338	poli	Forets hélicoïdaux courts	M42	N
71149	222	DIN 338	traité vapeur	Forets hélicoïdaux courts	HSS-Co	N
71150	275	DIN 340	poli	Forets hélicoïdaux longs	HSS	V70
71152	276	DIN 340	poli	Forets hélicoïdaux longs	HSS	V70
71154	278	DIN 340	listels niturés	Forets hélicoïdaux longs	HSS	V73
71156	280	DIN 340	listels niturés	Forets hélicoïdaux longs	HSS-Co	V73
71158	245	DIN 338	listels niturés	Forets hélicoïdaux courts	HSS-Co	V70
71168	262	Norme usine	poli	Forets hél. courts, queue cyl. Ø 16,0 mm	HSS-Co	V72
71169	263	Norme usine	poli	Forets hél. courts, queue cyl. Ø 25,4 mm	HSS-Co	V72
71175	293	Norme usine	poli	Forets NC	HSS	N
71176	295	Norme usine	poli	Forets NC	HSS	N
71180	140	DIN 8037	poli	Forets spéciaux avec arêtes de coupe CW	CW	N
71184	132	DIN 6539	poli	Forets hélicoïdaux extra-courts	CW monobloc	N
71187	291	DIN 1899	poli	Microforets	HSS-E-PM	N
71189	139	Norme usine	poli	Forets NC	CW monobloc	N
71190	137	Norme usine	poli	Forets NC	CW monobloc	N
71191	138	Norme usine	poli	Forets NC	CW monobloc	N
71192	284	DIN 1869	listels niturés	Forets hélicoïdaux extra-long, série 1	HSS-Co	V63
71193	286	DIN 1869	listels niturés	Forets hélicoïdaux extra-long, série 2	HSS-Co	V63
71195	288	Norme usine	listels niturés	Forets hélicoïdaux extra-long	HSS	V63
71196	289	Norme usine	poli	Forets hélicoïdaux extra-long	HSS	V63
71220	200	DIN 1897	poli	Forets hélicoïdaux extra-courts	HSS-Co	NX
71221	228	DIN 338	poli	Forets hélicoïdaux courts	HSS-Co	NX
71222	270	DIN 340	poli	Forets hélicoïdaux longs	HSS-Co	NX
71225	274	DIN 340	poli	Forets hélicoïdaux longs	HSS-Co	V66
71290	135	Norme usine	poli	Forets hélicoïdaux courts	CW monobloc	N
71300	298	DIN 345	traité vapeur	Forets hélicoïdaux	HSS	N
71303	296	Norme usine	poli	Forets hélicoïdaux courts	HSS-Co8	N
71304	297	Norme usine	poli	Forets hélicoïdaux courts	HSS-Co8	N
71305	302	DIN 345	poli	Forets hélicoïdaux	HSS	V70
71312	303	DIN 345	poli	Forets hélicoïdaux	HSS-Co	V66 Ti
71313	304	DIN 346	poli	Forets hélicoïdaux	HSS-Co	V66 Ti
71320	305	DIN 341	traité vapeur	Forets pour perçage par canon	HSS	N
71322	306	DIN 341	poli	Forets pour perçage par canon	HSS	V70
71325	307	DIN 1870	listels niturés	Forets hélicoïdaux extra-long, série 1	HSS	V63
71326	308	DIN 1870	listels niturés	Forets hélicoïdaux extra-long, série 2	HSS	V63
71380	141	DIN 8041	poli	Forets spéciaux avec arêtes de coupe CW	CW	N
71416	301	DIN 345	traité vapeur	Forets hélicoïdaux	HSS-Co	N
71500	319	DIN 8376	traité vapeur	Forets étagés à listels continus, queue cyl.	HSS	N
71501	317	DIN 8374	traité vapeur	Forets étagés à listels continus, queue cyl.	HSS	N
71503	318	DIN 8378	traité vapeur	Forets étagés à listels continus, queue cyl.	HSS	N
71520	321	DIN 8377	traité vapeur	Forets étagés à listels continus, queue CM	HSS	N
71523	320	DIN 8379	traité vapeur	Forets étagés à listels continus, queue CM	HSS	N

Programme de vente

Référence	Page	Norme	Surface	Désignation	Matière de coupe	Type
71550	310	Norme usine	traité vapeur	Forets à utilisations multiples, série longue	HSS-Co	V70-IK
71553	311	Norme usine	traité vapeur	Forets à utilisations multiples, série longue	HSS-Co	V70-IK
71554	309	Norme usine	traité vapeur	Forets à canaux de lubrification	HSS	N-IK
71560	316	Norme usine		Bagues d'alimentation du liquide de refroidissement		
71565	312	Norme usine	traité vapeur	Forets extra-longes à hélice, à trous d'huile	HSS-Co	V63-IK
71566	314	Norme usine	traité vapeur	Forets extra-longes à hélice, à trous d'huile	HSS-Co	V63-IK
71567	313	Norme usine	traité vapeur	Forets extra-longes à hélice, à trous d'huile	HSS-Co	V63-IK
71568	315	Norme usine	traité vapeur	Forets extra-longes à hélice, à trous d'huile	HSS-Co	V63-IK
71584	290	Norme usine	poli	Forets à canaux de lubrification	HSS	V73-IK
71600	322	DIN 333	poli	Forets à centrer sans méplat	HSS	N
71601	323	DIN 333	poli	Forets à centrer sans méplat	HSS	N
71602	324	DIN 333	poli	Forets à centrer sans méplat	HSS	N
71604	327	DIN 333	poli	Forets à centrer sans méplat	HSS	N
71605	326	Norme usine	poli	Forets à centrer sans méplat	HSS	N
71607	328	Norme usine	poli	Forets à centrer avec méplat	HSS	N
71609	329	Norme usine	poli	Forets à centrer avec méplat	HSS	N
71616	142	Norme usine	poli	Forets à centrer sans méplat	CW monobloc	N
71862	102	DIN 6537L	poli	Forets, type SuperV (3 dents)	CW monobloc	SuperV83-GAL
71994	93	Norme usine	poli	Forets avec trous d'huile, type SuperV	CW monobloc	SuperV95-GG
71995	80	Norme usine	poli	Forets avec trous d'huile, type SuperV	CW monobloc	SuperV95-GG
71996	94	Norme usine	poli	Forets avec trous d'huile, type SuperV	CW monobloc	SuperV95-GG
71997	96	Norme usine	poli	Forets avec trous d'huile, type SuperV	CW monobloc	SuperV95-GN
71998	103	Norme usine	AlTiN+	Microforets SuperV-NX à haute perfor. en CW sans can. de lub. int.	CW monobloc	SuperV-NX
71999	104	Norme usine	AlTiN+	Microforets SuperV-NX à haute perfor. en CW sans can. de lub. int.	CW monobloc	SuperV-NX
72200	330	DIN 344	traité vapeur	Forets aléseurs, queue cylindrique	HSS	N
72210	331	DIN 343	traité vapeur	Forets aléseurs, queue CM	HSS	N
72304	734	DIN 373	poli	Fraises à lamer avec pilote, tolérance fine	HSS	
72305	735	DIN 373	poli	Fraises à lamer avec pilote, tolérance moyenne	HSS	
72326	726	DIN 334	poli	Fraises à chanfreiner 60°	HSS	
72345	731	DIN 335	traité vapeur	Fraises à chanfreiner 90°	HSS	
72346	728	DIN 335	poli	Fraises à chanfreiner 90°	HSS	
72356	730	DIN 335	poli	Fraises à chanfreiner 90°	HSS	
72399	732	DIN 335	poli	Coffrets de fraises à chanfreiner 90°	HSS	
72600	724	DIN 206	poli	Alésoirs à main	HSS	
72610	725	DIN 206	poli	Alésoirs à main	HSS	
72640	716	DIN 212-2	poli	Alésoirs machine	HSS-E	
72650	717	DIN 212-2	poli	Alésoirs machine	HSS-E	
72654	714	DIN 212-2	poli	Alésoirs machine	HSS-E	
72660	718	DIN 208	poli	Alésoirs machine	HSS-E	
72670	719	DIN 208	poli	Alésoirs machine	HSS-E	
72680	721	DIN 311	nituré	Alésoirs de chaudronnerie machine 1:10	HSS	
72690	720	DIN 212-2	poli	Alésoirs machine, à coupe descendante	HSS-E	
72730	723	DIN 9	poli	Alésoirs à main, coniques	HSS	
72741	722	DIN 2179	poli	Alésoirs machine coniques	HSS-E	
72859	709	~DIN 8051	poli	Alésoirs machine, en CW	CW	
72860	708	~DIN 8051	poli	Alésoirs machine, en CW	CW	
72867	705	~DIN 8050	poli	Alésoirs machine, en CW	CW	
72868	704	~DIN 8050	poli	Alésoirs machine, en CW	CW	
72870	694	Norme usine	AlTiN nano	Alésoirs haute performance en CW monobloc	CW monobloc	SuperR-HS-S
72871	695	Norme usine	AlTiN nano	Alésoirs haute performance en CW monobloc	CW monobloc	SuperR-HS-D
72872	696	Norme usine	AlTiN nano	Alésoirs haute performance en CW monobloc	CW monobloc	SuperR-HS-S
72873	698	Norme usine	AlTiN nano	Alésoirs haute performance en CW monobloc	CW monobloc	SuperR-HS-D
72880	706	~DIN 8093	poli	Alésoirs machine, en CW	CW	
72881	707	~DIN 8093	poli	Alésoirs machine, en CW	CW	
72900	710	DIN 212-3	poli	Alésoirs machines NC	HSS-E	
72910	712	DIN 212-3	poli	Alésoirs machines NC	HSS-E	
72920	700	Norme usine	poli	Alésoirs machines NC	CW monobloc	
72930	702	Norme usine	poli	Alésoirs machines NC	CW monobloc	
73011	384	DIN 371	poli	Tarauds pour filetage métrique ISO	CW monobloc	H
73033	366	DIN 371	traité vapeur	Tarauds pour filetage métrique ISO	HSS-E	Produktiv N
73038	367	DIN 376	traité vapeur	Tarauds pour filetage métrique ISO	HSS-E	Produktiv N
73046	372	DIN 371	traité vapeur	Tarauds pour filetage métrique ISO	HSS-E	Intensiv N
73047	375	DIN 371	poli	Tarauds pour filetage métrique ISO	HSS-E	Intensiv N
73048	374	DIN 376	traité vapeur	Tarauds pour filetage métrique ISO	HSS-E	Intensiv N
73120	474	~DIN 371	poli	Tarauds à refouler avec rainures de lubr. p. filetage métrique ISO	HSS-E	Durativ
73121	482	DIN 371	poli	Tarauds à refouler sans rainures de lubr. p. filetage métrique ISO	HSS-E	Durativ
73126	380	DIN 371	poli	Tarauds pour filetage métrique ISO	HSS-E	Massiv N
73131	431	DIN 371	poli	Tarauds pour filetage métrique ISO	HSS-E	Produktiv W
73132	386	DIN 371	poli	Tarauds pour filetage métrique ISO	HSS-E	Produktiv N
73133	387	DIN 371	poli	Tarauds pour filetage métrique ISO	HSS-E	Produktiv N
73136	434	DIN 376	poli	Tarauds pour filetage métrique ISO	HSS-E	Intensiv W
73138	389	DIN 376	poli	Tarauds pour filetage métrique ISO	HSS-E	Produktiv N

Programme de vente

Référence	Page	Norme	Surface	Désignation	Matière de coupe	Type
73145	391	DIN 371	poli	Tarauds pour filetage métrique ISO	HSS-E	Intensiv N
73146	392	DIN 371	poli	Tarauds pour filetage métrique ISO	HSS-E	Intensiv N
73148	395	DIN 376	poli	Tarauds pour filetage métrique ISO	HSS-E	Intensiv N
73156	433	DIN 371	poli	Tarauds pour filetage métrique ISO	HSS-E	Intensiv W
73173	443	DIN 374	poli	Tarauds pour filetage métrique ISO fin	HSS-E	Intensiv N
73176	414	DIN 371	traité vapeur	Tarauds pour filetage métrique ISO	HSS-E	Produktiv HD
73177	418	DIN 376	traité vapeur	Tarauds pour filetage métrique ISO	HSS-E	Produktiv HD
73178	446	DIN 374	traité vapeur	Tarauds pour filetage métrique ISO fin	HSS-E	Produktiv HD
73180	447	DIN 374	traité vapeur	Tarauds pour filetage métrique ISO fin	HSS-E	Intensiv HD
73183	439	DIN 374	traité vapeur	Tarauds pour filetage métrique ISO fin	HSS-E	Produktiv N
73185	378	DIN 371	poli	Tarauds pour filetage métrique ISO	HSS-E	N
73187	440	DIN 374	traité vapeur	Tarauds pour filetage métrique ISO fin	HSS-E	Intensiv N
73189	432	DIN 376	poli	Tarauds pour filetage métrique ISO	HSS-E	Produktiv W
73191	379	DIN 376	poli	Tarauds pour filetage métrique ISO	HSS-E	N
73194	448	DIN 374	nitrué	Tarauds pour filetage métrique ISO fin	HSS-E	GG
73201	429	DIN 371	nitrué	Tarauds pour filetage métrique ISO	HSS-E	GG
73211	430	DIN 376	nitrué	Tarauds pour filetage métrique ISO	HSS-E	GG
73221	393	DIN 371	poli	Tarauds pour filetage métrique ISO	HSS-E	Intensiv N
73227	396	DIN 376	poli	Tarauds pour filetage métrique ISO	HSS-E	Intensiv N
73237	441	DIN 374	poli	Tarauds pour filetage métrique ISO fin	HSS-E	N
73243	498	DIN 357	poli	Tarauds machine à l'enfilade pour filetages métriques ISO	HSS-E	N
73248	497	Norme usine	poli	Forets taraudeur machine p.filetage métr. ISO	HSS-E	N
73250	442	DIN 374	poli	Tarauds pour filetage métrique ISO fin	HSS-E	Produktiv N
73286	467	DIN 5156	poli	Tarauds pour filetage BSP	HSS-E	Intensiv N
73288	469	DIN 5156	traité vapeur	Tarauds pour filetage BSP	HSS-E	Intensiv HD
73293	463	Norme usine	traité vapeur	Tarauds pour filetage NPT	HSS-E	VA
73295	473	Norme usine	poli	Taraud court pour les filetages NPT	HSS-E	N
73296	472	DIN 40432	poli	Tarauds courts pour filetage Pg	HSS-E	N
73297	453	~DIN 371	traité vapeur	Tarauds pour filetage UNC	HSS-E	Produktiv HD
73298	454	~DIN 376	traité vapeur	Tarauds pour filetage UNC	HSS-E	Produktiv HD
73299	461	~DIN 374	traité vapeur	Tarauds pour filetage UNF	HSS-E	Produktiv HD
73300	468	DIN 5156	traité vapeur	Tarauds pour filetage BSP	HSS-E	Produktiv HD
73304	455	~DIN 371	traité vapeur	Tarauds pour filetage UNC	HSS-E	Intensiv HD
73305	456	~DIN 376	traité vapeur	Tarauds pour filetage UNC	HSS-E	Intensiv HD
73306	462	~DIN 374	traité vapeur	Tarauds pour filetage UNF	HSS-E	Intensiv HD
73308	449	~DIN 371	traité vapeur	Tarauds pour filetage UNC	HSS-E	Produktiv N
73309	450	~DIN 376	traité vapeur	Tarauds pour filetage UNC	HSS-E	Produktiv N
73310	459	~DIN 374	traité vapeur	Tarauds pour filetage UNF	HSS-E	Produktiv N
73321	464	DIN 5156	traité vapeur	Tarauds pour filetage BSP	HSS-E	Produktiv N
73322	451	~DIN 371	traité vapeur	Tarauds pour filetage UNC	HSS-E	Intensiv N
73323	452	~DIN 376	traité vapeur	Tarauds pour filetage UNC	HSS-E	Intensiv N
73324	460	~DIN 374	traité vapeur	Tarauds pour filetage UNF	HSS-E	Intensiv N
73325	465	DIN 5156	traité vapeur	Tarauds pour filetage BSP	HSS-E	Intensiv N
73326	457	~DIN 371	nitrué	Tarauds pour filetage UNC	HSS-E	GG
73327	458	~DIN 376	nitrué	Tarauds pour filetage UNC	HSS-E	GG
73345	470	DIN 5156	nitrué	Tarauds pour filetage BSP	HSS-E	GG
73400	499	DIN EN 22568	poli	Filières pour filetage métrique ISO	HSS	
73410	500	DIN EN 22568	poli	Filières pour filetage métrique ISO	HSS	
73413	501	DIN EN 22568	nitrué	Filières pour filetage métrique ISO	HSS-E	
73521	493	DIN 2181	poli	Jeux de tarauds à main pour filetages métriques ISO fins	HSS	N
73522	496	DIN 5157	poli	Jeux de tarauds à main pour filetages BSP	HSS	N
73531	491	DIN 352	poli	Tarauds à main pour filetages métriques ISO, jeu(x), coupe à droite	HSS	N
73532	492	DIN 352	poli	Tarauds à main pour filetages métriques ISO, jeu(x), coupe à gauche	HSS	N
73534	495	~DIN 352	poli	Jeux de tarauds à main pour filetages BSW	HSS	N
73535	494	~DIN 352	poli	Jeux de tarauds à main pour filetages UNC	HSS	N
73619	406	DIN 371	poli	Tarauds pour filetage métrique ISO	HSS-E-PM	H R15
73640	400	DIN 371	poli	Tarauds pour filetage métrique ISO	HSS-E-PM	Produktiv H
73641	415	DIN 371	poli	Tarauds pour filetage métrique ISO	HSS-E-PM	Produktiv HD
73642	401	DIN 371	nitrué	Tarauds pour filetage métrique ISO	HSS-E	Produktiv H
73643	419	DIN 376	poli	Tarauds pour filetage métrique ISO	HSS-E-PM	Produktiv HD
73645	403	DIN 376	nitrué	Tarauds pour filetage métrique ISO	HSS-E	Produktiv H
73646	445	DIN 374	nitrué	Tarauds pour filetage métrique ISO fin	HSS-E	Produktiv H
73659	426	DIN 376	traité vapeur	Tarauds pour filetage métrique ISO	HSS-E	Intensiv HD
73660	422	DIN 371	traité vapeur	Tarauds pour filetage métrique ISO	HSS-E	Intensiv HD
73661	407	DIN 371	poli	Tarauds pour filetage métrique ISO	HSS-E	Intensiv H
73662	423	DIN 371	poli	Tarauds pour filetage métrique ISO	HSS-E-PM	Intensiv HD
73664	409	DIN 376	poli	Tarauds pour filetage métrique ISO	HSS-E	Intensiv H
73665	427	DIN 376	poli	Tarauds pour filetage métrique ISO	HSS-E-PM	Intensiv HD
73666	410	DIN 376	poli	Tarauds pour filetage métrique ISO	HSS-E-PM	H R15
73810	485	Norme usine	poli	Fraises à fileter avec chanfrein p. filetage métrique ISO	CW monobloc	TMC SP
73820	488	Norme usine	poli	Fraises à fileter avec chanfrein p. filetage métrique ISO fin	CW monobloc	TMC SP
73830	489	Norme usine	poli	Fraises à fileter sans chanfrein p. filetage métrique ISO	CW monobloc	TM SP

Programme de vente

Référence	Page	Norme	Surface	Désignation	Matière de coupe	Type
74202	585	DIN 6527L	poli	Fraises à rainurer Alu (3 dents)	CW monobloc	W
74203	623	DIN 6527L	poli	Fraises d'ébauche	CW monobloc	WR
74204	584	DIN 6527K	poli	Fraises à rainurer Alu (3 dents)	CW monobloc	W
74206	586	Norme usine	poli	Fraises à rainurer Alu (3 dents)	CW monobloc	W
74231	652	DIN 327	poli	Fraises pour clavettes (2 dents)	M42	N
74243	654	DIN 844K	poli	Fraises pour clavettes (2 dents)	M42	N
74244	656	DIN 844L	poli	Fraises pour clavettes (2 dents)	M42	N
74280	658	DIN 327	poli	Fraises à rainurer (3 dents)	M42	N
74282	660	DIN 844K	poli	Fraises à rainurer (3 dents)	M42	N
74294	663	DIN 844L	poli	Fraises à rainurer (3 dents)	M42	N
74303	624	DIN 6527L	poli	Fraises d'ébauche	CW monobloc	WR
74404	593	Norme usine	poli	Fraises pour clavettes (2 dents)	CW monobloc	N
74424	602	Norme usine	poli	Fraises à rainurer (3 dents)	CW monobloc	N
74478	605	DIN 6527L	poli	Fraises à rainurer (3 dents)	CW monobloc	NH
74479	587	Norme usine	poli	Fraises à rainurer Alu (3 dents)	CW monobloc	W
74520	588	DIN 6527K	poli	Fraises pour clavettes (2 dents)	CW monobloc	N
74521	591	DIN 6527L	poli	Fraises pour clavettes (2 dents)	CW monobloc	N
74522	597	DIN 6527K	poli	Fraises à rainurer (3 dents)	CW monobloc	N
74523	600	DIN 6527L	poli	Fraises à rainurer (3 dents)	CW monobloc	N
74525	609	DIN 6527L	poli	Fraises deux tailles (4 dents)	CW monobloc	N
74531	632	DIN 6528	poli	Fraises à bout hémisphérique	CW monobloc	N
74543	627	DIN 6527L	poli	Fraises à bout hémisphérique	CW monobloc	N
74545	630	Norme usine	poli	Fraises à bout hémisphérique	CW monobloc	N
74552	548	Norme usine	poli	Fraises Al-3 SuperF-UT	CW monobloc	SuperF-UT Al-3
74553	549	Norme usine	poli	Fraises Al-3 SuperF-UT	CW monobloc	SuperF-UT Al-3
74554	544	DIN 6527L	poli	Fraises SuperF-UT Al	CW monobloc	SuperF-UT Al
74555	545	DIN 6527L	poli	Fraises SuperF-UT Al	CW monobloc	SuperF-UT Al
74617	666	DIN 844K	poli	Fraises deux tailles à arêtes de coupe multiples	M42	N
74800	670	Norme usine	poli	Fraises deux tailles (4 dents)	M42	N
74816	674	DIN 844K	poli	Fraises d'ébauche (4 arêtes de coupe frontale)	M42	NR
74825	672	DIN 844K	poli	Fraises d'ébauche (3 arêtes de coupe frontale)	HSS-E-PM	NRf
74836	678	DIN 844L	poli	Fraises d'ébauche (4 arêtes de coupe frontale)	M42	NR
74845	676	DIN 844K	poli	Fraises d'ébauche (4 arêtes de coupe frontale)	HSS-E-PM	NRf
74847	668	DIN 844L	poli	Fraises deux tailles à arêtes de coupe multiples	M42	N
75017	147	Norme usine	TiN	Forets à une lèvre SuperT-N	CW	SuperT-N
75018	146	Norme usine	TiN	Forets à une lèvre SuperT-N	CW	SuperT-N
75020	156	Norme usine	poli	Forets à une lèvre en CW monobloc TBE	CW monobloc	TBE-VHM
75021	160	Norme usine	poli	Forets à une lèvre en CW monobloc TBE	CW monobloc	TBE-VHM
75022	148	Norme usine	TiN	Forets à une lèvre SuperT-N	CW	SuperT-N
75023	149	Norme usine	TiN	Forets à une lèvre SuperT-N	CW	SuperT-N
75024	154	Norme usine	poli	Forets à une lèvre en CW monobloc TBE	CW monobloc	TBE-VHM
75026	158	Norme usine	poli	Forets à une lèvre en CW monobloc TBE	CW monobloc	TBE-VHM
76000	125	Norme usine	nickelé	Porte-outils SuperV-AP maxi		SuperV-AP maxi
76001	126	Norme usine	nickelé	Porte-outils SuperV-AP maxi		SuperV-AP maxi
76003	127	Norme usine	nickelé	Porte-outils SuperV-AP maxi		SuperV-AP maxi
76011	128	Norme usine	TiN	Plaquettes interchangeables pour SuperV-AP mini	CW monobloc	SuperV-AP maxi
76020	130	Norme usine		Vis de fixation		
76021	131	Norme usine		Tournevis Torx		
77000	110	Norme usine	nickelé	Porte-outils SuperV-AP mini		SuperV-AP mini
77001	111	Norme usine	nickelé	Porte-outils SuperV-AP mini		SuperV-AP mini
77003	112	Norme usine	nickelé	Porte-outils SuperV-AP mini		SuperV-AP mini
77004	113	Norme usine	nickelé	Porte-outils SuperV-AP mini		SuperV-AP mini
77007	109	Norme usine	nickelé	Porte-outils SuperV-AP mini		SuperV-AP mini
77011	123	Norme usine	AlTiN nano	Plaquettes interchangeables pour SuperV-AP mini	CW monobloc	SuperV-AP mini NC
77012	120	Norme usine	poli	Plaquettes interchangeables pour SuperV-AP mini	CW monobloc	SuperV-AP mini AL
77020	130	Norme usine		Vis de fixation		
77021	131	Norme usine		Embouts pour Vis Torx		
77022	131	Norme usine		Clés dynamométriques		
78206	770			Douille de serrage pour mandrin de tar. à changement rapide		
78213	749	Norme usine	poli	Mandrin hydraulique SA à serrage renforcé		
78221	750	Norme usine	poli	Mandrin hydraulique MAS/BT à serrage renforcé		
78232	758	DIN 69882-4	poli	Attachements Weldon HSK-A pour attachements cyl.		
78233	762	Norme usine	bruni	Attachements cylindriques WhistleNotch MAS/BT		
78234	763	Norme usine	bruni	Attachements Weldon MAS/BT pour attachements cyl.		
78240	766	Norme usine		Mandrin de serrage pour outils NC MAS/BT avec lub. centrale		
78242	765	Norme usine		Mandrin de serrage pour outils NC SA avec lub. centrale		
78299	748	DIN 69882-7	poli	Mandrin hydraulique HSK-A à serrage renforcé		
78308	768	Norme usine		Pinces de taraudage		
78317	760	Norme usine	bruni	Attachements Weldon SK pour attachements cyl.		
78322	761	Norme usine	bruni	Attachements cylindriques Whistle Notch SA		
78326	767	Norme usine		Mandrin de taraudage synchro avec attachement cylindrique		
78334	759	DIN 69882-5	poli	Attachements cylindriques Whistle Notch HSK-A		

Programme de vente

Référence	Page	Norme	Surface	Désignation	Matière de coupe	Type
78335	772	Norme usine		Rondelle d'étanchéité		
78340	769	Norme usine		Mandrin de tar. à changement rapide sans lubrification centrale		
78346	764	Norme usine		Mandrin de serrage pour outils NC HSK-A avec lub. centrale		
78364	771	Norme usine		Vis de réglage « plan » p. mandrins de taraud.e synchro av. lub. centrale		
78368	751	Norme usine		Douille de réduction p. mandrin hydraul. sans lubr. périphérique		
78369	752	Norme usine		Douilles de réduction pour mandrins hydrauliques		
78729	756	Norme usine	poli	Mandrins à serrage par frettage cône ISO		
78736	753	DIN 69882-8	poli	Mandrin à serrage par frettage HSK-A		
78738	755	Norme usine	poli	Mandrin à serrage par frettage SA		
78739	757	Norme usine	poli	Mandrin à serrage par frettage MAS/BT		
78755	754	Norme usine	poli	Mandrins à fretter HSK A avec refroidissement périphérique		
78877	256	Norme usine		Jeux de forets hélicoïdaux		
78878	256	Norme usine		Jeux de forets hélicoïdaux		
78879	254	DIN 338	traité vapeur	Jeux de forets hélicoïdaux	HSS	N
78880	255	DIN 338	sommet rev. TiN	Jeux de forets hélicoïdaux	HSS	N
79012	254	DIN 338	poli	Jeux de forets hélicoïdaux	HSS-Co	NX





CW MONOBLOC

OUTILS DE PERÇAGE



ISO-CODES

P	Aciers communs, aciers hautement alliés
M	Aciers inoxydables
K	Fontes grises, fontes à graphite sphéroïdal et fontes malléables
N	Aluminium et ses alliages ainsi que d'autres métaux non ferreux
S	Alliages de titane, spéciaux et superalliages
H	Aciers trempés et fontes dures

Sur les pages suivantes programmes, sont mentionnées pour chacune des fraises, les recommandations d'utilisation pour chacun des groupes d'usinage par enlèvement de copeaux :

- particulièrement recommandé
- sous réserve



PICTOGRAMMES

MATIERE DE COUPE	VHM	HM										
	CW monobloc	CW										
REVETEMENT	poli	ni-ckélé	TiN	TiAlN nano	AlTiN nano	Al-TiN	TiAlN	TiCN	Al-TiN+			
TOLERANCE	h5	h6	h7	h8	m7							
PROFONDEURS	1,5xD	3xD	4xD	5xD	7xD	8xD	10xD	12xD	15xD			
	20xD	25xD	30xD	40xD	50xD	75xD	80xD	~3xD	~5xD			
SENS DE COUPE												
	à droite											
FORME D'ATTACHEMENT												
	Queue Morse											
ANGLE AU SOMMET												
NORME	DIN 6539	DIN 6537 K	DIN 6537 L	DIN 8037	DIN 8041							
	Norme usine											
TYPE	SuperV-F	SuperV-U	SuperV-IK-U	SuperV-VA	SuperV-95-GG	SuperV-IK-F	SuperV-95-GN	SuperV-T	SuperV-83-GAL	N	TBE-VHM	
	SuperV-NX	SuperV-IK-NX	SuperV-M	SuperV-AP mini	SuperV-AP mini U	SuperV-AP mini VA	SuperV-AP mini AL	SuperV-AP mini NC	SuperV-APmaxi	SuperT-AL	SuperT-N	SuperT-NX

P	M	K	N	S	H	Type	Forme d'attachement	Profondeur	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Forets sans trous d'huile, type SuperV

	○	●	○	○	●	●	SuperV-F	cyl.	3xD	CW monobloc	TiN	DIN 6539	3,000 - 12,000	61888	63
	●	○	○	○	○	○	SuperV-U	HA	3xD	CW monobloc	TiAlN-nano	DIN 6537K	3,000 - 20,000	51873	64
	●	○	○	○	○	○	SuperV-U	HE	3xD	CW monobloc	TiAlN-nano	DIN 6537K	3,000 - 20,000	51871	66
	●	○	○	○	○	○	SuperV-U	HA	5xD	CW monobloc	TiAlN-nano	DIN 6537L	3,000 - 20,000	51787	68
	●	○	○	○	○	○	SuperV-U	HE	5xD	CW monobloc	TiAlN-nano	DIN 6537L	3,000 - 20,000	51887	70

Forets avec trous d'huile, type SuperV

	●	○	○	○	○	○	SuperV-IK-U	HA	3xD	CW monobloc	TiAlN-nano	DIN 6537K	3,000 - 20,000	51776	72
	●	○	○	○	○	○	SuperV-IK-U	HE	3xD	CW monobloc	TiAlN-nano	DIN 6537K	3,000 - 20,000	51876	74
	○	○	○	○	○	○	SuperV-VA	HA	3xD	CW monobloc	AlTiN nano	DIN 6537K	3,000 - 20,000	51770	76
	○	○	○	○	○	○	SuperV-VA	HE	3xD	CW monobloc	AlTiN nano	DIN 6537K	3,000 - 20,000	51771	78
	○	○	○	○	○	○	SuperV95-GG	HA	4xD	CW monobloc	poli	Norme usine	3,000 - 21,500	71995	80
	○	●	○	○	●	●	SuperV-IK-F	HE	5xD	CW monobloc	TiN	DIN 6537L	4,000 - 25,000	61880	82
	●	○	○	○	○	○	SuperV-IK-U	HA	5xD	CW monobloc	TiAlN-nano	DIN 6537L	3,000 - 20,000	51781	83
	●	○	○	○	○	○	SuperV-IK-U	HE	5xD	CW monobloc	TiAlN-nano	DIN 6537L	3,000 - 20,000	51881	85
	○	○	○	○	○	○	SuperV-VA	HA	5xD	CW monobloc	AlTiN nano	DIN 6537L	3,000 - 20,000	51772	87
	○	○	○	○	○	○	SuperV-VA	HE	5xD	CW monobloc	AlTiN nano	DIN 6537L	3,000 - 20,000	51773	89

P	M	K	N	S	H	Type	Forme d'attachement	Profondeur	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Forets avec trous d'huile, type SuperV

						SuperV-IK-U	HA	7xD	CW monobloc	TiAlN-nano	Norme usine	3,000 - 20,000	51789	91
						SuperV-IK-U	HE	7xD	CW monobloc	TiAlN-nano	Norme usine	3,000 - 20,000	51889	92
						SuperV95-GG	HA	7xD	CW monobloc	poli	Norme usine	3,000 - 20,000	71994	93
						SuperV95-GG	HA	10xD	CW monobloc	poli	Norme usine	3,000 - 20,000	71996	94
						SuperV-IK-U	HA	12xD	CW monobloc	TiAlN-nano	Norme usine	3,000 - 20,000	51893	95
						SuperV95-GN	HA	15xD	CW monobloc	poli	Norme usine	5,000 - 14,000	71997	96
						SuperV-T	HA	15xD	CW monobloc	AlTiN	Norme usine	3,000 - 14,000	51764	97
						SuperV-T	HA	20xD	CW monobloc	AlTiN	Norme usine	3,000 - 14,000	51765	98
						SuperV-T	HA	25xD	CW monobloc	AlTiN	Norme usine	3,000 - 12,000	51766	99
						SuperV-T	HA	30xD	CW monobloc	AlTiN	Norme usine	3,000 - 10,000	51767	100
						SuperV-T	HA	40xD	CW monobloc	AlTiN	Norme usine	3,000 - 8,000	51768	101

Forets, type SuperV (3 dents)

						SuperV83-GAL	HA	5xD	CW monobloc	poli	DIN 6537L	3,000 - 20,000	71862	102
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Microforets SuperV-NX à haute perfor. en CW sans can. de lub. int.

						SuperV-NX	cyl.	4xD	CW monobloc	AlTiN+	Norme usine	0,500 - 3,000	71998	103
						SuperV-NX	HA	7xD	CW monobloc	AlTiN+	Norme usine	0,500 - 3,000	71999	104

P	M	K	N	S	H	Type	Forme d'attachement	Profondeur	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Microforets SuperV-NX à haute perfor. en CW avec can. de lub. int.

	•	•	•	○	○	SuperV-IK-NX	HA	5xD	CW monobloc	AlTiN	Norme usine	1,400 - 3,000	51997	105
	•	•	•	○	○	SuperV-IK-NX	HA	8xD	CW monobloc	AlTiN	Norme usine	1,400 - 3,000	51998	106
	•	•	•	○	○	SuperV-IK-NX	HA	15xD	CW monobloc	AlTiN	Norme usine	1,400 - 3,000	51999	107

Microforets SuperV-M en CW

	•	•	•	○	○	SuperV-M	HA		CW monobloc	AlTiN	Norme usine	0,100 - 3,000	51720	108
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Porte-outils SuperV-AP mini

						SuperV-AP mini	HE	1,5xD		nickelé	Norme usine		77007	109
						SuperV-AP mini	HE	3xD		nickelé	Norme usine		77000	110
						SuperV-AP mini	HE	5xD		nickelé	Norme usine		77001	111
						SuperV-AP mini	HE	7xD		nickelé	Norme usine		77003	112
						SuperV-AP mini	HE	10xD		nickelé	Norme usine		77004	113

Plaquettes interchangeables pour SuperV-AP mini

	•	•	○	○		SuperV-AP mini U			CW monobloc	TiAlN-nano	Norme usine	11,000 - 40,000	67011	114
	•	•	○	○		SuperV-AP mini VA			CW monobloc	AlTiN nano	Norme usine	11,000 - 40,000	67012	117
	•	•	•	○		SuperV-AP mini AL			CW monobloc	poli	Norme usine	11,000 - 40,000	77012	120

P	M	K	N	S	H	Type	Forme d'attachement	Profondeur	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Plaquettes interchangeables pour SuperV-AP mini



	SuperV-AP mini NC								CW monobloc	AlTiN nano	Norme usine	11,000 - 40,000	77011	123
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Porte-outils SuperV-AP maxi



	SuperV-AP maxi	HE	3xD						nickelé		Norme usine		76000	125
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	SuperV-AP maxi	HE	5xD						nickelé		Norme usine		76001	126
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	SuperV-AP maxi	HE	7xD						nickelé		Norme usine		76003	127
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Plaquettes interchangeables pour SuperV-AP mini



	SuperV-AP maxi								CW monobloc	TiN	Norme usine	16,000 - 40,500	76011	128
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	SuperV-AP maxi								CW monobloc	TiAlN	Norme usine	16,000 - 40,500	56011	129
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Accessoires



											Norme usine		76020	130
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											Norme usine		77020	130
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											Norme usine		77022	131
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											Norme usine		77021	131
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											Norme usine		76021	131
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P	M	K	N	S	H	Type	Forme d'attachement	Profondeur	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Forets hélicoïdaux extra-courts



•	•	•	•	•	•	N	cyl.	~3xD	CW monobloc	poli	DIN 6539	1,000 - 15,000	71184	132
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•	•	•	•	•	•	N	cyl.	~3xD	CW monobloc	TiAlN-nano	DIN 6539	1,000 - 12,000	51184	134
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Forets hélicoïdaux courts



•	•	•	•	•	•	N	cyl.	~5xD	CW monobloc	poli	Norme usine	1,000 - 12,000	71290	135
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Forets NC



•	•	•	•	•	•	N	HA		CW monobloc	poli	Norme usine	5,000 - 20,000	71190	137
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•	•	•	•	•	•	N	HA		CW monobloc	poli	Norme usine	5,000 - 20,000	71191	138
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•	•	•	•	•	•	N	HB		CW monobloc	poli	Norme usine	4,000 - 20,000	71189	139
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Forets spéciaux avec arêtes de coupe CW



○	•	○	○	○	○	N	cyl.		CW	poli	DIN 8037	3,000 - 20,000	71180	140
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○	•	○	○	○	○	N	CM		CW	poli	DIN 8041	11,000 - 33,000	71380	141
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Forets à centrer sans méplat



•	○	•	•	○	○	N			CW monobloc	poli	Norme usine	1,000 - 6,300	71616	142
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P	M	K	N	S	H	Type	Forme d'attachement	Profondeur	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Forets à une lèvre SuperT-AL

						SuperT-AL	HA	25xD	CW monobloc	AlTiN nano	Norme usine	2,380 - 12,000	55027	143
						SuperT-AL	HA	50xD	CW monobloc	AlTiN nano	Norme usine	2,380 - 8,000	55028	144
						SuperT-AL	HA	75xD	CW monobloc	AlTiN nano	Norme usine	2,380 - 6,000	55029	145

Forets à une lèvre SuperT-N

						SuperT-N	HA	20xD	CW	TiN	Norme usine	4,000 - 12,000	75018	146
						SuperT-N	HA	30xD	CW	TiN	Norme usine	4,000 - 12,000	75017	147
						SuperT-N	HA	40xD	CW	TiN	Norme usine	4,000 - 12,000	75022	148
						SuperT-N	HA	80xD	CW	TiN	Norme usine	4,950 - 11,950	75023	149

Forets à une lèvre SuperT-NX

						SuperT-NX	HA	20xD	CW	TiCN	Norme usine	3,970 - 12,700	55018	150
						SuperT-NX	HA	30xD	CW	TiCN	Norme usine	3,970 - 12,700	55017	151
						SuperT-NX	HA	40xD	CW	TiCN	Norme usine	3,970 - 12,700	55022	152
						SuperT-NX	HA	80xD	CW	TiCN	Norme usine	4,950 - 12,650	55023	153

Forets à une lèvre en CW monobloc TBE

						TBE-VHM	HA	45.000	CW monobloc	poli	Norme usine	1,200 - 3,200	75024	154
						TBE-VHM	HA	45.000	CW monobloc	AlTiN+	Norme usine	2,000 - 3,200	55024	155

P	M	K	N	S	H	Type	Forme d'attachement	Profondeur	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Forets à une lèvre en CW monobloc TBE

	•	•	○	○	○	TBE-VHM	HA	80.000	CW monobloc	poli	Norme usine	1,200 - 5,000	75020	156
	•	•	•	○	○	TBE-VHM	HA	80.000	CW monobloc	AlTiN+	Norme usine	2,000 - 5,000	55020	157
	•	•	○	•	○	TBE-VHM	HA	120.000	CW monobloc	poli	Norme usine	1,500 - 5,000	75026	158
	•	•	•	○	○	TBE-VHM	HA	120.000	CW monobloc	AlTiN+	Norme usine	2,000 - 5,000	55026	159
	•	•	○	•	○	TBE-VHM	HA	160.000	CW monobloc	poli	Norme usine	1,500 - 8,000	75021	160
	•	•	•	○	○	TBE-VHM	HA	160.000	CW monobloc	AlTiN+	Norme usine	2,000 - 8,000	55021	161

Application

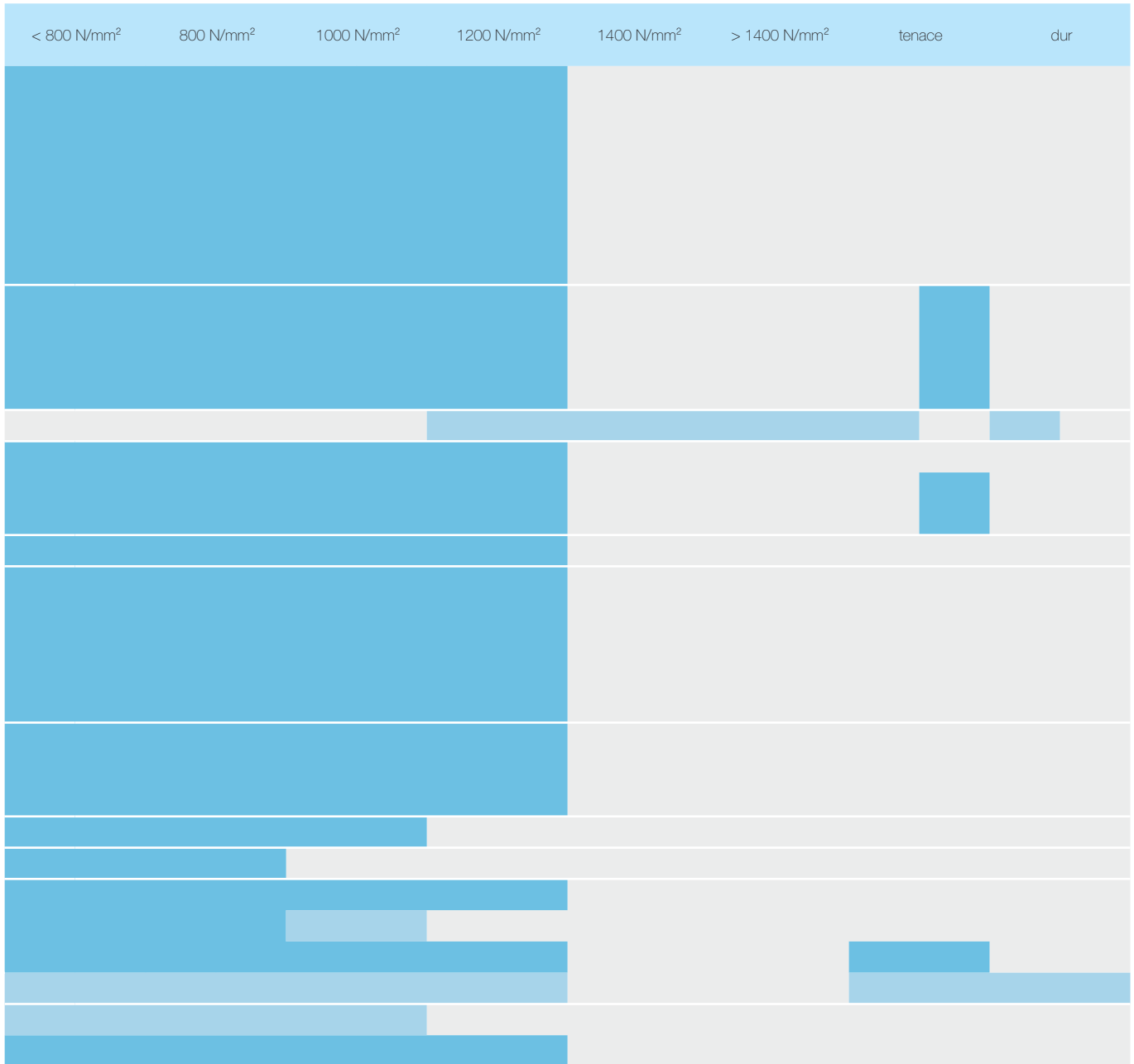
Classement selon les matières

Type	Référence		Métaux non ferreux, Aluminium	Aciers	GG, GGG	Aciers inoxydables/ résistants à l'acide	Nickel, alliages de Ti	Aciers trempés
	sans lub. int.	avec lub. int.						
SuperV-U	51873	51776		■				
	51871	51876		■				
	51787	51781		■				
	51887	51881		■				
		51789		■				
		51889		■				
		51893		■				
SuperV-VA		51770		■		■	■	
		51771		■		■	■	
		51772		■		■	■	
		51773		■		■	■	
SuperV-F	61888	61880		■	■	■	■	
SuperV-NX		51997		■				
	71998	51998		■				
	71999	51999		■				
SuperV-M	51720			■				
SuperV-T		51764		■				
		51765		■				
		51766		■				
		51767		■				
		51768		■				
SuperV95-GG		71995		■	■			
		71994		■	■			
		71996		■	■			
SuperV95-GN		71997		■	■			
SuperV83-GAL	71862			■				
SuperV-AP mini		67011		■	■			
		77012		■	■			
		67012		■	■	■		
		77011		■	■	■		
SuperV-AP maxi		76011		■	■			
		56011		■	■			

■ optimale ■ bien adapté

Plaque interchangeable NC pour centrage et pilotage

Classement selon la résistance



Conseils d'utilisation pour les forets SuperV

Gamme d'avance										
Lettre-Code	A	B	C	D	E	F	G	H	I	
Ø outil mm	0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
	1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
	2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
	2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
	3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
	4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
	5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
	6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
	8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
	10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
	12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
	16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
	20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
	25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
	31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
	40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250	
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000	

Les forets dont les lettres sont indiquées en gras doivent être utilisés en priorité pour le groupe de matière correspondant.

K, P, K/P

L'utilisation universelle de nos nouveaux carbures K a comme conséquence que nous définissons les groupes d'application carbure seulement avec K ou K/P.

Les lettres de code en caractères gras indiquent:

G pour les fontes, les alliages AISI

S pour les matières inoxydables

U usinage universel, aciers au carbone

* Utiliser des outils avec conicité arrière prononcé

Produits de réfrigération:

- Huile de coupe
- Emulsion d'huile à forer
- sans lubrifiant
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de ciment. non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/>
Aciers trempés	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		<input checked="" type="checkbox"/>
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		<input checked="" type="checkbox"/>
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		<input checked="" type="checkbox"/>
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes dures	-		≤350 HB	<input checked="" type="checkbox"/>
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Alliages d'Al d'inject. ≤10%Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input checked="" type="checkbox"/>
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input checked="" type="checkbox"/>
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Laiton à copeaux courts	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
à copeaux longs	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			<input type="checkbox"/>
Thermoplastiques	Plexiglas, Hostalen, Novodur, Macralon			<input checked="" type="checkbox"/>
Kevlar - plast. renf. de fibres	Kevlar			<input type="checkbox"/>
d'aramide, de verre ou de carb.	GFK/CFK			<input type="checkbox"/>

≤3×D Profondeur

≤4×D

Référence	61888	51873	51871	51770	51771	51776	51876	71995
Mat. de coupe	CW	CW	CW	CW	CW	CW	CW	CW
Nuance carbure	K/P	K/P	K/P	K/P	K/P	K/P	K/P	K
Version	TiN	TiAlN nano	TiAlN nano	AlTiN nano	AlTiN nano	TiAlN nano	TiAlN nano	poli
DIN/Forme	6539	6537K	6537K	6537K	6537K	6537K	6537K	N. U.
Type	F	U	U	VA	VA	U	U	GG
Lubrification				axial	axial	axial	axial	axial
Page	63	64	66	76	78	72	74	80



V _c m/min	Code d'avance	V _c m/min	Code d'avance	V _c m/min	Code d'avance	V _c m/min	Code d'avance	V _c m/min	Code d'avance	
100	F	130	G	G		145	G	G		
85	E	110	F	F		120	F	F		
110	G	145	H	H		170	H	H		
85	F	110	G	G		145	H	H		
90	F	120	G	G		130	H	H		
85	F	110	G	G		125	G	G		
80	F	105	G	G		120	G	G		
80	F	105	G	G		120	G	G		
75	E	100	F	F		105	G	G		
100	G	130	H	H		145	H	H		
90	F	120	G	G		120	G	G		
65	D	85	E	E		85	E	E		
75	E	100	F	F		110	G	G		
70	D	90	E	E		105	E	E		
50	E	65	F	F		80	F	F		
40	D	55	E	E		65	E	E		
40	C					60	D	D		
45	B	45	C	C		60	C	C		
35	B	40	A	A		55	C	C		
20	A	20	A	A		35	B	B		
40	C	40	B	B	80	E	E			
35	C	15	A	A	60	B-C	B-C			
35	B	35	B	B	80	E	E			
160	G	210	H	H		210	I	I	120	G
120	G	155	H	H		160	I	I	100	G
120	G	155	G	G		140	I	I	90	G
95	G	125	G	G		130	H	H	80	G
25	B	35	C	C		40	C	C	40	B
20	C	25	D	D	30	D	D	30	D	D
30	B	15	A	A	45	D	D	45	D	D
25	B	15	A	A	40	C	C	40	C	C
200	H	260	I	I		310	I	I	410	I
200	H	260	I	I		310	I	I	410	I
170	H	220	H	H		260	I	I	380	I
140	G	180	H	H		220	I	I	330	I
200	G	260	H	H		280	H	H		
80	F	105	G	G		125	G	G		
210	G	270	H	H		325	H	H	280	I
140	F	180	G	G		220	G	G		
80	E	105	F	F		125	G	G	110	F
65	E	85	F	F		105	F	F	80	E
60	D	80	E	E		90	F	F		
45	D	60	E	E		80	F	F		

Conseils d'utilisation pour les forets SuperV

Gamme d'avance										
Lettre-Code	A	B	C	D	E	F	G	H	I	
Ø outil mm	0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
	1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
	2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
	2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
	3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
	4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
	5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
	6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
	8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
	10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
	12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
	16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
	20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
	25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
	31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
	40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250	
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000	

Les forets dont les lettres sont indiquées en gras doivent être utilisés en priorité pour le groupe de matière correspondant.

K, P, K/P

L'utilisation universelle de nos nouveaux carbures K a comme conséquence que nous définissons les groupes d'application carbure seulement avec K ou K/P.

Les lettres de code en caractères gras indiquent:

- G** pour les fontes, les alliages AISI
- S** pour les matières inoxydables
- U** usinage universel, aciers au carbone

* Utiliser des outils avec conicité arrière prononcé

Produits de réfrigération:

- Huile de coupe
- Emulsion d'huile à forer
- sans lubrifiant
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de ciment. non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/>
Aciers trempés	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		<input checked="" type="checkbox"/>
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		<input checked="" type="checkbox"/>
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		<input checked="" type="checkbox"/>
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes dures	-		≤350 HB	<input checked="" type="checkbox"/>
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Alliages d'Al d'inject. ≤10%Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input checked="" type="checkbox"/>
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input checked="" type="checkbox"/>
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Laiton à copeaux courts	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
à copeaux longs	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			<input type="checkbox"/>
Thermoplastiques	Plexiglas, Hostalen, Novodur, Macralon			<input checked="" type="checkbox"/>
Kevlar - plast. renf. de fibres	Kevlar			<input type="checkbox"/>
d'aramide, de verre ou de carb.	GFK/CFK			<input type="checkbox"/>

≤5×D Profondeur

Référence	51887	51787
Mat. de coupe	CW	CW
Nuance carbure	K/P	K/P
Version	TiAlN nano	TiAlN nano
DIN/Forme	6537L	6537L
Type	U	U
Lubrification		
Page	70	68

Référence	51781	51881
Mat. de coupe	CW	CW
Nuance carbure	K/P	K/P
Version	TiAlN nano	TiAlN nano
DIN/Forme	6537L	6537L
Type	U	U
Lubrification	axial	axial
Page	83	85

Référence	71862
Mat. de coupe	CW
Nuance carbure	K
Version	poli
DIN/Forme	6537L
Type	GAL
Lubrification	
Page	102

Référence	51772	51773
Mat. de coupe	CW	CW
Nuance carbure	K/P	K/P
Version	AlTiN nano	AlTiN nano
DIN/Forme	6537L	6537L
Type	VA	VA
Lubrification	axial	axial
Page	87	89

Référence	61880
Mat. de coupe	CW
Nuance carbure	K/P
Version	TiN
DIN/Forme	6537L
Type	F
Lubrification	axial
Page	82



V _c m/min	Code d'avance	
130	G	G
110	F	F
145	H	H
110	G	G
120	G	G
110	G	G
105	G	G
105	G	G
100	F	F
130	H	H
120	G	G
85	E	E
100	F	F
90	E	E
65	F	F
55	E	E
45	C	C
35	A	A
20	A	A
40	B	B
15	A	A
35	B	B
210	H	H
155	H	H
145	G	G
125	G	G
35	C	C
25	D	D
15	A	A
15	A	C
260	I	I
260	I	I
235	I	I
170	H	H
260	H	H
105	G	G
270	H	H
180	G	G
105	F	F
85	F	F
80	E	E
60	E	E

V _c m/min	Code d'avance	
145	G	G
120	F	F
170	H	H
145	H	H
130	H	H
125	G	G
120	G	G
120	G	G
105	G	G
145	H	H
120	G	G
85	E	E
105	G	G
100	E	E
70	F	F
55	E	E
60	E	E
60	C	C
55	C	C
35	B	B
60	E	E
55	B	B
50	E	E
195	I	I
160	I	I
140	I	I
130	H	H
40	C	C
35	D	D
45	D	D
40	C	C
310	I	I
310	I	I
260	I	I
220	I	I
280	H	H
125	G	G
325	H	H
220	G	G
125	G	G
105	F	F
90	F	F
80	F	F

V _c m/min	Code d'avance
100	F
80	F
80	F
70	F
180	G
160	G
150	G
120	F
180	F
180	F

V _c m/min	Code d'avance	
80	E	E
60	B-C	B-C
80	E	E
30	D	D
45	D	D
40	C	C

V _c m/min	Code d'avance
110	F
90	E
130	G
110	G
100	G
95	F
90	F
90	F
80	F
110	G
90	F
65	D
85	F
80	E
60	E
50	D
45	D
45	B
40	B
25	A
45	D
40	B
35	D
160	H
120	H
100	H
95	G
30	B
25	C
35	C
30	B
240	H
240	H
200	H
170	H
230	G
95	F
250	G
170	F
95	F
80	E
70	E
60	E

Conseils d'utilisation pour les forets SuperV

Gamme d'avance										
Lettre-Code	A	B	C	D	E	F	G	H	I	
Ø outil mm	0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
	1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
	2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
	2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
	3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
	4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
	5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
	6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
	8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
	10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
	12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
	16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
	20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
	25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
	31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
	40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250	
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000	

Les forets dont les lettres sont indiquées en gras doivent être utilisés en priorité pour le groupe de matière correspondant.

K, P, K/P

L'utilisation universelle de nos nouveaux carbures K a comme conséquence que nous définissons les groupes d'application carbure seulement avec K ou K/P.

Les lettres de code en caractères gras indiquent:

- G** pour les fontes, les alliages AISI
- S** pour les matières inoxydables
- U** usinage universel, aciers au carbone

* Utiliser des outils avec conicité arrière prononcé

Produits de réfrigération:

- Huile de coupe
- Emulsion d'huile à forer
- sans lubrifiant
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de ciment. non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/>
Aciers trempés	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		<input checked="" type="checkbox"/>
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		<input checked="" type="checkbox"/>
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		<input checked="" type="checkbox"/>
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes dures	-		≤350 HB	<input checked="" type="checkbox"/>
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Alliages d'Al d'inject. ≤10%Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input checked="" type="checkbox"/>
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input checked="" type="checkbox"/>
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Laiton à copeaux courts	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
à copeaux longs	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			<input type="checkbox"/>
Thermoplastiques	Plexiglas, Hostalen, Novodur, Macralon			<input checked="" type="checkbox"/>
Kevlar - plast. renf. de fibres	Kevlar			<input type="checkbox"/>
d'aramide, de verre ou de carb.	GFK/CFK			<input type="checkbox"/>

≤7×D Profondeur

≤10×D

≤12×D

≤15×D

Référence	51789	51889
Mat. de coupe	CW	CW
Nuance carbure	K/P	K/P
Version	TiAlN nano	
DIN/Forme	N. U.	N. U.
Type	U	U
Lubrification	axial	axial
Page	91	92

Référence	71994
Mat. de coupe	CW
Nuance carbure	K
Version	poli
DIN/Forme	N. U.
Type	GG
Lubrification	axial
Page	93

Référence	71996
Mat. de coupe	CW
Nuance carbure	K
Version	poli
DIN/Forme	N. U.
Type	GG
Lubrification	axial
Page	94

Référence	51893
Mat. de coupe	CW
Nuance carbure	K/P
Version	TiAlN nano
DIN/Forme	N. U.
Type	U
Lubrification	axial
Page	95

Référence	71997
Mat. de coupe	CW
Nuance carbure	K
Version	poli
DIN/Forme	N. U.
Type	GN
Lubrification	axial
Page	96



V _c m/min	Code d'avance		V _c m/min	Code d'avance		V _c m/min	Code d'avance		V _c m/min	Code d'avance	
145	F	F				110	F				
120	E	E				110	E				
170	G	G				110	G				
145	G	G				100	G				
130	G	G				110	G				
125	F	F				110	F				
120	F	F				100	F				
120	F	F				110	F				
105	F	F				105	F				
145	G	G				110	G				
120	F	F				110	F				
85	D	D				85	D				
110	F	F				100	F				
105	D	D				80	D				
80	E	E				80	E				
65	D	D				65	D				
60	D	D				50	D				
60	B	B				50	B				
55	B	B									
						60	D				
						55	B				
						45	D				
195	H	H	120	F	120	F	120	H	120	E	
160	H	H	100	F	100	F	120	H	100	E	
140	H	H	90	F	90	F	100	H	90	E	
130	G	G	80	F	80	F	90	G	80	E	
40	B	B	40	B	40	A			40	A	
35	C	C									
310	H	H	410	H	410	H	150	H	410	F	
310	H	H	410	H	410	H	150	H	410	F	
260	H	H	380	H	380	H	150	H	380	G	
220	H	H	330	H	330	H	120	H	330	G	
280	G	G					150	G			
125	F	F					80	F			
325	G	G	280	G	280	G	120	G	280	F	
220	F	F					120	F			
125	F	F	110	F	110	F	40	F	110	E	
105	E	E	80	E	80	E			80	D	
90	E	E									
80	E	E					40	E			

Conseils d'utilisation pour les forets SuperV

Gamme d'avance										
Lettre-Code	A	B	C	D	E	F	G	H	I	
Ø outil mm	3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
	4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
	5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
	6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
	8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
	10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
	12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
	16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630

Les forets dont les lettres sont indiquées en gras doivent être utilisés en priorité pour le groupe de matière correspondant.

K, P, K/P

L'utilisation universelle de nos nouveaux carbures K a comme conséquence que nous définissons les groupes d'application carbure seulement avec K ou K/P.

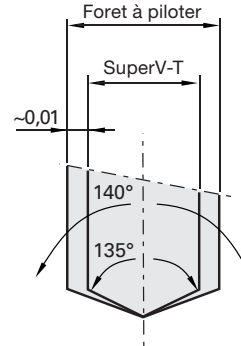
Conditions générales:

Attention, pour des raisons de sécurité, il est très important de ne jamais laisser tourner un foret à vide à plus de $n = 6.000$ T/min sans qu'il ne soit guidé! La force centrifuge peut amorcer la rupture du foret avant qu'il n'atteigne la pièce à usiner.

Processus d'usinage foret SuperV-T:

Afin d'obtenir d'excellents résultats lorsque vous usinez de très profonds perçages, nous vous recommandons:

- Réalisez un alésage cylindrique pilote (tol. F 9), profondeur d'au moins $1 \times D$ avec notre foret SuperV type U ou VA (angle au sommet 140° , tol. du Ø m 7)
- Engagez dans perçage pilote: vitesse de rotation d'env. 300 tr. / mn, avance d'env. 500 mm / mn.
- Programmer la lubrification et la vitesse de rotation.
- Percer continuellement sans déboucher.
- Pour trou débouchant à sortie droite (90°), réduire vf à 50% env. 1mm avant de transpercer.
- Lorsque le forage est débouchant avec une sortie en biais, il faut réduire vf à env. 40 %, à peu près 1 mm avant la sortie.
- Quand la profondeur est atteinte, stoppez la rotation et la lubrification, sortez avec max. 5000 mm/min.



Produits de réfrigération:

- Huile de coupe
- Emulsion d'huile à forer
- sans lubrifiant
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de ciment. non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/>
Aciers trempés	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		<input checked="" type="checkbox"/>
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		<input checked="" type="checkbox"/>
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		<input checked="" type="checkbox"/>
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes dures	-		≤350 HB	<input checked="" type="checkbox"/>
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Alliages d'Al d'inject. ≤10%Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input checked="" type="checkbox"/>
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input checked="" type="checkbox"/>
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/>
Laiton à copeaux courts	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		<input checked="" type="checkbox"/>
à copeaux longs	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		<input checked="" type="checkbox"/>
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			<input type="checkbox"/>
Thermoplastiques	Plexiglas, Hostalen, Novodur, Macralon			<input checked="" type="checkbox"/>
Kevlar - plast. renf. de fibres	Kevlar			<input type="checkbox"/>
d'aramide, de verre ou de carb.	GFK/CFK			<input type="checkbox"/>

≤15×D

≤20×D

≤25×D

≤30×D

≤40×D

Référence	51764
Mat. de coupe	CW monobloc
Nuance carbure	K/P
Version	AlTiN
DIN/Forme	N.U.
Type	T
Lubrification	axial
Page	97

Référence	51765
Mat. de coupe	CW monobloc
Nuance carbure	K/P
Version	AlTiN
DIN/Forme	N.U.
Type	T
Lubrification	axial
Page	98

Référence	51766
Mat. de coupe	CW monobloc
Nuance carbure	K/P
Version	AlTiN
DIN/Forme	N.U.
Type	T
Lubrification	axial
Page	99

Référence	51767
Mat. de coupe	CW monobloc
Nuance carbure	K/P
Version	AlTiN
DIN/Forme	N.U.
Type	T
Lubrification	axial
Page	100

Référence	51768
Mat. de coupe	CW monobloc
Nuance carbure	K/P
Version	AlTiN
DIN/Forme	N.U.
Type	T
Lubrification	axial
Page	101

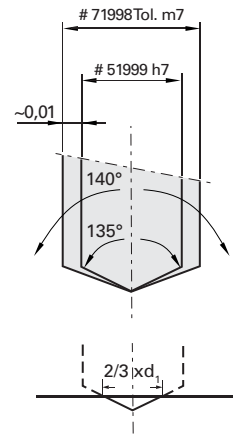


V _c m/min	Gamme d'avance	V _c m/min	Gamme d'avance	V _c m/min	Gamme d'avance	V _c m/min	Gamme d'avance	V _c m/min	Gamme d'avance
110	H	110	H	100	H	80	G	80	G
110	H	110	H	100	H	80	G	80	G
120	H	120	H	120	H	100	H	100	H
120	H	120	H	100	H	100	H	100	H
110	F	110	F	110	F	110	F	110	F
110	H	110	H	100	H	80	G	80	G
100	G	100	G	100	G	80	G	80	G
110	G	110	G	100	G	80	G	80	F-G
110	F	110	F	100	F	80	F	80	F
110	H	110	H	100	H	80	G	80	G
110	G	110	G	100	G	80	F	80	F
110	F	110	F	100	F	80	F	80	F
100	E	100	E	80	E	80	E	80	E
80	E	80	E	60	E	60	E	60	E
100	F-G	100	F	90	F	80	F	80	F-G
80	E	80	E	70	D	70	D	70	D
50	E	50	E	50	D	50	D	50	D
50	E	50	E	50	D	50	D	50	D
50	D	50	D	50	D	50	D	50	D
100	E	100	E	100	E	80	E	80	E
70	B-C	60	C	60	C	60	C	60	C
100	E	100	E	100	E	80	E	80	E
140	H	140	H	130	H	120	H	120	H
100	H	100	H	90	H	80	H	80	H
140	H	140	H	130	H	120	H	120	H
100	H	100	H	90	H	80	H	80	H
100	F	100	F	90	F	80	F	80	F
100	F	100	F	90	F	80	F	80	F
90	H	90	H	80	H	70	H	70	H
30	B	30	B	30	B	30	B	30	B
120	A	120	A	120	A	120	A	120	A
120	H	120	H	110	H	100	H	100	H

SuperV-NX Micro foret haute performance en CW

Conseils d'utilisation

Gamme d'avance															
Lettre-Code	AA	BB	CC	DD	EE	FF	GG	HH	II	JJ	KK	LL	MM		
Ø outil mm	0,50	0,006	0,012	0,018	0,022	0,030	0,035	0,040	0,045	0,050	0,050	0,055	0,060	0,060	Avance f (mm/rev.)
	0,80	0,008	0,016	0,024	0,032	0,040	0,050	0,060	0,070	0,080	0,080	0,080	0,090	0,090	
	1,00	0,012	0,022	0,032	0,042	0,060	0,070	0,080	0,090	0,100	0,100	0,110	0,110	0,120	
	1,50	0,021	0,036	0,051	0,066	0,090	0,100	0,120	0,130	0,150	0,150	0,160	0,170	0,180	
	2,00	0,032	0,052	0,072	0,092	0,120	0,140	0,160	0,180	0,200	0,210	0,220	0,230	0,240	
	2,50	0,045	0,070	0,095	0,120	0,150	0,170	0,200	0,220	0,250	0,260	0,270	0,280	0,300	
	3,00	0,060	0,090	0,120	0,150	0,180	0,210	0,240	0,270	0,300	0,310	0,330	0,340	0,360	



K, P, K/P L'utilisation universelle de nos nouveaux carbures K a comme conséquence que nous définissons les groupes d'application carbure seulement avec K ou K/P.

Les forets dont les lettres sont indiquées **en gras** doivent être utilisés en priorité pour le groupe de matière correspondant.

Instructions de sécurité: Attention, pour des raisons de sécurité, il est très important de ne jamais laisser tourner un foret à vide à plus de $n = 6.000$ U/min sans qu'il ne soit guidé! La force centrifuge peut amorcer la rupture du foret avant qu'il n'atteigne la pièce à usiner.

Recommandations: Machines très puissantes. Broches sans jeu. Alignement précis des outils. Nous conseillons l'utilisation de mandrins hydrauliques et des pressions

de lubrification optimales. Comme liquides de refroidissement et de lubrification, nous vous recommandons les huiles entières et les huiles solubles sous pression minimale de 40 bars.

Perçage pilote

Lors de l'usinage avec les SuperV-NX en CW prévus pour les profondeurs de $15xD$, nous recommandons de réaliser un perçage pilote sur une profondeur de 1 à $2xD$. Pour la réalisation du perçage pilote, le SuperV-NX en CW, $4xD$, est au mieux approprié. Son angle au sommet et la tolérance de son diamètre nominal sont optimisés et adaptés pour cette opération.

Centrage

Afin d'obtenir les meilleurs rendements d'usinage avec les SuperV-NX prévus pour les profondeurs de $8xD$, nous recommandons de réaliser un centrage avant le perçage. Pour cela il est possible d'utiliser le SuperV-NX

jusqu'à $4xD$ avec le n° d'article 71998. La valeur du diamètre de centrage devrait être d'environ les $2/3$ du diamètre de perçage. En alternative, le centrage peut être également effectué avec le foret NC Stock réf. 71189.

Produits de réfrigération:

- Huile de coupe
- Emulsion d'huile à forer
- sans lubrifiant
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de ciment. non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/>
Aciers trempés	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		<input checked="" type="checkbox"/>
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		<input checked="" type="checkbox"/>
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		<input checked="" type="checkbox"/>
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes dures	-		≤350 HB	<input checked="" type="checkbox"/>
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Alliages d'Al d'inject. ≤10%Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input checked="" type="checkbox"/>
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input checked="" type="checkbox"/>
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input checked="" type="checkbox"/>
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/>
Laiton à copeaux courts	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		<input checked="" type="checkbox"/>
à copeaux longs	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		<input checked="" type="checkbox"/>
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		<input checked="" type="checkbox"/>
	2.0790 CuNi18Zn19Pb	>600-850		<input checked="" type="checkbox"/>
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		<input checked="" type="checkbox"/>
	2.0980 CuAl11Ni, 2.1247 CuBe2	>850-1000		<input checked="" type="checkbox"/>

Systeme d'outil SuperV-AP mini

Conseils d'utilisation

Gamme d'avance										
Lettre-Code	A	B	C	D	E	F	G	H	I	
Ø-outils mm	10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
	12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
	16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
	20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
	25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
	31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
	40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250

Les forets dont les lettres sont indiquées **en gras** doivent être utilisés en priorité pour le groupe de matière correspondant.

K, P, K/P L'utilisation universelle de nos nouveaux carbures K a comme conséquence que nous définissons les groupes d'application carbure seulement avec k ou K/P.

Produits de réfrigération:

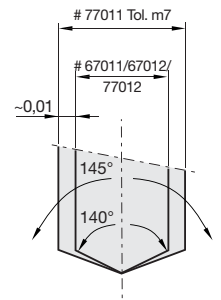
- Huile de coupe
- Emulsion d'huile à forer
- sans lubrifiant
- seulement air

Veuillez faire attention aux directives d'utilisation page 55!

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de ciment. non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/>
Aciers trempés	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers inoxydables, sulfurés austénitiques martensitiques	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850 ≤850 ≤850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes dures	-		≤350 HB	<input checked="" type="checkbox"/>
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Alliages d'Al d'inject. ≤10%Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input checked="" type="checkbox"/>
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input checked="" type="checkbox"/>
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/>
Laiton à copeaux courts	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		<input checked="" type="checkbox"/>
à copeaux longs	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		<input checked="" type="checkbox"/>
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			<input type="checkbox"/>
Thermoplastiques	Plexiglas, Hostalen, Novodur, Macralon			<input checked="" type="checkbox"/>
Kevlar - plast. renf. de fibres	Kevlar			<input type="checkbox"/>
d'aramide, de verre ou de carb.	GFK/CFK			<input type="checkbox"/>

Porte-outils $\leq 1,5 \times D$, p. perçages pilotes

Référence 77007



Référence	67011	67012	77012	77011
Mat. de coupe	CW	CW	CW	CW
Nuance carbure	K/P	K/P	K/P	K/P
Version	TiAlN nano	AlTiN nano	poli	AlTiN nano
Type	U	VA	AL	NC
Lubrification	axial	axial	axial	axial
Page	114	117	120	123



v_c m/min	Code d'avance
130	F
110	E
130	G
110	F
130	F
125	F
110	E
110	F
90	E
130	G
110	F
70	D
105	E
70	D
60	E
55	D
55	C
50	B
25	B
55	C
40	C
35	C
90	F
25	B
40	C
35	B
200	G
180	G
150	G
120	G
180	G
70	F
180	G
120	F
70	F
50	F
45	F
35	E

v_c m/min	Code d'avance
25	B
55	C
40	C
35	C
90	F
25	B
40	C
35	B
200	G
180	G
150	G
120	G
180	G
70	F
180	G
120	F
70	F
50	F
45	F
35	E

v_c m/min	Code d'avance
130	F
110	E
130	G
110	F
130	F
125	F
110	E
110	F
90	E
130	G
110	F
70	D
105	E
70	D
60	E
55	D
55	C
50	B
25	B
55	C
40	C
35	C
100	F
90	F
120	G
100	F
80	E
80	E
80	E
80	E
90	F
25	B
40	C
35	B
200	G
180	G
150	G
120	G
180	G
70	F
180	G
120	F
70	F
50	F
45	F
35	E

v_c m/min	Code d'avance
130	F
110	E
130	G
110	F
130	F
125	F
110	E
110	F
90	E
130	G
110	F
70	D
105	E
70	D
60	E
55	D
55	C
50	B
25	B
55	C
40	C
35	C
100	F
90	F
120	G
100	F
80	E
80	E
80	E
80	E
90	F
25	B
40	C
35	B
200	G
180	G
150	G
120	G
180	G
70	F
180	G
120	F
70	F
50	F
45	F
35	E

Systeme d'outil SuperV-AP mini

Conseils d'utilisation

Gamme d'avance										
Lettre-Code	A	B	C	D	E	F	G	H	I	
Ø-outils mm	10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
	12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
	16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
	20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
	25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
	31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
	40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250

Avance
f (mm/rev)

Les forets dont les lettres sont indiquées **en gras** doivent être utilisés en priorité pour le groupe de matière correspondant.

K, P, K/P L'utilisation universelle de nos nouveaux carbures K a comme conséquence que nous définissons les groupes d'application carbure seulement avec k ou K/P.

Produits de réfrigération:

- Huile de coupe
- Emulsion d'huile à forer
- sans lubrifiant
- seulement air

Veuillez faire attention aux directives d'utilisation page 55!

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de ciment. non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/>
Aciers trempés	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		<input checked="" type="checkbox"/>
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		<input checked="" type="checkbox"/>
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		<input checked="" type="checkbox"/>
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes dures	-		≤350 HB	<input checked="" type="checkbox"/>
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Alliages d'Al d'inject. ≤10%Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input checked="" type="checkbox"/>
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input checked="" type="checkbox"/>
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/>
Laiton à copeaux courts	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		<input checked="" type="checkbox"/>
à copeaux longs	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		<input checked="" type="checkbox"/>
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			<input type="checkbox"/>
Thermoplastiques	Plexiglas, Hostalen, Novodur, Macralon			<input checked="" type="checkbox"/>
Kevlar - plast. renf. de fibres	Kevlar			<input type="checkbox"/>
d'aramide, de verre ou de carb.	GFK/CFK			<input type="checkbox"/>

Systeme d'outil SuperV-AP mini

Conseils d'utilisation

Gamme d'avance										
Lettre-Code	A	B	C	D	E	F	G	H	I	
Ø-outils mm	10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
	12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
	16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
	20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
	25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
	31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
	40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250

Les forets dont les lettres sont indiquées **en gras** doivent être utilisés en priorité pour le groupe de matière correspondant.

K, P, K/P L'utilisation universelle de nos nouveaux carbures K a comme conséquence que nous définissons les groupes d'application carbure seulement avec k ou K/P.

Produits de réfrigération:

- Huile de coupe
- Emulsion d'huile à forer
- sans lubrifiant
- seulement air

Veuillez faire attention aux directives d'utilisation page 55!

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de ciment. non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/>
Aciers trempés	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers inoxydables, sulfurés austénitiques martensitiques	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850 ≤850 ≤850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes dures	-		≤350 HB	<input checked="" type="checkbox"/>
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Alliages d'Al d'inject. ≤10%Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input checked="" type="checkbox"/>
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input checked="" type="checkbox"/>
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/>
Laiton à copeaux courts	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		<input checked="" type="checkbox"/>
à copeaux longs	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		<input checked="" type="checkbox"/>
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			<input type="checkbox"/>
Thermoplastiques	Plexiglas, Hostalen, Novodur, Macralon			<input checked="" type="checkbox"/>
Kevlar - plast. renf. de fibres	Kevlar			<input type="checkbox"/>
d'aramide, de verre ou de carb.	GFK/CFK			<input type="checkbox"/>

Systeme d'outil SuperV-AP mini

Conseils d'utilisation

Gamme d'avance										
Lettre-Code	A	B	C	D	E	F	G	H	I	
Ø-outils mm	10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
	12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
	16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
	20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
	25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
	31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
	40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250

Les forets dont les lettres sont indiquées **en gras** doivent être utilisés en priorité pour le groupe de matière correspondant.

K, P, K/P L'utilisation universelle de nos nouveaux carbures K a comme conséquence que nous définissons les groupes d'application carbure seulement avec k ou K/P.

Produits de réfrigération:

- Huile de coupe
- Emulsion d'huile à forer
- sans lubrifiant
- seulement air

Veuillez faire attention aux directives d'utilisation page 55!

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de ciment. non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/>
Aciers trempés	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers inoxydables, sulfurés austénitiques martensitiques	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850 ≤850 ≤850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes dures	-		≤350 HB	<input checked="" type="checkbox"/>
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Alliages d'Al d'inject. ≤10%Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input checked="" type="checkbox"/>
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input checked="" type="checkbox"/>
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/>
Laiton à copeaux courts	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		<input checked="" type="checkbox"/>
à copeaux longs	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		<input checked="" type="checkbox"/>
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			<input type="checkbox"/>
Thermoplastiques	Plexiglas, Hostalen, Novodur, Macralon			<input checked="" type="checkbox"/>
Kevlar - plast. renf. de fibres	Kevlar			<input type="checkbox"/>
d'aramide, de verre ou de carb.	GFK/CFK			<input type="checkbox"/>

Systeme d'outil SuperV-AP mini

Conseils d'utilisation

Gamme d'avance										
Lettre-Code	A	B	C	D	E	F	G	H	I	
Ø-outils mm	10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
	12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
	16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
	20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
	25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
	31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
	40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250

Les forets dont les lettres sont indiquées **en gras** doivent être utilisés en priorité pour le groupe de matière correspondant.

K, P, K/P L'utilisation universelle de nos nouveaux carbures K a comme conséquence que nous définissons les groupes d'application carbure seulement avec k ou K/P.

Produits de réfrigération:

- Huile de coupe
- Emulsion d'huile à forer
- sans lubrifiant
- seulement air

Veuillez faire attention aux directives d'utilisation page 55!

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de ciment. non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/>
Aciers trempés	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers inoxydables, sulfurés austénitiques martensitiques	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850 ≤850 ≤850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes dures	-		≤350 HB	<input checked="" type="checkbox"/>
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Alliages d'Al d'inject. ≤10%Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input checked="" type="checkbox"/>
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input checked="" type="checkbox"/>
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/>
Laiton à copeaux courts	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		<input checked="" type="checkbox"/>
à copeaux longs	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		<input checked="" type="checkbox"/>
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			<input type="checkbox"/>
Thermoplastiques	Plexiglas, Hostalen, Novodur, Macralon			<input checked="" type="checkbox"/>
Kevlar - plast. renf. de fibres	Kevlar			<input type="checkbox"/>
d'aramide, de verre ou de carb.	GFK/CFK			<input type="checkbox"/>

Systeme d'outil SuperV-AP maxi

Conseils d'utilisation

Gamme d'avance										
Lettre-Code	A	B	C	D	E	F	G	H	I	
Ø-outils mm	10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
	12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
	16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
	20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
	25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
	31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
	40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250

Les forets dont les lettres sont indiquées **en gras** doivent être utilisés en priorité pour le groupe de matière correspondant.

K, P, K/P L'utilisation universelle de nos nouveaux carbures K a comme conséquence que nous définissons les groupes d'application carbure seulement avec k ou K/P.

Produits de réfrigération:

- Huile de coupe
- Emulsion d'huile à forer
- sans lubrifiant
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de ciment. non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/>
Aciers trempés	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers inoxydables, sulfurés austénitiques martensitiques	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850 ≤850 ≤850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes dures	-		≤350 HB	<input checked="" type="checkbox"/>
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Alliages d'Al d'inject. ≤10%Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input checked="" type="checkbox"/>
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input checked="" type="checkbox"/>
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/>
Laiton à copeaux courts	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		<input checked="" type="checkbox"/>
à copeaux longs	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		<input checked="" type="checkbox"/>
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			<input type="checkbox"/>
Thermoplastiques	Plexiglas, Hostalen, Novodur, Macralon			<input checked="" type="checkbox"/>
Kevlar - plast. renf. de fibres	Kevlar			<input type="checkbox"/>
d'aramide, de verre ou de carb.	GFK/CFK			<input type="checkbox"/>

Porte-outils ≤ 3×D

Référence 76000



Référence	56011
Mat. de coupe	CW
Nuance carbure	K/P
Version	TiAIN
Typ	SuperV-AP maxi
Lubrification	axial
Page	129

Référence	76011
Mat. de coupe	CW
Nuance carbure	K/P
Version	TiN
Typ	SuperV-AP maxi
Lubrification	axial
Page	128



v _c m/min	Code d'avance
130	F
110	E
130	G
110	F
130	F
125	F
110	E
110	F
90	E
130	G
110	F
70	D
105	E
70	D
55	E
50	D
55	C
50	B
25	B
55	C
40	C
35	C
210	G
155	G
155	G
130	F
35	B
40	C
35	B
290	G
260	G
235	G
195	G
260	G
105	F
270	G
180	F
105	F
85	F
65	F
55	E
105	E
105	E
105	E
105	E

v _c m/min	Code d'avance
100	F
85	E
100	G
85	F
100	F
95	F
85	E
85	F
70	E
100	G
85	F
55	D
80	E
55	D
40	E
35	D
40	C
35	B
20	B
40	C
30	C
25	C
160	G
80	G
120	G
100	F
25	B
30	C
25	B
220	G
200	G
180	G
150	G
200	G
80	F
210	G
140	F
80	F
65	F
50	F
40	E
80	E
80	E
80	E
80	E

Systeme d'outil SuperV-AP maxi

Conseils d'utilisation

Gamme d'avance										
Lettre-Code	A	B	C	D	E	F	G	H	I	
Ø-outils mm	10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
	12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
	16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
	20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
	25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
	31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
	40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250

Les forets dont les lettres sont indiquées **en gras** doivent être utilisés en priorité pour le groupe de matière correspondant.

K, P, K/P L'utilisation universelle de nos nouveaux carbures K a comme conséquence que nous définissons les groupes d'application carbure seulement avec k ou K/P.

Produits de réfrigération:

- Huile de coupe
- Emulsion d'huile à forer
- sans lubrifiant
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de ciment. non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/>
Aciers trempés	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers inoxydables, sulfurés austénitiques martensitiques	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850 ≤850 ≤850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes dures	-		≤350 HB	<input checked="" type="checkbox"/>
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Alliages d'Al d'inject. ≤10%Si > 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600 ≤600		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/>
Laiton à copeaux courts à copeaux longs	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			<input type="checkbox"/>
Thermoplastiques	Plexiglas, Hostalen, Novodur, Macralon			<input checked="" type="checkbox"/>
Kevlar - plast. renf. de fibres d'aramide, de verre ou de carb.	Kevlar GFK/CFK			<input type="checkbox"/> <input type="checkbox"/>

Porte-outils $\leq 5 \times D$

Référence 76001



Référence	56011
Mat. de coupe	CW
Nuance carbure	K/P
Version	TiAIN
Typ	SuperV-AP maxi
Lubrification	axial
Page	129

Référence	76011
Mat. de coupe	CW
Nuance carbure	K/P
Version	TiN
Typ	SuperV-AP maxi
Lubrification	axial
Page	128



v_c m/min	Code d'avance
125	F
105	E
125	G
105	F
125	F
120	F
105	E
105	F
85	E
125	G
105	F
70	D
105	E
70	D
55	E
50	D
55	C
50	B
25	B
55	C
40	C
35	C
195	G
145	G
145	G
120	F
35	B
25	B
40	C
35	B
260	G
260	G
220	G
180	G
260	G
105	F
270	G
180	F
105	F
85	F
65	F
55	E
105	E
105	E
105	E
105	E

v_c m/min	Code d'avance
95	F
80	E
95	G
80	F
95	F
90	F
80	E
80	F
65	E
95	G
80	F
55	D
80	E
55	D
40	E
35	D
40	C
35	B
20	B
40	C
30	C
25	C
150	G
110	G
110	G
90	F
25	B
20	B
30	C
25	B
200	G
200	G
170	G
140	G
200	G
80	F
210	G
140	F
80	F
65	F
50	F
40	E
80	E
80	E
80	E
80	E

Systeme d'outil SuperV-AP maxi

Conseils d'utilisation

Gamme d'avance										
Lettre-Code	A	B	C	D	E	F	G	H	I	
Ø-outils mm	10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
	12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
	16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
	20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
	25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
	31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
	40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250

Les forets dont les lettres sont indiquées **en gras** doivent être utilisés en priorité pour le groupe de matière correspondant.

K, P, K/P L'utilisation universelle de nos nouveaux carbures K a comme conséquence que nous définissons les groupes d'application carbure seulement avec k ou K/P.

Produits de réfrigération:

- Huile de coupe
- Emulsion d'huile à forer
- sans lubrifiant
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de ciment. non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/>
Aciers trempés	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers inoxydables, sulfurés austénitiques martensitiques	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850 ≤850 ≤850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes dures	-		≤350 HB	<input checked="" type="checkbox"/>
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Alliages d'Al d'inject. ≤10%Si > 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600 ≤600		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/>
Laiton à copeaux courts à copeaux longs	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			<input type="checkbox"/>
Thermoplastiques	Plexiglas, Hostalen, Novodur, Macralon			<input checked="" type="checkbox"/>
Kevlar - plast. renf. de fibres d'aramide, de verre ou de carb.	Kevlar GFK/CFK			<input type="checkbox"/> <input type="checkbox"/>

Porte-outils ≤ 7×D

Référence 76003



Référence	56011
Mat. de coupe	CW
Nuance carbure	K/P
Version	TiAIN
Typ	SuperV-AP maxi
Lubrification	axial
Page	129

Référence	76011
Mat. de coupe	CW
Nuance carbure	K/P
Version	TiN
Typ	SuperV-AP maxi
Lubrification	axial
Page	128



v _c m/min	Code d'avance
120	E
105	D
120	F
105	E
120	E
110	E
100	D
100	E
85	D
120	F
100	E
70	D
105	D
70	C
55	D
50	C
55	B
50	B
25	A
55	B
40	B
35	B
195	F
145	F
145	F
120	E
35	B
25	A
40	B
35	A
260	F
260	F
220	F
180	F
260	F
105	E
270	F
180	E
105	E
85	E
65	E
55	D
105	D
105	D
105	D
105	D

v _c m/min	Code d'avance
90	E
80	D
90	F
80	E
90	E
85	E
75	D
75	E
65	D
90	F
75	E
55	D
80	D
55	C
40	D
35	C
40	B
35	B
20	A
40	B
30	B
25	B
150	F
110	F
110	F
90	E
25	B
20	A
30	B
25	A
200	F
200	F
170	F
140	F
200	F
80	E
210	F
140	E
80	E
65	E
50	E
40	D
80	D
80	D
80	D
80	D

Conseils d'utilisation pour les forets en CW

Gamme d'avance										
Lettre-Code	A	B	C	D	E	F	G	H	I	
Ø outil mm	0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
	1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
	2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
	2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
	3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
	4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
	5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
	6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
	8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
	10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
	12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
	16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
	20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
	25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
	31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
	40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250	
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000	

Les forets dont les lettres sont indiquées **en gras** doivent être utilisés en priorité pour le groupe de matière correspondant.

K, P, K/P

L'utilisation universelle de nos nouveaux carbures K a comme conséquence que nous définissons les groupes d'application carbure seulement avec k ou K/P.

Produits de réfrigération:

- Huile de coupe
- Emulsion d'huile à forer
- sans lubrifiant
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de ciment. non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/>
Aciers trempés	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		<input checked="" type="checkbox"/>
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		<input checked="" type="checkbox"/>
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		<input checked="" type="checkbox"/>
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes dures	-		≤350 HB	<input checked="" type="checkbox"/>
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Alliages d'Al d'inject. ≤10%Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input checked="" type="checkbox"/>
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input checked="" type="checkbox"/>
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/>
Laiton à copeaux courts	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		<input checked="" type="checkbox"/>
à copeaux longs	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		<input checked="" type="checkbox"/>
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			<input type="checkbox"/>
Thermoplastiques	Plexiglas, Hostalen, Novodur, Macralon			<input checked="" type="checkbox"/>
Kevlar - plast. renf. de fibres	Kevlar			<input type="checkbox"/>
d'aramide, de verre ou de carb.	GFK/CFK			<input type="checkbox"/>

≤3×D Profondeur

≤5×D

Référence	71184
Mat. de coupe	CW
Nuance carbure	K10/K20
Version	poli
DIN/Forme	6539
Type	N
Lubrification	
Page	132

Référence	51184
Mat. de coupe	CW
Nuance carbure	K/P
Version	TiAlN nano
DIN/Forme	6539
Type	N
Lubrification	
Page	134

Référence	71380	71180
Mat. de coupe	CW	CW
Nuance carbure	K10/K20	K10/K20
Version	poli	poli
DIN/Forme	8041	8037
Type	N	N
Lubrification		
Page	141	140

Référence	71290
Mat. de coupe	CW
Nuance carbure	K10/K20
Version	poli
DIN/Forme	N. U.
Type	N
Lubrification	
Page	135

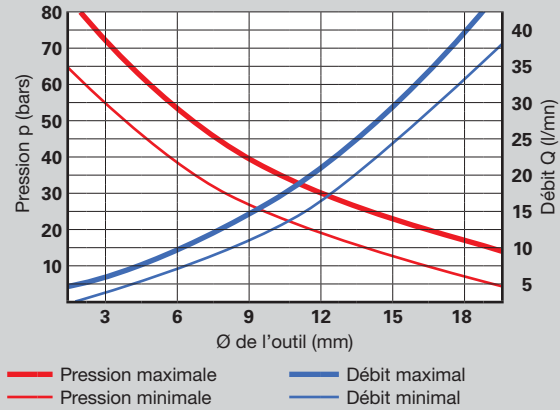


V _c m/min	Code d'avance	V _c m/min	Code d'avance	V _c m/min	Code d'avance		V _c m/min	Code d'avance
80	D	104	E				80	D
70	D	91	E				70	D
80	E	104	F	80	D	D	80	E
70	D	91	E	70	C	C	70	D
80	D	104	E				80	D
70	D	91	E				70	D
60	D	78	E				60	D
60	D	78	E				60	D
80	E	104	F				80	E
60	D	78	E				60	D
50	D	65	E				50	D
50	C	65	D				50	C
25	B	32	C	25	B	B	25	B
20	C	26	D	20	C	C	20	B
				10	B	B		
25	B	32	E				25	B
15	A	32	D				15	A
25	B	32	D				25	B
90	D	117	E	90	D	D	90	D
80	D	104	E	80	D	D	80	D
80	D	91	E	80	D	D	70	D
70	D	104	E	70	D	D	80	D
				10	A	A		
15	B	20	C				15	B
15	A	26	D				15	A
15	A	20	C				15	A
200	G	260	H				200	G
200	G	260	H				200	G
150	F	195	G				150	F
120	F	156	G				120	F
180	F	234	F				180	E
80	E	104	F				80	E
180	E	234	F	180	E	E	180	E
180	E	234	F	180	E	E	180	E
120	E	156	F				120	E
120	E	156	F				120	E
70	D	91	E				70	D
50	C	65	D				50	C
50	D	65	E				50	D
40	C	52	D				40	C
80	C	104	D				80	C

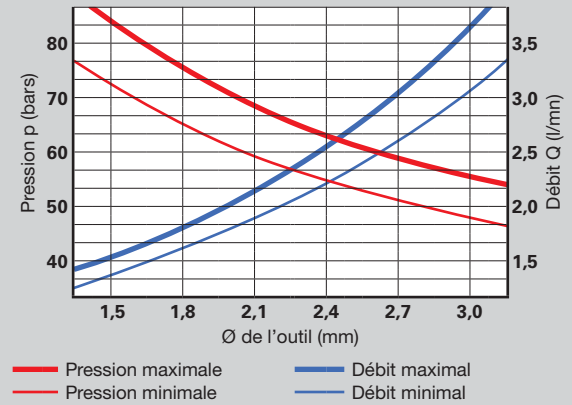
Foret STOCK SuperV

Recommandations pour valeurs du liquide de refroidissement

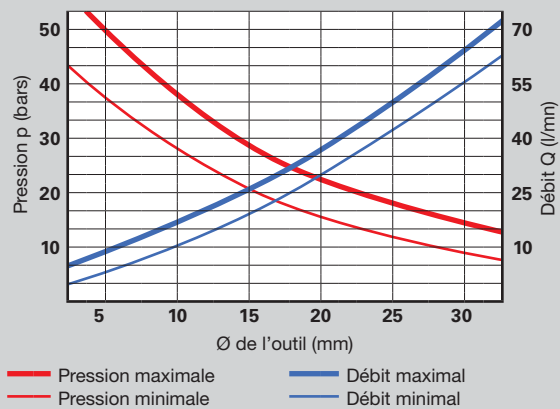
Valeurs du liquide de refroidissement SuperV-T
(Valeurs de référence pour huile soluble)



Valeurs du liquide de refroid. SuperV-NX
(Valeurs de référence pour huile soluble)



Valeurs du liquide de refroid. SuperV 95-GG/GN
(Valeurs de référence pour huile soluble)



Stock Système d'outils SuperV

Conseils d'application

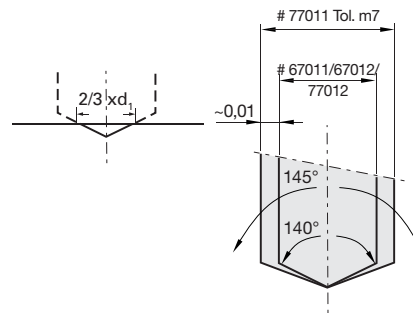
pour tous les porte-plaquettes

- Lors de la réalisation de perçages débouchants, il faut veiller à ce que les listels de guidage de la plaquette de coupe restent toujours en contact dans le perçage réalisé.
- Lorsqu'il s'agit d'usinages à coupe interrompue (rainures, perçages transversaux), avant d'utiliser ces outils, il faut réaliser quelques essais de perçage et, lors de la coupe interrompue de (max. : 0,2 x D), il est aussi recommandé de réduire l'avance.
- Contrairement aux outils classiques à plaquettes réversibles, les outils HT 800 peuvent percer les tôles empilées.
- Lors de l'utilisation sur les tours où l'outil de perçage est fixe, il faut s'assurer du bon centrage et de l'alignement parfait de l'outil.
- Afin d'obtenir un résultat d'usinage optimal, il faut s'assurer d'une parfaite alimentation des liquides de lubrification et de refroidissement, huiles de coupe, entières ou solubles.
- Ce système d'outils n'est que partiellement approprié à l'usinage MQL, voire, à sec.

Les techniciens de notre service clientèle vous renseignent volontiers.

Conseils supplémentaires pour porte-plaquettes à partir de 5×D

- En principe, lorsqu'il faut réaliser des centrages ou des perçages pilotes avec des profondeurs de perçages au-dessus de 5 x D, nous recommandons l'utilisation du porte - outils n° d'article 77007 et de la plaquette de coupe n° d'article 77011 pour les perçages pilotes. En fonction des matériaux à usiner, il est également possible d'utiliser les Forets SuperV-U, GG, le VA ou le foret NC 142° réf.71189.
- Lors de la réalisation de perçages débouchants, il faut veiller à ce que les listels de guidage de la plaquette de coupe restent toujours en contact dans le perçage réalisé. En outre, avant que la plaquette de coupe ne traverse les derniers millimètres à percer, nous recommandons de réduire l'avance.



Pour SuperV-AP mini:

Lors de l'échange de la plaquette de coupe, et cela afin d'obtenir les meilleurs résultats d'usinage, il est absolument nécessaire de respecter les valeurs prescrites du couple de serrage de la vis de serrage!

Diamètres mm	11,0 - 12,99	13,0 - 13,99	14,0 - 15,99	16,0 - 17,99	18,0 - 19,99	20,0 - 21,99	22,0 - 29,99	30,0 - 40,0
Filetage	M2,2	M2,5	M3	M3,5	M4	M4,5	M5	M6
Taille Torx	T7	T8	T9	T10	T15	T15	T20	T25
Couple de serrage (Nm)	0,8	1,0	1,7	2,7	4,0	6,0	8,0	14,0

Ces valeurs sont valables pour les freins de vis (Loctite) !

Recommand. d'utilisation p. outils de forage

Gamme d'avance										
Lettre-code	K	L	M	N	O	P	Q	R		
Ø outil mm	1,50	0,002	0,004	0,006	0,008	0,012	0,020	0,032	0,045	Avance f (mm/rev)
	2,00	0,003	0,005	0,007	0,010	0,016	0,028	0,046	0,055	
	2,50	0,004	0,006	0,008	0,012	0,018	0,030	0,054	0,070	
	4,00	0,005	0,007	0,010	0,016	0,025	0,043	0,065	0,085	
	6,00	0,007	0,009	0,013	0,024	0,035	0,061	0,085	0,120	
	8,00	0,010	0,014	0,022	0,032	0,045	0,068	0,100	0,150	
	10,00	0,012	0,016	0,028	0,040	0,055	0,075	0,120	0,160	
	14,00	0,020	0,025	0,035	0,050	0,065	0,085	0,130	0,180	
	18,00	0,025	0,030	0,040	0,055	0,070	0,095	0,145	0,200	
	20,00	0,026	0,035	0,045	0,060	0,080	0,110	0,180	0,250	
	24,00	0,027	0,036	0,047	0,065	0,085	0,130	0,185	0,300	
	28,00	0,028	0,038	0,049	0,068	0,090	0,140	0,195	0,350	
	30,00	0,030	0,040	0,050	0,070	0,100	0,150	0,200	0,400	
	35,00	0,035	0,045	0,055	0,075	0,120	0,180	0,250	0,450	
	40,00	0,040	0,050	0,060	0,080	0,150	0,200	0,300	0,500	

*Les avances se basent toujours sur des outils avec un revêtement approprié. Pour certains matériaux, un revêtement s'avère obligatoire.



Lorsqu'ils commencent à forer, les outils de forage doivent toujours être guidés! Il ne faut jamais les laisser tourner avec une vitesse de rotation élevée lorsqu'ils sont libres (hors de la pièce).

Veuillez tenir compte des indications d'utilisation page 62!

Produits de réfrigération:

Huile de coupe très active, lubrifiant de surface tensio-actif avec additifs à réaction chimique produisant un film lubrifiant bien adhérent et anti-usure.

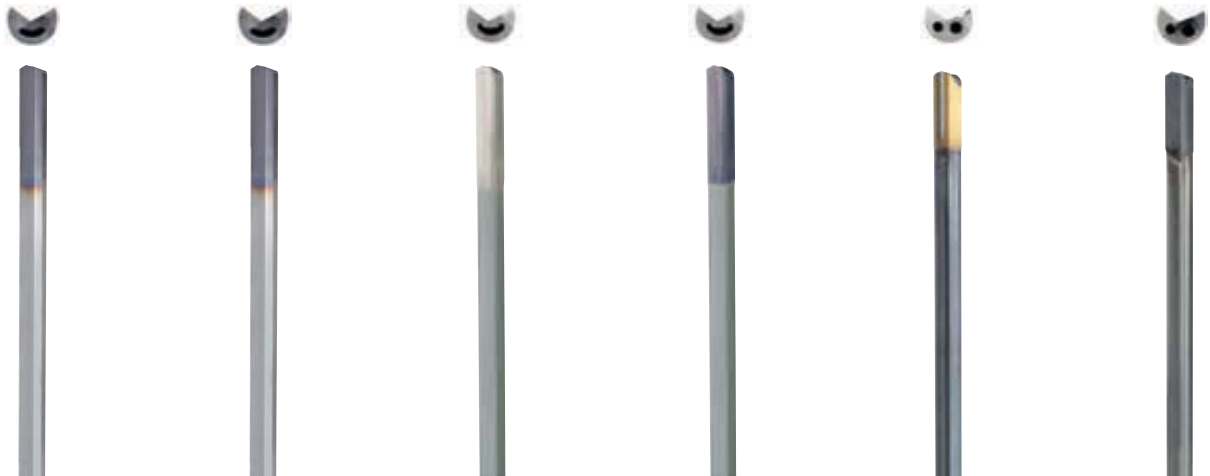
Emulsion d'huile à forer

sans lubrifiant

seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		■
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		■
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		■
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		■
Aciers de ciment, non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		■
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		■
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		■
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		■
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		■
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	■
Aciers trempés	-		≤40-48 HRC >48-60 HRC	■
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		■
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		■
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		■
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		■
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	■
Fontes dures	-		≤350 HB	■
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			■
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		■
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		■
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		■
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		■
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		■
Alliages d'Al d'inject. ≤10%Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		■
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		■
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		!
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		■
Laiton à copeaux courts à copeaux longs	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		■
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		■
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		■
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren		-	□
Thermoplastiques	Plexiglas, Hostalen, Novodur, Makralon		-	■
Kevlar - plast. renf. de fibres	Kevlar		-	□
d'aramide, de verre ou de carb.	GFK/CFK		-	□

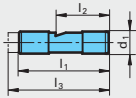
Référence	55027	55028 55029	75024 75020 75026 75021	55024 55020 55026 55021	75018 75017 75022 75023	55018 55017 55022 55023
Matière de coupe	CW	CW	CW	CW	sommet rev. CW	sommet rev. CW
Surface	AlTiN nano	AlTiN nano	poli	AlTiN +	TiN	TiCN
Type	SuperT-AI	SuperT-AI	TBE-VHM	TBE-VHM	SuperT-N	SuperT-NX
Page	143	144/145	154/156/158/160	155/157/159/161	146/147/148/149	150/151/152/153



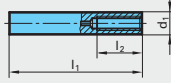
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100	O	95	N	95	N	95	N	95	M	95	M
85	O	80	N	80	N	80	N	80	M	80	M
90	O	85	N	85	N	85	N	85	M	85	M
80	O	75	N	75	N	75	N	75	M	75	M
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75	N	70	M	70	M	70	M	70	L	70	L
65	N	60	M	60	M	60	M	60	L	60	L
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65	N	60	M	60	M	60	M	60	L	60	L
75	N	70	M	70	M	70	M	70	L	70	L
65	N	60	M	60	M	60	M	60	L	60	L
75	M	70	L	70	L	70	L	70	K	70	K
65	M	60	L	60	L	60	L	60	K	60	K
55	L	50	K	50	K	50	K	50	K	50	K
65	M	60	L	60	L	60	L	60	L	60	L
30	M	25	L	25	L	25	L	25	K	25	K
55	N	50	M	50	M	50	M	50	L	50	L
45	N	40	M	40	M	40	M	40	L	40	L
35	N	35	M	35	M	35	M	35	L	35	L
85	P	80	O	80	O	80	O	80	N	80	N
80	P	75	O	75	O	75	O	75	N	75	N
80	O	75	N	75	N	75	N	75	M	75	M
70	O	65	N	65	N	65	N	65	M	65	M
55	N	50	M	50	M	50	M	50	L	50	L
80	P	70	O	70	N	70	N	70	M	70	M
70	P	65	O	65	N	65	N	65	M	65	M
65	O	60	N	65	M	65	M	65	L	65	L
60	O	55	N	55	M	55	M	55	L	55	L
25	L	20	K	20	K	20	K	20	K	20	K
35	L	30	K	30	K	30	K	30	K	30	K
30	L	25	K	25	K	25	K	25	K	25	K
150	Q	140	P	140	P	140	P	140	N	140	N
120	Q	115	P	115	P	115	P	115	N	115	N
150	R	140	Q	140	Q	140	Q	140	P	140	P
130	R	120	Q	120	Q	120	Q	120	P	120	P
110	Q	100	P	100	P	100	P	90	O	90	O
75	O	70	N	70	N	70	N	70	M	70	M
120	R	115	Q	115	Q	115	Q	115	P	115	P
90	R	85	Q	85	Q	85	Q	85	P	85	P
95	Q	90	P	90	P	90	P	90	O	90	O
75	Q	70	P	70	P	70	P	70	O	70	O
70	Q	65	P	65	P	65	P	65	O	65	O
60	Q	55	P	55	P	55	P	55	O	55	O
75	O	70	N	70	N	70	N	70	M	70	M
70	O	65	N	65	N	65	N	65	M	65	M
60	N	55	M	55	M	55	M	55	L	55	L
50	N	45	M	45	M	45	M	45	L	45	L

Attachements et accessoires

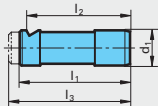
Attachements sur les foreuses



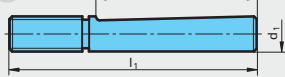
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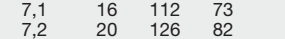
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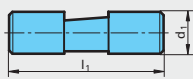
7



7,1



7,2



code	d ₁	l ₁
4,1	19,05	70
4,2	12,70	70
4,3	25,40	70
4,4	31,75	70
4,5	38,10	70

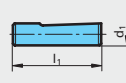
code	d ₁	l ₁	l ₂	l ₃
1,1	10	40	24	-
1,2	10	40	24	45
1,3	10	40	24	55
1,4	16	45	31,2	-
1,5	25	70	34	-
1,6	25	70	34	78

code	d ₁	l ₁	l ₂	l ₃
2,1	16	50	47	-
2,2	16	50	47	55
2,3	16	50	47	70

code	d ₁	l ₁	l ₂	l ₃
3,1	25	70	34	100

Attachements selon DIN 1835

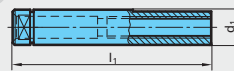
9 forme E



code	d ₁	l ₁
9,1	8	36
9,2	10	40
9,3	12	45
9,4	16	48
9,5	20	50
9,6	25	56
9,7	32	60
9,8	31,75	70
9,9	38,1	70
9,10	40	70

Attachements selon projet VDI

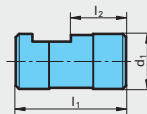
12



code	d ₁	l ₁
12,1	10	68
12,2	16	90
12,3	25	112

Attachements selon système Speed-Bit

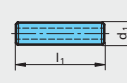
13



code	d ₁	l ₁	l ₂
13,1	16	40	16
13,2	25	50	25
13,3	35,6	60	

Attachements selon DIN 6535

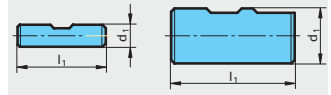
10 forme HA



code	d ₁	l ₁
10,1	8	36
10,2	10	40
10,3	12	45
10,4	16	48
10,5	20	50
10,6	25	56
10,7	32	60
10,8	25	70
10,9	40	70

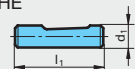
8 forme HB

with code 8,6, 8,7, 8,8



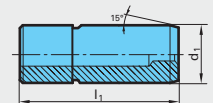
code	d ₁	l ₁
8,1	8	36
8,2	10	40
8,3	12	45
8,4	16	48
8,5	20	50
8,6	25	56
8,7	32	60
8,8	40	70

11 forme HE



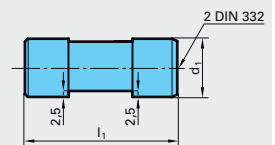
code	d ₁	l ₁
11,1	8	36
11,2	10	40
11,3	12	45
11,4	16	48
11,5	20	50
11,6	25,4	70
11,7	25	56
11,8	32	60
11,9	40	70

16 sim. forme HA



code	d ₁	l ₁
16,1	10	50
16,2	16	64
16,3	20	70
16,4	25	81
16,5	32	92

17 sim. forme HE



code	d ₁	l ₁
17,1	19,05	70
17,2	25,40	70
17,3	31,75	70
17,4	38,1	70

Le programme d'attachements ci-dessous représente les attachements standards tenus en stock. Nous pouvons réaliser n'importe quel attachement de précision, sur plan client ou pour vous, individuellement, selon vos besoins.

Attention! Les attachements des forets TBE-CW mono doivent absolument être pourvus du collet de redressage! Informations sur demande.

Accessoires pour les machines de forage

Contrairement aux machines conventionnelles, les foreuses sont équipées d'accessoires spéciaux comme par exemple les canons de guidage, les joints d'étanchéité, les guides des lunettes etc. qui font partie de l'équipement de base. Ci-joint, la photo représente ce genre d'accessoires. Sur le marché, il existe tout un programme de ces accessoires et il nous serait impossible de pouvoir vous le présenter, avec toutes ses dimensions, sur ce prospectus. Par contre, sur demande, et si possible avec un croquis détaillé, nous pouvons vous offrir les accessoires les plus usuels.

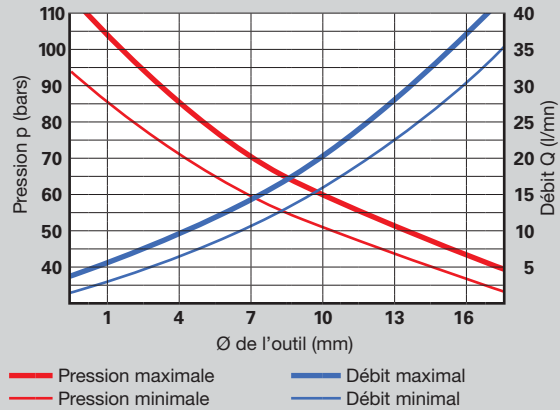


Outils de forets STOCK

Recommandations pour valeurs de liquide de refroidissement

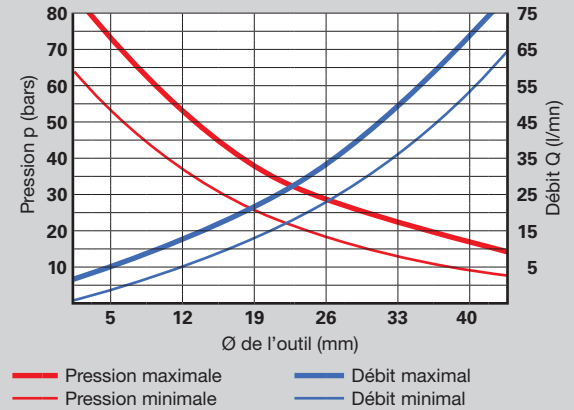
Valeurs du liquide de refr. TBE-VHM/SuperT-AL

(Valeurs de référence pour huile soluble)



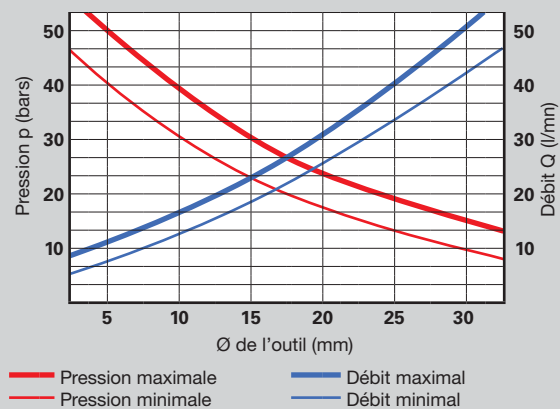
Valeurs du liquide de refr. SuperT-N/-NX

(Valeurs de référence pour huile soluble)



Valeurs du liquide de refr. SuperT-GG

(Valeurs de référence pour huile soluble)



Outils de forets STOCK

Recommandations pour valeurs de liquide de refroidissement

Conditions d'utilisation des outils de forage.

- Réaliser un perçage pilote ($L = 1,5 \times D$ tolérance H8)
- Avancer à env. 500 mm/mn et faible vit. de rot., env. à 200 Tr./ mn afin d'entrer dans le pré-perçage.
- Mettre la lub. sous pression et programmer la vitesse de rotation d'usinage.
- Forer continuellement sans débourages. Lors de l'utilisation des forets à une lèvre de très grandes longueurs et petits diamètres (par exemple sur TBE CW mono à partir d'une longueur de goujure de 160 mm) nous vous conseillons de réduire les paramètres de coupe sur une profondeur de forage d'environ 25 mm (à peu près à 75% des valeurs de coupe optimales).
- En fin de forage, stopper la lubrification
- Retirer l'outil de forage, sans rotation, en avance rapide

Dans le cas où les paramètres d'utilisation des produits de lubrification et de refroidissement ne peuvent pas être appliqués, il est possible de forer avec des conditions de coupe réduites. Il y a aussi possibilité d'équiper la machine de système haute pression.

Processus d'usinage

Afin d'obtenir d'excellents résultats lorsque vous usinez de très profonds perçages surtout si l'entrée du perçage est bombée, rayonnée ou si la surface est inégale, nous vous recommandons de procéder comme suit :

1. Fraiser une surface plane, perpendiculaire à l'axe de perçage du foret, par exemple, avec la fraise SuperF-UT-N pourvue de la coupe au centre.
2. Réalisez un alésage cylindrique pilote de tolérance F 9 sur une profondeur d'au moins une fois le diamètre. Pour réaliser cet alésage, nous vous conseillons d'utiliser le foret SuperV qui eux, avec leur angle au sommet de 140° et leur tolérance du diamètre m 7, sont au mieux appropriés pour cette opération.
3. Engagez le foret hélicoïdal dans son perçage pilote avec une vitesse de rotation d'environ 300 tr. / mn et une avance d'environ 500 mm / mn.
4. Mettre la lubrification sous pression et programmer la vitesse de rotation d'usinage.
5. Percer continuellement sans débouurer.
6. Lorsque le trou est débouchant, avec sortie perpendiculaire à 90°, il est recommandé de réduire la vitesse de l'avance à 50 %, environ 1 mm avant le débouché du foret.
7. Lorsque le forage est débouchant avec une sortie en biais, il faut réduire la vitesse de l'avance v_f à environ 40 %, à peu près 1 mm avant la sortie du foret.
8. Quand le foret a atteint sa profondeur de perçage, stoppez la rotation et la lubrification de l'outil et sortez avec max. 5000 mm/min.

Forets SuperV

Forets sans trou d'huile, type SuperV



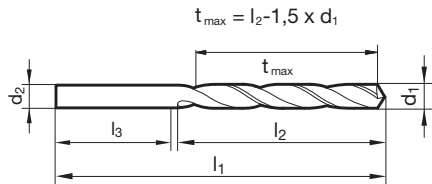
Référence **61888**



P	M	K	N	S	H
○	●	○	○	●	●

Conseils d'util.,
page 26

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage à dépouille conique
- forme concave de l'arête de coupe principale
- géométrie de coupe optimisée
- paramètres de coupe extrêmes



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
3,000	3,000	46,000	16,000	30,000
3,100	3,100	49,000	18,000	31,000
3,200	3,200	49,000	18,000	31,000
3,400	3,400	52,000	20,000	32,000
3,500	3,500	52,000	20,000	32,000
3,600	3,600	52,000	20,000	32,000
4,000	4,000	55,000	22,000	33,000
4,200	4,200	55,000	22,000	33,000
4,300	4,300	58,000	24,000	34,000
4,500	4,500	58,000	24,000	34,000
4,700	4,700	58,000	24,000	34,000
5,000	5,000	62,000	26,000	36,000
5,100	5,100	62,000	26,000	36,000
5,200	5,200	62,000	26,000	36,000
5,500	5,500	66,000	28,000	38,000
5,700	5,700	66,000	28,000	38,000
5,800	5,800	66,000	28,000	38,000
6,000	6,000	66,000	28,000	38,000
6,100	6,100	70,000	31,000	39,000
6,200	6,200	70,000	31,000	39,000
6,400	6,400	70,000	31,000	39,000
6,500	6,500	70,000	31,000	39,000
6,600	6,600	70,000	31,000	39,000
6,700	6,700	70,000	31,000	39,000

d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
6,800	6,800	74,000	34,000	40,000
7,000	7,000	74,000	34,000	40,000
7,200	7,200	74,000	34,000	40,000
7,300	7,300	74,000	34,000	40,000
7,500	7,500	74,000	34,000	40,000
7,700	7,700	79,000	37,000	42,000
7,800	7,800	79,000	37,000	42,000
8,000	8,000	79,000	37,000	42,000
8,400	8,400	79,000	37,000	42,000
8,500	8,500	79,000	37,000	42,000
8,700	8,700	84,000	40,000	44,000
8,900	8,900	84,000	40,000	44,000
9,000	9,000	84,000	40,000	44,000
9,100	9,100	84,000	40,000	44,000
9,200	9,200	84,000	40,000	44,000
9,300	9,300	84,000	40,000	44,000
9,400	9,400	84,000	40,000	44,000
9,500	9,500	84,000	40,000	44,000
9,700	9,700	89,000	43,000	46,000
10,000	10,000	89,000	43,000	46,000
10,100	10,100	89,000	43,000	46,000
10,200	10,200	89,000	43,000	46,000
12,000	12,000	102,000	51,000	51,000

Forets SuperV

Forets sans trou d'huile, type SuperV



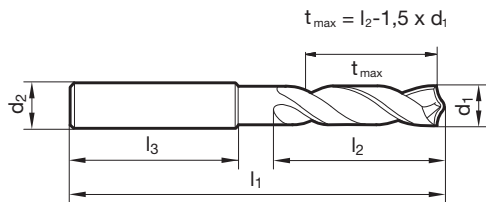
Référence **51873**



P	M	K	N	S	H
●		●	○	○	○

Conseils d'util.,
page 26

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage en pente
- arête de coupe principale rectiligne
- géométrie de coupe optimisée



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
3,000	6,000	62,000	20,000	36,000	7,600	8,000	79,000	41,000	36,000
3,100	6,000	62,000	20,000	36,000	7,700	8,000	79,000	41,000	36,000
3,200	6,000	62,000	20,000	36,000	7,800	8,000	79,000	41,000	36,000
3,300	6,000	62,000	20,000	36,000	7,900	8,000	79,000	41,000	36,000
3,400	6,000	62,000	20,000	36,000	8,000	8,000	79,000	41,000	36,000
3,500	6,000	62,000	20,000	36,000	8,100	10,000	89,000	47,000	40,000
3,600	6,000	62,000	20,000	36,000	8,200	10,000	89,000	47,000	40,000
3,700	6,000	62,000	20,000	36,000	8,300	10,000	89,000	47,000	40,000
3,800	6,000	66,000	24,000	36,000	8,400	10,000	89,000	47,000	40,000
3,900	6,000	66,000	24,000	36,000	8,500	10,000	89,000	47,000	40,000
4,000	6,000	66,000	24,000	36,000	8,600	10,000	89,000	47,000	40,000
4,100	6,000	66,000	24,000	36,000	8,700	10,000	89,000	47,000	40,000
4,200	6,000	66,000	24,000	36,000	8,800	10,000	89,000	47,000	40,000
4,300	6,000	66,000	24,000	36,000	8,900	10,000	89,000	47,000	40,000
4,400	6,000	66,000	24,000	36,000	9,000	10,000	89,000	47,000	40,000
4,500	6,000	66,000	24,000	36,000	9,100	10,000	89,000	47,000	40,000
4,600	6,000	66,000	24,000	36,000	9,200	10,000	89,000	47,000	40,000
4,650	6,000	66,000	24,000	36,000	9,250	10,000	89,000	47,000	40,000
4,700	6,000	66,000	24,000	36,000	9,300	10,000	89,000	47,000	40,000
4,800	6,000	66,000	28,000	36,000	9,400	10,000	89,000	47,000	40,000
4,900	6,000	66,000	28,000	36,000	9,500	10,000	89,000	47,000	40,000
5,000	6,000	66,000	28,000	36,000	9,600	10,000	89,000	47,000	40,000
5,100	6,000	66,000	28,000	36,000	9,700	10,000	89,000	47,000	40,000
5,200	6,000	66,000	28,000	36,000	9,800	10,000	89,000	47,000	40,000
5,300	6,000	66,000	28,000	36,000	9,900	10,000	89,000	47,000	40,000
5,400	6,000	66,000	28,000	36,000	10,000	10,000	89,000	47,000	40,000
5,500	6,000	66,000	28,000	36,000	10,100	12,000	102,000	55,000	45,000
5,550	6,000	66,000	28,000	36,000	10,200	12,000	102,000	55,000	45,000
5,600	6,000	66,000	28,000	36,000	10,300	12,000	102,000	55,000	45,000
5,700	6,000	66,000	28,000	36,000	10,400	12,000	102,000	55,000	45,000
5,800	6,000	66,000	28,000	36,000	10,500	12,000	102,000	55,000	45,000
5,900	6,000	66,000	28,000	36,000	10,600	12,000	102,000	55,000	45,000
6,000	6,000	66,000	28,000	36,000	10,700	12,000	102,000	55,000	45,000
6,100	8,000	79,000	34,000	36,000	10,800	12,000	102,000	55,000	45,000
6,200	8,000	79,000	34,000	36,000	10,900	12,000	102,000	55,000	45,000
6,300	8,000	79,000	34,000	36,000	11,000	12,000	102,000	55,000	45,000
6,400	8,000	79,000	34,000	36,000	11,100	12,000	102,000	55,000	45,000
6,500	8,000	79,000	34,000	36,000	11,200	12,000	102,000	55,000	45,000
6,600	8,000	79,000	34,000	36,000	11,300	12,000	102,000	55,000	45,000
6,700	8,000	79,000	34,000	36,000	11,400	12,000	102,000	55,000	45,000
6,800	8,000	79,000	34,000	36,000	11,500	12,000	102,000	55,000	45,000
6,900	8,000	79,000	34,000	36,000	11,600	12,000	102,000	55,000	45,000
7,000	8,000	79,000	34,000	36,000	11,700	12,000	102,000	55,000	45,000
7,100	8,000	79,000	41,000	36,000	11,800	12,000	102,000	55,000	45,000
7,200	8,000	79,000	41,000	36,000	11,900	12,000	102,000	55,000	45,000
7,300	8,000	79,000	41,000	36,000	12,000	12,000	102,000	55,000	45,000
7,400	8,000	79,000	41,000	36,000	12,200	14,000	107,000	60,000	45,000
7,500	8,000	79,000	41,000	36,000	12,500	14,000	107,000	60,000	45,000

d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
12,700	14,000	107,000	60,000	45,000	16,000	16,000	115,000	65,000	48,000
13,000	14,000	107,000	60,000	45,000	16,500	18,000	123,000	73,000	48,000
13,500	14,000	107,000	60,000	45,000	17,000	18,000	123,000	73,000	48,000
13,700	14,000	107,000	60,000	45,000	17,500	18,000	123,000	73,000	48,000
14,000	14,000	107,000	60,000	45,000	18,000	18,000	123,000	73,000	48,000
14,200	16,000	115,000	65,000	48,000	18,500	20,000	131,000	79,000	50,000
14,500	16,000	115,000	65,000	48,000	19,000	20,000	131,000	79,000	50,000
14,700	16,000	115,000	65,000	48,000	19,500	20,000	131,000	79,000	50,000
15,000	16,000	115,000	65,000	48,000	20,000	20,000	131,000	79,000	50,000
15,200	16,000	115,000	65,000	48,000					
15,500	16,000	115,000	65,000	48,000					
15,700	16,000	115,000	65,000	48,000					

Forets SuperV

Forets sans trou d'huile, type SuperV



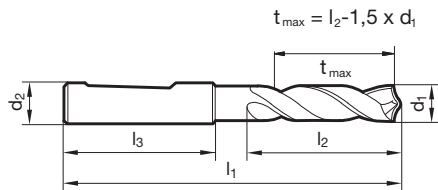
Référence **51871**



P	M	K	N	S	H
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Conseils d'util.,
page 26

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage en pente
- arête de coupe principale rectiligne
- géométrie de coupe optimisée



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
3,000	6,000	62,000	20,000	36,000	6,750	8,000	79,000	34,000	36,000
3,100	6,000	62,000	20,000	36,000	6,800	8,000	79,000	34,000	36,000
3,170	6,000	62,000	20,000	36,000	6,900	8,000	79,000	34,000	36,000
3,200	6,000	62,000	20,000	36,000	7,000	8,000	79,000	34,000	36,000
3,300	6,000	62,000	20,000	36,000	7,100	8,000	79,000	41,000	36,000
3,400	6,000	62,000	20,000	36,000	7,140	8,000	79,000	41,000	36,000
3,500	6,000	62,000	20,000	36,000	7,200	8,000	79,000	41,000	36,000
3,570	6,000	62,000	20,000	36,000	7,300	8,000	79,000	41,000	36,000
3,600	6,000	62,000	20,000	36,000	7,400	8,000	79,000	41,000	36,000
3,700	6,000	62,000	20,000	36,000	7,500	8,000	79,000	41,000	36,000
3,800	6,000	66,000	24,000	36,000	7,540	8,000	79,000	41,000	36,000
3,900	6,000	66,000	24,000	36,000	7,600	8,000	79,000	41,000	36,000
3,970	6,000	66,000	24,000	36,000	7,700	8,000	79,000	41,000	36,000
4,000	6,000	66,000	24,000	36,000	7,800	8,000	79,000	41,000	36,000
4,100	6,000	66,000	24,000	36,000	7,900	8,000	79,000	41,000	36,000
4,200	6,000	66,000	24,000	36,000	7,940	8,000	79,000	41,000	36,000
4,300	6,000	66,000	24,000	36,000	8,000	8,000	79,000	41,000	36,000
4,370	6,000	66,000	24,000	36,000	8,100	10,000	89,000	47,000	40,000
4,400	6,000	66,000	24,000	36,000	8,200	10,000	89,000	47,000	40,000
4,500	6,000	66,000	24,000	36,000	8,300	10,000	89,000	47,000	40,000
4,600	6,000	66,000	24,000	36,000	8,330	10,000	89,000	47,000	40,000
4,700	6,000	66,000	24,000	36,000	8,400	10,000	89,000	47,000	40,000
4,760	6,000	66,000	28,000	36,000	8,500	10,000	89,000	47,000	40,000
4,800	6,000	66,000	28,000	36,000	8,600	10,000	89,000	47,000	40,000
4,900	6,000	66,000	28,000	36,000	8,700	10,000	89,000	47,000	40,000
5,000	6,000	66,000	28,000	36,000	8,730	10,000	89,000	47,000	40,000
5,100	6,000	66,000	28,000	36,000	8,800	10,000	89,000	47,000	40,000
5,160	6,000	66,000	28,000	36,000	8,900	10,000	89,000	47,000	40,000
5,200	6,000	66,000	28,000	36,000	9,000	10,000	89,000	47,000	40,000
5,300	6,000	66,000	28,000	36,000	9,100	10,000	89,000	47,000	40,000
5,400	6,000	66,000	28,000	36,000	9,130	10,000	89,000	47,000	40,000
5,500	6,000	66,000	28,000	36,000	9,200	10,000	89,000	47,000	40,000
5,550	6,000	66,000	28,000	36,000	9,250	10,000	89,000	47,000	40,000
5,560	6,000	66,000	28,000	36,000	9,300	10,000	89,000	47,000	40,000
5,600	6,000	66,000	28,000	36,000	9,400	10,000	89,000	47,000	40,000
5,700	6,000	66,000	28,000	36,000	9,500	10,000	89,000	47,000	40,000
5,800	6,000	66,000	28,000	36,000	9,520	10,000	89,000	47,000	40,000
5,900	6,000	66,000	28,000	36,000	9,600	10,000	89,000	47,000	40,000
5,950	6,000	66,000	28,000	36,000	9,700	10,000	89,000	47,000	40,000
6,000	6,000	66,000	28,000	36,000	9,800	10,000	89,000	47,000	40,000
6,100	8,000	79,000	34,000	36,000	9,900	10,000	89,000	47,000	40,000
6,200	8,000	79,000	34,000	36,000	9,920	10,000	89,000	47,000	40,000
6,300	8,000	79,000	34,000	36,000	10,000	10,000	89,000	47,000	40,000
6,350	8,000	79,000	34,000	36,000	10,100	12,000	102,000	55,000	45,000
6,400	8,000	79,000	34,000	36,000	10,200	12,000	102,000	55,000	45,000
6,500	8,000	79,000	34,000	36,000	10,300	12,000	102,000	55,000	45,000
6,600	8,000	79,000	34,000	36,000	10,400	12,000	102,000	55,000	45,000
6,700	8,000	79,000	34,000	36,000	10,500	12,000	102,000	55,000	45,000

d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
10,600	12,000	102,000	55,000	45,000	14,200	16,000	115,000	65,000	48,000
10,700	12,000	102,000	55,000	45,000	14,300	16,000	115,000	65,000	48,000
10,800	12,000	102,000	55,000	45,000	14,400	16,000	115,000	65,000	48,000
10,900	12,000	102,000	55,000	45,000	14,500	16,000	115,000	65,000	48,000
11,000	12,000	102,000	55,000	45,000	14,700	16,000	115,000	65,000	48,000
11,100	12,000	102,000	55,000	45,000	15,000	16,000	115,000	65,000	48,000
11,200	12,000	102,000	55,000	45,000	15,200	16,000	115,000	65,000	48,000
11,300	12,000	102,000	55,000	45,000	15,500	16,000	115,000	65,000	48,000
11,400	12,000	102,000	55,000	45,000	15,600	16,000	115,000	65,000	48,000
11,500	12,000	102,000	55,000	45,000	15,700	16,000	115,000	65,000	48,000
11,600	12,000	102,000	55,000	45,000	15,800	16,000	115,000	65,000	48,000
11,700	12,000	102,000	55,000	45,000	16,000	16,000	115,000	65,000	48,000
11,800	12,000	102,000	55,000	45,000	16,100	18,000	123,000	73,000	48,000
11,900	12,000	102,000	55,000	45,000	16,200	18,000	123,000	73,000	48,000
12,000	12,000	102,000	55,000	45,000	16,300	18,000	123,000	73,000	48,000
12,100	14,000	107,000	60,000	45,000	16,500	18,000	123,000	73,000	48,000
12,200	14,000	107,000	60,000	45,000	17,000	18,000	123,000	73,000	48,000
12,300	14,000	107,000	60,000	45,000	17,500	18,000	123,000	73,000	48,000
12,400	14,000	107,000	60,000	45,000	18,000	18,000	123,000	73,000	48,000
12,500	14,000	107,000	60,000	45,000	18,300	20,000	131,000	79,000	50,000
12,600	14,000	107,000	60,000	45,000	18,500	20,000	131,000	79,000	50,000
12,700	14,000	107,000	60,000	45,000	19,000	20,000	131,000	79,000	50,000
13,000	14,000	107,000	60,000	45,000	19,500	20,000	131,000	79,000	50,000
13,200	14,000	107,000	60,000	45,000	20,000	20,000	131,000	79,000	50,000
13,300	14,000	107,000	60,000	45,000					
13,500	14,000	107,000	60,000	45,000					
13,700	14,000	107,000	60,000	45,000					
13,800	14,000	107,000	60,000	45,000					
14,000	14,000	107,000	60,000	45,000					
14,100	16,000	115,000	65,000	48,000					

Forets SuperV

Forets sans trou d'huile, type SuperV



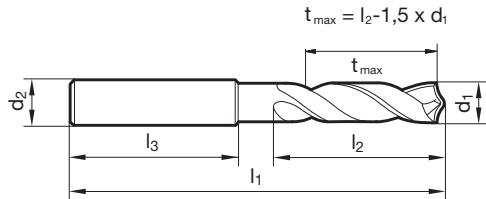
Référence **51787**



P	M	K	N	S	H
●		●	○	○	○

Conseils d'util.,
page 28

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage en pente
- arête de coupe principale rectiligne
- géométrie de coupe optimisée



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
3,000	6,000	66,000	28,000	36,000	7,600	8,000	91,000	53,000	36,000
3,100	6,000	66,000	28,000	36,000	7,700	8,000	91,000	53,000	36,000
3,200	6,000	66,000	28,000	36,000	7,800	8,000	91,000	53,000	36,000
3,300	6,000	66,000	28,000	36,000	7,900	8,000	91,000	53,000	36,000
3,400	6,000	66,000	28,000	36,000	8,000	8,000	91,000	53,000	36,000
3,500	6,000	66,000	28,000	36,000	8,100	10,000	103,000	61,000	40,000
3,600	6,000	66,000	28,000	36,000	8,200	10,000	103,000	61,000	40,000
3,700	6,000	66,000	28,000	36,000	8,300	10,000	103,000	61,000	40,000
3,800	6,000	74,000	36,000	36,000	8,330	10,000	103,000	61,000	40,000
3,900	6,000	74,000	36,000	36,000	8,400	10,000	103,000	61,000	40,000
4,000	6,000	74,000	36,000	36,000	8,500	10,000	103,000	61,000	40,000
4,100	6,000	74,000	36,000	36,000	8,600	10,000	103,000	61,000	40,000
4,200	6,000	74,000	36,000	36,000	8,700	10,000	103,000	61,000	40,000
4,300	6,000	74,000	36,000	36,000	8,800	10,000	103,000	61,000	40,000
4,400	6,000	74,000	36,000	36,000	8,900	10,000	103,000	61,000	40,000
4,500	6,000	74,000	36,000	36,000	9,000	10,000	103,000	61,000	40,000
4,600	6,000	74,000	36,000	36,000	9,100	10,000	103,000	61,000	40,000
4,700	6,000	74,000	36,000	36,000	9,200	10,000	103,000	61,000	40,000
4,760	6,000	82,000	44,000	36,000	9,300	10,000	103,000	61,000	40,000
4,800	6,000	82,000	44,000	36,000	9,400	10,000	103,000	61,000	40,000
4,900	6,000	82,000	44,000	36,000	9,500	10,000	103,000	61,000	40,000
5,000	6,000	82,000	44,000	36,000	9,600	10,000	103,000	61,000	40,000
5,100	6,000	82,000	44,000	36,000	9,700	10,000	103,000	61,000	40,000
5,200	6,000	82,000	44,000	36,000	9,800	10,000	103,000	61,000	40,000
5,300	6,000	82,000	44,000	36,000	9,900	10,000	103,000	61,000	40,000
5,400	6,000	82,000	44,000	36,000	10,000	10,000	103,000	61,000	40,000
5,500	6,000	82,000	44,000	36,000	10,100	12,000	118,000	71,000	45,000
5,600	6,000	82,000	44,000	36,000	10,200	12,000	118,000	71,000	45,000
5,700	6,000	82,000	44,000	36,000	10,300	12,000	118,000	71,000	45,000
5,800	6,000	82,000	44,000	36,000	10,400	12,000	118,000	71,000	45,000
5,900	6,000	82,000	44,000	36,000	10,500	12,000	118,000	71,000	45,000
6,000	6,000	82,000	44,000	36,000	10,600	12,000	118,000	71,000	45,000
6,100	8,000	91,000	53,000	36,000	10,700	12,000	118,000	71,000	45,000
6,200	8,000	91,000	53,000	36,000	10,800	12,000	118,000	71,000	45,000
6,300	8,000	91,000	53,000	36,000	10,900	12,000	118,000	71,000	45,000
6,350	8,000	91,000	53,000	36,000	11,000	12,000	118,000	71,000	45,000
6,400	8,000	91,000	53,000	36,000	11,100	12,000	118,000	71,000	45,000
6,500	8,000	91,000	53,000	36,000	11,200	12,000	118,000	71,000	45,000
6,600	8,000	91,000	53,000	36,000	11,300	12,000	118,000	71,000	45,000
6,700	8,000	91,000	53,000	36,000	11,400	12,000	118,000	71,000	45,000
6,800	8,000	91,000	53,000	36,000	11,500	12,000	118,000	71,000	45,000
6,900	8,000	91,000	53,000	36,000	11,600	12,000	118,000	71,000	45,000
7,000	8,000	91,000	53,000	36,000	11,700	12,000	118,000	71,000	45,000
7,100	8,000	91,000	53,000	36,000	11,800	12,000	118,000	71,000	45,000
7,200	8,000	91,000	53,000	36,000	11,900	12,000	118,000	71,000	45,000
7,300	8,000	91,000	53,000	36,000	12,000	12,000	118,000	71,000	45,000
7,400	8,000	91,000	53,000	36,000	12,200	14,000	124,000	77,000	45,000
7,500	8,000	91,000	53,000	36,000	12,500	14,000	124,000	77,000	45,000

d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
12,700	14,000	124,000	77,000	45,000	16,000	16,000	133,000	83,000	48,000
13,000	14,000	124,000	77,000	45,000	16,500	18,000	143,000	93,000	48,000
13,500	14,000	124,000	77,000	45,000	17,000	18,000	143,000	93,000	48,000
13,700	14,000	124,000	77,000	45,000	17,500	18,000	143,000	93,000	48,000
14,000	14,000	124,000	77,000	45,000	18,000	18,000	143,000	93,000	48,000
14,200	16,000	133,000	83,000	48,000	18,500	20,000	153,000	101,000	50,000
14,500	16,000	133,000	83,000	48,000	19,000	20,000	153,000	101,000	50,000
14,700	16,000	133,000	83,000	48,000	19,500	20,000	153,000	101,000	50,000
15,000	16,000	133,000	83,000	48,000	20,000	20,000	153,000	101,000	50,000
15,200	16,000	133,000	83,000	48,000					
15,500	16,000	133,000	83,000	48,000					
15,700	16,000	133,000	83,000	48,000					

Forets SuperV

Forets sans trou d'huile, type SuperV



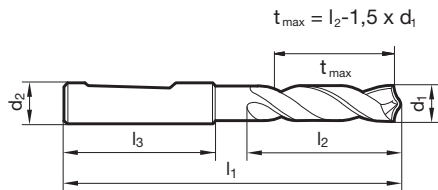
Référence **51887**



P	M	K	N	S	H
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Conseils d'util.,
page 28

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage en pente
- arête de coupe principale rectiligne
- géométrie de coupe optimisée



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
3,000	6,000	66,000	28,000	36,000	6,800	8,000	91,000	53,000	36,000
3,100	6,000	66,000	28,000	36,000	6,900	8,000	91,000	53,000	36,000
3,170	6,000	66,000	28,000	36,000	7,000	8,000	91,000	53,000	36,000
3,200	6,000	66,000	28,000	36,000	7,100	8,000	91,000	53,000	36,000
3,300	6,000	66,000	28,000	36,000	7,140	8,000	91,000	53,000	36,000
3,400	6,000	66,000	28,000	36,000	7,200	8,000	91,000	53,000	36,000
3,500	6,000	66,000	28,000	36,000	7,300	8,000	91,000	53,000	36,000
3,570	6,000	66,000	28,000	36,000	7,400	8,000	91,000	53,000	36,000
3,600	6,000	66,000	28,000	36,000	7,500	8,000	91,000	53,000	36,000
3,700	6,000	66,000	28,000	36,000	7,540	8,000	91,000	53,000	36,000
3,800	6,000	74,000	36,000	36,000	7,600	8,000	91,000	53,000	36,000
3,900	6,000	74,000	36,000	36,000	7,700	8,000	91,000	53,000	36,000
3,970	6,000	74,000	36,000	36,000	7,800	8,000	91,000	53,000	36,000
4,000	6,000	74,000	36,000	36,000	7,900	8,000	91,000	53,000	36,000
4,100	6,000	74,000	36,000	36,000	7,940	8,000	91,000	53,000	36,000
4,200	6,000	74,000	36,000	36,000	8,000	8,000	91,000	53,000	36,000
4,300	6,000	74,000	36,000	36,000	8,100	10,000	103,000	61,000	40,000
4,370	6,000	74,000	36,000	36,000	8,200	10,000	103,000	61,000	40,000
4,400	6,000	74,000	36,000	36,000	8,300	10,000	103,000	61,000	40,000
4,500	6,000	74,000	36,000	36,000	8,330	10,000	103,000	61,000	40,000
4,600	6,000	74,000	36,000	36,000	8,400	10,000	103,000	61,000	40,000
4,700	6,000	74,000	36,000	36,000	8,500	10,000	103,000	61,000	40,000
4,760	6,000	82,000	44,000	36,000	8,600	10,000	103,000	61,000	40,000
4,800	6,000	82,000	44,000	36,000	8,700	10,000	103,000	61,000	40,000
4,900	6,000	82,000	44,000	36,000	8,730	10,000	103,000	61,000	40,000
5,000	6,000	82,000	44,000	36,000	8,800	10,000	103,000	61,000	40,000
5,100	6,000	82,000	44,000	36,000	8,900	10,000	103,000	61,000	40,000
5,160	6,000	82,000	44,000	36,000	9,000	10,000	103,000	61,000	40,000
5,200	6,000	82,000	44,000	36,000	9,100	10,000	103,000	61,000	40,000
5,300	6,000	82,000	44,000	36,000	9,130	10,000	103,000	61,000	40,000
5,400	6,000	82,000	44,000	36,000	9,200	10,000	103,000	61,000	40,000
5,500	6,000	82,000	44,000	36,000	9,300	10,000	103,000	61,000	40,000
5,560	6,000	82,000	44,000	36,000	9,400	10,000	103,000	61,000	40,000
5,600	6,000	82,000	44,000	36,000	9,500	10,000	103,000	61,000	40,000
5,700	6,000	82,000	44,000	36,000	9,520	10,000	103,000	61,000	40,000
5,800	6,000	82,000	44,000	36,000	9,600	10,000	103,000	61,000	40,000
5,900	6,000	82,000	44,000	36,000	9,700	10,000	103,000	61,000	40,000
5,950	6,000	82,000	44,000	36,000	9,800	10,000	103,000	61,000	40,000
6,000	6,000	82,000	44,000	36,000	9,900	10,000	103,000	61,000	40,000
6,100	8,000	91,000	53,000	36,000	9,920	10,000	103,000	61,000	40,000
6,200	8,000	91,000	53,000	36,000	10,000	10,000	103,000	61,000	40,000
6,300	8,000	91,000	53,000	36,000	10,100	12,000	118,000	71,000	45,000
6,350	8,000	91,000	53,000	36,000	10,200	12,000	118,000	71,000	45,000
6,400	8,000	91,000	53,000	36,000	10,300	12,000	118,000	71,000	45,000
6,500	8,000	91,000	53,000	36,000	10,400	12,000	118,000	71,000	45,000
6,600	8,000	91,000	53,000	36,000	10,500	12,000	118,000	71,000	45,000
6,700	8,000	91,000	53,000	36,000	10,600	12,000	118,000	71,000	45,000
6,750	8,000	91,000	53,000	36,000	10,700	12,000	118,000	71,000	45,000

d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
10,800	12,000	118,000	71,000	45,000	14,700	16,000	133,000	83,000	48,000
10,900	12,000	118,000	71,000	45,000	15,000	16,000	133,000	83,000	48,000
11,000	12,000	118,000	71,000	45,000	15,200	16,000	133,000	83,000	48,000
11,100	12,000	118,000	71,000	45,000	15,500	16,000	133,000	83,000	48,000
11,200	12,000	118,000	71,000	45,000	15,700	16,000	133,000	83,000	48,000
11,300	12,000	118,000	71,000	45,000	16,000	16,000	133,000	83,000	48,000
11,400	12,000	118,000	71,000	45,000	16,500	18,000	143,000	93,000	48,000
11,500	12,000	118,000	71,000	45,000	17,000	18,000	143,000	93,000	48,000
11,600	12,000	118,000	71,000	45,000	17,500	18,000	143,000	93,000	48,000
11,700	12,000	118,000	71,000	45,000	18,000	18,000	143,000	93,000	48,000
11,800	12,000	118,000	71,000	45,000	18,500	20,000	153,000	101,000	50,000
11,900	12,000	118,000	71,000	45,000	19,000	20,000	153,000	101,000	50,000
12,000	12,000	118,000	71,000	45,000	19,500	20,000	153,000	101,000	50,000
12,100	14,000	124,000	77,000	45,000	20,000	20,000	153,000	101,000	50,000
12,200	14,000	124,000	77,000	45,000					
12,500	14,000	124,000	77,000	45,000					
12,700	14,000	124,000	77,000	45,000					
13,000	14,000	124,000	77,000	45,000					
13,500	14,000	124,000	77,000	45,000					
13,700	14,000	124,000	77,000	45,000					
14,000	14,000	124,000	77,000	45,000					
14,100	16,000	133,000	83,000	48,000					
14,200	16,000	133,000	83,000	48,000					
14,500	16,000	133,000	83,000	48,000					

Forets SuperV

Forets avec trous d'huile, type SuperV



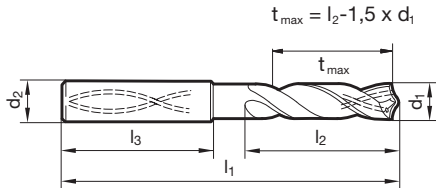
Référence **51776**



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Conseils d'util.,
page 26

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage en pente
- arête de coupe principale rectiligne
- géométrie de coupe optimisée



d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	62,000	20,000	36,000	7,500		8,000	79,000	41,000	36,000
3,100		6,000	62,000	20,000	36,000	7,600		8,000	79,000	41,000	36,000
3,200		6,000	62,000	20,000	36,000	7,700		8,000	79,000	41,000	36,000
3,300		6,000	62,000	20,000	36,000	7,800		8,000	79,000	41,000	36,000
3,400		6,000	62,000	20,000	36,000	7,900		8,000	79,000	41,000	36,000
3,500		6,000	62,000	20,000	36,000	8,000		8,000	79,000	41,000	36,000
3,600		6,000	62,000	20,000	36,000	8,100		10,000	89,000	47,000	40,000
3,700		6,000	62,000	20,000	36,000	8,200		10,000	89,000	47,000	40,000
3,800		6,000	66,000	24,000	36,000	8,300		10,000	89,000	47,000	40,000
3,900		6,000	66,000	24,000	36,000	8,400		10,000	89,000	47,000	40,000
4,000		6,000	66,000	24,000	36,000	8,500		10,000	89,000	47,000	40,000
4,100		6,000	66,000	24,000	36,000	8,600		10,000	89,000	47,000	40,000
4,200		6,000	66,000	24,000	36,000	8,700		10,000	89,000	47,000	40,000
4,300		6,000	66,000	24,000	36,000	8,800		10,000	89,000	47,000	40,000
4,400		6,000	66,000	24,000	36,000	8,900		10,000	89,000	47,000	40,000
4,500		6,000	66,000	24,000	36,000	9,000		10,000	89,000	47,000	40,000
4,600		6,000	66,000	24,000	36,000	9,100		10,000	89,000	47,000	40,000
4,650		6,000	66,000	24,000	36,000	9,200		10,000	89,000	47,000	40,000
4,700		6,000	66,000	24,000	36,000	9,250		10,000	89,000	47,000	40,000
4,800		6,000	66,000	28,000	36,000	9,300		10,000	89,000	47,000	40,000
4,900		6,000	66,000	28,000	36,000	9,400		10,000	89,000	47,000	40,000
5,000		6,000	66,000	28,000	36,000	9,500		10,000	89,000	47,000	40,000
5,100		6,000	66,000	28,000	36,000	9,600		10,000	89,000	47,000	40,000
5,200		6,000	66,000	28,000	36,000	9,700		10,000	89,000	47,000	40,000
5,300		6,000	66,000	28,000	36,000	9,800		10,000	89,000	47,000	40,000
5,400		6,000	66,000	28,000	36,000	9,900		10,000	89,000	47,000	40,000
5,500		6,000	66,000	28,000	36,000	10,000		10,000	89,000	47,000	40,000
5,550		6,000	66,000	28,000	36,000	10,100		12,000	102,000	55,000	45,000
5,600		6,000	66,000	28,000	36,000	10,200		12,000	102,000	55,000	45,000
5,700		6,000	66,000	28,000	36,000	10,300		12,000	102,000	55,000	45,000
5,800		6,000	66,000	28,000	36,000	10,400		12,000	102,000	55,000	45,000
5,900		6,000	66,000	28,000	36,000	10,500		12,000	102,000	55,000	45,000
6,000		6,000	66,000	28,000	36,000	10,600		12,000	102,000	55,000	45,000
6,100		8,000	79,000	34,000	36,000	10,700		12,000	102,000	55,000	45,000
6,200		8,000	79,000	34,000	36,000	10,800		12,000	102,000	55,000	45,000
6,300		8,000	79,000	34,000	36,000	10,900		12,000	102,000	55,000	45,000
6,350	1/4	8,000	79,000	34,000	36,000	11,000		12,000	102,000	55,000	45,000
6,400		8,000	79,000	34,000	36,000	11,100		12,000	102,000	55,000	45,000
6,500		8,000	79,000	34,000	36,000	11,200		12,000	102,000	55,000	45,000
6,600		8,000	79,000	34,000	36,000	11,300		12,000	102,000	55,000	45,000
6,700		8,000	79,000	34,000	36,000	11,400		12,000	102,000	55,000	45,000
6,800		8,000	79,000	34,000	36,000	11,500		12,000	102,000	55,000	45,000
6,900		8,000	79,000	34,000	36,000	11,600		12,000	102,000	55,000	45,000
7,000		8,000	79,000	34,000	36,000	11,700		12,000	102,000	55,000	45,000
7,100		8,000	79,000	41,000	36,000	11,800		12,000	102,000	55,000	45,000
7,200		8,000	79,000	41,000	36,000	11,900		12,000	102,000	55,000	45,000
7,300		8,000	79,000	41,000	36,000	12,000		12,000	102,000	55,000	45,000
7,400		8,000	79,000	41,000	36,000	12,200		14,000	107,000	60,000	45,000

d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
12,500		14,000	107,000	60,000	45,000	18,000		18,000	123,000	73,000	48,000
12,700	1/2	14,000	107,000	60,000	45,000	18,500		20,000	131,000	79,000	50,000
13,000		14,000	107,000	60,000	45,000	18,700		20,000	131,000	79,000	50,000
13,500		14,000	107,000	60,000	45,000	19,000		20,000	131,000	79,000	50,000
13,700		14,000	107,000	60,000	45,000	19,500		20,000	131,000	79,000	50,000
14,000		14,000	107,000	60,000	45,000	19,700		20,000	131,000	79,000	50,000
14,200		16,000	115,000	65,000	48,000	20,000		20,000	131,000	79,000	50,000
14,500		16,000	115,000	65,000	48,000						
14,700		16,000	115,000	65,000	48,000						
15,000		16,000	115,000	65,000	48,000						
15,200		16,000	115,000	65,000	48,000						
15,500		16,000	115,000	65,000	48,000						
15,700		16,000	115,000	65,000	48,000						
16,000		16,000	115,000	65,000	48,000						
16,500		18,000	123,000	73,000	48,000						
16,700		18,000	123,000	73,000	48,000						
17,000		18,000	123,000	73,000	48,000						
17,500		18,000	123,000	73,000	48,000						

Forets SuperV

Forets avec trous d'huile, type SuperV



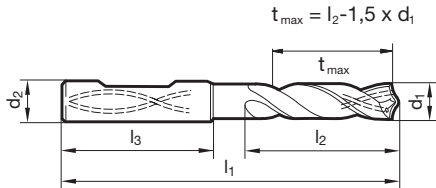
Référence **51876**



P	M	K	N	S	H
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Conseils d'util.,
page 26

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage en pente
- arête de coupe principale rectiligne
- géométrie de coupe optimisée



d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	62,000	20,000	36,000	7,100		8,000	79,000	41,000	36,000
3,100		6,000	62,000	20,000	36,000	7,140	9/32	8,000	79,000	41,000	36,000
3,200		6,000	62,000	20,000	36,000	7,200		8,000	79,000	41,000	36,000
3,300		6,000	62,000	20,000	36,000	7,300		8,000	79,000	41,000	36,000
3,400		6,000	62,000	20,000	36,000	7,400		8,000	79,000	41,000	36,000
3,500		6,000	62,000	20,000	36,000	7,500		8,000	79,000	41,000	36,000
3,600		6,000	62,000	20,000	36,000	7,540	19/64	8,000	79,000	41,000	36,000
3,700		6,000	62,000	20,000	36,000	7,600		8,000	79,000	41,000	36,000
3,800		6,000	66,000	24,000	36,000	7,700		8,000	79,000	41,000	36,000
3,900		6,000	66,000	24,000	36,000	7,800		8,000	79,000	41,000	36,000
4,000		6,000	66,000	24,000	36,000	7,900		8,000	79,000	41,000	36,000
4,100		6,000	66,000	24,000	36,000	7,940	5/16	8,000	79,000	41,000	36,000
4,200		6,000	66,000	24,000	36,000	8,000		8,000	79,000	41,000	36,000
4,300		6,000	66,000	24,000	36,000	8,100		10,000	89,000	47,000	40,000
4,370	11/64	6,000	66,000	24,000	36,000	8,200		10,000	89,000	47,000	40,000
4,400		6,000	66,000	24,000	36,000	8,300		10,000	89,000	47,000	40,000
4,500		6,000	66,000	24,000	36,000	8,330	21/64	10,000	89,000	47,000	40,000
4,600		6,000	66,000	24,000	36,000	8,400		10,000	89,000	47,000	40,000
4,700		6,000	66,000	24,000	36,000	8,500		10,000	89,000	47,000	40,000
4,760	3/16	6,000	66,000	28,000	36,000	8,600		10,000	89,000	47,000	40,000
4,800		6,000	66,000	28,000	36,000	8,700		10,000	89,000	47,000	40,000
4,900		6,000	66,000	28,000	36,000	8,730	11/32	10,000	89,000	47,000	40,000
5,000		6,000	66,000	28,000	36,000	8,800		10,000	89,000	47,000	40,000
5,100		6,000	66,000	28,000	36,000	8,900		10,000	89,000	47,000	40,000
5,160	13/64	6,000	66,000	28,000	36,000	9,000		10,000	89,000	47,000	40,000
5,200		6,000	66,000	28,000	36,000	9,100		10,000	89,000	47,000	40,000
5,300		6,000	66,000	28,000	36,000	9,130	23/64	10,000	89,000	47,000	40,000
5,400		6,000	66,000	28,000	36,000	9,200		10,000	89,000	47,000	40,000
5,500		6,000	66,000	28,000	36,000	9,300		10,000	89,000	47,000	40,000
5,560	7/32	6,000	66,000	28,000	36,000	9,400		10,000	89,000	47,000	40,000
5,600		6,000	66,000	28,000	36,000	9,500		10,000	89,000	47,000	40,000
5,700		6,000	66,000	28,000	36,000	9,520	3/8	10,000	89,000	47,000	40,000
5,800		6,000	66,000	28,000	36,000	9,600		10,000	89,000	47,000	40,000
5,900		6,000	66,000	28,000	36,000	9,700		10,000	89,000	47,000	40,000
5,950	15/64	6,000	66,000	28,000	36,000	9,800		10,000	89,000	47,000	40,000
6,000		6,000	66,000	28,000	36,000	9,900		10,000	89,000	47,000	40,000
6,100		8,000	79,000	34,000	36,000	9,920	25/64	10,000	89,000	47,000	40,000
6,200		8,000	79,000	34,000	36,000	10,000		10,000	89,000	47,000	40,000
6,300		8,000	79,000	34,000	36,000	10,100		12,000	102,000	55,000	45,000
6,350	1/4	8,000	79,000	34,000	36,000	10,200		12,000	102,000	55,000	45,000
6,400		8,000	79,000	34,000	36,000	10,300		12,000	102,000	55,000	45,000
6,500		8,000	79,000	34,000	36,000	10,320	13/32	12,000	102,000	55,000	45,000
6,600		8,000	79,000	34,000	36,000	10,400		12,000	102,000	55,000	45,000
6,700		8,000	79,000	34,000	36,000	10,500		12,000	102,000	55,000	45,000
6,750	17/64	8,000	79,000	34,000	36,000	10,600		12,000	102,000	55,000	45,000
6,800		8,000	79,000	34,000	36,000	10,700		12,000	102,000	55,000	45,000
6,900		8,000	79,000	34,000	36,000	10,800		12,000	102,000	55,000	45,000
7,000		8,000	79,000	34,000	36,000	10,900		12,000	102,000	55,000	45,000

d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
11,000		12,000	102,000	55,000	45,000	14,100		16,000	115,000	65,000	48,000
11,100		12,000	102,000	55,000	45,000	14,200		16,000	115,000	65,000	48,000
11,110	7/16	12,000	102,000	55,000	45,000	14,290	9/16	16,000	115,000	65,000	48,000
11,200		12,000	102,000	55,000	45,000	14,300		16,000	115,000	65,000	48,000
11,300		12,000	102,000	55,000	45,000	14,500		16,000	115,000	65,000	48,000
11,400		12,000	102,000	55,000	45,000	14,700		16,000	115,000	65,000	48,000
11,500		12,000	102,000	55,000	45,000	14,900		16,000	115,000	65,000	48,000
11,600		12,000	102,000	55,000	45,000	15,000		16,000	115,000	65,000	48,000
11,700		12,000	102,000	55,000	45,000	15,200		16,000	115,000	65,000	48,000
11,800		12,000	102,000	55,000	45,000	15,500		16,000	115,000	65,000	48,000
11,900		12,000	102,000	55,000	45,000	15,600		16,000	115,000	65,000	48,000
11,910	15/32	12,000	102,000	55,000	45,000	15,700		16,000	115,000	65,000	48,000
12,000		12,000	102,000	55,000	45,000	16,000		16,000	115,000	65,000	48,000
12,100		14,000	107,000	60,000	45,000	16,100		18,000	123,000	73,000	48,000
12,200		14,000	107,000	60,000	45,000	16,200		18,000	123,000	73,000	48,000
12,300	31/64	14,000	107,000	60,000	45,000	16,500		18,000	123,000	73,000	48,000
12,400		14,000	107,000	60,000	45,000	17,000		18,000	123,000	73,000	48,000
12,500		14,000	107,000	60,000	45,000	17,500		18,000	123,000	73,000	48,000
12,700	1/2	14,000	107,000	60,000	45,000	17,700		18,000	123,000	73,000	48,000
13,000		14,000	107,000	60,000	45,000	18,000		18,000	123,000	73,000	48,000
13,200		14,000	107,000	60,000	45,000	18,500		20,000	131,000	79,000	50,000
13,500		14,000	107,000	60,000	45,000	19,000		20,000	131,000	79,000	50,000
13,700		14,000	107,000	60,000	45,000	19,500		20,000	131,000	79,000	50,000
14,000		14,000	107,000	60,000	45,000	20,000		20,000	131,000	79,000	50,000

Forets SuperV

Forets avec trous d'huile, type SuperV



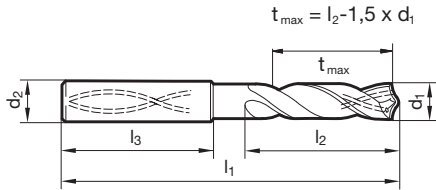
Référence 51770



P	M	K	N	S	H
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Conseils d'util.,
page 26

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage en pente
- arête de coupe principale rectiligne
- géométrie de coupe optimisée
- particulièrement bien approprié pour les aciers inoxydables



d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	62,000	20,000	36,000
3,100		6,000	62,000	20,000	36,000
3,170	1/8	6,000	62,000	20,000	36,000
3,200		6,000	62,000	20,000	36,000
3,250		6,000	62,000	20,000	36,000
3,300		6,000	62,000	20,000	36,000
3,400		6,000	62,000	20,000	36,000
3,500		6,000	62,000	20,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000
3,600		6,000	62,000	20,000	36,000
3,700		6,000	62,000	20,000	36,000
3,800		6,000	66,000	24,000	36,000
3,900		6,000	66,000	24,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000
4,000		6,000	66,000	24,000	36,000
4,100		6,000	66,000	24,000	36,000
4,200		6,000	66,000	24,000	36,000
4,300		6,000	66,000	24,000	36,000
4,370	11/64	6,000	66,000	24,000	36,000
4,400		6,000	66,000	24,000	36,000
4,500		6,000	66,000	24,000	36,000
4,600		6,000	66,000	24,000	36,000
4,650		6,000	66,000	24,000	36,000
4,700		6,000	66,000	24,000	36,000
4,760	3/16	6,000	66,000	28,000	36,000
4,800		6,000	66,000	28,000	36,000
4,900		6,000	66,000	28,000	36,000
5,000		6,000	66,000	28,000	36,000
5,100		6,000	66,000	28,000	36,000
5,160	13/64	6,000	66,000	28,000	36,000
5,200		6,000	66,000	28,000	36,000
5,300		6,000	66,000	28,000	36,000
5,400		6,000	66,000	28,000	36,000
5,500		6,000	66,000	28,000	36,000
5,550		6,000	66,000	28,000	36,000
5,560	7/32	6,000	66,000	28,000	36,000
5,600		6,000	66,000	28,000	36,000
5,700		6,000	66,000	28,000	36,000
5,800		6,000	66,000	28,000	36,000
5,900		6,000	66,000	28,000	36,000
5,950	15/64	6,000	66,000	28,000	36,000
6,000		6,000	66,000	28,000	36,000
6,100		8,000	79,000	34,000	36,000
6,200		8,000	79,000	34,000	36,000
6,300		8,000	79,000	34,000	36,000
6,350	1/4	8,000	79,000	34,000	36,000
6,400		8,000	79,000	34,000	36,000
6,500		8,000	79,000	34,000	36,000

d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
6,600		8,000	79,000	34,000	36,000
6,700		8,000	79,000	34,000	36,000
6,750	17/64	8,000	79,000	34,000	36,000
6,800		8,000	79,000	34,000	36,000
6,900		8,000	79,000	34,000	36,000
7,000		8,000	79,000	34,000	36,000
7,100		8,000	79,000	41,000	36,000
7,140	9/32	8,000	79,000	41,000	36,000
7,200		8,000	79,000	41,000	36,000
7,300		8,000	79,000	41,000	36,000
7,400		8,000	79,000	41,000	36,000
7,500		8,000	79,000	41,000	36,000
7,540	19/64	8,000	79,000	41,000	36,000
7,600		8,000	79,000	41,000	36,000
7,700		8,000	79,000	41,000	36,000
7,800		8,000	79,000	41,000	36,000
7,900		8,000	79,000	41,000	36,000
7,940	5/16	8,000	79,000	41,000	36,000
8,000		8,000	79,000	41,000	36,000
8,100		10,000	89,000	47,000	40,000
8,200		10,000	89,000	47,000	40,000
8,300		10,000	89,000	47,000	40,000
8,330	21/64	10,000	89,000	47,000	40,000
8,400		10,000	89,000	47,000	40,000
8,500		10,000	89,000	47,000	40,000
8,600		10,000	89,000	47,000	40,000
8,700		10,000	89,000	47,000	40,000
8,730	11/32	10,000	89,000	47,000	40,000
8,800		10,000	89,000	47,000	40,000
8,900		10,000	89,000	47,000	40,000
9,000		10,000	89,000	47,000	40,000
9,100		10,000	89,000	47,000	40,000
9,130	23/64	10,000	89,000	47,000	40,000
9,200		10,000	89,000	47,000	40,000
9,250		10,000	89,000	47,000	40,000
9,300		10,000	89,000	47,000	40,000
9,400		10,000	89,000	47,000	40,000
9,500		10,000	89,000	47,000	40,000
9,520	3/8	10,000	89,000	47,000	40,000
9,600		10,000	89,000	47,000	40,000
9,700		10,000	89,000	47,000	40,000
9,800		10,000	89,000	47,000	40,000
9,900		10,000	89,000	47,000	40,000
9,920	25/64	10,000	89,000	47,000	40,000
10,000		10,000	89,000	47,000	40,000
10,100		12,000	102,000	55,000	45,000
10,200		12,000	102,000	55,000	45,000
10,300		12,000	102,000	55,000	45,000

d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
10,320	13/32	12,000	102,000	55,000	45,000	14,290	9/16	16,000	115,000	65,000	48,000
10,400		12,000	102,000	55,000	45,000	14,300		16,000	115,000	65,000	48,000
10,500		12,000	102,000	55,000	45,000	14,500		16,000	115,000	65,000	48,000
10,600		12,000	102,000	55,000	45,000	14,700		16,000	115,000	65,000	48,000
10,700		12,000	102,000	55,000	45,000	15,000		16,000	115,000	65,000	48,000
10,800		12,000	102,000	55,000	45,000	15,200		16,000	115,000	65,000	48,000
10,900		12,000	102,000	55,000	45,000	15,300		16,000	115,000	65,000	48,000
11,000		12,000	102,000	55,000	45,000	15,500		16,000	115,000	65,000	48,000
11,100		12,000	102,000	55,000	45,000	15,700		16,000	115,000	65,000	48,000
11,110	7/16	12,000	102,000	55,000	45,000	16,000		16,000	115,000	65,000	48,000
11,200		12,000	102,000	55,000	45,000	16,300		18,000	123,000	73,000	48,000
11,300		12,000	102,000	55,000	45,000	16,500		18,000	123,000	73,000	48,000
11,400		12,000	102,000	55,000	45,000	16,900		18,000	123,000	73,000	48,000
11,500		12,000	102,000	55,000	45,000	17,000		18,000	123,000	73,000	48,000
11,600		12,000	102,000	55,000	45,000	17,300		18,000	123,000	73,000	48,000
11,700		12,000	102,000	55,000	45,000	17,500		18,000	123,000	73,000	48,000
11,800		12,000	102,000	55,000	45,000	18,000		18,000	123,000	73,000	48,000
11,900		12,000	102,000	55,000	45,000	18,500		20,000	131,000	79,000	50,000
11,910	15/32	12,000	102,000	55,000	45,000	18,900		20,000	131,000	79,000	50,000
12,000		12,000	102,000	55,000	45,000	19,000		20,000	131,000	79,000	50,000
12,200		14,000	107,000	60,000	45,000	19,300		20,000	131,000	79,000	50,000
12,500		14,000	107,000	60,000	45,000	19,500		20,000	131,000	79,000	50,000
12,700	1/2	14,000	107,000	60,000	45,000	20,000		20,000	131,000	79,000	50,000
12,800		14,000	107,000	60,000	45,000						
13,000		14,000	107,000	60,000	45,000						
13,300		14,000	107,000	60,000	45,000						
13,500		14,000	107,000	60,000	45,000						
13,700		14,000	107,000	60,000	45,000						
14,000		14,000	107,000	60,000	45,000						
14,200		16,000	115,000	65,000	48,000						

Forets SuperV

Forets avec trous d'huile, type SuperV



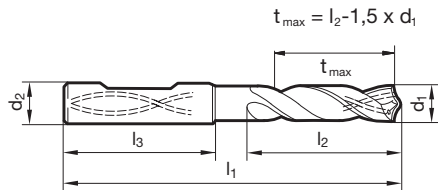
Référence 51771



P	M	K	N	S	H
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Conseils d'util.,
page 26

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage en pente
- arête de coupe principale rectiligne
- géométrie de coupe optimisée
- particulièrement bien approprié pour les aciers inoxydables



d1		d2	l1	l2	l3	d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	62,000	20,000	36,000	6,600		8,000	79,000	34,000	36,000
3,100		6,000	62,000	20,000	36,000	6,700		8,000	79,000	34,000	36,000
3,170	1/8	6,000	62,000	20,000	36,000	6,750	17/64	8,000	79,000	34,000	36,000
3,200		6,000	62,000	20,000	36,000	6,800		8,000	79,000	34,000	36,000
3,250		6,000	62,000	20,000	36,000	6,900		8,000	79,000	34,000	36,000
3,300		6,000	62,000	20,000	36,000	7,000		8,000	79,000	34,000	36,000
3,400		6,000	62,000	20,000	36,000	7,100		8,000	79,000	41,000	36,000
3,500		6,000	62,000	20,000	36,000	7,140	9/32	8,000	79,000	41,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000	7,200		8,000	79,000	41,000	36,000
3,600		6,000	62,000	20,000	36,000	7,300		8,000	79,000	41,000	36,000
3,700		6,000	62,000	20,000	36,000	7,400		8,000	79,000	41,000	36,000
3,800		6,000	66,000	24,000	36,000	7,500		8,000	79,000	41,000	36,000
3,900		6,000	66,000	24,000	36,000	7,540	19/64	8,000	79,000	41,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000	7,600		8,000	79,000	41,000	36,000
4,000		6,000	66,000	24,000	36,000	7,700		8,000	79,000	41,000	36,000
4,100		6,000	66,000	24,000	36,000	7,800		8,000	79,000	41,000	36,000
4,200		6,000	66,000	24,000	36,000	7,900		8,000	79,000	41,000	36,000
4,300		6,000	66,000	24,000	36,000	7,940	5/16	8,000	79,000	41,000	36,000
4,370	11/64	6,000	66,000	24,000	36,000	8,000		8,000	79,000	41,000	36,000
4,400		6,000	66,000	24,000	36,000	8,100		10,000	89,000	47,000	40,000
4,500		6,000	66,000	24,000	36,000	8,200		10,000	89,000	47,000	40,000
4,600		6,000	66,000	24,000	36,000	8,300		10,000	89,000	47,000	40,000
4,650		6,000	66,000	24,000	36,000	8,330	21/64	10,000	89,000	47,000	40,000
4,700		6,000	66,000	24,000	36,000	8,400		10,000	89,000	47,000	40,000
4,760	3/16	6,000	66,000	28,000	36,000	8,500		10,000	89,000	47,000	40,000
4,800		6,000	66,000	28,000	36,000	8,600		10,000	89,000	47,000	40,000
4,900		6,000	66,000	28,000	36,000	8,700		10,000	89,000	47,000	40,000
5,000		6,000	66,000	28,000	36,000	8,730	11/32	10,000	89,000	47,000	40,000
5,100		6,000	66,000	28,000	36,000	8,800		10,000	89,000	47,000	40,000
5,160	13/64	6,000	66,000	28,000	36,000	8,900		10,000	89,000	47,000	40,000
5,200		6,000	66,000	28,000	36,000	9,000		10,000	89,000	47,000	40,000
5,300		6,000	66,000	28,000	36,000	9,100		10,000	89,000	47,000	40,000
5,400		6,000	66,000	28,000	36,000	9,130	23/64	10,000	89,000	47,000	40,000
5,500		6,000	66,000	28,000	36,000	9,200		10,000	89,000	47,000	40,000
5,550		6,000	66,000	28,000	36,000	9,250		10,000	89,000	47,000	40,000
5,560	7/32	6,000	66,000	28,000	36,000	9,300		10,000	89,000	47,000	40,000
5,600		6,000	66,000	28,000	36,000	9,400		10,000	89,000	47,000	40,000
5,700		6,000	66,000	28,000	36,000	9,500		10,000	89,000	47,000	40,000
5,800		6,000	66,000	28,000	36,000	9,520	3/8	10,000	89,000	47,000	40,000
5,900		6,000	66,000	28,000	36,000	9,600		10,000	89,000	47,000	40,000
5,950	15/64	6,000	66,000	28,000	36,000	9,700		10,000	89,000	47,000	40,000
6,000		6,000	66,000	28,000	36,000	9,800		10,000	89,000	47,000	40,000
6,100		8,000	79,000	34,000	36,000	9,900		10,000	89,000	47,000	40,000
6,200		8,000	79,000	34,000	36,000	9,920	25/64	10,000	89,000	47,000	40,000
6,300		8,000	79,000	34,000	36,000	10,000		10,000	89,000	47,000	40,000
6,350	1/4	8,000	79,000	34,000	36,000	10,100		12,000	102,000	55,000	45,000
6,400		8,000	79,000	34,000	36,000	10,200		12,000	102,000	55,000	45,000
6,500		8,000	79,000	34,000	36,000	10,300		12,000	102,000	55,000	45,000

d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
10,320	13/32	12,000	102,000	55,000	45,000	14,290	9/16	16,000	115,000	65,000	48,000
10,400		12,000	102,000	55,000	45,000	14,300		16,000	115,000	65,000	48,000
10,500		12,000	102,000	55,000	45,000	14,500		16,000	115,000	65,000	48,000
10,600		12,000	102,000	55,000	45,000	14,700		16,000	115,000	65,000	48,000
10,700		12,000	102,000	55,000	45,000	15,000		16,000	115,000	65,000	48,000
10,800		12,000	102,000	55,000	45,000	15,200		16,000	115,000	65,000	48,000
10,900		12,000	102,000	55,000	45,000	15,300		16,000	115,000	65,000	48,000
11,000		12,000	102,000	55,000	45,000	15,500		16,000	115,000	65,000	48,000
11,100		12,000	102,000	55,000	45,000	15,700		16,000	115,000	65,000	48,000
11,110	7/16	12,000	102,000	55,000	45,000	16,000		16,000	115,000	65,000	48,000
11,200		12,000	102,000	55,000	45,000	16,300		18,000	123,000	73,000	48,000
11,300		12,000	102,000	55,000	45,000	16,500		18,000	123,000	73,000	48,000
11,400		12,000	102,000	55,000	45,000	16,900		18,000	123,000	73,000	48,000
11,500		12,000	102,000	55,000	45,000	17,000		18,000	123,000	73,000	48,000
11,600		12,000	102,000	55,000	45,000	17,300		18,000	123,000	73,000	48,000
11,700		12,000	102,000	55,000	45,000	17,500		18,000	123,000	73,000	48,000
11,800		12,000	102,000	55,000	45,000	18,000		18,000	123,000	73,000	48,000
11,900		12,000	102,000	55,000	45,000	18,500		20,000	131,000	79,000	50,000
11,910	15/32	12,000	102,000	55,000	45,000	18,900		20,000	131,000	79,000	50,000
12,000		12,000	102,000	55,000	45,000	19,000		20,000	131,000	79,000	50,000
12,200		14,000	107,000	60,000	45,000	19,300		20,000	131,000	79,000	50,000
12,500		14,000	107,000	60,000	45,000	19,500		20,000	131,000	79,000	50,000
12,700	1/2	14,000	107,000	60,000	45,000	20,000		20,000	131,000	79,000	50,000
12,800		14,000	107,000	60,000	45,000						
13,000		14,000	107,000	60,000	45,000						
13,300		14,000	107,000	60,000	45,000						
13,500		14,000	107,000	60,000	45,000						
13,700		14,000	107,000	60,000	45,000						
14,000		14,000	107,000	60,000	45,000						
14,200		16,000	115,000	65,000	48,000						

Forets SuperV

Forets avec trous d'huile, type SuperV

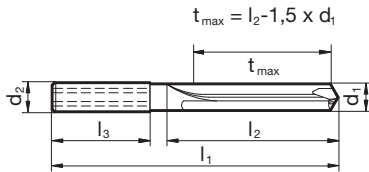


Référence 71995



Conseils d'util., page 26

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage à dépouille conique
- tolérances serrées des diamètres
- état de surface d.perçages de qualité supérieure
- tenir compte des valeurs des pressions des produits de lubrification et de refroidissement (voir le diagramme)



d1		d2	l1	l2	l3	d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	24,000	36,000	7,200		8,000	91,000	53,000	36,000
3,100		6,000	66,000	24,000	36,000	7,300		8,000	91,000	53,000	36,000
3,200		6,000	66,000	24,000	36,000	7,400		8,000	91,000	53,000	36,000
3,300		6,000	66,000	24,000	36,000	7,500		8,000	91,000	53,000	36,000
3,400		6,000	66,000	24,000	36,000	7,540	19/64	8,000	91,000	53,000	36,000
3,500		6,000	66,000	24,000	36,000	7,600		8,000	91,000	53,000	36,000
3,600		6,000	66,000	24,000	36,000	7,700		8,000	91,000	53,000	36,000
3,700		6,000	66,000	24,000	36,000	7,800		8,000	91,000	53,000	36,000
3,800		6,000	74,000	30,000	36,000	7,900		8,000	91,000	53,000	36,000
3,900		6,000	74,000	30,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
4,000		6,000	74,000	30,000	36,000	8,000		8,000	91,000	53,000	36,000
4,100		6,000	74,000	30,000	36,000	8,100		10,000	103,000	61,000	40,000
4,200		6,000	74,000	30,000	36,000	8,200		10,000	103,000	61,000	40,000
4,300		6,000	74,000	30,000	36,000	8,300		10,000	103,000	61,000	40,000
4,400		6,000	74,000	30,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
4,500		6,000	74,000	30,000	36,000	8,400		10,000	103,000	61,000	40,000
4,600		6,000	74,000	30,000	36,000	8,500		10,000	103,000	61,000	40,000
4,700		6,000	74,000	30,000	36,000	8,600		10,000	103,000	61,000	40,000
4,800		6,000	74,000	36,000	36,000	8,700		10,000	103,000	61,000	40,000
4,900		6,000	74,000	36,000	36,000	8,730	11/32	10,000	103,000	61,000	40,000
5,000		6,000	74,000	36,000	36,000	8,800		10,000	103,000	61,000	40,000
5,100		6,000	74,000	36,000	36,000	8,900		10,000	103,000	61,000	40,000
5,160	13/64	6,000	74,000	36,000	36,000	9,000		10,000	103,000	61,000	40,000
5,200		6,000	74,000	36,000	36,000	9,100		10,000	103,000	61,000	40,000
5,300		6,000	74,000	36,000	36,000	9,130	23/64	10,000	103,000	61,000	40,000
5,400		6,000	74,000	36,000	36,000	9,200		10,000	103,000	61,000	40,000
5,500		6,000	74,000	36,000	36,000	9,300		10,000	103,000	61,000	40,000
5,560	7/32	6,000	74,000	36,000	36,000	9,400		10,000	103,000	61,000	40,000
5,600		6,000	74,000	36,000	36,000	9,500		10,000	103,000	61,000	40,000
5,700		6,000	74,000	36,000	36,000	9,520	3/8	10,000	103,000	61,000	40,000
5,800		6,000	74,000	36,000	36,000	9,600		10,000	103,000	61,000	40,000
5,900		6,000	74,000	36,000	36,000	9,700		10,000	103,000	61,000	40,000
5,950	15/64	6,000	74,000	36,000	36,000	9,800		10,000	103,000	61,000	40,000
6,000		6,000	74,000	36,000	36,000	9,900		10,000	103,000	61,000	40,000
6,100		8,000	91,000	53,000	36,000	9,920	25/64	10,000	103,000	61,000	40,000
6,200		8,000	91,000	53,000	36,000	10,000		10,000	103,000	61,000	40,000
6,300		8,000	91,000	53,000	36,000	10,200		12,000	118,000	71,000	45,000
6,350	1/4	8,000	91,000	53,000	36,000	10,500		12,000	118,000	71,000	45,000
6,400		8,000	91,000	53,000	36,000	10,720	27/64	12,000	118,000	71,000	45,000
6,500		8,000	91,000	53,000	36,000	11,000		12,000	118,000	71,000	45,000
6,600		8,000	91,000	53,000	36,000	11,110	7/16	12,000	118,000	71,000	45,000
6,700		8,000	91,000	53,000	36,000	11,200		12,000	118,000	71,000	45,000
6,750	17/64	8,000	91,000	53,000	36,000	11,500		12,000	118,000	71,000	45,000
6,800		8,000	91,000	53,000	36,000	11,510	29/64	12,000	118,000	71,000	45,000
6,900		8,000	91,000	53,000	36,000	11,910	15/32	12,000	118,000	71,000	45,000
7,000		8,000	91,000	53,000	36,000	12,000		12,000	118,000	71,000	45,000
7,100		8,000	91,000	53,000	36,000	12,300	31/64	14,000	124,000	74,000	45,000
7,140	9/32	8,000	91,000	53,000	36,000	12,500		14,000	124,000	74,000	45,000

d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
12,700	1/2	14,000	124,000	74,000	45,000	18,500		20,000	153,000	101,000	50,000
13,000		14,000	124,000	74,000	45,000	19,000		20,000	153,000	101,000	50,000
13,500		14,000	124,000	74,000	45,000	19,500		20,000	153,000	101,000	50,000
14,000		14,000	124,000	74,000	45,000	20,000		20,000	153,000	101,000	50,000
14,500		16,000	133,000	83,000	48,000	21,500		25,000	168,000	110,000	56,000
15,000		16,000	133,000	83,000	48,000						
15,500		16,000	133,000	83,000	48,000						
16,000		16,000	133,000	83,000	48,000						
16,500		18,000	143,000	93,000	48,000						
17,000		18,000	143,000	93,000	48,000						
17,500		18,000	143,000	93,000	48,000						
18,000		18,000	143,000	93,000	48,000						

Forets SuperV

Forets avec trous d'huile, type SuperV



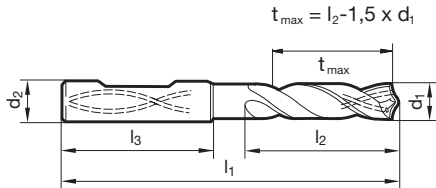
Référence **61880**



P	M	K	N	S	H
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Conseils d'util.,
page 28

- Amin. de l'âme $\geq \varnothing 4,000$
- affûtage à dépouille conique
- forme concave de l'arête de coupe principale
- géométrie de coupe optimisée
- paramètres de coupe extrêmes



d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
4,000		6,000	74,000	36,000	36,000
4,100		6,000	74,000	36,000	36,000
4,200		6,000	74,000	36,000	36,000
4,300		6,000	74,000	36,000	36,000
4,500		6,000	74,000	36,000	36,000
4,800		6,000	82,000	44,000	36,000
4,900		6,000	82,000	44,000	36,000
5,000		6,000	82,000	44,000	36,000
5,100		6,000	82,000	44,000	36,000
5,200		6,000	82,000	44,000	36,000
5,400		6,000	82,000	44,000	36,000
5,500		6,000	82,000	44,000	36,000
5,700		6,000	82,000	44,000	36,000
5,800		6,000	82,000	44,000	36,000
5,900		6,000	82,000	44,000	36,000
6,000		6,000	82,000	44,000	36,000
6,100		8,000	91,000	53,000	36,000
6,200		8,000	91,000	53,000	36,000
6,500		8,000	91,000	53,000	36,000
6,600		8,000	91,000	53,000	36,000
6,750	17/64	8,000	91,000	53,000	36,000
6,800		8,000	91,000	53,000	36,000
6,900		8,000	91,000	53,000	36,000
7,000		8,000	91,000	53,000	36,000
7,140	9/32	8,000	91,000	53,000	36,000
7,200		8,000	91,000	53,000	36,000
7,500		8,000	91,000	53,000	36,000
7,600		8,000	91,000	53,000	36,000
7,700		8,000	91,000	53,000	36,000
7,800		8,000	91,000	53,000	36,000
7,900		8,000	91,000	53,000	36,000
8,000		8,000	91,000	53,000	36,000
8,100		10,000	103,000	61,000	40,000
8,200		10,000	103,000	61,000	40,000
8,300		10,000	103,000	61,000	40,000
8,500		10,000	103,000	61,000	40,000
8,600		10,000	103,000	61,000	40,000
8,700		10,000	103,000	61,000	40,000
8,800		10,000	103,000	61,000	40,000
9,000		10,000	103,000	61,000	40,000
9,100		10,000	103,000	61,000	40,000
9,300		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
9,700		10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,200		12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
10,800		12,000	118,000	71,000	45,000

d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
11,000		12,000	118,000	71,000	45,000
11,400		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,600		12,000	118,000	71,000	45,000
11,700		12,000	118,000	71,000	45,000
11,800		12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,100		14,000	124,000	77,000	45,000
12,200		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000
12,800		14,000	124,000	77,000	45,000
12,900		14,000	124,000	77,000	45,000
13,000		14,000	124,000	77,000	45,000
13,200		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
13,800		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,100		16,000	133,000	83,000	48,000
14,200		16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,800		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,500		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000
21,000		25,000	165,000	105,000	56,000
22,000		25,000	165,000	105,000	56,000
23,500		25,000	180,000	117,000	56,000
24,000		25,000	180,000	117,000	56,000
24,500		25,000	180,000	117,000	56,000
25,000	63/64	25,000	180,000	117,000	56,000

Forets SuperV

Forets avec trous d'huile, type SuperV



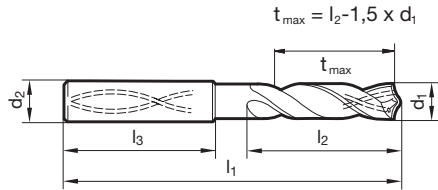
Référence **51781**



P	M	K	N	S	H
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Conseils d'util.,
page 28

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage en pente
- arête de coupe principale rectiligne
- géométrie de coupe optimisée



d1		d2	l1	l2	l3	d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	6,900		8,000	91,000	53,000	36,000
3,100		6,000	66,000	28,000	36,000	7,000		8,000	91,000	53,000	36,000
3,200		6,000	66,000	28,000	36,000	7,100		8,000	91,000	53,000	36,000
3,300		6,000	66,000	28,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
3,400		6,000	66,000	28,000	36,000	7,200		8,000	91,000	53,000	36,000
3,500		6,000	66,000	28,000	36,000	7,300		8,000	91,000	53,000	36,000
3,600		6,000	66,000	28,000	36,000	7,400		8,000	91,000	53,000	36,000
3,700		6,000	66,000	28,000	36,000	7,500		8,000	91,000	53,000	36,000
3,800		6,000	74,000	36,000	36,000	7,540	19/64	8,000	91,000	53,000	36,000
3,900		6,000	74,000	36,000	36,000	7,600		8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	7,700		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	7,800		8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	7,900		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000	8,000		8,000	91,000	53,000	36,000
4,400		6,000	74,000	36,000	36,000	8,100		10,000	103,000	61,000	40,000
4,500		6,000	74,000	36,000	36,000	8,200		10,000	103,000	61,000	40,000
4,600		6,000	74,000	36,000	36,000	8,300		10,000	103,000	61,000	40,000
4,650		6,000	74,000	36,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
4,700		6,000	74,000	36,000	36,000	8,400		10,000	103,000	61,000	40,000
4,760	3/16	6,000	82,000	44,000	36,000	8,500		10,000	103,000	61,000	40,000
4,800		6,000	82,000	44,000	36,000	8,600		10,000	103,000	61,000	40,000
4,900		6,000	82,000	44,000	36,000	8,700		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	8,730	11/32	10,000	103,000	61,000	40,000
5,100		6,000	82,000	44,000	36,000	8,800		10,000	103,000	61,000	40,000
5,160	13/64	6,000	82,000	44,000	36,000	8,900		10,000	103,000	61,000	40,000
5,200		6,000	82,000	44,000	36,000	9,000		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	9,100		10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	9,130	23/64	10,000	103,000	61,000	40,000
5,500		6,000	82,000	44,000	36,000	9,200		10,000	103,000	61,000	40,000
5,550		6,000	82,000	44,000	36,000	9,250		10,000	103,000	61,000	40,000
5,560	7/32	6,000	82,000	44,000	36,000	9,300		10,000	103,000	61,000	40,000
5,600		6,000	82,000	44,000	36,000	9,400		10,000	103,000	61,000	40,000
5,700		6,000	82,000	44,000	36,000	9,500		10,000	103,000	61,000	40,000
5,800		6,000	82,000	44,000	36,000	9,520	3/8	10,000	103,000	61,000	40,000
5,900		6,000	82,000	44,000	36,000	9,600		10,000	103,000	61,000	40,000
5,950	15/64	6,000	82,000	44,000	36,000	9,700		10,000	103,000	61,000	40,000
6,000		6,000	82,000	44,000	36,000	9,800		10,000	103,000	61,000	40,000
6,100		8,000	91,000	53,000	36,000	9,900		10,000	103,000	61,000	40,000
6,200		8,000	91,000	53,000	36,000	9,920	25/64	10,000	103,000	61,000	40,000
6,300		8,000	91,000	53,000	36,000	10,000		10,000	103,000	61,000	40,000
6,350	1/4	8,000	91,000	53,000	36,000	10,100		12,000	118,000	71,000	45,000
6,400		8,000	91,000	53,000	36,000	10,200		12,000	118,000	71,000	45,000
6,500		8,000	91,000	53,000	36,000	10,300		12,000	118,000	71,000	45,000
6,600		8,000	91,000	53,000	36,000	10,320	13/32	12,000	118,000	71,000	45,000
6,700		8,000	91,000	53,000	36,000	10,400		12,000	118,000	71,000	45,000
6,750	17/64	8,000	91,000	53,000	36,000	10,500		12,000	118,000	71,000	45,000
6,800		8,000	91,000	53,000	36,000	10,600		12,000	118,000	71,000	45,000

d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
10,700		12,000	118,000	71,000	45,000	14,000		14,000	124,000	77,000	45,000
10,720	27/64	12,000	118,000	71,000	45,000	14,100		16,000	133,000	83,000	48,000
10,800		12,000	118,000	71,000	45,000	14,200		16,000	133,000	83,000	48,000
10,900		12,000	118,000	71,000	45,000	14,290	9/16	16,000	133,000	83,000	48,000
11,000		12,000	118,000	71,000	45,000	14,500		16,000	133,000	83,000	48,000
11,100		12,000	118,000	71,000	45,000	14,700		16,000	133,000	83,000	48,000
11,110	7/16	12,000	118,000	71,000	45,000	15,000		16,000	133,000	83,000	48,000
11,200		12,000	118,000	71,000	45,000	15,200		16,000	133,000	83,000	48,000
11,300		12,000	118,000	71,000	45,000	15,500		16,000	133,000	83,000	48,000
11,400		12,000	118,000	71,000	45,000	15,600		16,000	133,000	83,000	48,000
11,500		12,000	118,000	71,000	45,000	15,700		16,000	133,000	83,000	48,000
11,600		12,000	118,000	71,000	45,000	15,800		16,000	133,000	83,000	48,000
11,700		12,000	118,000	71,000	45,000	16,000		16,000	133,000	83,000	48,000
11,800		12,000	118,000	71,000	45,000	16,500		18,000	143,000	93,000	48,000
11,900		12,000	118,000	71,000	45,000	16,700		18,000	143,000	93,000	48,000
11,910	15/32	12,000	118,000	71,000	45,000	17,000		18,000	143,000	93,000	48,000
12,000		12,000	118,000	71,000	45,000	17,500		18,000	143,000	93,000	48,000
12,100		14,000	124,000	77,000	45,000	17,700		18,000	143,000	93,000	48,000
12,200		14,000	124,000	77,000	45,000	18,000		18,000	143,000	93,000	48,000
12,300	31/64	14,000	124,000	77,000	45,000	18,500		20,000	153,000	101,000	50,000
12,400		14,000	124,000	77,000	45,000	18,700		20,000	153,000	101,000	50,000
12,500		14,000	124,000	77,000	45,000	19,000		20,000	153,000	101,000	50,000
12,700	1/2	14,000	124,000	77,000	45,000	19,500		20,000	153,000	101,000	50,000
13,000		14,000	124,000	77,000	45,000	19,700		20,000	153,000	101,000	50,000
13,200		14,000	124,000	77,000	45,000	20,000		20,000	153,000	101,000	50,000
13,500		14,000	124,000	77,000	45,000						
13,600		14,000	124,000	77,000	45,000						
13,700		14,000	124,000	77,000	45,000						
13,800		14,000	124,000	77,000	45,000						
13,900		14,000	124,000	77,000	45,000						

Forets SuperV

Forets avec trous d'huile, type SuperV



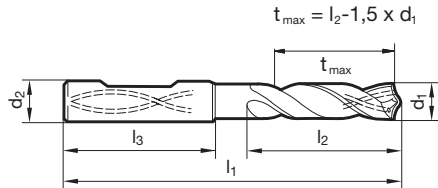
Référence **51881**



P	M	K	N	S	H
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Conseils d'util.,
page 28

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage en pente
- arête de coupe principale rectiligne
- géométrie de coupe optimisée



d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	66,000	28,000	36,000	7,100		8,000	91,000	53,000	36,000
3,100		6,000	66,000	28,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
3,200		6,000	66,000	28,000	36,000	7,200		8,000	91,000	53,000	36,000
3,300		6,000	66,000	28,000	36,000	7,300		8,000	91,000	53,000	36,000
3,400		6,000	66,000	28,000	36,000	7,400		8,000	91,000	53,000	36,000
3,500		6,000	66,000	28,000	36,000	7,500		8,000	91,000	53,000	36,000
3,600		6,000	66,000	28,000	36,000	7,540	19/64	8,000	91,000	53,000	36,000
3,700		6,000	66,000	28,000	36,000	7,600		8,000	91,000	53,000	36,000
3,800		6,000	74,000	36,000	36,000	7,700		8,000	91,000	53,000	36,000
3,900		6,000	74,000	36,000	36,000	7,800		8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	7,900		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	8,000		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	8,100		10,000	103,000	61,000	40,000
4,370	11/64	6,000	74,000	36,000	36,000	8,200		10,000	103,000	61,000	40,000
4,400		6,000	74,000	36,000	36,000	8,300		10,000	103,000	61,000	40,000
4,500		6,000	74,000	36,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
4,600		6,000	74,000	36,000	36,000	8,400		10,000	103,000	61,000	40,000
4,700		6,000	74,000	36,000	36,000	8,500		10,000	103,000	61,000	40,000
4,760	3/16	6,000	82,000	44,000	36,000	8,600		10,000	103,000	61,000	40,000
4,800		6,000	82,000	44,000	36,000	8,700		10,000	103,000	61,000	40,000
4,900		6,000	82,000	44,000	36,000	8,730	11/32	10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	8,800		10,000	103,000	61,000	40,000
5,100		6,000	82,000	44,000	36,000	8,900		10,000	103,000	61,000	40,000
5,160	13/64	6,000	82,000	44,000	36,000	9,000		10,000	103,000	61,000	40,000
5,200		6,000	82,000	44,000	36,000	9,100		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	9,130	23/64	10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	9,200		10,000	103,000	61,000	40,000
5,500		6,000	82,000	44,000	36,000	9,300		10,000	103,000	61,000	40,000
5,560	7/32	6,000	82,000	44,000	36,000	9,400		10,000	103,000	61,000	40,000
5,600		6,000	82,000	44,000	36,000	9,500		10,000	103,000	61,000	40,000
5,700		6,000	82,000	44,000	36,000	9,520	3/8	10,000	103,000	61,000	40,000
5,800		6,000	82,000	44,000	36,000	9,600		10,000	103,000	61,000	40,000
5,900		6,000	82,000	44,000	36,000	9,700		10,000	103,000	61,000	40,000
5,950	15/64	6,000	82,000	44,000	36,000	9,800		10,000	103,000	61,000	40,000
6,000		6,000	82,000	44,000	36,000	9,900		10,000	103,000	61,000	40,000
6,100		8,000	91,000	53,000	36,000	9,920	25/64	10,000	103,000	61,000	40,000
6,200		8,000	91,000	53,000	36,000	10,000		10,000	103,000	61,000	40,000
6,300		8,000	91,000	53,000	36,000	10,100		12,000	118,000	71,000	45,000
6,350	1/4	8,000	91,000	53,000	36,000	10,200		12,000	118,000	71,000	45,000
6,400		8,000	91,000	53,000	36,000	10,300		12,000	118,000	71,000	45,000
6,500		8,000	91,000	53,000	36,000	10,320	13/32	12,000	118,000	71,000	45,000
6,600		8,000	91,000	53,000	36,000	10,400		12,000	118,000	71,000	45,000
6,700		8,000	91,000	53,000	36,000	10,500		12,000	118,000	71,000	45,000
6,750	17/64	8,000	91,000	53,000	36,000	10,600		12,000	118,000	71,000	45,000
6,800		8,000	91,000	53,000	36,000	10,700		12,000	118,000	71,000	45,000
6,900		8,000	91,000	53,000	36,000	10,800		12,000	118,000	71,000	45,000
7,000		8,000	91,000	53,000	36,000	10,900		12,000	118,000	71,000	45,000

d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
11,000		12,000	118,000	71,000	45,000	14,000		14,000	124,000	77,000	45,000
11,100		12,000	118,000	71,000	45,000	14,100		16,000	133,000	83,000	48,000
11,110	7/16	12,000	118,000	71,000	45,000	14,200		16,000	133,000	83,000	48,000
11,200		12,000	118,000	71,000	45,000	14,290	9/16	16,000	133,000	83,000	48,000
11,300		12,000	118,000	71,000	45,000	14,500		16,000	133,000	83,000	48,000
11,400		12,000	118,000	71,000	45,000	14,700		16,000	133,000	83,000	48,000
11,500		12,000	118,000	71,000	45,000	15,000		16,000	133,000	83,000	48,000
11,600		12,000	118,000	71,000	45,000	15,200		16,000	133,000	83,000	48,000
11,700		12,000	118,000	71,000	45,000	15,500		16,000	133,000	83,000	48,000
11,800		12,000	118,000	71,000	45,000	15,700		16,000	133,000	83,000	48,000
11,900		12,000	118,000	71,000	45,000	15,800		16,000	133,000	83,000	48,000
11,910	15/32	12,000	118,000	71,000	45,000	16,000		16,000	133,000	83,000	48,000
12,000		12,000	118,000	71,000	45,000	16,500		18,000	143,000	93,000	48,000
12,100		14,000	124,000	77,000	45,000	17,000		18,000	143,000	93,000	48,000
12,200		14,000	124,000	77,000	45,000	17,300		18,000	143,000	93,000	48,000
12,300	31/64	14,000	124,000	77,000	45,000	17,500		18,000	143,000	93,000	48,000
12,400		14,000	124,000	77,000	45,000	18,000		18,000	143,000	93,000	48,000
12,500		14,000	124,000	77,000	45,000	18,200		20,000	153,000	101,000	50,000
12,700	1/2	14,000	124,000	77,000	45,000	18,500		20,000	153,000	101,000	50,000
13,000		14,000	124,000	77,000	45,000	18,600		20,000	153,000	101,000	50,000
13,500		14,000	124,000	77,000	45,000	19,000		20,000	153,000	101,000	50,000
13,700		14,000	124,000	77,000	45,000	19,500		20,000	153,000	101,000	50,000
13,800		14,000	124,000	77,000	45,000	20,000		20,000	153,000	101,000	50,000
13,900		14,000	124,000	77,000	45,000						

Forets SuperV

Forets avec trous d'huile, type SuperV



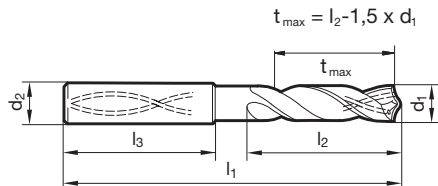
Référence **51772**



P	M	K	N	S	H
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Conseils d'util.,
page 28

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage en pente
- arête de coupe principale rectiligne
- géométrie de coupe optimisée
- particulièrement bien approprié pour les aciers inoxydables



d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	66,000	28,000	36,000
3,100		6,000	66,000	28,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000
3,200		6,000	66,000	28,000	36,000
3,250		6,000	66,000	28,000	36,000
3,300		6,000	66,000	28,000	36,000
3,400		6,000	66,000	28,000	36,000
3,500		6,000	66,000	28,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000
3,600		6,000	66,000	28,000	36,000
3,700		6,000	66,000	28,000	36,000
3,800		6,000	74,000	36,000	36,000
3,900		6,000	74,000	36,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000
4,000		6,000	74,000	36,000	36,000
4,100		6,000	74,000	36,000	36,000
4,200		6,000	74,000	36,000	36,000
4,300		6,000	74,000	36,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000
4,400		6,000	74,000	36,000	36,000
4,500		6,000	74,000	36,000	36,000
4,600		6,000	74,000	36,000	36,000
4,650		6,000	74,000	36,000	36,000
4,700		6,000	74,000	36,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000
4,800		6,000	82,000	44,000	36,000
4,900		6,000	82,000	44,000	36,000
5,000		6,000	82,000	44,000	36,000
5,100		6,000	82,000	44,000	36,000
5,160	13/64	6,000	82,000	44,000	36,000
5,200		6,000	82,000	44,000	36,000
5,300		6,000	82,000	44,000	36,000
5,400		6,000	82,000	44,000	36,000
5,500		6,000	82,000	44,000	36,000
5,550		6,000	82,000	44,000	36,000
5,560	7/32	6,000	82,000	44,000	36,000
5,600		6,000	82,000	44,000	36,000
5,700		6,000	82,000	44,000	36,000
5,800		6,000	82,000	44,000	36,000
5,900		6,000	82,000	44,000	36,000
5,950	15/64	6,000	82,000	44,000	36,000
6,000		6,000	82,000	44,000	36,000
6,100		8,000	91,000	53,000	36,000
6,200		8,000	91,000	53,000	36,000
6,300		8,000	91,000	53,000	36,000
6,350	1/4	8,000	91,000	53,000	36,000
6,400		8,000	91,000	53,000	36,000
6,500		8,000	91,000	53,000	36,000

d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
6,600		8,000	91,000	53,000	36,000
6,700		8,000	91,000	53,000	36,000
6,750	17/64	8,000	91,000	53,000	36,000
6,800		8,000	91,000	53,000	36,000
6,900		8,000	91,000	53,000	36,000
7,000		8,000	91,000	53,000	36,000
7,100		8,000	91,000	53,000	36,000
7,140	9/32	8,000	91,000	53,000	36,000
7,200		8,000	91,000	53,000	36,000
7,300		8,000	91,000	53,000	36,000
7,400		8,000	91,000	53,000	36,000
7,500		8,000	91,000	53,000	36,000
7,540	19/64	8,000	91,000	53,000	36,000
7,600		8,000	91,000	53,000	36,000
7,700		8,000	91,000	53,000	36,000
7,800		8,000	91,000	53,000	36,000
7,900		8,000	91,000	53,000	36,000
7,940	5/16	8,000	91,000	53,000	36,000
8,000		8,000	91,000	53,000	36,000
8,100		10,000	103,000	61,000	40,000
8,200		10,000	103,000	61,000	40,000
8,300		10,000	103,000	61,000	40,000
8,330	21/64	10,000	103,000	61,000	40,000
8,400		10,000	103,000	61,000	40,000
8,500		10,000	103,000	61,000	40,000
8,600		10,000	103,000	61,000	40,000
8,700		10,000	103,000	61,000	40,000
8,730	11/32	10,000	103,000	61,000	40,000
8,800		10,000	103,000	61,000	40,000
8,900		10,000	103,000	61,000	40,000
9,000		10,000	103,000	61,000	40,000
9,100		10,000	103,000	61,000	40,000
9,130	23/64	10,000	103,000	61,000	40,000
9,200		10,000	103,000	61,000	40,000
9,250		10,000	103,000	61,000	40,000
9,300		10,000	103,000	61,000	40,000
9,400		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
9,520	3/8	10,000	103,000	61,000	40,000
9,600		10,000	103,000	61,000	40,000
9,700		10,000	103,000	61,000	40,000
9,800		10,000	103,000	61,000	40,000
9,900		10,000	103,000	61,000	40,000
9,920	25/64	10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,100		12,000	118,000	71,000	45,000
10,200		12,000	118,000	71,000	45,000
10,300		12,000	118,000	71,000	45,000

d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
10,320	13/32	12,000	118,000	71,000	45,000	14,290	9/16	16,000	133,000	83,000	48,000
10,400		12,000	118,000	71,000	45,000	14,300		16,000	133,000	83,000	48,000
10,500		12,000	118,000	71,000	45,000	14,500		16,000	133,000	83,000	48,000
10,600		12,000	118,000	71,000	45,000	14,700		16,000	133,000	83,000	48,000
10,700		12,000	118,000	71,000	45,000	15,000		16,000	133,000	83,000	48,000
10,800		12,000	118,000	71,000	45,000	15,200		16,000	133,000	83,000	48,000
10,900		12,000	118,000	71,000	45,000	15,300		16,000	133,000	83,000	48,000
11,000		12,000	118,000	71,000	45,000	15,500		16,000	133,000	83,000	48,000
11,100		12,000	118,000	71,000	45,000	15,700		16,000	133,000	83,000	48,000
11,110	7/16	12,000	118,000	71,000	45,000	16,000		16,000	133,000	83,000	48,000
11,200		12,000	118,000	71,000	45,000	16,300		18,000	143,000	93,000	48,000
11,300		12,000	118,000	71,000	45,000	16,500		18,000	143,000	93,000	48,000
11,400		12,000	118,000	71,000	45,000	16,900		18,000	143,000	93,000	48,000
11,500		12,000	118,000	71,000	45,000	17,000		18,000	143,000	93,000	48,000
11,600		12,000	118,000	71,000	45,000	17,300		18,000	143,000	93,000	48,000
11,700		12,000	118,000	71,000	45,000	17,500		18,000	143,000	93,000	48,000
11,800		12,000	118,000	71,000	45,000	18,000		18,000	143,000	93,000	48,000
11,900		12,000	118,000	71,000	45,000	18,500		20,000	153,000	101,000	50,000
11,910	15/32	12,000	118,000	71,000	45,000	18,900		20,000	153,000	101,000	50,000
12,000		12,000	118,000	71,000	45,000	19,000		20,000	153,000	101,000	50,000
12,200		14,000	124,000	77,000	45,000	19,050	3/4	20,000	153,000	101,000	50,000
12,500		14,000	124,000	77,000	45,000	19,300		20,000	153,000	101,000	50,000
12,700	1/2	14,000	124,000	77,000	45,000	19,500		20,000	153,000	101,000	50,000
12,800		14,000	124,000	77,000	45,000	20,000		20,000	153,000	101,000	50,000
13,000		14,000	124,000	77,000	45,000						
13,300		14,000	124,000	77,000	45,000						
13,500		14,000	124,000	77,000	45,000						
13,700		14,000	124,000	77,000	45,000						
14,000		14,000	124,000	77,000	45,000						
14,200		16,000	133,000	83,000	48,000						

Forets SuperV

Forets avec trous d'huile, type SuperV



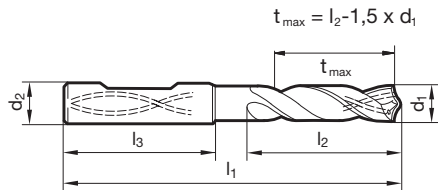
Référence **51773**



P	M	K	N	S	H
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Conseils d'util.,
page 28

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage en pente
- arête de coupe principale rectiligne
- géométrie de coupe optimisée
- particulièrement bien approprié pour les aciers inoxydables



d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000
3,100		6,000	66,000	28,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000
3,200		6,000	66,000	28,000	36,000
3,250		6,000	66,000	28,000	36,000
3,300		6,000	66,000	28,000	36,000
3,400		6,000	66,000	28,000	36,000
3,500		6,000	66,000	28,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000
3,600		6,000	66,000	28,000	36,000
3,700		6,000	66,000	28,000	36,000
3,800		6,000	74,000	36,000	36,000
3,900		6,000	74,000	36,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000
4,000		6,000	74,000	36,000	36,000
4,100		6,000	74,000	36,000	36,000
4,200		6,000	74,000	36,000	36,000
4,300		6,000	74,000	36,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000
4,400		6,000	74,000	36,000	36,000
4,500		6,000	74,000	36,000	36,000
4,600		6,000	74,000	36,000	36,000
4,650		6,000	74,000	36,000	36,000
4,700		6,000	74,000	36,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000
4,800		6,000	82,000	44,000	36,000
4,900		6,000	82,000	44,000	36,000
5,000		6,000	82,000	44,000	36,000
5,100		6,000	82,000	44,000	36,000
5,160	13/64	6,000	82,000	44,000	36,000
5,200		6,000	82,000	44,000	36,000
5,300		6,000	82,000	44,000	36,000
5,400		6,000	82,000	44,000	36,000
5,500		6,000	82,000	44,000	36,000
5,550		6,000	82,000	44,000	36,000
5,560	7/32	6,000	82,000	44,000	36,000
5,600		6,000	82,000	44,000	36,000
5,700		6,000	82,000	44,000	36,000
5,800		6,000	82,000	44,000	36,000
5,900		6,000	82,000	44,000	36,000
5,950	15/64	6,000	82,000	44,000	36,000
6,000		6,000	82,000	44,000	36,000
6,100		8,000	91,000	53,000	36,000
6,200		8,000	91,000	53,000	36,000
6,300		8,000	91,000	53,000	36,000
6,350	1/4	8,000	91,000	53,000	36,000
6,400		8,000	91,000	53,000	36,000
6,500		8,000	91,000	53,000	36,000

d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm
6,600		8,000	91,000	53,000	36,000
6,700		8,000	91,000	53,000	36,000
6,750	17/64	8,000	91,000	53,000	36,000
6,800		8,000	91,000	53,000	36,000
6,900		8,000	91,000	53,000	36,000
7,000		8,000	91,000	53,000	36,000
7,100		8,000	91,000	53,000	36,000
7,140	9/32	8,000	91,000	53,000	36,000
7,200		8,000	91,000	53,000	36,000
7,300		8,000	91,000	53,000	36,000
7,400		8,000	91,000	53,000	36,000
7,500		8,000	91,000	53,000	36,000
7,540	19/64	8,000	91,000	53,000	36,000
7,600		8,000	91,000	53,000	36,000
7,700		8,000	91,000	53,000	36,000
7,800		8,000	91,000	53,000	36,000
7,900		8,000	91,000	53,000	36,000
7,940	5/16	8,000	91,000	53,000	36,000
8,000		8,000	91,000	53,000	36,000
8,100		10,000	103,000	61,000	40,000
8,200		10,000	103,000	61,000	40,000
8,300		10,000	103,000	61,000	40,000
8,330	21/64	10,000	103,000	61,000	40,000
8,400		10,000	103,000	61,000	40,000
8,500		10,000	103,000	61,000	40,000
8,600		10,000	103,000	61,000	40,000
8,700		10,000	103,000	61,000	40,000
8,730	11/32	10,000	103,000	61,000	40,000
8,800		10,000	103,000	61,000	40,000
8,900		10,000	103,000	61,000	40,000
9,000		10,000	103,000	61,000	40,000
9,100		10,000	103,000	61,000	40,000
9,130	23/64	10,000	103,000	61,000	40,000
9,200		10,000	103,000	61,000	40,000
9,250		10,000	103,000	61,000	40,000
9,300		10,000	103,000	61,000	40,000
9,400		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
9,520	3/8	10,000	103,000	61,000	40,000
9,600		10,000	103,000	61,000	40,000
9,700		10,000	103,000	61,000	40,000
9,800		10,000	103,000	61,000	40,000
9,900		10,000	103,000	61,000	40,000
9,920	25/64	10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,100		12,000	118,000	71,000	45,000
10,200		12,000	118,000	71,000	45,000
10,300		12,000	118,000	71,000	45,000

d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
10,320	13/32	12,000	118,000	71,000	45,000	14,290	9/16	16,000	133,000	83,000	48,000
10,400		12,000	118,000	71,000	45,000	14,300		16,000	133,000	83,000	48,000
10,500		12,000	118,000	71,000	45,000	14,500		16,000	133,000	83,000	48,000
10,600		12,000	118,000	71,000	45,000	14,700		16,000	133,000	83,000	48,000
10,700		12,000	118,000	71,000	45,000	15,000		16,000	133,000	83,000	48,000
10,800		12,000	118,000	71,000	45,000	15,200		16,000	133,000	83,000	48,000
10,900		12,000	118,000	71,000	45,000	15,300		16,000	133,000	83,000	48,000
11,000		12,000	118,000	71,000	45,000	15,500		16,000	133,000	83,000	48,000
11,100		12,000	118,000	71,000	45,000	15,700		16,000	133,000	83,000	48,000
11,110	7/16	12,000	118,000	71,000	45,000	16,000		16,000	133,000	83,000	48,000
11,200		12,000	118,000	71,000	45,000	16,300		18,000	143,000	93,000	48,000
11,300		12,000	118,000	71,000	45,000	16,500		18,000	143,000	93,000	48,000
11,400		12,000	118,000	71,000	45,000	16,900		18,000	143,000	93,000	48,000
11,500		12,000	118,000	71,000	45,000	17,000		18,000	143,000	93,000	48,000
11,600		12,000	118,000	71,000	45,000	17,300		18,000	143,000	93,000	48,000
11,700		12,000	118,000	71,000	45,000	17,500		18,000	143,000	93,000	48,000
11,800		12,000	118,000	71,000	45,000	18,000		18,000	143,000	93,000	48,000
11,900		12,000	118,000	71,000	45,000	18,500		20,000	153,000	101,000	50,000
11,910	15/32	12,000	118,000	71,000	45,000	18,900		20,000	153,000	101,000	50,000
12,000		12,000	118,000	71,000	45,000	19,000		20,000	153,000	101,000	50,000
12,200		14,000	124,000	77,000	45,000	19,050	3/4	20,000	153,000	101,000	50,000
12,500		14,000	124,000	77,000	45,000	19,300		20,000	153,000	101,000	50,000
12,700	1/2	14,000	124,000	77,000	45,000	19,500		20,000	153,000	101,000	50,000
12,800		14,000	124,000	77,000	45,000	20,000		20,000	153,000	101,000	50,000
13,000		14,000	124,000	77,000	45,000						
13,300		14,000	124,000	77,000	45,000						
13,500		14,000	124,000	77,000	45,000						
13,700		14,000	124,000	77,000	45,000						
14,000		14,000	124,000	77,000	45,000						
14,200		16,000	133,000	83,000	48,000						

Forets SuperV

Forets avec trous d'huile, type SuperV



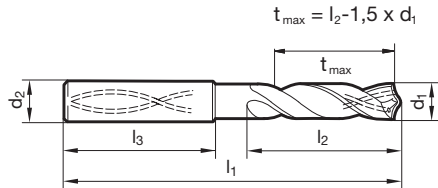
Référence **51789**



P	M	K	N	S	H
●	○	●	○	○	○

Conseils d'util.,
page 30

- Amin. de l'âme ≥ Ø 3,000
- affûtage en pente
- arête de coupe principale rectiligne
- géométrie de coupe optimisée
- quatre listels de guidage



d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	70,000	30,000	36,000
3,100		6,000	70,000	30,000	36,000
3,170	1/8	6,000	70,000	30,000	36,000
3,200		6,000	70,000	30,000	36,000
3,250		6,000	70,000	30,000	36,000
3,300		6,000	70,000	30,000	36,000
3,400		6,000	75,000	35,500	36,000
3,500		6,000	75,000	35,500	36,000
3,570	9/64	6,000	75,000	35,500	36,000
3,600		6,000	75,000	35,500	36,000
3,700		6,000	75,000	35,500	36,000
3,800		6,000	75,000	37,500	36,000
3,900		6,000	75,000	37,500	36,000
3,970	5/32	6,000	75,000	37,500	36,000
4,000		6,000	75,000	37,500	36,000
4,100		6,000	75,000	37,500	36,000
4,200		6,000	75,000	37,500	36,000
4,300		6,000	85,000	45,000	36,000
4,400		6,000	85,000	45,000	36,000
4,500		6,000	85,000	45,000	36,000
4,600		6,000	85,000	45,000	36,000
4,700		6,000	85,000	45,000	36,000
4,800		6,000	90,000	50,000	36,000
4,900		6,000	90,000	50,000	36,000
5,000		6,000	90,000	50,000	36,000
5,100		6,000	90,000	50,000	36,000
5,200		6,000	90,000	50,000	36,000
5,300		6,000	90,000	50,000	36,000
5,400		6,000	97,000	57,000	36,000
5,500		6,000	97,000	57,000	36,000
5,700		6,000	97,000	57,000	36,000
5,800		6,000	97,000	57,000	36,000
5,900		6,000	97,000	57,000	36,000
6,000		6,000	97,000	57,000	36,000
6,200		8,000	106,000	66,000	36,000
6,300		8,000	106,000	66,000	36,000
6,500		8,000	106,000	66,000	36,000
6,600		8,000	106,000	66,000	36,000
6,700		8,000	106,000	66,000	36,000
6,800		8,000	106,000	66,000	36,000
6,900		8,000	116,000	76,000	36,000
7,000		8,000	116,000	76,000	36,000
7,100		8,000	116,000	76,000	36,000
7,200		8,000	116,000	76,000	36,000
7,500		8,000	116,000	76,000	36,000
7,600		8,000	116,000	76,000	36,000
7,700		8,000	116,000	76,000	36,000
7,800		8,000	116,000	76,000	36,000

d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
8,000		8,000	116,000	76,000	36,000
8,100		10,000	131,000	87,000	40,000
8,200		10,000	131,000	87,000	40,000
8,400		10,000	131,000	87,000	40,000
8,500		10,000	131,000	87,000	40,000
8,600		10,000	131,000	87,000	40,000
8,700		10,000	131,000	87,000	40,000
8,800		10,000	131,000	87,000	40,000
9,000		10,000	131,000	87,000	40,000
9,100		10,000	139,000	95,000	40,000
9,200		10,000	139,000	95,000	40,000
9,300		10,000	139,000	95,000	40,000
9,400		10,000	139,000	95,000	40,000
9,500		10,000	139,000	95,000	40,000
9,700		10,000	139,000	95,000	40,000
9,800		10,000	139,000	95,000	40,000
9,900		10,000	139,000	95,000	40,000
10,000		10,000	139,000	95,000	40,000
10,200		12,000	155,000	106,000	45,000
10,500		12,000	155,000	106,000	45,000
10,800		12,000	155,000	106,000	45,000
11,000		12,000	155,000	106,000	45,000
11,200		12,000	163,000	114,000	45,000
11,500		12,000	163,000	114,000	45,000
11,800		12,000	163,000	114,000	45,000
12,000		12,000	163,000	114,000	45,000
12,200		14,000	182,000	133,000	45,000
12,500		14,000	182,000	133,000	45,000
12,700	1/2	14,000	182,000	133,000	45,000
13,000		14,000	182,000	133,000	45,000
13,500		14,000	182,000	133,000	45,000
14,000		14,000	182,000	133,000	45,000
14,200		16,000	204,000	152,000	48,000
14,500		16,000	204,000	152,000	48,000
15,000		16,000	204,000	152,000	48,000
15,500		16,000	204,000	152,000	48,000
16,000		16,000	204,000	152,000	48,000
16,500		18,000	223,000	171,000	48,000
17,000		18,000	223,000	171,000	48,000
17,500		18,000	223,000	171,000	48,000
18,000		18,000	223,000	171,000	48,000
18,500		20,000	244,000	190,000	50,000
19,000		20,000	244,000	190,000	50,000
19,500		20,000	244,000	190,000	50,000
20,000		20,000	244,000	190,000	50,000

Forets SuperV

Forets avec trous d'huile, type SuperV



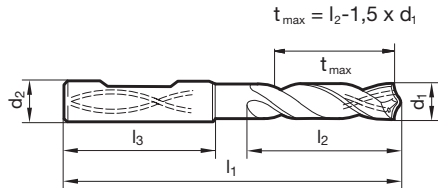
Référence **51889**



P	M	K	N	S	H
●	○	●	○	○	○

Conseils d'util.,
page 30

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage en pente
- arête de coupe principale rectiligne
- géométrie de coupe optimisée
- quatre listels de guidage



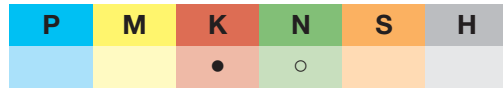
d1	inch	d2	l1	l2	l3	d1	inch	d2	l1	l2	l3
mm		mm	mm	mm	mm	mm		mm	mm	mm	mm
3,000		6,000	70,000	30,000	36,000	8,000		8,000	116,000	76,000	36,000
3,100		6,000	70,000	30,000	36,000	8,100		10,000	131,000	87,000	40,000
3,170	1/8	6,000	70,000	30,000	36,000	8,200		10,000	131,000	87,000	40,000
3,200		6,000	70,000	30,000	36,000	8,400		10,000	131,000	87,000	40,000
3,250		6,000	70,000	30,000	36,000	8,500		10,000	131,000	87,000	40,000
3,300		6,000	70,000	30,000	36,000	8,600		10,000	131,000	87,000	40,000
3,400		6,000	75,000	35,500	36,000	8,700		10,000	131,000	87,000	40,000
3,500		6,000	75,000	35,500	36,000	8,800		10,000	131,000	87,000	40,000
3,570	9/64	6,000	75,000	35,500	36,000	9,000		10,000	131,000	87,000	40,000
3,600		6,000	75,000	35,500	36,000	9,100		10,000	139,000	95,000	40,000
3,700		6,000	75,000	35,500	36,000	9,200		10,000	139,000	95,000	40,000
3,800		6,000	75,000	37,500	36,000	9,300		10,000	139,000	95,000	40,000
3,900		6,000	75,000	37,500	36,000	9,400		10,000	139,000	95,000	40,000
3,970	5/32	6,000	75,000	37,500	36,000	9,500		10,000	139,000	95,000	40,000
4,000		6,000	75,000	37,500	36,000	9,700		10,000	139,000	95,000	40,000
4,100		6,000	75,000	37,500	36,000	9,800		10,000	139,000	95,000	40,000
4,200		6,000	75,000	37,500	36,000	9,900		10,000	139,000	95,000	40,000
4,300		6,000	85,000	45,000	36,000	10,000		10,000	139,000	95,000	40,000
4,400		6,000	85,000	45,000	36,000	10,200		12,000	155,000	106,000	45,000
4,500		6,000	85,000	45,000	36,000	10,300		12,000	155,000	106,000	45,000
4,600		6,000	85,000	45,000	36,000	10,500		12,000	155,000	106,000	45,000
4,700		6,000	85,000	45,000	36,000	10,800		12,000	155,000	106,000	45,000
4,800		6,000	90,000	50,000	36,000	11,000		12,000	155,000	106,000	45,000
4,900		6,000	90,000	50,000	36,000	11,200		12,000	163,000	114,000	45,000
5,000		6,000	90,000	50,000	36,000	11,500		12,000	163,000	114,000	45,000
5,100		6,000	90,000	50,000	36,000	11,800		12,000	163,000	114,000	45,000
5,200		6,000	90,000	50,000	36,000	12,000		12,000	163,000	114,000	45,000
5,300		6,000	90,000	50,000	36,000	12,100		14,000	182,000	133,000	45,000
5,400		6,000	97,000	57,000	36,000	12,200		14,000	182,000	133,000	45,000
5,500		6,000	97,000	57,000	36,000	12,500		14,000	182,000	133,000	45,000
5,700		6,000	97,000	57,000	36,000	12,700	1/2	14,000	182,000	133,000	45,000
5,800		6,000	97,000	57,000	36,000	13,000		14,000	182,000	133,000	45,000
5,900		6,000	97,000	57,000	36,000	13,500		14,000	182,000	133,000	45,000
6,000		6,000	97,000	57,000	36,000	14,000		14,000	182,000	133,000	45,000
6,200		8,000	106,000	66,000	36,000	14,100		16,000	204,000	152,000	48,000
6,300		8,000	106,000	66,000	36,000	14,200		16,000	204,000	152,000	48,000
6,500		8,000	106,000	66,000	36,000	14,500		16,000	204,000	152,000	48,000
6,600		8,000	106,000	66,000	36,000	15,000		16,000	204,000	152,000	48,000
6,700		8,000	106,000	66,000	36,000	15,500		16,000	204,000	152,000	48,000
6,800		8,000	106,000	66,000	36,000	16,000		16,000	204,000	152,000	48,000
6,900		8,000	116,000	76,000	36,000	16,500		18,000	223,000	171,000	48,000
7,000		8,000	116,000	76,000	36,000	17,000		18,000	223,000	171,000	48,000
7,100		8,000	116,000	76,000	36,000	17,500		18,000	223,000	171,000	48,000
7,200		8,000	116,000	76,000	36,000	18,000		18,000	223,000	171,000	48,000
7,500		8,000	116,000	76,000	36,000	18,500		20,000	244,000	190,000	50,000
7,600		8,000	116,000	76,000	36,000	19,000		20,000	244,000	190,000	50,000
7,700		8,000	116,000	76,000	36,000	19,500		20,000	244,000	190,000	50,000
7,800		8,000	116,000	76,000	36,000	20,000		20,000	244,000	190,000	50,000

Forets SuperV

Forets avec trous d'huile, type SuperV

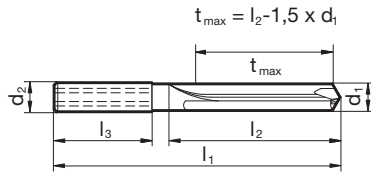


Référence **71994**



Conseils d'util.,
page 30

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage à dépouille conique
- tolérances serrées des diamètres
- état de surface d.perçages de qualité supérieure
- tenir compte des valeurs des pressions des produits de lubrification et de refroidissement (voir le diagramme)



d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	74,000	32,000	36,000
3,100		6,000	74,000	32,000	36,000
3,200		6,000	74,000	32,000	36,000
3,300		6,000	74,000	32,000	36,000
3,400		6,000	74,000	34,000	36,000
3,500		6,000	74,000	34,000	36,000
3,600		6,000	74,000	34,000	36,000
3,700		6,000	74,000	34,000	36,000
3,800		6,000	97,000	45,000	36,000
3,900		6,000	97,000	45,000	36,000
4,000		6,000	97,000	45,000	36,000
4,100		6,000	97,000	45,000	36,000
4,200		6,000	97,000	45,000	36,000
4,300		6,000	97,000	45,000	36,000
4,400		6,000	97,000	45,000	36,000
4,500		6,000	97,000	45,000	36,000
4,700		6,000	97,000	45,000	36,000
4,800		6,000	97,000	57,000	36,000
4,900		6,000	97,000	57,000	36,000
5,000		6,000	97,000	57,000	36,000
5,500		6,000	97,000	57,000	36,000
6,000		6,000	97,000	57,000	36,000
6,500		8,000	116,000	76,000	36,000
6,800		8,000	116,000	76,000	36,000
7,000		8,000	116,000	76,000	36,000
7,500		8,000	116,000	76,000	36,000
7,800		8,000	116,000	76,000	36,000
8,000		8,000	116,000	76,000	36,000
8,500		10,000	139,000	95,000	40,000
9,000		10,000	139,000	95,000	40,000

d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
9,500		10,000	139,000	95,000	40,000
10,000		10,000	139,000	95,000	40,000
10,200		12,000	163,000	114,000	45,000
10,500		12,000	163,000	114,000	45,000
11,000		12,000	163,000	114,000	45,000
11,500		12,000	163,000	114,000	45,000
12,000		12,000	163,000	114,000	45,000
12,300	31/64	14,000	182,000	133,000	45,000
12,500		14,000	182,000	133,000	45,000
12,700	1/2	14,000	182,000	133,000	45,000
13,000		14,000	182,000	133,000	45,000
13,500		14,000	182,000	133,000	45,000
14,000		14,000	182,000	133,000	45,000
14,500		16,000	204,000	152,000	48,000
15,000		16,000	204,000	152,000	48,000
15,500		16,000	204,000	152,000	48,000
16,000		16,000	204,000	152,000	48,000
16,500		18,000	223,000	171,000	48,000
17,000		18,000	223,000	171,000	48,000
17,500		18,000	223,000	171,000	48,000
18,000		18,000	223,000	171,000	48,000
18,500		20,000	244,000	190,000	50,000
19,000		20,000	244,000	190,000	50,000
19,500		20,000	244,000	190,000	50,000
20,000		20,000	244,000	190,000	50,000

Forets SuperV

Forets avec trous d'huile, type SuperV

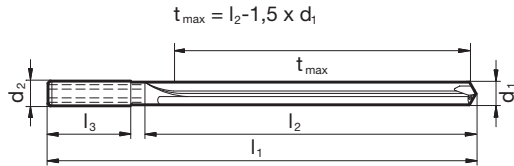


Référence **71996**



Conseils d'util.,
page 30

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage à dépouille conique
- tolérances serrées des diamètres
- état de surface d.perçages de qualité supérieure
- tenir compte des valeurs des pressions des produits de lubrification et de refroidissement (voir le diagramme)



d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	91,000	42,000	36,000
3,300		6,000	91,000	42,000	36,000
3,500		6,000	91,000	48,000	36,000
3,800		6,000	121,000	77,000	36,000
4,000		6,000	121,000	77,000	36,000
4,200		6,000	121,000	77,000	36,000
4,500		6,000	121,000	77,000	36,000
4,700		6,000	121,000	77,000	36,000
4,800		6,000	121,000	82,000	36,000
5,000		6,000	121,000	82,000	36,000
5,500		6,000	121,000	82,000	36,000
6,000		6,000	121,000	82,000	36,000
6,350	1/4	8,000	146,000	106,000	36,000
6,500		8,000	146,000	106,000	36,000
6,800		8,000	146,000	106,000	36,000
7,000		8,000	146,000	106,000	36,000
7,500		8,000	146,000	106,000	36,000
7,800		8,000	146,000	106,000	36,000
8,000		8,000	146,000	106,000	36,000
8,500		10,000	175,000	130,000	40,000
9,000		10,000	175,000	130,000	40,000
9,500		10,000	175,000	130,000	40,000
10,000		10,000	175,000	130,000	40,000
10,200		12,000	209,000	159,000	45,000

d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
10,500		12,000	209,000	159,000	45,000
11,000		12,000	209,000	159,000	45,000
11,500		12,000	209,000	159,000	45,000
12,000		12,000	209,000	159,000	45,000
12,500		14,000	233,000	183,000	45,000
12,700	1/2	14,000	233,000	183,000	45,000
13,000		14,000	233,000	183,000	45,000
13,500		14,000	233,000	183,000	45,000
14,000		14,000	233,000	183,000	45,000
14,500		16,000	260,000	207,000	48,000
15,000		16,000	260,000	207,000	48,000
15,500		16,000	260,000	207,000	48,000
16,000		16,000	260,000	207,000	48,000
16,500		18,000	284,000	231,000	48,000
17,000		18,000	284,000	231,000	48,000
17,500		18,000	284,000	231,000	48,000
18,000		18,000	284,000	231,000	48,000
18,500		20,000	308,000	255,000	50,000
19,000		20,000	308,000	255,000	50,000
19,500		20,000	308,000	255,000	50,000
20,000		20,000	308,000	255,000	50,000

Forets SuperV

Forets avec trous d'huile, type SuperV



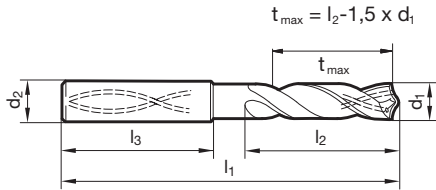
Référence **51893**



P	M	K	N	S	H
●	○	●	○	○	

Conseils d'util.,
page 30

- Amin. de l'âme ≥ Ø 3,000
- affûtage en pente
- pointe revêtue
- arête de coupe principale rectiligne
- géométrie de coupe optimisée
- quatre listels de guidage
- tenir compte des valeurs des pressions des produits de lubrification et de refroidissement (voir le diagramme)



d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	90,000	50,000	36,000
3,100		6,000	90,000	50,000	36,000
3,200		6,000	90,000	50,000	36,000
3,300		6,000	90,000	50,000	36,000
3,400		6,000	90,000	50,000	36,000
3,500		6,000	90,000	50,000	36,000
3,600		6,000	90,000	50,000	36,000
3,700		6,000	90,000	50,000	36,000
3,800		6,000	102,000	64,000	36,000
3,900		6,000	102,000	64,000	36,000
4,000		6,000	102,000	64,000	36,000
4,100		6,000	102,000	64,000	36,000
4,200		6,000	102,000	64,000	36,000
4,300		6,000	102,000	64,000	36,000
4,400		6,000	102,000	64,000	36,000
4,500		6,000	102,000	64,000	36,000
4,600		6,000	102,000	64,000	36,000
4,700		6,000	102,000	64,000	36,000
4,800		6,000	116,000	78,000	36,000
4,900		6,000	116,000	78,000	36,000
5,000		6,000	116,000	78,000	36,000
5,100		6,000	116,000	78,000	36,000
5,200		6,000	116,000	78,000	36,000
5,300		6,000	116,000	78,000	36,000
5,400		6,000	116,000	78,000	36,000
5,500		6,000	116,000	78,000	36,000
5,600		6,000	116,000	78,000	36,000
5,700		6,000	116,000	78,000	36,000
5,800		6,000	116,000	78,000	36,000
5,900		6,000	116,000	78,000	36,000
6,000		6,000	116,000	78,000	36,000
6,100		8,000	146,000	108,000	36,000
6,200		8,000	146,000	108,000	36,000
6,300		8,000	146,000	108,000	36,000
6,400		8,000	146,000	108,000	36,000
6,500		8,000	146,000	108,000	36,000
6,600		8,000	146,000	108,000	36,000
6,700		8,000	146,000	108,000	36,000
6,800		8,000	146,000	108,000	36,000
6,900		8,000	146,000	108,000	36,000
7,000		8,000	146,000	108,000	36,000
7,100		8,000	146,000	108,000	36,000
7,200		8,000	146,000	108,000	36,000
7,300		8,000	146,000	108,000	36,000
7,400		8,000	146,000	108,000	36,000
7,500		8,000	146,000	108,000	36,000
7,600		8,000	146,000	108,000	36,000
7,700		8,000	146,000	108,000	36,000

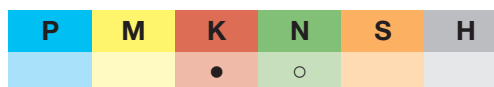
d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
7,800		8,000	146,000	108,000	36,000
7,900		8,000	146,000	108,000	36,000
8,000		8,000	146,000	108,000	36,000
8,100		10,000	162,000	120,000	40,000
8,200		10,000	162,000	120,000	40,000
8,300		10,000	162,000	120,000	40,000
8,400		10,000	162,000	120,000	40,000
8,500		10,000	162,000	120,000	40,000
8,600		10,000	162,000	120,000	40,000
8,700		10,000	162,000	120,000	40,000
8,800		10,000	162,000	120,000	40,000
8,900		10,000	162,000	120,000	40,000
9,000		10,000	162,000	120,000	40,000
9,100		10,000	162,000	120,000	40,000
9,200		10,000	162,000	120,000	40,000
9,300		10,000	162,000	120,000	40,000
9,400		10,000	162,000	120,000	40,000
9,500		10,000	162,000	120,000	40,000
9,600		10,000	162,000	120,000	40,000
9,700		10,000	162,000	120,000	40,000
9,800		10,000	162,000	120,000	40,000
9,900		10,000	162,000	120,000	40,000
10,000		10,000	162,000	120,000	40,000
10,200		12,000	204,000	156,000	45,000
10,500		12,000	204,000	156,000	45,000
11,000		12,000	204,000	156,000	45,000
11,500		12,000	204,000	156,000	45,000
12,000		12,000	204,000	156,000	45,000
12,500		14,000	230,000	182,000	45,000
12,700	1/2	14,000	230,000	182,000	45,000
13,000		14,000	230,000	182,000	45,000
13,500		14,000	230,000	182,000	45,000
14,000		14,000	230,000	182,000	45,000
14,500		16,000	260,000	208,000	48,000
15,000		16,000	260,000	208,000	48,000
15,500		16,000	260,000	208,000	48,000
16,000		16,000	260,000	208,000	48,000
16,500		18,000	285,000	234,000	48,000
17,000		18,000	285,000	234,000	48,000
17,500		18,000	285,000	234,000	48,000
18,000		18,000	285,000	234,000	48,000
18,500		20,000	310,000	258,000	50,000
19,000		20,000	310,000	258,000	50,000
19,500		20,000	310,000	258,000	50,000
20,000		20,000	310,000	258,000	50,000

Forets SuperV

Forets avec trous d'huile, type SuperV

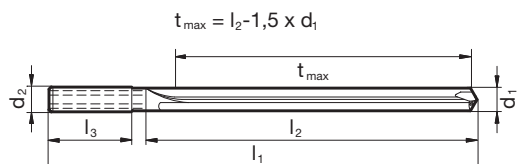


Référence **71997**



Conseils d'util.,
page 30

- Amin. de l'âme $\geq \varnothing 5,000$
- affûtage à dépouille conique
- à hélice descendante (angle négatif)
- pour les perçages de grande précision
- état de surface d.perçages de qualité supérieure
- tenir compte des valeurs des pressions des produits de lubrification et de refroidissement (voir le diagramme)



d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
5,000		6,000	145,000	105,000	36,000
6,000		6,000	145,000	105,000	36,000
8,000		8,000	180,000	137,000	36,000
9,000		10,000	217,000	170,000	40,000
10,000		10,000	217,000	170,000	40,000
11,000		12,000	258,000	205,000	45,000

d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
12,000		12,000	258,000	205,000	45,000
14,000		14,000	290,000	236,000	45,000

Forets SuperV

Forets avec trous d'huile, type SuperV



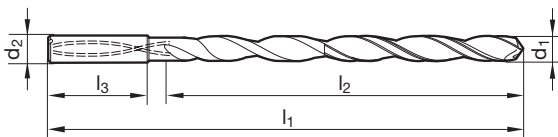
Référence **51764**



P	M	K	N	S	H
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Conseils d'util.,
page 32

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage à dépouille conique
- pointe revêtue
- forme concave de l'arête de coupe principale
- section des goujures optimisée
- section maximale des canaux de lubrification
- utilisation sur mandrins à serrage hydraulique
- quatre listels de guidage
- tenir compte des valeurs des pressions des produits de lubrification et de refroidissement (voir le diagramme)



d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	95,000	55,000	36,000
3,170	1/8	6,000	106,000	67,000	36,000
3,500		6,000	116,000	76,000	36,000
3,570	9/64	6,000	116,000	76,000	36,000
3,970	5/32	6,000	116,000	76,000	36,000
4,000		6,000	116,000	76,000	36,000
4,370	11/64	6,000	133,000	93,000	36,000
4,500		6,000	133,000	93,000	36,000
4,760	3/16	6,000	133,000	93,000	36,000
5,000		6,000	133,000	93,000	36,000
5,100		6,000	150,000	110,000	36,000
5,160	13/64	6,000	150,000	110,000	36,000
5,410		6,000	150,000	110,000	36,000
5,500		6,000	150,000	110,000	36,000
5,560	7/32	6,000	150,000	110,000	36,000
5,950	15/64	6,000	150,000	110,000	36,000
6,000		6,000	150,000	110,000	36,000
6,350	1/4	8,000	167,000	127,000	36,000
6,500		8,000	167,000	127,000	36,000
6,750	17/64	8,000	167,000	127,000	36,000
7,000		8,000	167,000	127,000	36,000
7,140	9/32	8,000	183,000	143,000	36,000
7,500		8,000	183,000	143,000	36,000
7,540	19/64	8,000	183,000	143,000	36,000

d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
7,940	5/16	8,000	183,000	143,000	36,000
8,000		8,000	183,000	143,000	36,000
8,330	21/64	10,000	204,000	160,000	40,000
8,500		10,000	204,000	160,000	40,000
8,730	11/32	10,000	204,000	160,000	40,000
9,000		10,000	204,000	160,000	40,000
9,130	23/64	10,000	221,000	177,000	40,000
9,520	3/8	10,000	221,000	177,000	40,000
9,920	25/64	10,000	221,000	177,000	40,000
10,000		10,000	221,000	177,000	40,000
10,320	13/32	12,000	247,000	198,000	45,000
10,720	27/64	12,000	247,000	198,000	45,000
11,000		12,000	247,000	198,000	45,000
11,110	7/16	12,000	263,000	214,000	45,000
11,510	29/64	12,000	263,000	214,000	45,000
11,910	15/32	12,000	263,000	214,000	45,000
12,000		12,000	263,000	214,000	45,000
12,300	31/64	14,000	297,000	248,000	45,000
12,700	1/2	14,000	297,000	248,000	45,000
13,100	33/64	14,000	297,000	248,000	45,000
13,490	17/32	14,000	297,000	248,000	45,000
13,890	35/64	14,000	297,000	248,000	45,000
14,000		14,000	297,000	248,000	45,000

Forets SuperV

Forets avec trous d'huile, type SuperV



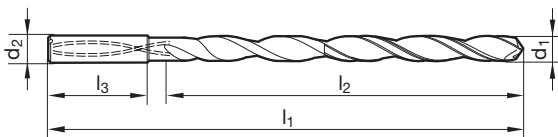
Référence 51765



P	M	K	N	S	H
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Conseils d'util.,
page 32

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage à dépouille conique
- pointe revêtue
- forme concave de l'arête de coupe principale
- section des goujures optimisée
- section maximale des canaux de lubrification
- utilisation sur mandrin hydraulique
- quatre listels de guidage
- tenir compte des valeurs des pressions des produits de lubrification et de refroidissement (voir le diagramme)



d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	110,000	70,000	36,000
3,500		6,000	136,000	96,000	36,000
3,970	5/32	6,000	136,000	96,000	36,000
4,000		6,000	136,000	96,000	36,000
4,500		6,000	158,000	118,000	36,000
4,760	3/16	6,000	158,000	118,000	36,000
5,000		6,000	158,000	118,000	36,000
5,100		6,000	180,000	140,000	36,000
5,500		6,000	180,000	140,000	36,000
5,560	7/32	6,000	180,000	140,000	36,000
6,000		6,000	180,000	140,000	36,000
6,350	1/4	8,000	202,000	162,000	36,000
6,500		8,000	202,000	162,000	36,000
7,000		8,000	202,000	162,000	36,000
7,140	9/32	8,000	223,000	183,000	36,000
7,500		8,000	223,000	183,000	36,000
8,000		8,000	223,000	183,000	36,000
8,500		10,000	249,000	205,000	40,000

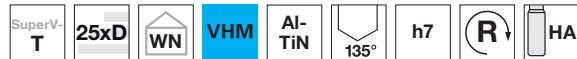
d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
9,000		10,000	249,000	205,000	40,000
10,000		10,000	271,000	227,000	40,000
11,000		12,000	302,000	253,000	45,000
12,000		12,000	323,000	274,000	45,000
12,700	1/2	14,000	367,000	318,000	45,000
13,490	17/32	14,000	367,000	318,000	45,000
14,000		14,000	367,000	318,000	45,000

Forets SuperV

Forets avec trous d'huile, type SuperV



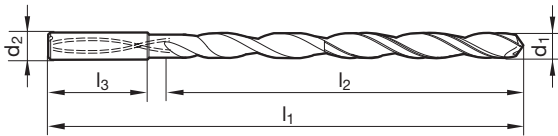
Référence 51766



P	M	K	N	S	H
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Conseils d'util.,
page 32

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage à dépouille conique
- pointe revêtue
- forme concave de l'arête de coupe principale
- section des goujures optimisée
- section maximale des canaux de lubrification
- utilisation sur mandrin hydraulique
- quatre listels de guidage
- tenir compte des valeurs des pressions des produits de lubrification et de refroidissement (voir le diagramme)



d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	125,000	85,000	36,000
3,100		6,000	141,000	101,000	36,000
3,500		6,000	156,000	116,000	36,000
3,800		6,000	156,000	116,000	36,000
3,970	5/32	6,000	156,000	116,000	36,000
4,000		6,000	156,000	116,000	36,000
4,200		6,000	183,000	143,000	36,000
4,500		6,000	183,000	143,000	36,000
4,760	3/16	6,000	183,000	143,000	36,000
5,000		6,000	183,000	143,000	36,000
5,100		6,000	210,000	170,000	36,000
5,500		6,000	210,000	170,000	36,000
5,560	7/32	6,000	210,000	170,000	36,000
6,000		6,000	210,000	170,000	36,000
6,300		8,000	237,000	197,000	36,000
6,350	1/4	8,000	237,000	197,000	36,000
6,500		8,000	237,000	197,000	36,000
7,000		8,000	237,000	197,000	36,000

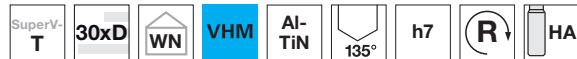
d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
7,140	9/32	8,000	263,000	223,000	36,000
7,500		8,000	263,000	223,000	36,000
8,000		8,000	263,000	223,000	36,000
8,500		10,000	294,000	250,000	40,000
8,800		10,000	294,000	250,000	40,000
9,000		10,000	294,000	250,000	40,000
10,000		10,000	321,000	277,000	40,000
11,000		12,000	359,000	310,000	45,000
12,000		12,000	386,000	337,000	45,000

Forets SuperV

Forets avec trous d'huile, type SuperV



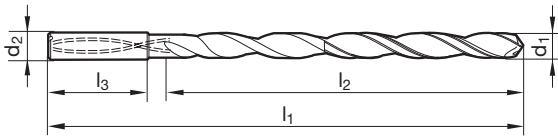
Référence 51767



P	M	K	N	S	H
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Conseils d'util.,
page 32

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage à dépouille conique
- pointe revêtue
- forme concave de l'arête de coupe principale
- section des goujures optimisée
- section maximale des canaux de lubrification
- utilisation sur mandrin hydraulique
- quatre listels de guidage
- tenir compte des valeurs des pressions des produits de lubrification et de refroidissement (voir le diagramme)



d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	140,000	100,000	36,000
3,100		6,000	158,000	118,000	36,000
3,500		6,000	176,000	136,000	36,000
3,800		6,000	176,000	136,000	36,000
3,970	5/32	6,000	176,000	136,000	36,000
4,000		6,000	176,000	136,000	36,000
4,200		6,000	208,000	168,000	36,000
4,500		6,000	208,000	168,000	36,000
4,760	3/16	6,000	208,000	168,000	36,000
5,000		6,000	208,000	168,000	36,000
5,100		6,000	240,000	200,000	36,000
5,500		6,000	240,000	200,000	36,000
5,560	7/32	6,000	240,000	200,000	36,000
6,000		6,000	240,000	200,000	36,000
6,300		8,000	272,000	232,000	36,000
6,350	1/4	8,000	272,000	232,000	36,000
6,500		8,000	272,000	232,000	36,000
7,000		8,000	272,000	232,000	36,000

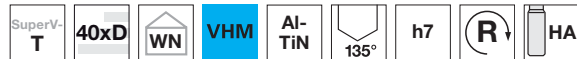
d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
7,140	9/32	8,000	303,000	263,000	36,000
7,500		8,000	303,000	263,000	36,000
8,000		8,000	303,000	263,000	36,000
8,500		10,000	339,000	295,000	40,000
8,800		10,000	339,000	295,000	40,000
9,000		10,000	339,000	295,000	40,000
10,000		10,000	371,000	327,000	40,000

Forets SuperV

Forets avec trous d'huile, type SuperV



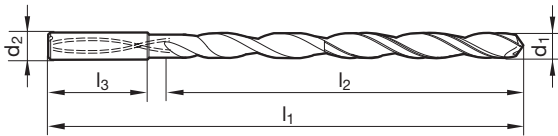
Référence 51768



P	M	K	N	S	H
●	●	●	○	○	

Conseils d'util.,
page 32

- Amin. de l'âme $\geq \text{Ø } 3,000$
- affûtage à dépouille conique
- pointe revêtue
- forme concave de l'arête de coupe principale
- section des goujures optimisée
- section maximale des canaux de lubrification
- utilisation sur mandrin hydraulique
- quatre listels de guidage
- tenir compte des valeurs des pressions des produits de lubrification et de refroidissement (voir le diagramme)



d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	170,000	130,000	36,000
3,100		6,000	193,000	153,000	36,000
3,170	1/8	6,000	193,000	153,000	36,000
3,500		6,000	193,000	153,000	36,000
3,800		6,000	216,000	176,000	36,000
3,970	5/32	6,000	216,000	176,000	36,000
4,000		6,000	216,000	176,000	36,000
4,200		6,000	238,000	198,000	36,000
4,500		6,000	238,000	198,000	36,000
4,760	3/16	6,000	258,000	218,000	36,000
5,000		6,000	258,000	218,000	36,000
5,100		6,000	280,000	240,000	36,000

d1 mm	inch	d2 mm	l1 mm	l2 mm	l3 mm
5,500		6,000	280,000	240,000	36,000
5,560	7/32	6,000	300,000	260,000	36,000
6,000		6,000	300,000	260,000	36,000
6,300		8,000	322,000	282,000	36,000
6,350	1/4	8,000	322,000	282,000	36,000
6,500		8,000	322,000	282,000	36,000
7,000		8,000	342,000	302,000	36,000
7,140	9/32	8,000	363,000	323,000	36,000
7,500		8,000	363,000	323,000	36,000
8,000		8,000	383,000	343,000	36,000

Forets SuperV

Forets, type SuperV (3 dents)



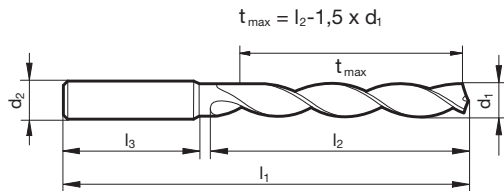
Référence **71862**



P	M	K	N	S	H
		•	•		

Conseils d'util.,
page 28

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage Spiropoint
- goujures larges
- centrage optimal
- pour une coupe interrompue



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
3,000	6,000	66,000	28,000	36,000
3,100	6,000	66,000	28,000	36,000
3,200	6,000	66,000	28,000	36,000
3,300	6,000	66,000	28,000	36,000
3,500	6,000	66,000	28,000	36,000
3,700	6,000	66,000	28,000	36,000
3,800	6,000	74,000	36,000	36,000
4,000	6,000	74,000	36,000	36,000
4,100	6,000	74,000	36,000	36,000
4,200	6,000	74,000	36,000	36,000
4,500	6,000	74,000	36,000	36,000
4,800	6,000	82,000	44,000	36,000
5,000	6,000	82,000	44,000	36,000
5,100	6,000	82,000	44,000	36,000
5,200	6,000	82,000	44,000	36,000
5,300	6,000	82,000	44,000	36,000
5,500	6,000	82,000	44,000	36,000
5,800	6,000	82,000	44,000	36,000
6,000	6,000	82,000	44,000	36,000
6,100	8,000	91,000	53,000	36,000
6,200	8,000	91,000	53,000	36,000
6,400	8,000	91,000	53,000	36,000
6,500	8,000	91,000	53,000	36,000
6,700	8,000	91,000	53,000	36,000
6,800	8,000	91,000	53,000	36,000
6,900	8,000	91,000	53,000	36,000
7,000	8,000	91,000	53,000	36,000
7,100	8,000	91,000	53,000	36,000
7,400	8,000	91,000	53,000	36,000
7,500	8,000	91,000	53,000	36,000
7,800	8,000	91,000	53,000	36,000
8,000	8,000	91,000	53,000	36,000
8,100	10,000	103,000	61,000	40,000
8,200	10,000	103,000	61,000	40,000
8,400	10,000	103,000	61,000	40,000
8,500	10,000	103,000	61,000	40,000

d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
8,600	10,000	103,000	61,000	40,000
8,700	10,000	103,000	61,000	40,000
8,800	10,000	103,000	61,000	40,000
9,000	10,000	103,000	61,000	40,000
9,100	10,000	103,000	61,000	40,000
9,500	10,000	103,000	61,000	40,000
9,800	10,000	103,000	61,000	40,000
10,000	10,000	103,000	61,000	40,000
10,100	12,000	118,000	71,000	45,000
10,200	12,000	118,000	71,000	45,000
10,300	12,000	118,000	71,000	45,000
10,500	12,000	118,000	71,000	45,000
11,000	12,000	118,000	71,000	45,000
11,200	12,000	118,000	71,000	45,000
11,500	12,000	118,000	71,000	45,000
11,800	12,000	118,000	71,000	45,000
12,000	12,000	118,000	71,000	45,000
12,100	14,000	124,000	77,000	45,000
12,500	14,000	124,000	77,000	45,000
13,000	14,000	124,000	77,000	45,000
13,500	14,000	124,000	77,000	45,000
14,000	14,000	124,000	77,000	45,000
14,100	16,000	133,000	83,000	48,000
14,500	16,000	133,000	83,000	48,000
15,000	16,000	133,000	83,000	48,000
15,500	16,000	133,000	83,000	48,000
16,000	16,000	133,000	83,000	48,000
16,500	18,000	143,000	93,000	48,000
17,000	18,000	143,000	93,000	48,000
17,500	18,000	143,000	93,000	48,000
18,000	18,000	143,000	93,000	48,000
18,500	20,000	153,000	101,000	50,000
19,000	20,000	153,000	101,000	50,000
19,500	20,000	153,000	101,000	50,000
20,000	20,000	153,000	101,000	50,000

Forets SuperV

Microforets SuperV-NX à haute perfor. en CW sans can. de lub. int.



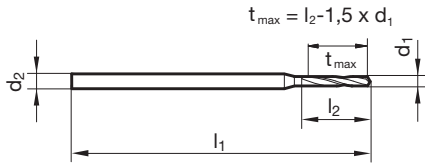
Référence 71998



P	M	K	N	S	H
●	○	●	○	○	

Conseils d'util.,
page 34

- Amin. de l'âme $\geq \varnothing 0,500$
- affûtage en pente
- arête de coupe principale rectiligne
- affilage de l'arête de coupe automatisé



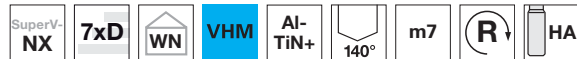
d1	inch	d2	l1	l2	d1	inch	d2	l1	l2
mm		mm	mm	mm	mm		mm	mm	mm
0,500		3,000	47,000	3,000	1,950		3,000	52,000	11,700
0,550		3,000	47,000	3,300	1,980	5/64	4,000	59,000	12,000
0,600		3,000	47,000	3,600	2,000		4,000	59,000	12,000
0,650		3,000	47,000	3,900	2,050		4,000	59,000	12,300
0,700		3,000	47,000	4,200	2,100		4,000	59,000	12,600
0,750		3,000	47,000	4,500	2,150		4,000	59,000	12,900
0,800		3,000	47,000	4,800	2,200		4,000	59,000	13,200
0,850		3,000	47,000	5,100	2,250		4,000	59,000	13,500
0,900		3,000	47,000	5,400	2,300		4,000	59,000	13,800
0,950		3,000	47,000	5,700	2,350		4,000	59,000	14,100
1,000		3,000	47,000	6,000	2,380	3/32	4,000	59,000	14,400
1,050		3,000	47,000	6,300	2,400		4,000	59,000	14,400
1,100		3,000	47,000	6,600	2,450		4,000	59,000	14,700
1,150		3,000	47,000	6,900	2,500		4,000	59,000	15,000
1,200		3,000	47,000	7,200	2,550		4,000	59,000	15,300
1,250		3,000	47,000	7,500	2,600		4,000	59,000	15,600
1,300		3,000	47,000	7,800	2,650		4,000	59,000	15,900
1,350		3,000	47,000	8,100	2,700		4,000	59,000	16,200
1,400		3,000	47,000	8,400	2,750		4,000	59,000	16,500
1,450		3,000	47,000	8,700	2,780	7/64	4,000	59,000	16,800
1,500		3,000	47,000	9,000	2,800		4,000	59,000	16,800
1,550		3,000	47,000	9,300	2,850		4,000	59,000	17,100
1,590	1/16	3,000	47,000	9,600	2,900		4,000	59,000	17,400
1,600		3,000	47,000	9,600	2,950		4,000	59,000	17,700
1,650		3,000	47,000	9,900	3,000		4,000	59,000	18,000
1,700		3,000	47,000	10,200					
1,750		3,000	47,000	10,500					
1,800		3,000	52,000	10,800					
1,850		3,000	52,000	11,100					
1,900		3,000	52,000	11,400					

Forets SuperV

Microforets SuperV-NX à haute perfor. en CW sans can. de lub. int.



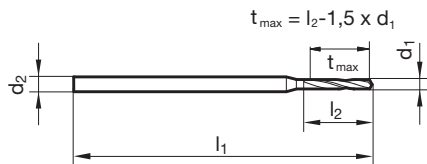
Référence 71999



P	M	K	N	S	H
●	○	●	○	○	

Conseils d'util.,
page 34

- Amin. de l'âme $\geq \varnothing 0,500$
- affûtage en pente
- arête de coupe principale rectiligne
- affilage de l'arête de coupe automatisé



d1	inch	d2	l1	l2	d1	inch	d2	l1	l2
mm		mm	mm	mm	mm		mm	mm	mm
0,500		3,000	47,000	4,000	1,950		3,000	52,000	17,600
0,550		3,000	47,000	4,400	1,980	5/64	4,000	63,000	18,000
0,600		3,000	47,000	4,800	2,000		4,000	63,000	18,000
0,650		3,000	47,000	5,200	2,050		4,000	63,000	18,500
0,700		3,000	47,000	5,600	2,100		4,000	63,000	18,900
0,750		3,000	47,000	6,000	2,150		4,000	63,000	19,400
0,800		3,000	47,000	6,400	2,200		4,000	63,000	19,800
0,850		3,000	47,000	6,800	2,250		4,000	63,000	20,300
0,900		3,000	47,000	7,200	2,300		4,000	63,000	20,700
0,950		3,000	47,000	7,600	2,350		4,000	63,000	21,200
1,000		3,000	47,000	8,000	2,380	3/32	4,000	63,000	21,600
1,050		3,000	47,000	8,400	2,400		4,000	63,000	21,600
1,100		3,000	47,000	8,800	2,450		4,000	63,000	22,100
1,150		3,000	47,000	9,200	2,500		4,000	63,000	22,500
1,200		3,000	52,000	10,800	2,550		4,000	63,000	23,000
1,250		3,000	52,000	11,300	2,600		4,000	67,000	23,400
1,300		3,000	52,000	11,700	2,650		4,000	67,000	23,900
1,350		3,000	52,000	12,200	2,700		4,000	67,000	24,300
1,400		3,000	52,000	12,600	2,750		4,000	67,000	24,800
1,450		3,000	52,000	13,100	2,780	7/64	4,000	67,000	25,200
1,500		3,000	52,000	13,500	2,800		4,000	67,000	25,200
1,550		3,000	52,000	14,000	2,850		4,000	67,000	25,700
1,590	1/16	3,000	52,000	14,400	2,900		4,000	67,000	26,100
1,600		3,000	52,000	14,400	2,950		4,000	67,000	26,600
1,650		3,000	52,000	14,900	3,000		4,000	67,000	27,000
1,700		3,000	52,000	15,300					
1,750		3,000	52,000	15,800					
1,800		3,000	52,000	16,200					
1,850		3,000	52,000	16,700					
1,900		3,000	52,000	17,100					

Forets SuperV

Microforets SuperV-NX à haute perfor. en CW avec can. de lub. int.



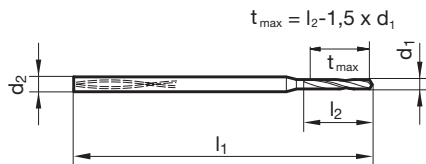
Référence **51997**



P	M	K	N	S	H
●	●	●	○	○	

Conseils d'util.,
page 34

- Amin. de l'âme $\geq \varnothing 1,400$
- affûtage en pente
- arête de coupe principale rectiligne
- affilage de l'arête de coupe automatisé
- tenir compte des valeurs des pressions des produits de lubrification et de refroidissement (voir le diagramme)



d1 mm	inch	d2 mm	l1 mm	l2 mm
1,400		4,000	52,000	11,000
1,450		4,000	52,000	12,000
1,500		4,000	52,000	12,000
1,550		4,000	52,000	12,000
1,590	1/16	4,000	52,000	13,000
1,600		4,000	52,000	13,000
1,650		4,000	52,000	13,000
1,700		4,000	56,000	14,000
1,750		4,000	56,000	14,000
1,800		4,000	56,000	14,000
1,850		4,000	56,000	15,000
1,900		4,000	56,000	15,000
1,950		4,000	56,000	16,000
1,980	5/64	4,000	56,000	16,000
2,000		4,000	56,000	16,000
2,050		4,000	56,000	16,000
2,100		4,000	62,000	17,000
2,150		4,000	62,000	17,000
2,200		4,000	62,000	18,000
2,250		4,000	62,000	18,000
2,300		4,000	62,000	18,000
2,350		4,000	62,000	19,000
2,380	3/32	4,000	62,000	19,000
2,400		4,000	62,000	19,000

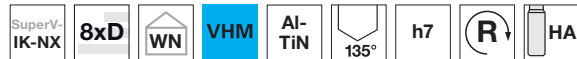
d1 mm	inch	d2 mm	l1 mm	l2 mm
2,450		4,000	62,000	20,000
2,500		4,000	62,000	20,000
2,550		4,000	62,000	20,000
2,600		4,000	66,000	21,000
2,650		4,000	66,000	21,000
2,700		4,000	66,000	22,000
2,750		4,000	66,000	22,000
2,780	7/64	4,000	66,000	22,000
2,800		4,000	66,000	22,000
2,850		4,000	66,000	23,000
2,900		4,000	66,000	23,000
2,950		4,000	66,000	24,000
3,000		4,000	66,000	24,000

Forets SuperV

Microforets SuperV-NX à haute perfor. en CW avec can. de lub. int.



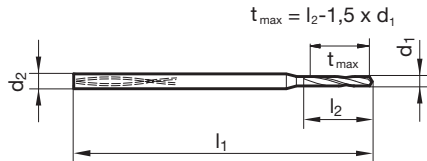
Référence 51998



P	M	K	N	S	H
●	●	●	○	○	

Conseils d'util.,
page 34

- Amin. de l'âme $\geq \varnothing 1,400$
- affûtage en pente
- arête de coupe principale rectiligne
- affilage de l'arête de coupe automatisé
- tenir compte des valeurs des pressions des produits de lubrification et de refroidissement (voir le diagramme)



d1 mm	inch	d2 mm	l1 mm	l2 mm
1,400		4,000	52,000	15,000
1,450		4,000	52,000	16,000
1,500		4,000	52,000	17,000
1,550		4,000	52,000	17,000
1,590	1/16	4,000	52,000	18,000
1,600		4,000	52,000	18,000
1,650		4,000	52,000	18,000
1,700		4,000	56,000	19,000
1,750		4,000	56,000	19,000
1,800		4,000	56,000	20,000
1,850		4,000	56,000	20,000
1,900		4,000	56,000	21,000
1,950		4,000	56,000	21,000
1,980	5/64	4,000	56,000	22,000
2,000		4,000	56,000	22,000
2,050		4,000	56,000	23,000
2,100		4,000	62,000	23,000
2,150		4,000	62,000	24,000
2,200		4,000	62,000	24,000
2,250		4,000	62,000	25,000
2,300		4,000	62,000	25,000
2,350		4,000	62,000	26,000
2,380	3/32	4,000	62,000	26,000
2,400		4,000	62,000	26,000

d1 mm	inch	d2 mm	l1 mm	l2 mm
2,450		4,000	62,000	27,000
2,500		4,000	62,000	28,000
2,550		4,000	62,000	28,000
2,600		4,000	66,000	29,000
2,650		4,000	66,000	29,000
2,700		4,000	66,000	30,000
2,750		4,000	66,000	30,000
2,780	7/64	4,000	66,000	31,000
2,800		4,000	66,000	31,000
2,850		4,000	66,000	31,000
2,900		4,000	66,000	32,000
2,950		4,000	66,000	32,000
3,000		4,000	66,000	33,000

Forets SuperV

Microforets SuperV-NX à haute perfor. en CW avec can. de lub. int.



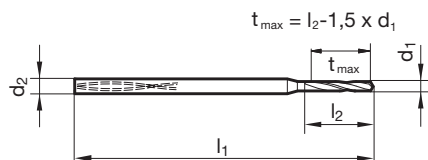
Référence 51999



P	M	K	N	S	H
●	●	●	○	○	

Conseils d'util.,
page 34

- Amin. de l'âme $\geq \varnothing 1,400$
- affûtage en pente
- pointe revêtue
- arête de coupe principale rectiligne
- affilage de l'arête de coupe automatisé
- tenir compte des valeurs des pressions des produits de lubrification et de refroidissement (voir le diagramme)



d1 mm	inch	d2 mm	l1 mm	l2 mm
1,400		4,000	62,000	25,000
1,500		4,000	62,000	27,000
1,590	1/16	4,000	62,000	29,000
1,600		4,000	62,000	29,000
1,700		4,000	70,000	31,000
1,800		4,000	70,000	32,000
1,900		4,000	70,000	34,000
1,980	5/64	4,000	70,000	36,000
2,000		4,000	70,000	36,000
2,100		4,000	78,000	38,000
2,200		4,000	78,000	40,000
2,300		4,000	78,000	42,000

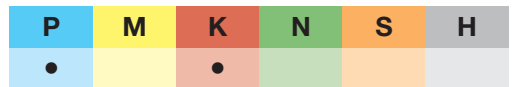
d1 mm	inch	d2 mm	l1 mm	l2 mm
2,380	3/32	4,000	78,000	44,000
2,400		4,000	78,000	44,000
2,500		4,000	78,000	45,000
2,600		4,000	87,000	47,000
2,700		4,000	87,000	48,000
2,780	7/64	4,000	87,000	50,000
2,800		4,000	87,000	50,000
2,900		4,000	87,000	52,000
3,000		4,000	87,000	54,000

Forets SuperV

Microforets SuperV-M en CW

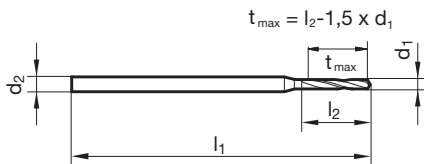


Référence 51720



Conseils d'util.,
page 34

- Amin. de l'âme $\geq \varnothing 0,800$
- affûtage en pente
- arête de coupe principale rectiligne



d1 mm	inch	d2 mm	l1 mm	l2 mm	d1 mm	inch	d2 mm	l1 mm	l2 mm
0,100		3,000	38,000	1,200	1,400		3,000	38,000	10,000
0,150		3,000	38,000	2,000	1,450		3,000	38,000	10,000
0,200		3,000	38,000	2,500	1,500		3,000	38,000	10,000
0,250		3,000	38,000	3,000	1,510		3,000	38,000	10,000
0,300		3,000	38,000	5,000	1,520		3,000	38,000	10,000
0,310		3,000	38,000	5,000	1,550		3,000	38,000	10,000
0,350		3,000	38,000	6,000	1,600		3,000	38,000	12,000
0,370		3,000	38,000	6,000	1,650		3,000	38,000	12,000
0,400		3,000	38,000	7,000	1,700		3,000	38,000	12,000
0,450		3,000	38,000	7,000	1,800		3,000	38,000	12,000
0,500		3,000	38,000	7,000	1,810		3,000	38,000	12,000
0,550		3,000	38,000	7,000	1,830		3,000	38,000	12,000
0,600		3,000	38,000	7,000	1,850		3,000	38,000	12,000
0,640		3,000	38,000	7,000	1,900		3,000	38,000	12,000
0,650		3,000	38,000	7,000	1,920		3,000	38,000	12,000
0,700		3,000	38,000	8,000	1,950		3,000	38,000	12,000
0,710		3,000	38,000	8,000	1,980	5/64	3,000	38,000	12,000
0,720		3,000	38,000	8,000	2,000		3,000	38,000	12,000
0,740		3,000	38,000	8,000	2,100		3,000	38,000	12,000
0,750		3,000	38,000	8,000	2,400		3,000	38,000	12,000
0,790	1/32	3,000	38,000	8,000	2,500		3,000	38,000	12,000
0,800		3,000	38,000	10,000	2,600		3,000	38,000	12,000
0,810		3,000	38,000	10,000	2,750		3,000	38,000	12,000
0,820		3,000	38,000	10,000	2,950		3,000	38,000	12,000
0,840		3,000	38,000	10,000	3,000		3,000	38,000	12,000
0,900		3,000	38,000	10,000					
0,910		3,000	38,000	10,000					
0,920		3,000	38,000	10,000					
0,930		3,000	38,000	10,000					
0,940		3,000	38,000	10,000					
0,950		3,000	38,000	10,000					
0,990		3,000	38,000	10,000					
1,000		3,000	38,000	10,000					
1,100		3,000	38,000	10,000					
1,150		3,000	38,000	10,000					
1,200		3,000	38,000	10,000					

Le système de perçage SuperV

Porte-outils SuperV-AP mini

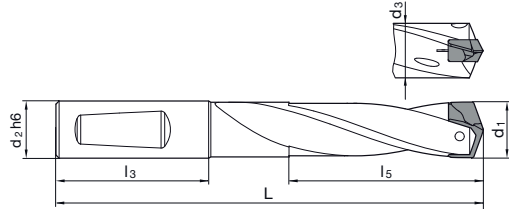


Référence **77007**



Conseils d'util., page 36

- résistance à l'usure particulièrement élevée
- section des goujures optimisée
- sortie optimisée des can.de refroid.
- y compris la vis de fixation n° de catalogue 77020
- y compris le tournevis n° de catalogue 76021



d1 mm	N° de code	d2 h6 mm	d3 mm	L mm	l3 mm	l5 mm	Taille
11,00-11,49	11,000	12,000	10,700	84,000	45,000	19,300	110
11,50-11,99	11,500	12,000	11,200	85,000	45,000	20,100	115
12,00-12,49	12,000	12,000	11,700	87,000	45,000	21,000	120
12,50-12,99	12,500	14,000	12,200	89,000	45,000	21,900	125
13,00-13,49	13,000	14,000	12,700	90,000	45,000	22,600	130
13,50-13,99	13,500	14,000	13,200	92,000	45,000	23,600	135
14,00-14,49	14,000	14,000	13,700	93,000	45,000	24,500	140
14,50-14,99	14,500	16,000	14,200	98,000	48,000	25,300	145
15,00-15,49	15,000	16,000	14,700	100,000	48,000	26,100	150
15,50-15,99	15,500	16,000	15,200	101,000	48,000	27,000	155
16,00-16,49	16,000	16,000	15,700	102,000	48,000	27,800	160
16,50-16,99	16,500	18,000	16,200	105,000	48,000	28,700	165
17,00-17,49	17,000	18,000	16,700	106,000	48,000	29,600	170
17,50-17,99	17,500	18,000	17,200	107,000	48,000	30,400	175
18,00-18,49	18,000	18,000	17,700	109,000	48,000	31,200	180
18,50-18,99	18,500	20,000	18,200	113,000	50,000	32,100	185
19,00-19,49	19,000	20,000	18,700	114,000	50,000	32,900	190
19,50-19,99	19,500	20,000	19,200	116,000	50,000	33,700	195
20,00-20,49	20,000	20,000	19,700	117,000	50,000	34,600	200
20,50-20,99	20,500	25,000	20,200	128,000	56,000	35,500	205
21,00-21,49	21,000	25,000	20,700	129,000	56,000	36,400	210
21,50-21,99	21,500	25,000	21,200	130,000	56,000	37,200	215
22,00-22,49	22,000	25,000	21,700	131,000	56,000	38,000	220
22,50-22,99	22,500	25,000	22,200	134,000	56,000	38,900	225
23,00-23,49	23,000	25,000	22,700	135,000	56,000	39,800	230
23,50-23,99	23,500	25,000	23,200	137,000	56,000	40,600	235
24,00-24,49	24,000	25,000	23,700	138,000	56,000	41,500	240
24,50-24,99	24,500	25,000	24,200	140,000	56,000	42,300	245
25,00-25,49	25,000	25,000	24,700	142,000	56,000	43,200	250
25,50-25,99	25,500	32,000	25,200	148,000	60,000	44,000	255
26,00-26,49	26,000	32,000	25,700	151,000	60,000	44,300	260
26,50-26,99	26,500	32,000	26,200	153,000	60,000	45,100	265
27,00-27,49	27,000	32,000	26,700	155,000	60,000	46,000	270
27,50-27,99	27,500	32,000	27,200	156,000	60,000	46,800	275
28,00-28,49	28,000	32,000	27,700	157,000	60,000	47,700	280
28,50-28,99	28,500	32,000	28,200	159,000	60,000	48,500	285
29,00-29,49	29,000	32,000	28,700	161,000	60,000	49,400	290
29,50-29,99	29,500	32,000	29,200	162,000	60,000	50,200	295
30,00-30,49	30,000	32,000	29,700	164,000	60,000	50,900	300
30,50-30,99	30,500	32,000	30,200	166,000	60,000	51,700	305
31,00-31,49	31,000	32,000	30,700	167,000	60,000	52,600	310
31,50-31,99	31,500	32,000	31,200	168,000	60,000	53,400	315
32,00-32,99	32,000	32,000	31,700	172,000	60,000	55,100	320
33,00-33,99	33,000	32,000	32,700	175,000	60,000	56,800	330
34,00-34,99	34,000	32,000	33,700	178,000	60,000	58,500	340
35,00-35,99	35,000	32,000	34,700	181,000	60,000	60,200	350
36,00-36,99	36,000	32,000	35,700	184,000	60,000	61,800	360
37,00-37,99	37,000	32,000	36,700	188,000	60,000	63,500	370
38,00-38,99	38,000	32,000	37,700	191,000	60,000	65,200	380
39,00-40,00	39,000	32,000	38,700	194,000	60,000	66,900	390

Le système de perçage SuperV

Porte-outils SuperV-AP mini

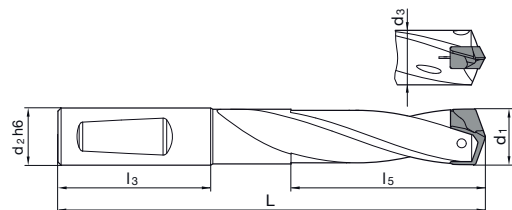


Référence **77000**



Conseils d'util., page 38

- résistance à l'usure particulièrement élevée
- section des goujures optimisée
- sortie optimisée des can.de refroid.
- y compris la vis de fixation n° de catalogue 77020
- y compris le tournevis n° de catalogue 76021



d1 mm	N° de code	d2 h6 mm	d3 mm	L mm	l3 mm	l5 mm	Taille
11,00-11,49	11,000	12,000	10,700	101,000	45,000	36,600	110
11,50-11,99	11,500	12,000	11,200	103,000	45,000	38,100	115
12,00-12,49	12,000	12,000	11,700	106,000	45,000	39,700	120
12,50-12,99	12,500	14,000	12,200	108,000	45,000	41,300	125
13,00-13,49	13,000	14,000	12,700	110,000	45,000	42,900	130
13,50-13,99	13,500	14,000	13,200	113,000	45,000	44,600	135
14,00-14,49	14,000	14,000	13,700	115,000	45,000	46,200	140
14,50-14,99	14,500	16,000	14,200	120,000	48,000	47,800	145
15,00-15,49	15,000	16,000	14,700	123,000	48,000	49,300	150
15,50-15,99	15,500	16,000	15,200	125,000	48,000	50,900	155
16,00-16,49	16,000	16,000	15,700	127,000	48,000	52,900	160
16,50-16,99	16,500	18,000	16,200	130,000	48,000	54,100	165
17,00-17,49	17,000	18,000	16,700	132,000	48,000	55,800	170
17,50-17,99	17,500	18,000	17,200	134,000	48,000	57,400	175
18,00-18,49	18,000	18,000	17,700	137,000	48,000	58,900	180
18,50-18,99	18,500	20,000	18,200	141,000	50,000	60,500	185
19,00-19,49	19,000	20,000	18,700	143,000	50,000	62,100	190
19,50-19,99	19,500	20,000	19,200	146,000	50,000	63,700	195
20,00-20,49	20,000	20,000	19,700	148,000	50,000	65,300	200
20,50-20,99	20,500	25,000	20,200	159,000	56,000	67,000	205
21,00-21,49	21,000	25,000	20,700	161,000	56,000	68,600	210
21,50-21,99	21,500	25,000	21,200	163,000	56,000	70,100	215
22,00-22,49	22,000	25,000	21,700	165,000	56,000	71,700	220
22,50-22,99	22,500	25,000	22,200	168,000	56,000	73,300	225
23,00-23,49	23,000	25,000	22,700	170,000	56,000	74,900	230
23,50-23,99	23,500	25,000	23,200	173,000	56,000	76,500	235
24,00-24,49	24,000	25,000	23,700	175,000	56,000	78,100	240
24,50-24,99	24,500	25,000	24,200	177,000	56,000	79,700	245
25,00-25,49	25,000	25,000	24,700	180,000	56,000	81,300	250
25,50-25,99	25,500	32,000	25,200	187,000	60,000	82,900	255
26,00-26,49	26,000	32,000	25,700	191,000	60,000	84,000	260
26,50-26,99	26,500	32,000	26,200	193,000	60,000	86,100	265
27,00-27,49	27,000	32,000	26,700	196,000	60,000	87,200	270
27,50-27,99	27,500	32,000	27,200	198,000	60,000	88,900	275
28,00-28,49	28,000	32,000	27,700	200,000	60,000	90,400	280
28,50-28,99	28,500	32,000	28,200	202,000	60,000	92,500	285
29,00-29,49	29,000	32,000	28,700	205,000	60,000	94,600	290
29,50-29,99	29,500	32,000	29,200	207,000	60,000	95,100	295
30,00-30,49	30,000	32,000	29,700	210,000	60,000	96,700	300
30,50-30,99	30,500	32,000	30,200	212,000	60,000	98,300	305
31,00-31,49	31,000	32,000	30,700	214,000	60,000	99,800	310
31,50-31,99	31,500	32,000	31,200	216,000	60,000	101,400	315
32,00-32,99	32,000	32,000	31,700	221,000	60,000	104,600	320
33,00-33,99	33,000	32,000	32,700	226,000	60,000	107,800	330
34,00-34,99	34,000	32,000	33,700	230,000	60,000	111,000	340
35,00-35,99	35,000	32,000	34,700	235,000	60,000	114,200	350
36,00-36,99	36,000	32,000	35,700	240,000	60,000	117,300	360
37,00-37,99	37,000	32,000	36,700	245,000	60,000	120,500	370
38,00-38,99	38,000	32,000	37,700	249,000	60,000	123,700	380
39,00-40,00	39,000	32,000	38,700	254,000	60,000	126,900	390

Le système de perçage SuperV

Porte-outils SuperV-AP mini

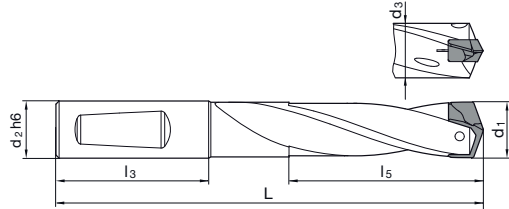


Référence **77001**



Conseils d'util., page 40

- résistance à l'usure particulièrement élevée
- section des goujures optimisée
- sortie optimisée des can.de refroid.
- y compris la vis de fixation n° de catalogue 77020
- y compris le tournevis n° de catalogue 76021



d1 mm	N° de code	d2 h6 mm	d3 mm	L mm	l3 mm	l5 mm	Taille
11,00-11,49	11,000	12,000	10,700	124,000	45,000	59,600	110
11,50-11,99	11,500	12,000	11,200	127,000	45,000	62,100	115
12,00-12,49	12,000	12,000	11,700	131,000	45,000	64,700	120
12,50-12,99	12,500	14,000	12,200	134,000	45,000	67,300	125
13,00-13,49	13,000	14,000	12,700	137,000	45,000	69,900	130
13,50-13,99	13,500	14,000	13,200	141,000	45,000	72,600	135
14,00-14,49	14,000	14,000	13,700	144,000	45,000	75,200	140
14,50-14,99	14,500	16,000	14,200	150,000	48,000	77,800	145
15,00-15,49	15,000	16,000	14,700	154,000	48,000	80,300	150
15,50-15,99	15,500	16,000	15,200	157,000	48,000	82,900	155
16,00-16,49	16,000	16,000	15,700	160,000	48,000	85,900	160
16,50-16,99	16,500	18,000	16,200	164,000	48,000	88,100	165
17,00-17,49	17,000	18,000	16,700	167,000	48,000	90,800	170
17,50-17,99	17,500	18,000	17,200	170,000	48,000	93,400	175
18,00-18,49	18,000	18,000	17,700	174,000	48,000	95,900	180
18,50-18,99	18,500	20,000	18,200	179,000	50,000	98,500	185
19,00-19,49	19,000	20,000	18,700	182,000	50,000	101,100	190
19,50-19,99	19,500	20,000	19,200	186,000	50,000	103,700	195
20,00-20,49	20,000	20,000	19,700	189,000	50,000	106,300	200
20,50-20,99	20,500	25,000	20,200	201,000	56,000	109,000	205
21,00-21,49	21,000	25,000	20,700	204,000	56,000	111,600	210
21,50-21,99	21,500	25,000	21,200	207,000	56,000	114,100	215
22,00-22,49	22,000	25,000	21,700	210,000	56,000	116,700	220
22,50-22,99	22,500	25,000	22,200	214,000	56,000	119,300	225
23,00-23,49	23,000	25,000	22,700	217,000	56,000	121,900	230
23,50-23,99	23,500	25,000	23,200	221,000	56,000	124,500	235
24,00-24,49	24,000	25,000	23,700	224,000	56,000	127,100	240
24,50-24,99	24,500	25,000	24,200	227,000	56,000	129,700	245
25,00-25,49	25,000	25,000	24,700	231,000	56,000	132,300	250
25,50-25,99	25,500	32,000	25,200	239,000	60,000	134,900	255
26,00-26,49	26,000	32,000	25,700	244,000	60,000	137,000	260
26,50-26,99	26,500	32,000	26,200	247,000	60,000	140,000	265
27,00-27,49	27,000	32,000	26,700	251,000	60,000	142,200	270
27,50-27,99	27,500	32,000	27,200	254,000	60,000	144,800	275
28,00-28,49	28,000	32,000	27,700	257,000	60,000	147,400	280
28,50-28,99	28,500	32,000	28,200	260,000	60,000	150,400	285
29,00-29,49	29,000	32,000	28,700	264,000	60,000	153,500	290
30,00-30,49	30,000	32,000	29,700	271,000	60,000	157,600	300
30,50-30,99	30,500	32,000	30,200	274,000	60,000	160,200	305
31,00-31,49	31,000	32,000	30,700	277,000	60,000	162,800	310
31,50-31,99	31,500	32,000	31,200	280,000	60,000	165,400	315
32,00-32,99	32,000	32,000	31,700	287,000	60,000	170,600	320
33,00-33,99	33,000	32,000	32,700	294,000	60,000	175,800	330
34,00-34,99	34,000	32,000	33,700	300,000	60,000	181,000	340
35,00-35,99	35,000	32,000	34,700	307,000	60,000	186,200	350
36,00-36,99	36,000	32,000	35,700	314,000	60,000	191,300	360
37,00-37,99	37,000	32,000	36,700	321,000	60,000	196,500	370
38,00-38,99	38,000	32,000	37,700	327,000	60,000	201,700	380
39,00-40,00	39,000	32,000	38,700	334,000	60,000	206,900	390

Le système de perçage SuperV

Porte-outils SuperV-AP mini

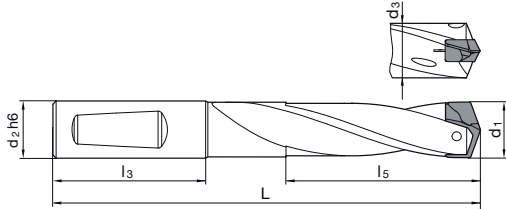


Référence **77003**



Conseils d'util., page 42

- résistance à l'usure particulièrement élevée
- section des goujures optimisée
- sortie optimisée des can.de refroid.
- y compris la vis de fixation n° de catalogue 77020
- y compris le tournevis n° de catalogue 76021



d1 mm	N° de code	d2 h6 mm	d3 mm	L mm	l3 mm	l5 mm	Taille
11,00-11,49	11,000	12,000	10,700	147,000	45,000	82,600	110
11,50-11,99	11,500	12,000	11,200	151,000	45,000	86,100	115
12,00-12,49	12,000	12,000	11,700	156,000	45,000	89,700	120
12,50-12,99	12,500	14,000	12,200	160,000	45,000	93,300	125
13,00-13,49	13,000	14,000	12,700	164,000	45,000	96,900	130
13,50-13,99	13,500	14,000	13,200	169,000	45,000	100,600	135
14,00-14,49	14,000	14,000	13,700	173,000	45,000	104,200	140
14,50-14,99	14,500	16,000	14,200	180,000	48,000	107,800	145
15,00-15,49	15,000	16,000	14,700	185,000	48,000	111,300	150
15,50-15,99	15,500	16,000	15,200	189,000	48,000	114,900	155
16,00-16,49	16,000	16,000	15,700	193,000	48,000	118,900	160
16,50-16,99	16,500	18,000	16,200	198,000	48,000	122,100	165
17,00-17,49	17,000	18,000	16,700	202,000	48,000	125,800	170
17,50-17,99	17,500	18,000	17,200	206,000	48,000	129,400	175
18,00-18,49	18,000	18,000	17,700	211,000	48,000	132,900	180
18,50-18,99	18,500	20,000	18,200	217,000	50,000	136,500	185
19,00-19,49	19,000	20,000	18,700	221,000	50,000	140,100	190
19,50-19,99	19,500	20,000	19,200	226,000	50,000	143,700	195
20,00-20,49	20,000	20,000	19,700	230,000	50,000	147,300	200
20,50-20,99	20,500	25,000	20,200	243,000	56,000	151,000	205
21,00-21,49	21,000	25,000	20,700	247,000	56,000	154,600	210
21,50-21,99	21,500	25,000	21,200	251,000	56,000	158,100	215
22,00-22,49	22,000	25,000	21,700	255,000	56,000	161,700	220
22,50-22,99	22,500	25,000	22,200	260,000	56,000	165,300	225
23,00-23,49	23,000	25,000	22,700	264,000	56,000	168,900	230
23,50-23,99	23,500	25,000	23,200	269,000	56,000	172,500	235
24,00-24,49	24,000	25,000	23,700	273,000	56,000	176,100	240
24,50-24,99	24,500	25,000	24,200	277,000	56,000	179,700	245
25,00-25,49	25,000	25,000	24,700	282,000	56,000	183,300	250
25,50-25,99	25,500	32,000	25,200	291,000	60,000	186,900	255
26,00-26,49	26,000	32,000	25,700	297,000	60,000	190,000	260
26,50-26,99	26,500	32,000	26,200	301,000	60,000	194,000	265
27,00-27,49	27,000	32,000	26,700	306,000	60,000	197,200	270
27,50-27,99	27,500	32,000	27,200	310,000	60,000	200,800	275
28,00-28,49	28,000	32,000	27,700	314,000	60,000	204,400	280
28,50-28,99	28,500	32,000	28,200	318,000	60,000	208,400	285
29,00-29,49	29,000	32,000	28,700	323,000	60,000	212,500	290
29,50-29,99	29,500	32,000	29,200	327,000	60,000	215,100	295
30,00-30,49	30,000	32,000	29,700	332,000	60,000	218,600	300
30,50-30,99	30,500	32,000	30,200	336,000	60,000	222,200	305
31,00-31,49	31,000	32,000	30,700	340,000	60,000	225,800	310
31,50-31,99	31,500	32,000	31,200	344,000	60,000	229,400	315
33,00-33,99	33,000	32,000	32,700	362,000	60,000	244,600	330
36,00-36,99	36,000	32,000	35,700	387,000	60,000	265,800	360
39,00-40,00	39,000	32,000	38,700	413,000	60,000	287,400	390

Le système de perçage SuperV

Porte-outils SuperV-AP mini

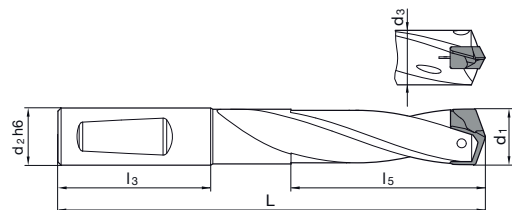


Référence **77004**



Conseils d'util., page 44

- résistance à l'usure particulièrement élevée
- section des goujures optimisée
- sortie optimisée des can.de refroid.
- y compris la vis de fixation n° de catalogue 77020
- y compris le tournevis n° de catalogue 76021



d1 mm	N° de code	d2 h6 mm	d3 mm	L mm	l3 mm	l5 mm	Taille
11,00-11,49	11,000	12,000	10,700	182,000	45,000	117,100	110
11,50-11,99	11,500	12,000	11,200	187,000	45,000	122,100	115
12,00-12,49	12,000	12,000	11,700	194,000	45,000	127,200	120
12,50-12,99	12,500	14,000	12,200	199,000	45,000	132,300	125
13,00-13,49	13,000	14,000	12,700	205,000	45,000	137,500	130
13,50-13,99	13,500	14,000	13,200	211,000	45,000	142,500	135
14,00-14,49	14,000	14,000	13,700	217,000	45,000	147,700	140
14,50-14,99	14,500	16,000	14,200	225,000	48,000	152,800	145
15,00-15,49	15,000	16,000	14,700	232,000	48,000	157,800	150
15,50-15,99	15,500	16,000	15,200	237,000	48,000	162,900	155
16,00-16,49	16,000	16,000	15,700	243,000	48,000	168,000	160
16,50-16,99	16,500	18,000	16,200	249,000	48,000	170,000	165
17,00-17,49	17,000	18,000	16,700	255,000	48,000	178,300	170
17,50-17,99	17,500	18,000	17,200	260,000	48,000	183,500	175
18,00-18,49	18,000	18,000	17,700	267,000	48,000	188,400	180
18,50-18,99	18,500	20,000	18,200	274,000	50,000	193,500	185
19,00-19,49	19,000	20,000	18,700	280,000	50,000	198,700	190
19,50-19,99	19,500	20,000	19,200	286,000	50,000	203,700	195
20,00-20,49	20,000	20,000	19,700	292,000	50,000	208,900	200
20,50-20,99	20,500	25,000	20,200	306,000	56,000	214,000	205
21,00-21,49	21,000	25,000	20,700	312,000	56,000	219,100	210
21,50-21,99	21,500	25,000	21,200	317,000	56,000	224,200	215
22,00-22,49	22,000	25,000	21,700	323,000	56,000	229,300	220
22,50-22,99	22,500	25,000	22,200	329,000	56,000	234,400	225
23,00-23,49	23,000	25,000	22,700	335,000	56,000	239,500	230
23,50-23,99	23,500	25,000	23,200	341,000	56,000	244,600	235
24,00-24,49	24,000	25,000	23,700	347,000	56,000	249,700	240
24,50-24,99	24,500	25,000	24,200	352,000	56,000	254,800	245
25,00-25,49	25,000	25,000	24,700	359,000	56,000	259,900	250
25,50-25,99	25,500	32,000	25,200	369,000	60,000	265,000	255
26,00-26,49	26,000	32,000	25,700	377,000	60,000	270,000	260
26,50-26,99	26,500	32,000	26,200	382,000	60,000	275,000	265
27,00-27,49	27,000	32,000	26,700	388,000	60,000	280,100	270
27,50-27,99	27,500	32,000	27,200	394,000	60,000	285,200	275
28,00-28,49	28,000	32,000	27,700	400,000	60,000	290,300	280
28,50-28,99	28,500	32,000	28,200	405,000	60,000	295,400	285
29,00-29,49	29,000	32,000	28,700	412,000	60,000	300,500	290
29,50-29,99	29,500	32,000	29,200	418,000	60,000	305,600	295
30,00-30,49	30,000	32,000	29,700	424,000	60,000	310,600	300
30,50-30,99	30,500	32,000	30,200	429,000	60,000	315,700	305
31,00-31,49	31,000	32,000	30,700	435,000	60,000	320,800	310
31,50-31,99	31,500	32,000	31,200	441,000	60,000	325,900	315

Le système de perçage SuperV

Plaquettes interchangeables pour SuperV-AP mini



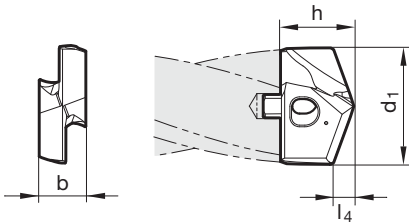
Référence **67011**



P	M	K	N	S	H
●		○			

Conseils d'util.,
page 36-44

- Amin. de l'âme $\geq \varnothing 11,000$
- affûtage en pente
- forme de l'arête de coupe principale, rectiligne, (obtenue par correction)
- y compris la vis de fixation n° de catalogue 77020



d1 mm	d1 inch	N° de code	l4 mm	b mm	h mm	Taille
11,000		11,000	2,100	4,500	7,500	110
11,200		11,200	2,100	4,500	7,500	110
11,500		11,500	2,100	4,500	7,500	115
11,510	29/64	11,510	2,100	4,500	7,500	115
11,700		11,700	2,200	4,500	7,500	115
11,800		11,800	2,200	4,500	7,500	115
11,910	15/32	11,910	2,200	4,500	7,500	115
12,000		12,000	2,200	5,000	7,700	120
12,100		12,100	2,300	5,000	7,700	120
12,200		12,200	2,300	5,000	7,700	120
12,300	31/64	12,300	2,300	5,000	7,700	120
12,500		12,500	2,300	5,000	7,700	125
12,600		12,600	2,300	5,000	7,700	125
12,700	1/2	12,700	2,400	5,000	7,700	125
12,800		12,800	2,400	5,000	7,700	125
12,900		12,900	2,400	5,000	7,700	125
13,000		13,000	2,400	5,500	8,500	130
13,100	33/64	13,100	2,400	5,500	8,500	130
13,490	17/32	13,490	2,500	5,500	8,500	130
13,500		13,500	2,500	5,500	8,500	135
13,600		13,600	2,500	5,500	8,500	135
13,700		13,700	2,500	5,500	8,500	135
13,800		13,800	2,600	5,500	8,500	135
13,890	35/64	13,890	2,600	5,500	8,500	135
14,000		14,000	2,600	6,000	9,600	140
14,100		14,100	2,600	6,000	9,600	140
14,290	9/16	14,290	2,700	6,000	9,600	140
14,400		14,400	2,700	6,000	9,600	140
14,500		14,500	2,700	6,000	9,600	145
14,600		14,600	2,700	6,000	9,600	145
14,680	37/64	14,680	2,700	6,000	9,600	145
14,700		14,700	2,700	6,000	9,600	145
14,800		14,800	2,700	6,000	9,600	145
15,000		15,000	2,800	6,000	9,800	150
15,080	19/32	15,080	2,800	6,000	9,800	150
15,100		15,100	2,800	6,000	9,800	150
15,200		15,200	2,800	6,000	9,800	150
15,300		15,300	2,800	6,000	9,800	150
15,480	39/64	15,480	2,900	6,000	9,800	150
15,500		15,500	2,900	6,000	9,800	155
15,600		15,600	2,900	6,000	9,800	155
15,700		15,700	2,900	6,000	9,800	155
15,800		15,800	2,900	6,000	9,800	155
15,870	5/8	15,870	2,900	6,000	9,800	155
16,000		16,000	3,000	7,000	11,000	160
16,270	41/64	16,270	3,000	7,000	11,000	160
16,500		16,500	3,100	7,000	11,000	165
16,670	21/32	16,670	3,100	7,000	11,000	165

d1 mm	d1 inch	N° de code	l4 mm	b mm	h mm	Taille
17,000		17,000	3,100	7,000	11,000	170
17,070	43/64	17,070	3,200	7,000	11,000	170
17,250		17,250	3,200	7,000	11,000	170
17,460	11/16	17,460	3,200	7,000	11,000	170
17,500		17,500	3,200	7,000	11,000	175
17,600		17,600	3,300	7,000	11,000	175
17,860	45/64	17,860	3,300	7,000	11,000	175
18,000		18,000	3,300	8,000	12,600	180
18,260	23/32	18,260	3,400	8,000	12,600	180
18,500		18,500	3,400	8,000	12,600	185
18,650	47/64	18,650	3,400	8,000	12,600	185
19,000		19,000	3,500	8,000	12,600	190
19,050	3/4	19,050	3,500	8,000	12,600	190
19,250		19,250	3,600	8,000	12,600	190
19,450	49/64	19,450	3,600	8,000	12,600	190
19,500		19,500	3,600	8,000	12,600	195
19,600		19,600	3,600	8,000	12,600	195
19,840	25/32	19,840	3,700	8,000	12,600	195
20,000		20,000	3,700	9,000	13,900	200
20,240	51/64	20,240	3,700	9,000	13,900	200
20,500		20,500	3,800	9,000	13,900	205
20,640	13/16	20,640	3,800	9,000	13,900	205
21,000		21,000	3,900	9,000	13,900	210
21,030	53/64	21,030	3,900	9,000	13,900	210
21,100		21,100	3,900	9,000	13,900	210
21,430	27/32	21,430	3,900	9,000	13,900	210
21,500		21,500	4,000	9,000	13,900	215
21,830	55/64	21,830	4,000	9,000	13,900	215
22,000		22,000	4,100	10,000	15,300	220
22,220	7/8	22,220	4,100	10,000	15,300	220
22,500		22,500	4,100	10,000	15,300	225
22,620	57/64	22,620	4,200	10,000	15,300	225
23,000		23,000	4,200	10,000	15,300	230
23,020	29/32	23,020	4,200	10,000	15,300	230
23,420	59/64	23,420	4,300	10,000	15,300	230
23,500		23,500	4,300	10,000	15,300	235
23,810	15/16	23,810	4,400	10,000	15,300	235
24,000		24,000	4,400	11,000	15,800	240
24,100		24,100	4,400	11,000	15,800	240
24,210	61/64	24,210	4,500	11,000	15,800	240
24,500		24,500	4,500	11,000	15,800	245
24,610	31/32	24,610	4,500	11,000	15,800	245
25,000	63/64	25,000	4,600	11,000	15,800	250
25,250		25,250	4,600	11,000	15,800	250
25,400	1	25,400	4,700	11,000	15,800	250
25,500		25,500	4,700	11,000	15,800	255
25,650		25,650	4,700	11,000	15,800	255
25,670		25,670	4,700	11,000	15,800	255
25,700		25,700	4,700	11,000	15,800	255
25,810		25,810	4,700	11,000	15,800	255
26,000		26,000	4,800	12,000	20,000	260
26,190	1 1/32	26,190	4,800	12,000	20,000	260
26,500		26,500	4,900	12,000	20,000	265
26,590	1 3/64	26,590	4,900	12,000	20,000	265
27,000		27,000	5,000	12,000	20,000	270
27,500		27,500	5,100	12,000	20,000	275
27,700		27,700	5,100	12,000	20,000	275
27,780	1 3/32	27,780	5,100	12,000	20,000	275
28,000		28,000	5,100	13,000	20,700	280
28,180	1 7/64	28,180	5,200	13,000	20,700	280
28,500		28,500	5,200	13,000	20,700	285
28,580		28,580	5,300	13,000	20,700	285
29,000		29,000	5,300	13,000	20,700	290
29,370	1 5/32	29,370	5,400	13,000	20,700	290
29,500		29,500	5,400	13,000	20,700	295
29,600		29,600	5,400	13,000	20,700	295
29,770	1 11/64	29,770	5,500	13,000	20,700	295
30,000		30,000	5,500	14,000	22,300	300
30,160	1 3/16	30,160	5,500	14,000	22,300	300
30,500		30,500	5,600	14,000	22,300	305
30,960	1 7/32	30,960	5,700	14,000	22,300	305
31,000		31,000	5,700	14,000	22,300	310

d1 mm	d1 inch	N° de code	l4 mm	b mm	h mm	Taille
31,500		31,500	5,800	14,000	22,300	315
31,750	1 1/4	31,750	5,800	14,000	22,300	315
32,000		32,000	5,900	15,000	23,100	320
32,500		32,500	6,000	15,000	23,100	320
32,540	1 9/32	32,540	6,000	15,000	23,100	320
32,940	1 19/64	32,940	6,000	15,000	23,100	320
33,000		33,000	6,100	15,000	23,100	330
33,340	1 5/16	33,340	6,100	15,000	23,100	330
33,500		33,500	6,100	15,000	23,100	330
34,000		34,000	6,200	15,000	23,100	340
34,130	1 11/32	34,130	6,300	15,000	23,100	340
34,500		34,500	6,300	15,000	23,100	340
34,930		34,930	6,400	15,000	23,100	340
35,000		35,000	6,400	15,000	23,100	350
35,500		35,500	6,500	15,000	23,100	350
35,720	1 13/32	35,720	6,600	15,000	23,100	350
36,000		36,000	6,600	16,000	23,900	360
36,500		36,500	6,700	16,000	23,900	360
36,510	1 7/16	36,510	6,700	16,000	23,900	360
37,000		37,000	6,800	16,000	23,900	370
37,310	1 15/32	37,310	6,800	16,000	23,900	370
37,500		37,500	6,900	16,000	23,900	370
38,000		38,000	7,000	16,000	23,900	380
38,100	1 1/2	38,100	7,000	16,000	23,900	380
38,500	1 33/64	38,500	7,100	16,000	23,900	380
39,000		39,000	7,100	16,000	23,900	390
39,500		39,500	7,200	16,000	23,900	390
40,000		40,000	7,300	16,000	23,900	400

Le système de perçage SuperV

Plaquettes interchangeables pour SuperV-AP mini



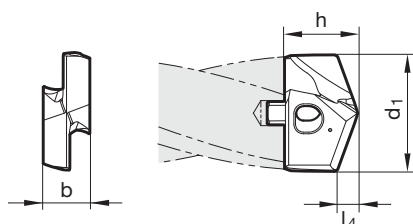
Référence **67012**



P	M	K	N	S	H
	●	○		○	

Conseils d'util.,
page 36-44

- Amin. de l'âme $\geq \varnothing 11,000$
- affûtage à dépouille conique
- forme de l'arête de coupe principale, rectiligne, (obtenue par correction)
- y compris la vis de fixation n° de catalogue 77020



d1 mm	d1 inch	N° de code	l4 mm	b mm	h mm	Taille
11,000		11,000	2,100	4,500	7,500	110
11,200		11,200	2,100	4,500	7,500	110
11,500		11,500	2,100	4,500	7,500	115
11,510	29/64	11,510	2,100	4,500	7,500	115
11,700		11,700	2,200	4,500	7,500	115
11,800		11,800	2,200	4,500	7,500	115
11,910	15/32	11,910	2,200	4,500	7,500	115
12,000		12,000	2,200	5,000	7,700	120
12,100		12,100	2,300	5,000	7,700	120
12,200		12,200	2,300	5,000	7,700	120
12,300	31/64	12,300	2,300	5,000	7,700	120
12,500		12,500	2,300	5,000	7,700	125
12,600		12,600	2,300	5,000	7,700	125
12,700	1/2	12,700	2,400	5,000	7,700	125
12,800		12,800	2,400	5,000	7,700	125
12,900		12,900	2,400	5,000	7,700	125
13,000		13,000	2,400	5,500	8,500	130
13,100	33/64	13,100	2,400	5,500	8,500	130
13,490	17/32	13,490	2,500	5,500	8,500	130
13,500		13,500	2,500	5,500	8,500	135
13,600		13,600	2,500	5,500	8,500	135
13,700		13,700	2,500	5,500	8,500	135
13,800		13,800	2,600	5,500	8,500	135
13,890	35/64	13,890	2,600	5,500	8,500	135
14,000		14,000	2,600	6,000	9,600	140
14,100		14,100	2,600	6,000	9,600	140
14,290	9/16	14,290	2,700	6,000	9,600	140
14,400		14,400	2,700	6,000	9,600	140
14,500		14,500	2,700	6,000	9,600	145
14,600		14,600	2,700	6,000	9,600	145
14,700		14,700	2,700	6,000	9,600	145
14,800		14,800	2,700	6,000	9,600	145
15,000		15,000	2,800	6,000	9,800	150
15,080	19/32	15,080	2,800	6,000	9,800	150
15,100		15,100	2,800	6,000	9,800	150
15,200		15,200	2,800	6,000	9,800	150
15,300		15,300	2,800	6,000	9,800	150
15,500		15,500	2,900	6,000	9,800	155
15,600		15,600	2,900	6,000	9,800	155
15,700		15,700	2,900	6,000	9,800	155
15,800		15,800	2,900	6,000	9,800	155
15,870	5/8	15,870	2,900	6,000	9,800	155
16,000		16,000	3,000	7,000	11,000	160
16,270	41/64	16,270	3,000	7,000	11,000	160
16,500		16,500	3,100	7,000	11,000	165
16,670	21/32	16,670	3,100	7,000	11,000	165
17,000		17,000	3,100	7,000	11,000	170
17,070	43/64	17,070	3,200	7,000	11,000	170

d1 mm	d1 inch	N° de code	l4 mm	b mm	h mm	Taille
17,250		17,250	3,200	7,000	11,000	170
17,460	11/16	17,460	3,200	7,000	11,000	170
17,500		17,500	3,200	7,000	11,000	175
17,600		17,600	3,300	7,000	11,000	175
17,860	45/64	17,860	3,300	7,000	11,000	175
18,000		18,000	3,300	8,000	12,600	180
18,260	23/32	18,260	3,400	8,000	12,600	180
18,500		18,500	3,400	8,000	12,600	185
18,650	47/64	18,650	3,400	8,000	12,600	185
19,000		19,000	3,500	8,000	12,600	190
19,050	3/4	19,050	3,500	8,000	12,600	190
19,250		19,250	3,600	8,000	12,600	190
19,450	49/64	19,450	3,600	8,000	12,600	190
19,500		19,500	3,600	8,000	12,600	195
19,600		19,600	3,600	8,000	12,600	195
19,840	25/32	19,840	3,700	8,000	12,600	195
20,000		20,000	3,700	9,000	13,900	200
20,240	51/64	20,240	3,700	9,000	13,900	200
20,500		20,500	3,800	9,000	13,900	205
20,640	13/16	20,640	3,800	9,000	13,900	205
21,000		21,000	3,900	9,000	13,900	210
21,030	53/64	21,030	3,900	9,000	13,900	210
21,100		21,100	3,900	9,000	13,900	210
21,430	27/32	21,430	3,900	9,000	13,900	210
21,500		21,500	4,000	9,000	13,900	215
21,830	55/64	21,830	4,000	9,000	13,900	215
22,000		22,000	4,100	10,000	15,300	220
22,220	7/8	22,220	4,100	10,000	15,300	220
22,500		22,500	4,100	10,000	15,300	225
22,620	57/64	22,620	4,200	10,000	15,300	225
23,000		23,000	4,200	10,000	15,300	230
23,020	29/32	23,020	4,200	10,000	15,300	230
23,420	59/64	23,420	4,300	10,000	15,300	230
23,500		23,500	4,300	10,000	15,300	235
23,810	15/16	23,810	4,400	10,000	15,300	235
24,000		24,000	4,400	11,000	15,800	240
24,100		24,100	4,400	11,000	15,800	240
24,210	61/64	24,210	4,500	11,000	15,800	240
24,500		24,500	4,500	11,000	15,800	245
24,610	31/32	24,610	4,500	11,000	15,800	245
25,000	63/64	25,000	4,600	11,000	15,800	250
25,250		25,250	4,600	11,000	15,800	250
25,400	1	25,400	4,700	11,000	15,800	250
25,500		25,500	4,700	11,000	15,800	255
25,650		25,650	4,700	11,000	15,800	255
25,670		25,670	4,700	11,000	15,800	255
25,700		25,700	4,700	11,000	15,800	255
26,000		26,000	4,800	12,000	20,000	260
26,190	1 1/32	26,190	4,800	12,000	20,000	260
26,500		26,500	4,900	12,000	20,000	265
27,000		27,000	5,000	12,000	20,000	270
27,500		27,500	5,100	12,000	20,000	275
27,700		27,700	5,100	12,000	20,000	275
27,780	1 3/32	27,780	5,100	12,000	20,000	275
28,000		28,000	5,100	13,000	20,700	280
28,180	1 7/64	28,180	5,200	13,000	20,700	280
28,500		28,500	5,200	13,000	20,700	285
28,580		28,580	5,300	13,000	20,700	285
29,000		29,000	5,300	13,000	20,700	290
29,370	1 5/32	29,370	5,400	13,000	20,700	290
29,500		29,500	5,400	13,000	20,700	295
29,600		29,600	5,400	13,000	20,700	295
30,000		30,000	5,500	14,000	22,300	300
30,160	1 3/16	30,160	5,500	14,000	22,300	300
30,500		30,500	5,600	14,000	22,300	305
30,960	1 7/32	30,960	5,700	14,000	22,300	305
31,000		31,000	5,700	14,000	22,300	310
31,500		31,500	5,800	14,000	22,300	315
31,750	1 1/4	31,750	5,800	14,000	22,300	315
32,000		32,000	5,900	15,000	23,100	320
32,500		32,500	6,000	15,000	23,100	320
32,540	1 9/32	32,540	6,000	15,000	23,100	320

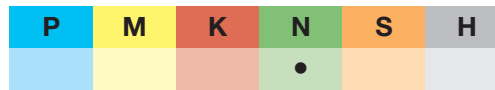
d1 mm	d1 inch	N° de code	l4 mm	b mm	h mm	Taille
33,000		33,000	6,100	15,000	23,100	330
33,340	1 5/16	33,340	6,100	15,000	23,100	330
33,500		33,500	6,100	15,000	23,100	330
34,000		34,000	6,200	15,000	23,100	340
34,130	1 11/32	34,130	6,300	15,000	23,100	340
34,500		34,500	6,300	15,000	23,100	340
34,930		34,930	6,400	15,000	23,100	340
35,000		35,000	6,400	15,000	23,100	350
35,500		35,500	6,500	15,000	23,100	350
35,720	1 13/32	35,720	6,600	15,000	23,100	350
36,000		36,000	6,600	16,000	23,900	360
36,500		36,500	6,700	16,000	23,900	360
36,510	1 7/16	36,510	6,700	16,000	23,900	360
37,000		37,000	6,800	16,000	23,900	370
37,310	1 15/32	37,310	6,800	16,000	23,900	370
37,500		37,500	6,900	16,000	23,900	370
38,000		38,000	7,000	16,000	23,900	380
38,100	1 1/2	38,100	7,000	16,000	23,900	380
38,500	1 33/64	38,500	7,100	16,000	23,900	380
39,000		39,000	7,100	16,000	23,900	390
39,500		39,500	7,200	16,000	23,900	390
40,000		40,000	7,300	16,000	23,900	400

Le système de perçage SuperV

Plaquettes interchangeables pour SuperV-AP mini

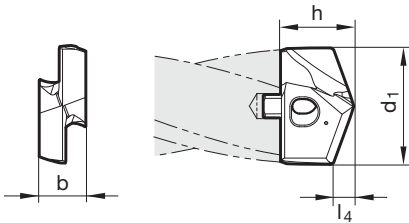


Référence **77012**



Conseils d'util.,
page 36-44

- Amin. de l'âme $\geq \text{Ø } 11,000$
- affûtage à dépouille conique
- forme concave de l'arête de coupe principale
- y compris la vis de fixation n° de catalogue 77020



d1 mm	d1 inch	N° de code	l4 mm	b mm	h mm	Taille
11,000		11,000	2,100	4,500	7,500	110
11,200		11,200	2,100	4,500	7,500	110
11,510	29/64	11,510	2,100	4,500	7,500	115
11,800		11,800	2,200	4,500	7,500	115
12,000		12,000	2,200	5,000	7,700	120
12,200		12,200	2,300	5,000	7,700	120
12,500		12,500	2,300	5,000	7,700	125
12,700	1/2	12,700	2,400	5,000	7,700	125
12,900		12,900	2,400	5,000	7,700	125
13,100	33/64	13,100	2,400	5,500	8,500	130
13,500		13,500	2,500	5,500	8,500	135
13,700		13,700	2,500	5,500	8,500	135
13,800		13,800	2,600	5,500	8,500	135
14,000		14,000	2,600	6,000	9,600	140
14,100		14,100	2,600	6,000	9,600	140
14,400		14,400	2,700	6,000	9,600	140
14,500		14,500	2,700	6,000	9,600	145
14,680	37/64	14,680	2,700	6,000	9,600	145
14,700		14,700	2,700	6,000	9,600	145
15,000		15,000	2,800	6,000	9,800	150
15,080	19/32	15,080	2,800	6,000	9,800	150
15,200		15,200	2,800	6,000	9,800	150
15,300		15,300	2,800	6,000	9,800	150
15,500		15,500	2,900	6,000	9,800	155
15,600		15,600	2,900	6,000	9,800	155
15,800		15,800	2,900	6,000	9,800	155
15,870	5/8	15,870	2,900	6,000	9,800	155
16,270	41/64	16,270	3,000	7,000	11,000	160
16,500		16,500	3,100	7,000	11,000	165
17,000		17,000	3,100	7,000	11,000	170
17,070	43/64	17,070	3,200	7,000	11,000	170
17,460	11/16	17,460	3,200	7,000	11,000	170
17,500		17,500	3,200	7,000	11,000	175
17,600		17,600	3,300	7,000	11,000	175
17,860	45/64	17,860	3,300	7,000	11,000	175
18,000		18,000	3,300	8,000	12,600	180
18,260	23/32	18,260	3,400	8,000	12,600	180
18,500		18,500	3,400	8,000	12,600	185
18,650	47/64	18,650	3,400	8,000	12,600	185
19,000		19,000	3,500	8,000	12,600	190
19,050	3/4	19,050	3,500	8,000	12,600	190
19,250		19,250	3,600	8,000	12,600	190
19,450	49/64	19,450	3,600	8,000	12,600	190
19,500		19,500	3,600	8,000	12,600	195
19,600		19,600	3,600	8,000	12,600	195
19,840	25/32	19,840	3,700	8,000	12,600	195
20,000		20,000	3,700	9,000	13,900	200
20,240	51/64	20,240	3,700	9,000	13,900	200

d1 mm	d1 inch	N° de code	l4 mm	b mm	h mm	Taille
20,500		20,500	3,800	9,000	13,900	205
20,640	13/16	20,640	3,800	9,000	13,900	205
21,000		21,000	3,900	9,000	13,900	210
21,030	53/64	21,030	3,900	9,000	13,900	210
21,100		21,100	3,900	9,000	13,900	210
21,430	27/32	21,430	3,900	9,000	13,900	210
21,500		21,500	4,000	9,000	13,900	215
21,830	55/64	21,830	4,000	9,000	13,900	215
22,000		22,000	4,100	10,000	15,300	220
22,220	7/8	22,220	4,100	10,000	15,300	220
22,500		22,500	4,100	10,000	15,300	225
22,620	57/64	22,620	4,200	10,000	15,300	225
23,000		23,000	4,200	10,000	15,300	230
23,020	29/32	23,020	4,200	10,000	15,300	230
23,420	59/64	23,420	4,300	10,000	15,300	230
23,500		23,500	4,300	10,000	15,300	235
23,810	15/16	23,810	4,400	10,000	15,300	235
24,000		24,000	4,400	11,000	15,800	240
24,100		24,100	4,400	11,000	15,800	240
24,210	61/64	24,210	4,500	11,000	15,800	240
24,500		24,500	4,500	11,000	15,800	245
24,610	31/32	24,610	4,500	11,000	15,800	245
25,000	63/64	25,000	4,600	11,000	15,800	250
25,400	1	25,400	4,700	11,000	15,800	250
25,500		25,500	4,700	11,000	15,800	255
25,670		25,670	4,700	11,000	15,800	255
25,700		25,700	4,700	11,000	15,800	255
25,810		25,810	4,700	11,000	15,800	255
26,000		26,000	4,800	12,000	20,000	260
26,190	1 1/32	26,190	4,800	12,000	20,000	260
26,500		26,500	4,900	12,000	20,000	265
26,590	1 3/64	26,590	4,900	12,000	20,000	265
27,000		27,000	5,000	12,000	20,000	270
27,500		27,500	5,100	12,000	20,000	275
27,700		27,700	5,100	12,000	20,000	275
27,780	1 3/32	27,780	5,100	12,000	20,000	275
28,000		28,000	5,100	13,000	20,700	280
28,180	1 7/64	28,180	5,200	13,000	20,700	280
28,500		28,500	5,200	13,000	20,700	285
28,580		28,580	5,300	13,000	20,700	285
29,000		29,000	5,300	13,000	20,700	290
29,370	1 5/32	29,370	5,400	13,000	20,700	290
29,500		29,500	5,400	13,000	20,700	295
29,770	1 11/64	29,770	5,500	13,000	20,700	295
30,000		30,000	5,500	14,000	22,300	300
30,160	1 3/16	30,160	5,500	14,000	22,300	300
30,500		30,500	5,600	14,000	22,300	305
30,960	1 7/32	30,960	5,700	14,000	22,300	305
31,000		31,000	5,700	14,000	22,300	310
31,500		31,500	5,800	14,000	22,300	315
31,750	1 1/4	31,750	5,800	14,000	22,300	315
32,000		32,000	5,900	15,000	23,100	320
32,500		32,500	6,000	15,000	23,100	320
32,540	1 9/32	32,540	6,000	15,000	23,100	320
32,940	1 19/64	32,940	6,000	15,000	23,100	320
33,000		33,000	6,100	15,000	23,100	330
33,340	1 5/16	33,340	6,100	15,000	23,100	330
33,500		33,500	6,100	15,000	23,100	330
34,000		34,000	6,200	15,000	23,100	340
34,130	1 11/32	34,130	6,300	15,000	23,100	340
34,500		34,500	6,300	15,000	23,100	340
34,930		34,930	6,400	15,000	23,100	340
35,000		35,000	6,400	15,000	23,100	350
35,500		35,500	6,500	15,000	23,100	350
35,720	1 13/32	35,720	6,600	15,000	23,100	350
36,000		36,000	6,600	16,000	23,900	360
36,500		36,500	6,700	16,000	23,900	360
36,510	1 7/16	36,510	6,700	16,000	23,900	360
37,000		37,000	6,800	16,000	23,900	370
37,310	1 15/32	37,310	6,800	16,000	23,900	370
37,500		37,500	6,900	16,000	23,900	370
38,000		38,000	7,000	16,000	23,900	380

d1 mm	d1 inch	N° de code	l4 mm	b mm	h mm	Taille
38,100	1 1/2	38,100	7,000	16,000	23,900	380
38,500	1 33/64	38,500	7,100	16,000	23,900	380
39,000		39,000	7,100	16,000	23,900	390
39,500		39,500	7,200	16,000	23,900	390
40,000		40,000	7,300	16,000	23,900	400

Le système de perçage SuperV

Plaquettes interchangeables pour SuperV-AP mini

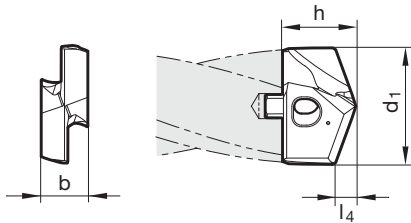


Référence **77011**



P	M	K	N	S	H
●	●	●	●	○	

Conseils d'util.,
page 36



- Amin. de l'âme $\geq \varnothing 11,000$
- affûtage en pente
- quatre listels de guidage
- forme de l'arête de coupe principale, rectiligne, (obtenue par correction)
- y compris la vis de fixation n° de catalogue 77020
- spécifiquement pour l'utilisation de l'article selon n° de catalogue 77007

d1 mm	d1 inch	N° de code	l4 mm	b mm	h mm	Taille
11,000		11,000	1,800	4,500	7,200	110
11,200		11,200	1,800	4,500	7,200	110
11,510	29/64	11,510	1,900	4,500	7,200	110
11,800		11,800	1,900	4,500	7,200	110
12,000		12,000	1,900	5,000	7,400	120
12,200		12,200	2,000	5,000	7,400	120
12,500		12,500	2,000	5,000	7,400	120
12,700	1/2	12,700	2,100	5,000	7,400	120
12,900		12,900	2,100	5,000	7,400	120
13,100	33/64	13,100	2,100	5,500	8,200	130
13,500		13,500	2,200	5,500	8,200	130
13,700		13,700	2,200	5,500	8,200	130
13,800		13,800	2,200	5,500	8,200	130
14,000		14,000	2,300	6,000	9,400	140
14,100		14,100	2,300	6,000	9,400	140
14,400		14,400	2,300	6,000	9,400	140
14,500		14,500	2,300	6,000	9,400	140
14,680	37/64	14,680	2,400	6,000	9,400	140
14,700		14,700	2,400	6,000	9,400	140
15,000		15,000	2,400	6,000	9,400	140
15,080	19/32	15,080	2,400	6,000	9,400	140
15,200		15,200	2,400	6,000	9,400	140
15,300		15,300	2,500	6,000	9,400	140
15,500		15,500	2,500	6,000	9,400	140
15,600		15,600	2,500	6,000	9,400	140
15,800		15,800	2,500	6,000	9,400	140
15,870	5/8	15,870	2,600	6,000	9,400	140
16,270	41/64	16,270	2,600	7,000	10,600	160
16,500		16,500	2,700	7,000	10,600	160
17,000		17,000	2,700	7,000	10,600	160
17,070	43/64	17,070	2,700	7,000	10,600	160
17,460	11/16	17,460	2,800	7,000	10,600	160
17,500		17,500	2,800	7,000	10,600	160
17,600		17,600	2,800	7,000	10,600	160
17,860	45/64	17,860	2,900	7,000	10,600	160
18,000		18,000	2,900	8,000	12,100	180
18,260	23/32	18,260	2,900	8,000	12,100	180
18,500		18,500	3,000	8,000	12,100	180
18,650	47/64	18,650	3,000	8,000	12,100	180
19,000		19,000	3,000	8,000	12,100	180
19,050	3/4	19,050	3,100	8,000	12,100	180
19,450	49/64	19,450	3,100	8,000	12,100	180
19,500		19,500	3,100	8,000	12,100	180
19,600		19,600	3,100	8,000	12,100	180
19,840	25/32	19,840	3,200	8,000	12,100	180
20,000		20,000	3,200	9,000	13,300	200
20,240	51/64	20,240	3,200	9,000	13,300	200
20,500		20,500	3,300	9,000	13,300	200

d1 mm	d1 inch	N° de code	l4 mm	b mm	h mm	Taille
20,640	13/16	20,640	3,300	9,000	13,300	200
21,000		21,000	3,400	9,000	13,300	200
21,030	53/64	21,030	3,400	9,000	13,300	200
21,100		21,100	3,400	9,000	13,300	200
21,500		21,500	3,400	9,000	13,300	200
22,000		22,000	3,500	10,000	14,800	220
22,500		22,500	3,600	10,000	14,800	220
23,000		23,000	3,700	10,000	14,800	220
23,420	59/64	23,420	3,700	10,000	14,800	220
23,810	15/16	23,810	3,800	10,000	14,800	220
24,100		24,100	3,800	11,000	15,300	240
24,500		24,500	3,900	11,000	15,300	240
25,000	63/64	25,000	4,000	11,000	15,300	240
25,500		25,500	4,100	11,000	15,300	240
25,700		25,700	4,100	11,000	15,300	240
26,190	1 1/32	26,190	4,200	12,000	19,400	260
26,500		26,500	4,200	12,000	19,400	260
27,500		27,500	4,400	12,000	19,400	260
27,700		27,700	4,400	12,000	19,400	260
28,000		28,000	4,500	13,000	20,100	280
28,180	1 7/64	28,180	4,500	13,000	20,100	280
28,580		28,580	4,600	13,000	20,100	280
29,000		29,000	4,600	13,000	20,100	280
29,500		29,500	4,700	13,000	20,100	280
30,000		30,000	4,800	14,000	21,700	300
30,500		30,500	4,900	14,000	21,700	300
30,960	1 7/32	30,960	4,900	14,000	21,700	300
31,500		31,500	5,000	14,000	21,700	300
31,750	1 1/4	31,750	5,100	14,000	21,700	300
32,500		32,500	5,200	15,000	22,400	320
32,540	1 9/32	32,540	5,200	15,000	22,400	320
33,340	1 5/16	33,340	5,300	15,000	22,400	320
33,500		33,500	5,300	15,000	22,400	320
34,000		34,000	5,400	15,000	22,400	320
34,130	1 11/32	34,130	5,400	15,000	22,400	320
34,500		34,500	5,500	15,000	22,400	320
34,930		34,930	5,600	15,000	22,400	320
35,000		35,000	5,600	15,000	22,400	320
35,500		35,500	5,600	15,000	22,400	320
36,000		36,000	5,700	16,000	23,200	360
36,500		36,500	5,800	16,000	23,200	360
36,510	1 7/16	36,510	5,800	16,000	23,200	360
37,000		37,000	5,900	16,000	23,200	360
37,310	1 15/32	37,310	5,900	16,000	23,200	360
37,500		37,500	6,000	16,000	23,200	360
38,000		38,000	6,000	16,000	23,200	360
38,100	1 1/2	38,100	6,100	16,000	23,200	360
38,500	1 33/64	38,500	6,100	16,000	23,200	360
39,000		39,000	6,200	16,000	23,200	360
39,500		39,500	6,300	16,000	23,200	360
40,000		40,000	6,400	16,000	23,200	360

Le système de perçage SuperV

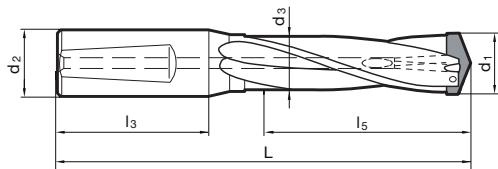
Porte-outils SuperV-AP maxi



Référence **76000**



Conseils d'util., page 46



- attachement renforcé
- plaquette de coupe interchangeable avec indice de l'état intégré, échangeable
- y compris la vis de fixation n° de catalogue 76020
- y compris le tournevis n° de catalogue 76021

d1 mm	N° de code	d2 mm	d3 mm	L mm	l3 mm	l5 mm	Taille
16,00-17,00	17,000	20,000	15,700	128,400	50,000	53,000	0.1
17,01-17,99	17,990	20,000	16,700	128,400	50,000	53,000	0.2
18,00-19,00	19,000	20,000	17,700	136,700	50,000	53,000	1.1
19,01-20,00	20,000	20,000	18,700	136,700	50,000	58,000	1.2
20,01-21,00	21,000	25,000	19,700	151,600	56,000	58,000	2.1
21,01-22,50	22,500	25,000	20,700	151,600	56,000	63,000	2.2
22,51-24,00	24,000	25,000	22,200	159,400	56,000	63,000	3.1
24,01-25,50	25,500	25,000	23,700	168,400	56,000	68,000	3.2
25,51-27,50	27,500	32,000	25,200	180,000	60,000	68,000	4.1
27,51-29,50	29,500	32,000	27,200	188,000	60,000	68,000	4.2
29,51-32,00	32,000	32,000	29,200	195,600	60,000	75,000	5.1
32,01-34,50	34,500	32,000	31,700	203,600	60,000	75,000	5.2
34,51-37,50	37,500	32,000	34,000	215,100	60,000	75,000	6.1
37,51-40,50	40,500	32,000	37,000	228,100	60,000	120,000	6.2

Le système de perçage SuperV

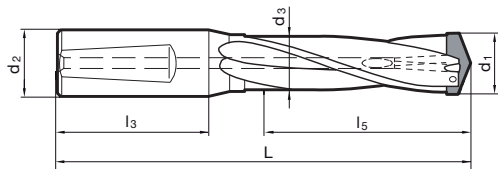
Porte-outils SuperV-AP maxi



Référence **76001**



Conseils d'util., page 48



- attachement renforcé
- plaquette de coupe interchangeable avec indice de l'état intégré, échangeable
- y compris la vis de fixation n° de catalogue 76020
- y compris le tournevis n° de catalogue 76021

d1 mm	N° de code	d2 mm	d3 mm	L mm	l3 mm	l5 mm	Taille
16,00-17,00	17,000	20,000	15,700	164,400	50,000	90,000	0.1
17,01-17,99	17,990	20,000	16,700	164,400	50,000	90,000	0.2
18,00-19,00	19,000	20,000	17,700	176,700	50,000	100,000	1.1
19,01-20,00	20,000	20,000	18,700	176,700	50,000	100,000	1.2
20,01-21,00	21,000	25,000	19,700	195,600	56,000	110,000	2.1
21,01-22,50	22,500	25,000	20,700	195,600	56,000	110,000	2.2
22,51-24,00	24,000	25,000	22,200	207,400	56,000	120,000	3.1
24,01-25,50	25,500	25,000	23,700	220,400	56,000	130,000	3.2
25,51-27,50	27,500	32,000	25,200	236,000	60,000	140,000	4.1
27,51-29,50	29,500	32,000	27,200	248,000	60,000	150,000	4.2
29,51-32,00	32,000	32,000	29,200	259,600	60,000	160,000	5.1
32,01-34,50	34,500	32,000	31,700	271,600	60,000	170,000	5.2
34,51-37,50	37,500	32,000	34,000	289,100	60,000	190,000	6.1
37,51-40,50	40,500	32,000	37,000	308,100	60,000	200,000	6.2

Le système de perçage SuperV

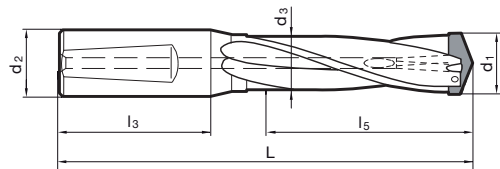
Porte-outils SuperV-AP maxi



Référence **76003**



Conseils d'util., page 50



- attachement renforcé
- plaquette de coupe interchangeable avec indice de l'état intégré, échangeable
- y compris la vis de fixation n° de catalogue 76020
- y compris le tournevis n° de catalogue 76021

d1 mm	N° de code	d2 mm	d3 mm	L mm	l3 mm	l5 mm	Taille
16,00-17,00	17,000	20,000	15,700	194,000	50,000	126,000	0.1
17,01-17,99	17,990	20,000	16,700	194,000	50,000	126,000	0.2
18,00-19,00	19,000	20,000	17,700	210,000	50,000	140,000	1.1
19,01-20,00	20,000	20,000	18,700	210,000	50,000	140,000	1.2
20,01-21,00	21,000	25,000	19,700	232,200	56,000	154,000	2.1
21,01-22,50	22,500	25,000	20,700	232,200	56,000	154,000	2.2
22,51-24,00	24,000	25,000	22,200	247,000	56,000	168,000	3.1
24,01-25,50	25,500	25,000	23,700	264,000	56,000	182,000	3.2
25,51-27,50	27,500	32,000	25,200	282,400	60,000	196,000	4.1
27,51-29,50	29,500	32,000	27,200	298,400	60,000	210,000	4.2
29,51-32,00	32,000	32,000	29,200	312,400	60,000	224,000	5.1
32,01-34,50	34,500	32,000	31,700	328,400	60,000	238,000	5.2
34,51-37,50	37,500	32,000	34,000	350,000	60,000	266,000	6.1
37,51-40,50	40,500	32,000	37,000	375,000	60,000	280,000	6.2

Le système de perçage SuperV

Plaquettes interchangeables pour SuperV-AP mini



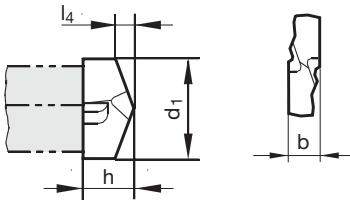
Référence **76011**



P	M	K	N	S	H
●		●	○		

Conseils d'util.,
page 46-50

- affûtage à dépouille conique
- forme concave de l'arête de coupe principale
- y compris la vis de fixation n° de catalogue 76020



d1 mm	d1 inch	N° de code	l4 mm	b mm	h mm	Taille
16,000		16,000	3,000	4,500	8,000	0.1
16,500		16,500	3,100	4,500	8,000	0.1
17,000		17,000	3,100	4,500	8,000	0.1
17,500		17,500	3,200	4,500	8,000	0.2
18,000		18,000	3,300	5,000	8,000	1.1
18,500		18,500	3,400	5,000	8,000	1.1
19,000		19,000	3,500	5,000	8,000	1.1
19,500		19,500	3,600	5,000	8,000	1.2
20,000		20,000	3,700	5,000	8,000	1.2
20,500		20,500	3,800	5,500	8,800	2.1
21,000		21,000	3,900	5,500	8,800	2.1
21,500		21,500	4,000	5,500	8,800	2.2
22,000		22,000	4,100	5,500	8,800	2.2
22,500		22,500	4,100	5,500	8,800	2.2
23,000		23,000	4,200	6,300	10,000	3.1
23,500		23,500	4,300	6,300	10,000	3.1
24,000		24,000	4,400	6,300	10,000	3.1
24,500		24,500	4,500	6,300	10,000	3.2
25,000	63/64	25,000	4,600	6,300	10,000	3.2
25,500		25,500	4,700	6,300	10,000	3.2
26,000		26,000	4,800	7,300	11,600	4.1
26,500		26,500	4,900	7,300	11,600	4.1
27,000		27,000	5,000	7,300	11,600	4.1
27,500		27,500	5,100	7,300	11,600	4.1
28,000		28,000	5,100	7,300	11,600	4.2
28,500		28,500	5,200	7,300	11,600	4.2
29,000		29,000	5,300	7,300	11,600	4.2
29,500		29,500	5,400	7,300	11,600	4.2
30,000		30,000	5,500	8,500	13,600	5.1
30,500		30,500	5,600	8,500	13,600	5.1
31,000		31,000	5,700	8,500	13,600	5.1
31,500		31,500	5,800	8,500	13,600	5.1
32,000		32,000	5,900	8,500	13,600	5.1
32,500		32,500	6,000	8,500	13,600	5.2
33,000		33,000	6,100	8,500	13,600	5.2
33,500		33,500	6,100	8,500	13,600	5.2
34,000		34,000	6,200	8,500	13,600	5.2
34,500		34,500	6,300	8,500	13,600	5.2
35,000		35,000	6,400	10,000	16,000	6.1
36,000		36,000	6,600	10,000	16,000	6.1
37,000		37,000	6,800	10,000	16,000	6.1
37,500		37,500	6,900	10,000	16,000	6.1
38,000		38,000	7,000	10,000	16,000	6.2
39,000		39,000	7,100	10,000	16,000	6.2
40,000		40,000	7,300	10,000	16,000	6.2
40,500		40,500	7,400	10,000	16,000	6.2

Le système de perçage SuperV

Plaquettes interchangeables pour SuperV-AP mini



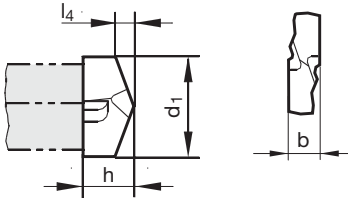
Référence **56011**



P	M	K	N	S	H
●		●	○		

Conseils d'util.,
page 46-50

- affûtage à dépouille conique
- forme concave de l'arête de coupe principale
- meilleure résistance à l'usure
- y compris la vis de fixation n° de catalogue 76020



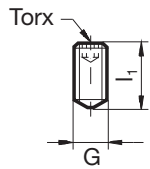
d1 mm	d1 inch	N° de code	l4 mm	b mm	h mm	Taille
16,000		16,000	3,000	4,500	8,000	0.1
16,500		16,500	3,100	4,500	8,000	0.1
17,000		17,000	3,100	4,500	8,000	0.1
17,500		17,500	3,200	4,500	8,000	0.2
18,000		18,000	3,300	5,000	8,000	1.1
18,500		18,500	3,400	5,000	8,000	1.1
19,000		19,000	3,500	5,000	8,000	1.1
19,500		19,500	3,600	5,000	8,000	1.2
20,000		20,000	3,700	5,000	8,000	1.2
20,500		20,500	3,800	5,500	8,800	2.1
21,000		21,000	3,900	5,500	8,800	2.1
21,500		21,500	4,000	5,500	8,800	2.2
22,000		22,000	4,100	5,500	8,800	2.2
22,500		22,500	4,100	5,500	8,800	2.2
23,000		23,000	4,200	6,300	10,000	3.1
23,500		23,500	4,300	6,300	10,000	3.1
24,000		24,000	4,400	6,300	10,000	3.1
24,500		24,500	4,500	6,300	10,000	3.2
25,000	63/64	25,000	4,600	6,300	10,000	3.2
25,500		25,500	4,700	6,300	10,000	3.2
26,000		26,000	4,800	7,300	11,600	4.1
26,500		26,500	4,900	7,300	11,600	4.1
27,000		27,000	5,000	7,300	11,600	4.1
27,500		27,500	5,100	7,300	11,600	4.1
28,000		28,000	5,100	7,300	11,600	4.2
28,500		28,500	5,200	7,300	11,600	4.2
29,000		29,000	5,300	7,300	11,600	4.2
29,500		29,500	5,400	7,300	11,600	4.2
30,000		30,000	5,500	8,500	13,600	5.1
30,500		30,500	5,600	8,500	13,600	5.1
31,000		31,000	5,700	8,500	13,600	5.1
31,500		31,500	5,800	8,500	13,600	5.1
32,000		32,000	5,900	8,500	13,600	5.1
32,500		32,500	6,000	8,500	13,600	5.2
33,000		33,000	6,100	8,500	13,600	5.2
33,500		33,500	6,100	8,500	13,600	5.2
34,000		34,000	6,200	8,500	13,600	5.2
34,500		34,500	6,300	8,500	13,600	5.2
35,000		35,000	6,400	10,000	16,000	6.1
36,000		36,000	6,600	10,000	16,000	6.1
37,000		37,000	6,800	10,000	16,000	6.1
37,500		37,500	6,900	10,000	16,000	6.1
38,000		38,000	7,000	10,000	16,000	6.2
39,000		39,000	7,100	10,000	16,000	6.2
40,000		40,000	7,300	10,000	16,000	6.2
40,500		40,500	7,400	10,000	16,000	6.2

Le système de perçage SuperV

Vis de fixation



Référence 76020



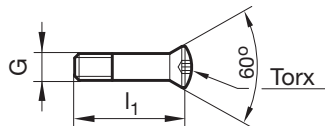
G	l1 mm	Torx	N° de code
M 3X0,35	7,000	T6	3,000
M 3X0,35	6,000	T6	3,006
M 3,5X0,35	8,000	T7	3,500
M 4X0,5	9,000	T8	4,000
M 4,5X0,5	10,000	T8	4,500
M 5X0,5	11,000	T10	5,000

Le système de perçage SuperV

Vis de fixation



Référence 77020



G	l1 mm	Torx	N° de code
M 2,2	9,500	T7	2,200
M 2,2	10,500	T7	2,201
M 2,5	11,400	T8	2,500
M 3	12,100	T9	3,000
M 3	13,100	T9	3,001
M 3,5	14,250	T10	3,500
M 4	16,000	T15	4,000
M 4,5	18,000	T15	4,500
M 5	19,750	T20	5,000
M 5	21,750	T20	5,001
M 5	23,400	T20	5,003
M 6	27,000	T25	6,000
M 6	28,500	T25	6,001
M 6	32,500	T25	6,002

Le système de perçage SuperV

Clés dynamométriques



Référence **77022**

Type	N° de code	Torx	L mm	Couple Nm
A	2,000	1/4»	160,000	0,8...2
A	5,001	1/4»	160,000	1...5
A	8,000	1/4»	160,000	2...8

Le système de perçage SuperV

Embouts pour Vis Torx



Référence **77021**

Torx	L mm	kg	N° de code
T6	25,000	0,040	6,000
T8	25,000	0,071	8,000
T10	25,000	0,112	10,000
T20	25,000	0,045	20,000

Le système de perçage SuperV

Tournevis Torx



Référence **76021**

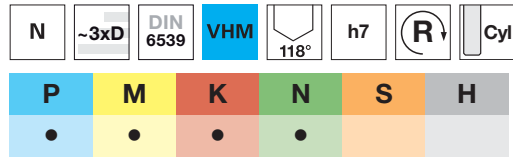
Torx	N° de code	L mm
T6	6,000	42,000
T7	7,001	150,000
T8	8,000	48,000
T8	8,001	150,000
T9	9,001	150,000
T10	10,001	170,000
T15	15,000	54,000
T15	15,001	190,000
T20	20,000	57,000
T20	20,001	205,000
T25	25,000	60,000
T25	25,001	207,000

Forets en carbure

Forets hélicoïdaux extra-courts



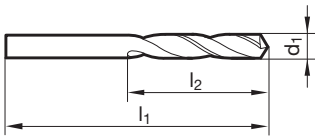
Référence **71184**



P	M	K	N	S	H
•	•	•	•		

Conseils d'util.,
page 52

- Amin. de l'âme $\geq \varnothing 2,100$
- affûtage en pente
- arête de coupe principale rectiligne



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		26,000	6,000	5,100		62,000	26,000
1,100		28,000	7,000	5,200		62,000	26,000
1,200		30,000	8,000	5,300		62,000	26,000
1,300		30,000	8,000	5,400		66,000	28,000
1,400		32,000	9,000	5,500		66,000	28,000
1,500		32,000	9,000	5,600		66,000	28,000
1,600		34,000	10,000	5,700		66,000	28,000
1,700		34,000	10,000	5,800		66,000	28,000
1,800		36,000	11,000	5,900		66,000	28,000
1,900		36,000	11,000	6,000		66,000	28,000
2,000		38,000	12,000	6,100		70,000	31,000
2,100		38,000	12,000	6,200		70,000	31,000
2,200		40,000	13,000	6,300		70,000	31,000
2,300		40,000	13,000	6,350	1/4	70,000	31,000
2,380	3/32	43,000	14,000	6,400		70,000	31,000
2,400		43,000	14,000	6,500		70,000	31,000
2,500		43,000	14,000	6,600		70,000	31,000
2,600		43,000	14,000	6,700		70,000	31,000
2,700		46,000	16,000	6,800		74,000	34,000
2,780	7/64	46,000	16,000	6,900		74,000	34,000
2,800		46,000	16,000	7,000		74,000	34,000
2,900		46,000	16,000	7,100		74,000	34,000
3,000		46,000	16,000	7,140	9/32	74,000	34,000
3,100		49,000	18,000	7,200		74,000	34,000
3,170	1/8	49,000	18,000	7,300		74,000	34,000
3,200		49,000	18,000	7,400		74,000	34,000
3,300		49,000	18,000	7,500		74,000	34,000
3,400		52,000	20,000	7,600		79,000	37,000
3,500		52,000	20,000	7,700		79,000	37,000
3,570	9/64	52,000	20,000	7,800		79,000	37,000
3,600		52,000	20,000	7,900		79,000	37,000
3,700		52,000	20,000	7,940	5/16	79,000	37,000
3,800		55,000	22,000	8,000		79,000	37,000
3,900		55,000	22,000	8,100		79,000	37,000
3,970	5/32	55,000	22,000	8,200		79,000	37,000
4,000		55,000	22,000	8,300		79,000	37,000
4,100		55,000	22,000	8,400		79,000	37,000
4,200		55,000	22,000	8,500		79,000	37,000
4,300		58,000	24,000	8,600		84,000	40,000
4,370	11/64	58,000	24,000	8,700		84,000	40,000
4,400		58,000	24,000	8,730	11/32	84,000	40,000
4,500		58,000	24,000	8,800		84,000	40,000
4,600		58,000	24,000	8,900		84,000	40,000
4,700		58,000	24,000	9,000		84,000	40,000
4,760	3/16	62,000	26,000	9,100		84,000	40,000
4,800		62,000	26,000	9,200		84,000	40,000
4,900		62,000	26,000	9,300		84,000	40,000
5,000		62,000	26,000	9,400		84,000	40,000

d1 mm	inch	l1 mm	l2 mm
9,500		84,000	40,000
9,600		89,000	43,000
9,700		89,000	43,000
9,800		89,000	43,000
9,900		89,000	43,000
10,000		89,000	43,000
10,100		89,000	43,000
10,200		89,000	43,000
10,300		89,000	43,000
10,500		89,000	43,000
11,000		95,000	47,000
11,110	7/16	95,000	47,000

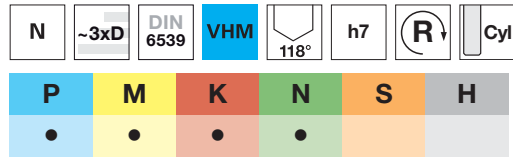
d1 mm	inch	l1 mm	l2 mm
11,500		95,000	47,000
11,910	15/32	102,000	51,000
12,000		102,000	51,000
13,000		102,000	51,000
15,000		111,000	56,000

Forets en carbure

Forets hélicoïdaux extra-courts

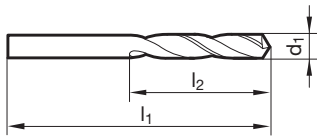


Référence **51184**



Conseils d'util.,
page 52

- Amin. de l'âme $\geq \varnothing 2,100$
- affûtage en pente
- arête de coupe principale rectiligne
- meilleure résistance à l'usure



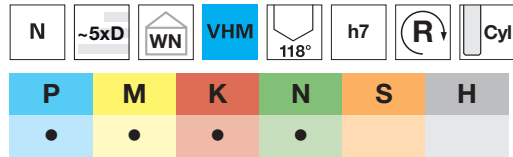
d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		26,000	6,000	5,800		66,000	28,000
1,100		28,000	7,000	5,900		66,000	28,000
1,200		30,000	8,000	6,000		66,000	28,000
1,300		30,000	8,000	6,100		70,000	31,000
1,400		32,000	9,000	6,200		70,000	31,000
1,500		32,000	9,000	6,300		70,000	31,000
1,600		34,000	10,000	6,400		70,000	31,000
1,700		34,000	10,000	6,500		70,000	31,000
1,800		36,000	11,000	6,600		70,000	31,000
1,900		36,000	11,000	6,700		70,000	31,000
2,000		38,000	12,000	6,800		74,000	34,000
2,100		38,000	12,000	6,900		74,000	34,000
2,200		40,000	13,000	7,000		74,000	34,000
2,300		40,000	13,000	7,100		74,000	34,000
2,400		43,000	14,000	7,200		74,000	34,000
2,500		43,000	14,000	7,300		74,000	34,000
2,600		43,000	14,000	7,400		74,000	34,000
2,700		46,000	16,000	7,500		74,000	34,000
2,800		46,000	16,000	7,600		79,000	37,000
2,900		46,000	16,000	7,700		79,000	37,000
3,000		46,000	16,000	7,800		79,000	37,000
3,100		49,000	18,000	7,900		79,000	37,000
3,200		49,000	18,000	8,000		79,000	37,000
3,300		49,000	18,000	8,100		79,000	37,000
3,400		52,000	20,000	8,200		79,000	37,000
3,500		52,000	20,000	8,300		79,000	37,000
3,600		52,000	20,000	8,400		79,000	37,000
3,700		52,000	20,000	8,500		79,000	37,000
3,800		55,000	22,000	8,600		84,000	40,000
3,900		55,000	22,000	8,700		84,000	40,000
4,000		55,000	22,000	8,800		84,000	40,000
4,100		55,000	22,000	8,900		84,000	40,000
4,200		55,000	22,000	9,000		84,000	40,000
4,300		58,000	24,000	9,100		84,000	40,000
4,400		58,000	24,000	9,200		84,000	40,000
4,500		58,000	24,000	9,300		84,000	40,000
4,600		58,000	24,000	9,400		84,000	40,000
4,700		58,000	24,000	9,500		84,000	40,000
4,800		62,000	26,000	9,600		89,000	43,000
4,900		62,000	26,000	9,700		89,000	43,000
5,000		62,000	26,000	9,800		89,000	43,000
5,100		62,000	26,000	9,900		89,000	43,000
5,200		62,000	26,000	10,000		89,000	43,000
5,300		62,000	26,000	10,200		89,000	43,000
5,400		66,000	28,000	10,500		89,000	43,000
5,500		66,000	28,000	11,000		95,000	47,000
5,600		66,000	28,000	11,500		95,000	47,000
5,700		66,000	28,000	12,000		102,000	51,000

Forets en carbure

Forets hélicoïdaux courts

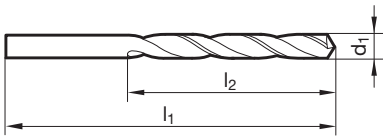


Référence 71290



Conseils d'util.,
page 52

- Amin. de l'âme $\geq \varnothing 2,100$
- affûtage en pente
- arête de coupe principale rectiligne



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		34,000	12,000	5,100		86,000	52,000
1,100		36,000	14,000	5,160	13/64	86,000	52,000
1,200		38,000	16,000	5,200		86,000	52,000
1,300		38,000	16,000	5,300		86,000	52,000
1,400		40,000	18,000	5,400		93,000	57,000
1,500		40,000	18,000	5,500		93,000	57,000
1,600		43,000	20,000	5,560	7/32	93,000	57,000
1,700		43,000	20,000	5,600		93,000	57,000
1,800		46,000	22,000	5,700		93,000	57,000
1,900		46,000	22,000	5,800		93,000	57,000
2,000		49,000	24,000	5,900		93,000	57,000
2,100		49,000	24,000	5,950	15/64	93,000	57,000
2,200		53,000	27,000	6,000		93,000	57,000
2,300		53,000	27,000	6,100		101,000	63,000
2,380	3/32	57,000	30,000	6,200		101,000	63,000
2,400		57,000	30,000	6,300		101,000	63,000
2,500		57,000	30,000	6,350	1/4	101,000	63,000
2,600		57,000	30,000	6,400		101,000	63,000
2,700		61,000	33,000	6,500		101,000	63,000
2,780	7/64	61,000	33,000	6,600		101,000	63,000
2,800		61,000	33,000	6,700		101,000	63,000
2,900		61,000	33,000	6,800		109,000	69,000
3,000		61,000	33,000	6,900		109,000	69,000
3,100		65,000	36,000	7,000		109,000	69,000
3,170	1/8	65,000	36,000	7,100		109,000	69,000
3,200		65,000	36,000	7,140	9/32	109,000	69,000
3,300		65,000	36,000	7,200		109,000	69,000
3,400		70,000	39,000	7,300		109,000	69,000
3,500		70,000	39,000	7,400		109,000	69,000
3,570	9/64	70,000	39,000	7,500		109,000	69,000
3,600		70,000	39,000	7,600		117,000	75,000
3,700		70,000	39,000	7,700		117,000	75,000
3,800		75,000	43,000	7,800		117,000	75,000
3,900		75,000	43,000	7,900		117,000	75,000
3,970	5/32	75,000	43,000	7,940	5/16	117,000	75,000
4,000		75,000	43,000	8,000		117,000	75,000
4,100		75,000	43,000	8,100		117,000	75,000
4,200		75,000	43,000	8,200		117,000	75,000
4,300		80,000	47,000	8,300		117,000	75,000
4,370	11/64	80,000	47,000	8,400		117,000	75,000
4,400		80,000	47,000	8,500		117,000	75,000
4,500		80,000	47,000	8,600		125,000	81,000
4,600		80,000	47,000	8,700		125,000	81,000
4,700		80,000	47,000	8,730	11/32	125,000	81,000
4,760	3/16	86,000	52,000	8,800		125,000	81,000
4,800		86,000	52,000	8,900		125,000	81,000
4,900		86,000	52,000	9,000		125,000	81,000
5,000		86,000	52,000	9,100		125,000	81,000

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
9,200		125,000	81,000	11,000		142,000	94,000
9,300		125,000	81,000	11,110	7/16	142,000	94,000
9,400		125,000	81,000	11,500		142,000	94,000
9,500		125,000	81,000	11,910	15/32	151,000	101,000
9,600		133,000	87,000	12,000		151,000	101,000
9,700		133,000	87,000				
9,800		133,000	87,000				
9,900		133,000	87,000				
10,000		133,000	87,000				
10,200		133,000	87,000				
10,300		133,000	87,000				
10,500		133,000	87,000				

Forets en carbure

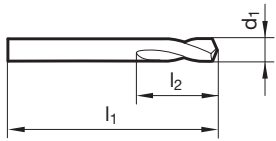
Forets NC



Référence 71190

N	WN	VHM	poli	90°	h6	R	HA
P	M	K	N	S	H		
•	•	•	•	•			

- affûtage en pente
- seulement prévu pour amorcer un perçage



d1 mm	l1 mm	l2 mm
5,000	62,000	14,000
6,000	66,000	16,000
8,000	79,000	21,000
10,000	89,000	25,000
12,000	102,000	30,000
16,000	115,000	37,500

d1 mm	l1 mm	l2 mm
20,000	131,000	45,000

Forets en carbure

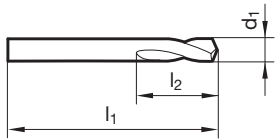
Forets NC



Référence 71191

N	WN	VHM	poli	120°	h6	R	HA
P	M	K	N	S	H		
•	•	•	•	•			

- affûtage en pente
- seulement prévu pour amorcer un perçage



d1 mm	l1 mm	l2 mm
5,000	62,000	14,000
6,000	66,000	16,000
8,000	79,000	21,000
10,000	89,000	25,000
12,000	102,000	30,000
16,000	115,000	37,500

d1 mm	l1 mm	l2 mm
20,000	131,000	45,000

Forets en carbure

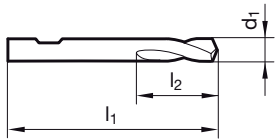
Forets NC



Référence 71189

N	WN	VHM	poli	142°	h6	R	HB
P	M	K	N	S	H		
•	•	•	•	•			

- affûtage en pente
- seulement prévu pour amorcer un perçage
- à partir du $\varnothing = 6,00$ mm, avec méplat de serrage



d1 mm	l1 mm	l2 mm
4,000	55,000	12,000
5,000	62,000	14,000
6,000	66,000	16,000
8,000	79,000	21,000
10,000	89,000	25,000
12,000	102,000	30,000

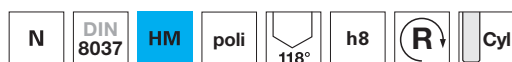
d1 mm	l1 mm	l2 mm
16,000	115,000	37,500
20,000	131,000	45,000

Forets en carbure

Forets spéciaux avec arêtes de coupe CW



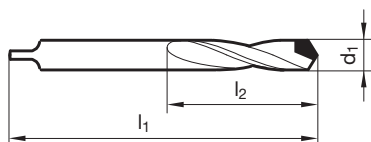
Référence **71180**



P	M	K	N	S	H
○		○	○		

Conseils d'util.,
page 52

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage en pente
- à plaquette(s) cw rapportée(s)



d1 mm	l1 mm	l2 mm
3,000	50,000	20,000
3,500	56,000	25,000
4,000	56,000	25,000
4,500	63,000	28,000
5,000	63,000	28,000
5,500	71,000	32,000
6,000	71,000	32,000
6,500	71,000	32,000
7,000	80,000	40,000
7,500	80,000	40,000
8,000	80,000	40,000
8,500	90,000	50,000
9,000	90,000	50,000
9,500	90,000	50,000
10,000	100,000	56,000
10,500	100,000	56,000
11,000	100,000	56,000
11,500	112,000	63,000

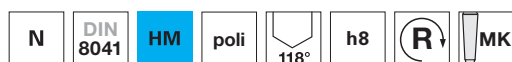
d1 mm	l1 mm	l2 mm
12,000	112,000	63,000
13,000	112,000	63,000
14,000	125,000	71,000
14,500	125,000	71,000
15,000	125,000	71,000
16,000	140,000	80,000
20,000	160,000	90,000

Forets en carbure

Forets spéciaux avec arêtes de coupe CW



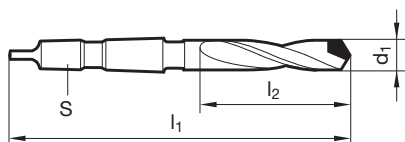
Référence 71380



P	M	K	N	S	H
○		●	○	○	○

Conseils d'util.,
page 52

- Amin. de l'âme $\geq \varnothing 11,000$
- affûtage en pente
- à plaquette(s) cw rapportée(s)



d1 mm	S	l1 mm	l2 mm
11,000	MK-1	140,000	50,000
12,500	MK-1	146,000	56,000
13,000	MK-1	146,000	56,000
13,500	MK-2	168,000	63,000
14,000	MK-2	168,000	63,000
15,000	MK-2	168,000	63,000
15,500	MK-2	175,000	70,000
16,000	MK-2	175,000	70,000
17,000	MK-2	175,000	70,000
17,500	MK-2	185,000	80,000
18,000	MK-2	185,000	80,000
20,000	MK-3	215,000	90,000

d1 mm	S	l1 mm	l2 mm
21,000	MK-3	215,000	90,000
22,000	MK-3	215,000	90,000
28,000	MK-4	260,000	110,000
30,000	MK-4	275,000	125,000
33,000	MK-4	290,000	140,000

Forets à centrer en CW monobloc

Forets à centrer sans méplat

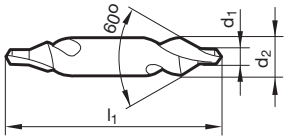


Référence **71616**



P	M	K	N	S	H
●	○	●	●	○	

- Amin. de l'âme $\geq \varnothing 2,000$
- affûtage à dépouille conique
- selon DIN 332, page 1, forme A



d1 mm	d2 mm	l1 mm
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000
2,500	6,300	45,000
3,150	8,000	50,000

d1 mm	d2 mm	l1 mm
4,000	10,000	56,000
5,000	12,500	63,000
6,300	16,000	71,000

Forets à une lèvre

Forets à une lèvre SuperT-AL



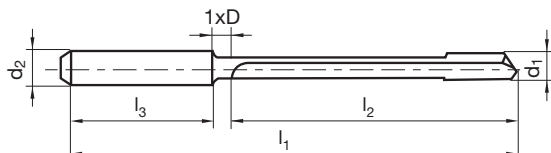
Référence **55027**



P	M	K	N	S	H
•	•	•	•	•	

Conseils d'util.,
page 56

- forme périphérique G
- à partir de $d1=3\text{mm}$ ou $d2=6\text{mm}$, attach.cyl.cw monobloc av.extrémité conique MQL
- pour applications universelles



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	N° de code
2,380	4,000	100,000	70,000	28,000	2,380
2,500	4,000	115,000	85,000	28,000	2,500
2,780	4,000	115,000	85,000	28,000	2,780
3,000	6,000	145,000	105,000	36,000	3,000
3,170	6,000	145,000	105,000	36,000	3,170
3,500	6,000	145,000	105,000	36,000	3,500
3,970	6,000	160,000	120,000	36,000	3,970
4,000	6,000	160,000	120,000	36,000	4,000
5,000	6,000	220,000	180,000	36,000	5,000
5,560	6,000	220,000	180,000	36,000	5,560
6,000	6,000	220,000	180,000	36,000	6,000
6,350	8,000	260,000	210,000	36,000	6,350
7,000	8,000	260,000	210,000	36,000	7,000
7,140	8,000	285,000	240,000	36,000	7,140
8,000	8,000	285,000	240,000	36,000	8,000
9,000	10,000	350,000	300,000	40,000	9,000
10,000	10,000	350,000	300,000	40,000	10,000
11,000	12,000	420,000	360,000	45,000	11,000
12,000	12,000	420,000	360,000	45,000	12,000

Forets à une lèvre

Forets à une lèvre SuperT-AL



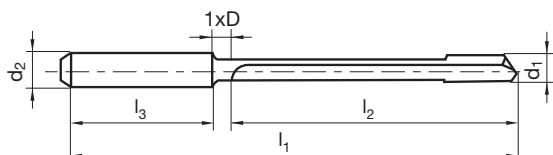
Référence **55028**



P	M	K	N	S	H
•	•	•	•	•	

Conseils d'util.,
page 56

- forme périphérique G
- à partir de $d_1=3\text{mm}$ ou $d_2=6\text{mm}$, attach.cyl.cw monobloc av.extrémité conique MQL
- pour applications universelles



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	N° de code
2,380	4,000	160,000	130,000	28,000	2,380
2,500	4,000	185,000	155,000	28,000	2,500
2,780	4,000	185,000	155,000	28,000	2,780
3,000	6,000	230,000	190,000	36,000	3,000
3,170	6,000	230,000	190,000	36,000	3,170
3,500	6,000	230,000	190,000	36,000	3,500
3,970	6,000	260,000	220,000	36,000	3,970
4,000	6,000	260,000	220,000	36,000	4,000
5,000	6,000	370,000	330,000	36,000	5,000
5,560	6,000	370,000	330,000	36,000	5,560
6,000	6,000	370,000	330,000	36,000	6,000
6,350	8,000	430,000	385,000	36,000	6,350
7,000	8,000	430,000	385,000	36,000	7,000
7,140	8,000	485,000	440,000	36,000	7,140
8,000	8,000	485,000	440,000	36,000	8,000

Forets à une lèvre

Forets à une lèvre SuperT-AL



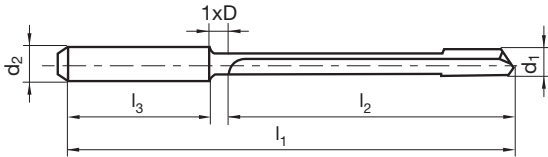
Référence **55029**



P	M	K	N	S	H
•	•	•	•	•	

Conseils d'util.,
page 56

- forme périphérique G
- à partir de d1=3mm ou d2=6mm, attach.cyl.cw monobloc av.extrémité conique MQL
- pour applications universelles



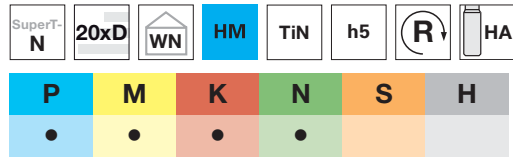
d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	N° de code
2,380	4,000	220,000	190,000	28,000	2,380
2,500	4,000	255,000	220,000	28,000	2,500
2,780	4,000	255,000	220,000	28,000	2,780
3,000	6,000	320,000	280,000	36,000	3,000
3,170	6,000	320,000	280,000	36,000	3,170
3,500	6,000	320,000	280,000	36,000	3,500
3,970	6,000	360,000	320,000	36,000	3,970
4,000	6,000	360,000	320,000	36,000	4,000
5,000	6,000	525,000	485,000	36,000	5,000
5,560	6,000	525,000	485,000	36,000	5,560
6,000	6,000	525,000	485,000	36,000	6,000

Forets à une lèvre

Forets à une lèvre SuperT-N

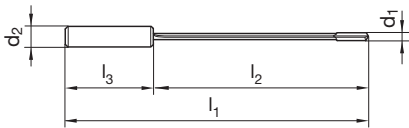


Référence **75018**



Conseils d'util.,
page 56

- avec brise-copeaux latéral
- forme périphérique G



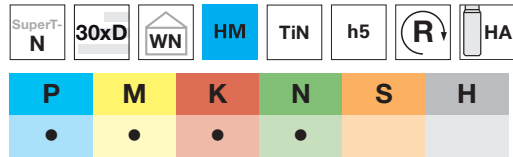
d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	N° de code
4,000	12,000	150,000	100,000	45,000	4,000
4,200	12,000	160,000	110,000	45,000	4,200
4,500	12,000	170,000	120,000	45,000	4,500
5,000	16,000	180,000	130,000	48,000	5,000
5,500	16,000	190,000	140,000	48,000	5,500
6,000	16,000	210,000	160,000	48,000	6,000
6,500	16,000	220,000	170,000	48,000	6,500
7,000	16,000	235,000	185,000	48,000	7,000
8,000	16,000	260,000	210,000	48,000	8,000
9,000	16,000	280,000	230,000	48,000	9,000
10,000	20,000	320,000	260,000	50,000	10,000
12,000	20,000	370,000	310,000	50,000	12,000

Forets à une lèvre

Forets à une lèvre SuperT-N

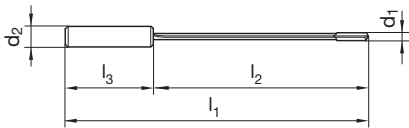


Référence **75017**



Conseils d'util.,
page 56

- avec brise-copeaux latéral
- forme périphérique G



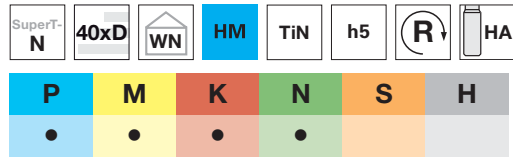
d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	N° de code
4,000	12,000	200,000	155,000	45,000	4,000
4,200	12,000	210,000	165,000	45,000	4,200
4,500	12,000	220,000	175,000	45,000	4,500
5,000	16,000	230,000	182,000	48,000	5,000
5,500	16,000	245,000	197,000	48,000	5,500
6,000	16,000	260,000	212,000	48,000	6,000
6,500	16,000	275,000	227,000	48,000	6,500
7,000	16,000	290,000	242,000	48,000	7,000
8,000	16,000	320,000	272,000	48,000	8,000
9,000	16,000	350,000	302,000	48,000	9,000
10,000	20,000	400,000	350,000	50,000	10,000
12,000	20,000	450,000	400,000	50,000	12,000

Forets à une lèvre

Forets à une lèvre SuperT-N

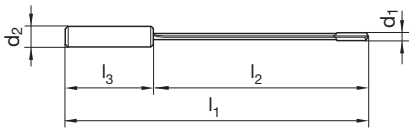


Référence **75022**



Conseils d'util.,
page 56

- avec brise-copeaux latéral
- forme périphérique G



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	N° de code
4,000	12,000	230,000	185,000	45,000	4,000
4,200	12,000	240,000	195,000	45,000	4,200
4,500	12,000	250,000	205,000	45,000	4,500
5,000	16,000	280,000	232,000	48,000	5,000
5,500	16,000	300,000	252,000	48,000	5,500
6,000	16,000	320,000	272,000	48,000	6,000
6,500	16,000	340,000	292,000	48,000	6,500
7,000	16,000	370,000	322,000	48,000	7,000
8,000	16,000	420,000	372,000	48,000	8,000
9,000	16,000	450,000	402,000	48,000	9,000
10,000	20,000	510,000	460,000	50,000	10,000
12,000	20,000	600,000	550,000	50,000	12,000

Forets à une lèvre

Forets à une lèvre SuperT-N



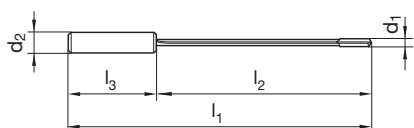
Référence **75023**



P	M	K	N	S	H
•	•	•	•		

Conseils d'util.,
page 56

- avec brise-copeaux latéral
- forme périphérique G
- profondeur maximale de perçage pour chacun des outils 40 x D, lorsqu'il s'agit de perçages plus profonds utiliser, auparavant, le foret n° d'article 75022
- pour les matières à copeaux longs



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	N° de code
4,950	16,000	480,000	432,000	48,000	4,950
5,950	16,000	560,000	512,000	48,000	5,950
7,950	16,000	740,000	692,000	48,000	7,950
9,950	20,000	910,000	860,000	50,000	9,950
11,950	20,000	1080,000	1030,000	50,000	11,950

Forets à une lèvre

Forets à une lèvre SuperT-NX

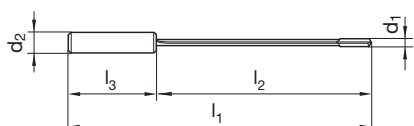


Référence **55018**



Conseils d'util.,
page 56

- forme périphérique G
- pour aciers alliés et hautement alliés



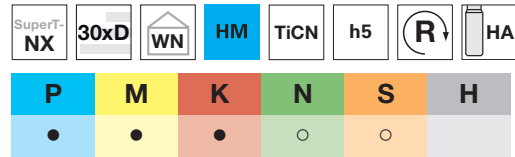
d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	N° de code
3,970	10,000	150,000	100,000	40,000	3,970
4,000	12,000	150,000	100,000	45,000	4,000
5,000	16,000	180,000	130,000	48,000	5,000
5,156	16,000	180,000	130,000	48,000	5,156
6,000	16,000	210,000	160,000	48,000	6,000
6,350	16,000	220,000	170,000	48,000	6,350
7,000	16,000	235,000	185,000	48,000	7,000
7,938	16,000	260,000	210,000	48,000	7,938
8,000	16,000	260,000	210,000	48,000	8,000
9,000	16,000	280,000	230,000	48,000	9,000
9,525	16,000	290,000	240,000	48,000	9,525
10,000	20,000	320,000	260,000	50,000	10,000
11,000	20,000	340,000	290,000	50,000	11,000
11,113	20,000	340,000	290,000	50,000	11,113
12,000	20,000	370,000	310,000	50,000	12,000
12,700	20,000	385,000	330,000	50,000	12,700

Forets à une lèvre

Forets à une lèvre SuperT-NX

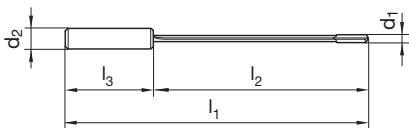


Référence **55017**



Conseils d'util.,
page 56

- forme périphérique G
- pour aciers alliés et hautement alliés



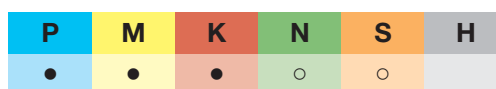
d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	N° de code
3,970	10,000	200,000	155,000	40,000	3,970
4,000	12,000	200,000	155,000	45,000	4,000
5,000	16,000	230,000	182,000	48,000	5,000
5,156	16,000	230,000	182,000	48,000	5,156
6,000	16,000	260,000	212,000	48,000	6,000
6,350	16,000	275,000	227,000	48,000	6,350
7,000	16,000	290,000	242,000	48,000	7,000
7,938	16,000	320,000	272,000	48,000	7,938
8,000	16,000	320,000	272,000	48,000	8,000
9,000	16,000	350,000	302,000	48,000	9,000
9,525	16,000	380,000	330,000	48,000	9,525
10,000	20,000	400,000	350,000	50,000	10,000
11,000	20,000	430,000	380,000	50,000	11,000
11,113	20,000	430,000	380,000	50,000	11,113
12,000	20,000	450,000	400,000	50,000	12,000
12,700	20,000	500,000	450,000	50,000	12,700

Forets à une lèvre

Forets à une lèvre SuperT-NX

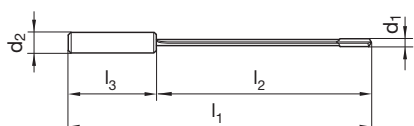


Référence **55022**



Conseils d'util.,
page 56

- forme périphérique G
- pour aciers alliés et hautement alliés



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	N° de code
3,970	10,000	230,000	185,000	40,000	3,970
4,000	12,000	230,000	185,000	45,000	4,000
5,000	16,000	280,000	232,000	48,000	5,000
5,156	16,000	280,000	232,000	48,000	5,156
6,000	16,000	320,000	272,000	48,000	6,000
6,350	16,000	340,000	292,000	48,000	6,350
7,000	16,000	370,000	322,000	48,000	7,000
7,938	16,000	420,000	372,000	48,000	7,938
8,000	16,000	420,000	372,000	48,000	8,000
9,000	16,000	450,000	402,000	48,000	9,000
9,525	16,000	480,000	432,000	48,000	9,525
10,000	20,000	510,000	460,000	50,000	10,000
11,000	20,000	550,000	500,000	50,000	11,000
11,113	20,000	550,000	500,000	50,000	11,113
12,000	20,000	600,000	550,000	50,000	12,000
12,700	20,000	635,000	585,000	50,000	12,700

Forets à une lèvre

Forets à une lèvre SuperT-NX



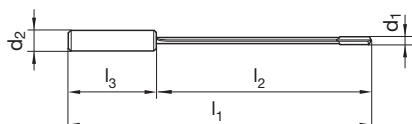
Référence **55023**



P	M	K	N	S	H
●	●	●	○	○	○

Conseils d'util.,
page 56

- forme périphérique G
- profondeur maximale de perçage pour chacun des outils 40 x D, lorsqu'il s'agit de perçages plus profonds utiliser, auparavant, le foret n° d'article 75022
- pour aciers alliés et hautement alliés



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	N° de code
4,950	16,000	480,000	432,000	48,000	4,950
5,106	16,000	480,000	432,000	48,000	5,106
5,950	16,000	560,000	512,000	48,000	5,950
6,300	16,000	590,000	542,000	48,000	6,300
6,950	16,000	650,000	602,000	48,000	6,950
7,888	16,000	740,000	692,000	48,000	7,888
7,950	16,000	740,000	692,000	48,000	7,950
8,950	16,000	820,000	772,000	48,000	8,950
9,475	16,000	870,000	822,000	48,000	9,475
9,950	20,000	910,000	860,000	50,000	9,950
10,950	20,000	995,000	945,000	50,000	10,950
11,063	20,000	995,000	945,000	50,000	11,063
11,950	20,000	1080,000	1030,000	50,000	11,950
12,650	20,000	1140,000	1090,000	50,000	12,650

Forets à une lèvre

Forets à une lèvre en CW monobloc TBE



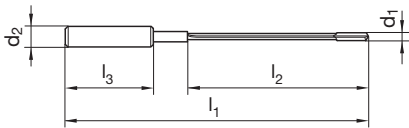
Référence **75024**



P	M	K	N	S	H
•	•	•	•	○	

Conseils d'util.,
page 56

- longueur taillée 45 mm
- forme périphérique G
- pour applications universelles



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	N° de code
1,200	4,000	90,000	45,000	28,000	1,200
1,500	4,000	90,000	45,000	28,000	1,500
1,600	4,000	90,000	45,000	28,000	1,600
2,000	4,000	90,000	45,000	28,000	2,000
2,500	10,000	100,000	45,000	40,000	2,500
2,700	10,000	100,000	45,000	40,000	2,700
3,000	10,000	100,000	45,000	40,000	3,000
3,200	10,000	100,000	45,000	40,000	3,200

Forets à une lèvre

Forets à une lèvre en CW monobloc TBE



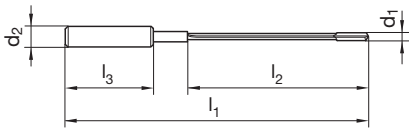
Référence **55024**



P	M	K	N	S	H
●	●	●	●	○	○

Conseils d'util.,
page 56

- longueur taillée 45 mm
- forme périphérique G
- pour aciers alliés et hautement alliés



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	N° de code
2,000	4,000	90,000	45,000	28,000	2,000
2,500	10,000	100,000	45,000	40,000	2,500
2,700	10,000	100,000	45,000	40,000	2,700
3,000	10,000	100,000	45,000	40,000	3,000
3,200	10,000	100,000	45,000	40,000	3,200

Forets à une lèvre

Forets à une lèvre en CW monobloc TBE



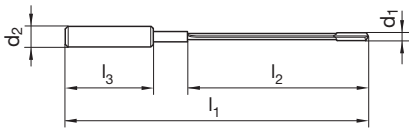
Référence **75020**



P	M	K	N	S	H
●	●	○	○	○	

Conseils d'util.,
page 56

- longueur taillée 80 mm
- forme périphérique G
- pour applications universelles



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	N° de code
1,200	4,000	125,000	80,000	28,000	1,200
1,500	4,000	125,000	80,000	28,000	1,500
1,600	4,000	125,000	80,000	28,000	1,600
2,000	4,000	125,000	80,000	28,000	2,000
2,500	10,000	135,000	80,000	40,000	2,500
2,700	10,000	135,000	80,000	40,000	2,700
3,000	10,000	135,000	80,000	40,000	3,000
3,200	10,000	135,000	80,000	40,000	3,200
3,500	10,000	135,000	80,000	40,000	3,500
4,000	10,000	135,000	80,000	40,000	4,000
4,200	10,000	135,000	80,000	40,000	4,200
4,500	10,000	135,000	80,000	40,000	4,500
5,000	10,000	135,000	80,000	40,000	5,000

Forets à une lèvre

Forets à une lèvre en CW monobloc TBE



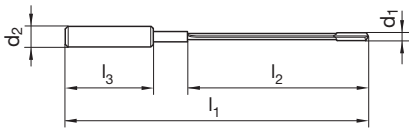
Référence **55020**



P	M	K	N	S	H
●	●	●	○	○	

Conseils d'util.,
page 56

- longueur taillée 80 mm
- forme périphérique G
- pour aciers alliés et hautement alliés



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	N° de code
2,000	4,000	125,000	80,000	28,000	2,000
2,500	10,000	135,000	80,000	40,000	2,500
2,700	10,000	135,000	80,000	40,000	2,700
3,000	10,000	135,000	80,000	40,000	3,000
3,200	10,000	135,000	80,000	40,000	3,200
3,500	10,000	135,000	80,000	40,000	3,500
4,000	10,000	135,000	80,000	40,000	4,000
4,200	10,000	135,000	80,000	40,000	4,200
4,500	10,000	135,000	80,000	40,000	4,500
5,000	10,000	135,000	80,000	40,000	5,000

Forets à une lèvre

Forets à une lèvre en CW monobloc TBE



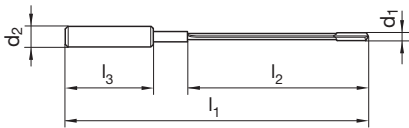
Référence **75026**



P	M	K	N	S	H
●	●	○	●	○	

Conseils d'util.,
page 56

- longueur taillée 120 mm
- forme périphérique G
- pour applications universelles



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	N° de code
1,500	4,000	165,000	120,000	28,000	1,500
1,600	4,000	165,000	120,000	28,000	1,600
2,000	4,000	165,000	120,000	28,000	2,000
2,500	10,000	175,000	120,000	40,000	2,500
2,700	10,000	175,000	120,000	40,000	2,700
3,000	10,000	175,000	120,000	40,000	3,000
3,200	10,000	175,000	120,000	40,000	3,200
3,500	10,000	175,000	120,000	40,000	3,500
4,000	10,000	175,000	120,000	40,000	4,000
4,200	10,000	175,000	120,000	40,000	4,200
4,500	10,000	175,000	120,000	40,000	4,500
5,000	10,000	175,000	120,000	40,000	5,000

Forets à une lèvre

Forets à une lèvre en CW monobloc TBE



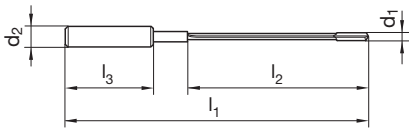
Référence **55026**



P	M	K	N	S	H
●	●	●	○	○	

Conseils d'util.,
page 56

- longueur taillée 120 mm
- forme périphérique G
- pour aciers alliés et hautement alliés



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	N° de code
2,000	4,000	165,000	120,000	28,000	2,000
2,500	10,000	175,000	120,000	40,000	2,500
2,700	10,000	175,000	120,000	40,000	2,700
3,000	10,000	175,000	120,000	40,000	3,000
3,200	10,000	175,000	120,000	40,000	3,200
3,500	10,000	175,000	120,000	40,000	3,500
4,000	10,000	175,000	120,000	40,000	4,000
4,200	10,000	175,000	120,000	40,000	4,200
4,500	10,000	175,000	120,000	40,000	4,500
5,000	10,000	175,000	120,000	40,000	5,000

Forets à une lèvre

Forets à une lèvre en CW monobloc TBE



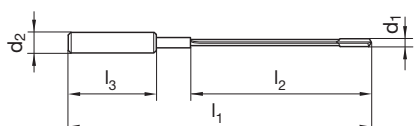
Référence **75021**



P	M	K	N	S	H
●	●	○	●	○	

Conseils d'util.,
page 56

- longueur taillée 160 mm
- forme périphérique G
- pour applications universelles



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	N° de code
1,500	4,000	205,000	160,000	28,000	1,500
1,600	4,000	205,000	160,000	28,000	1,600
2,000	4,000	205,000	160,000	28,000	2,000
2,500	10,000	215,000	160,000	40,000	2,500
2,700	10,000	215,000	160,000	40,000	2,700
3,000	10,000	215,000	160,000	40,000	3,000
3,200	10,000	215,000	160,000	40,000	3,200
3,500	10,000	215,000	160,000	40,000	3,500
4,000	10,000	215,000	160,000	40,000	4,000
4,200	10,000	215,000	160,000	40,000	4,200
4,500	10,000	215,000	160,000	40,000	4,500
5,000	10,000	215,000	160,000	40,000	5,000
6,000	16,000	225,000	160,000	48,000	6,000
8,000	16,000	225,000	160,000	48,000	8,000

Forets à une lèvre

Forets à une lèvre en CW monobloc TBE



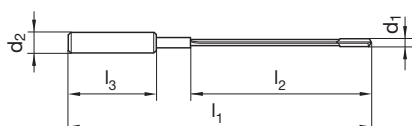
Référence **55021**



P	M	K	N	S	H
●	●	●	○	○	

Conseils d'util.,
page 56

- longueur taillée 160 mm
- forme périphérique G
- pour aciers alliés et hautement alliés



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	N° de code
2,000	4,000	205,000	160,000	28,000	2,000
2,500	10,000	215,000	160,000	40,000	2,500
2,700	10,000	215,000	160,000	40,000	2,700
3,000	10,000	215,000	160,000	40,000	3,000
3,200	10,000	215,000	160,000	40,000	3,200
3,500	10,000	215,000	160,000	40,000	3,500
4,000	10,000	215,000	160,000	40,000	4,000
4,200	10,000	215,000	160,000	40,000	4,200
4,500	10,000	215,000	160,000	40,000	4,500
5,000	10,000	215,000	160,000	40,000	5,000
6,000	16,000	225,000	160,000	48,000	6,000
8,000	16,000	225,000	160,000	48,000	8,000





HSS

FORETS HÉLICOÏDAUX



CODES ISO

P	Aciers communs, aciers hautement alliés
M	Aciers inoxydables
K	Fontes grises, fontes à graphite sphéroïdal et fontes malléables
N	Aluminium et ses alliages ainsi que d'autres métaux non ferreux
S	Alliages de titane, spéciaux et superalliages
H	Aciers trempés et fontes dures

Sur les pages produit, vous trouverez pour chaque outil des conseils concernant les groupes d'application ou les indications des ténacités et duretés maxi.

- particulièrement recommandé
- sous réserve

PICTOGRAMMES



MATIERE DE COUPE	HSS	M42	HSS-Co	HSS-E-PM	HSS-Co8								
REVETEMENT	poli	traité vapeur	sommet revêtu TiN	TiN	TiAlN nano	Listels nitrurés							
TOLERANCE	h6	h8	-0,004										
PROFONDEURS	~3xD	~5xD	~10xD	~15xD	~20xD	~25xD	<5xD	>25xD					
SENS DE COUPE													
	à droite	à gauche											
FORME D'ATTACHEMENT													
			Queue cône morse										
ANGLE AU SOMMET													
NORME	DIN 1897	DIN 338	DIN 339	DIN 1869	DIN 1899	DIN 345	DIN 346	DIN 341	DIN 344	DIN 1870			
	DIN 8374	DIN 8378	DIN 8376	DIN 8379	DIN 8377	DIN 333	DIN 343	DIN 340					
									Norme usine				
TYPE	N	NX	V97	V-PM	VX	V72	H	V66					
	V66Ti	V70	V73	V63	V73-IK	N-IK	V70-IK	V63-IK					

P	M	K	N	S	H	Type	Sens de coupe	Angle au sommet °	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Forets hélicoïdaux extra-courts

						N	à droite	118	HSS	poli	DIN 1897	0,500 - 32,000	71110	190
						N	à gauche	118	HSS	poli	DIN 1897	0,500 - 32,000	71111	192
						N	à droite	118	HSS	traité vapeur	DIN 1897	2,000 - 27,000	71108	194
						N	à gauche	118	HSS	traité vapeur	DIN 1897	2,600 - 26,500	71109	196
						N	à droite	118	HSS	TiN	DIN 1897	1,000 - 13,100	61118	197
						N	à droite	135	M42	poli	DIN 1897	1,000 - 10,000	71106	199
						NX	à droite	118	HSS-Co	poli	DIN 1897	1,000 - 14,000	71220	200
						NX	à droite	118	HSS-Co	TiN	DIN 1897	1,000 - 14,000	61220	202
						V97	à droite	130	HSS-Co	TiAlN nano	DIN 1897	2,000 - 16,000	51159	204
						V-PM	à droite	130	HSS-E-PM	TiN	DIN 1897	1,000 - 14,000	61131	205
						VX	à droite	118	HSS-Co	traité vapeur	DIN 1897	1,000 - 10,000	71112	206
						VX	à droite	118	HSS-Co	TiN	DIN 1897	1,000 - 12,500	61112	207
						V72	à droite	118	HSS	poli	Norme usine	1,000 - 16,000	71114	209
						V72	à gauche	118	HSS	poli	Norme usine	1,000 - 16,000	71113	210

Forets hélicoïdaux courts

						N	à droite	118	HSS	poli	DIN 338	0,200 - 16,000	71116	212
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P	M	K	N	S	H	Type	Sens de coupe	Angle au sommet °	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Forets hélicoïdaux courts

	•	•	•	•	•	N	à gauche	118	HSS	poli	DIN 338	2,800 - 13,500	71119	214
	•	•	•	•	•	N	à droite	118	HSS	traité vapeur	DIN 338	2,000 - 20,000	71115	215
	•	•	•	○	•	N	à droite	118	HSS	TiN	DIN 338	1,000 - 16,000	61116	218
	•	•	•	○	•	N	à droite	118	HSS	sommet rev. TiN	DIN 338	1,000 - 16,000	61115	220
	•	•	•	○	•	N	à droite	118	HSS-Co	traité vapeur	DIN 338	1,000 - 15,000	71149	222
	•	•	•	•	○	N	à droite	135	M42	poli	DIN 338	1,000 - 16,000	71148	224
	•	•	•	○	•	H	à droite	118	HSS	poli	DIN 338	1,000 - 12,000	71117	226
	•	•	•	•	•	NX	à droite	118	HSS-Co	poli	DIN 338	1,000 - 14,000	71221	228
	•	•	•	•	•	NX	à droite	118	HSS-Co	TiN	DIN 338	1,000 - 14,000	61221	230
	•	○	•	•	○	V66	à droite	130	HSS-Co	listels nitrurés	DIN 338	0,800 - 13,500	71123	232
	○	•	•	•	•	V66 Ti	à droite	130	HSS-Co	poli	DIN 338	1,000 - 16,000	71122	234
	•	•	•	○	•	V66 Ti	à droite	130	HSS-Co	TiN	DIN 338	1,000 - 13,500	61223	236
	○	•	•	•	○	V66 Ti	à droite	130	HSS-Co	TiAlN nano	DIN 338	2,000 - 13,000	51122	238
	•	•	○	•	•	V70	à droite	130	HSS	poli	DIN 338	1,500 - 15,500	71124	239
	•	•	○	•	•	V70	à gauche	130	HSS	poli	DIN 338	1,500 - 16,000	71126	241
	•	•	•	○	•	V70	à droite	130	HSS	TiN	DIN 338	1,500 - 16,000	61124	243

P	M	K	N	S	H	Type	Sens de coupe	Angle au sommet °	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Forets hélicoïdaux courts

	•	•	○	•	○	V70	à droite	130	HSS-Co	listels nitrurés	DIN 338	1,500 - 13,000	71158	245
	•	•	○	•	○	V63	à droite	130	HSS-Co	TiN	DIN 338	1,500 - 13,000	61158	247
	•	○	○	•	○	V72	à droite	118	HSS	poli	DIN 338	0,550 - 13,000	71128	248
	•	○	○	•	○	V72	à gauche	118	HSS	poli	DIN 338	0,500 - 12,800	71129	250
	•	○	○	○	○	V97	à droite	130	HSS-Co	TiAlN nano	DIN 338	1,000 - 13,000	51158	251
	○	○	•	○	○	V-PM	à droite	130	HSS-E-PM	TiN	DIN 338	1,000 - 14,000	61232	253

Jeux de forets hélicoïdaux



	•	•	•	•	○	NX	à droite	118	HSS-Co	poli	DIN 338		79012	254
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	•	•	•	•	○	N	à droite	118	HSS	traité vapeur	DIN 338		78879	254
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	○	•	○	○	○	N	à droite	118	HSS	sommet rev. TiN	DIN 338		78880	255
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P	M	K	N	S	H	Type	Sens de coupe	Angle au sommet °	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Jeux de forets hélicoïdaux



												Norme usine	78877	256
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												Norme usine	78878	256
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Forets hélicoïd. à queue cylind.renforcée



•	•	•	•	•	•	NX	à droite	118	HSS-Co	TiN	Norme usine	2,000 - 20,000	61120	257
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•	•	•	•	•	•	NX	à droite	118	HSS-Co	TiN	Norme usine	2,000 - 20,000	61121	259
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•	•	•	•	•	•	V-PM	à droite	130	HSS-E-PM	TiAlN nano	Norme usine	2,000 - 13,000	51132	261
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Forets hél. courts, queue cyl. Ø 16,0 mm



•	•	•	•	•	•	V72	à droite	118	HSS-Co	poli	Norme usine	16,000 - 30,000	71168	262
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Forets hél. courts, queue cyl. Ø 25,4 mm



•	•	•	•	•	•	V72	à droite	118	HSS-Co	poli	Norme usine	28,000 - 40,000	71169	263
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Forets pour perçage par canon



•	•	•	•	•	•	N	à droite	118	HSS	traité vapeur	DIN 339	1,000 - 19,500	71130	264
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P	M	K	N	S	H	Type	Sens de coupe	Angle au sommet °	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Forets hélicoïdaux longs

						N	à droite	118	HSS	poli	DIN 340	0,500 - 16,500	71136	265
						N	à droite	118	HSS	traité vapeur	DIN 340	1,800 - 20,000	71135	266
						N	à droite	118	HSS	TiN	DIN 340	1,000 - 16,000	61136	268
						NX	à droite	118	HSS-Co	poli	DIN 340	1,000 - 14,000	71222	270
						NX	à droite	118	HSS-Co	TiN	DIN 340	1,000 - 14,000	61222	272
						V66	à droite	130	HSS-Co	poli	DIN 340	1,000 - 13,000	71225	274
						V70	à droite	130	HSS	poli	DIN 340	1,500 - 12,000	71150	275
						V70	à gauche	130	HSS	poli	DIN 340	1,500 - 13,000	71152	276
						V70	à droite	130	HSS	TiN	DIN 340	2,000 - 12,000	61150	277
						V73	à droite	130	HSS	listels nitrurés	DIN 340	1,500 - 12,700	71154	278
						V73	à droite	130	HSS-Co	listels nitrurés	DIN 340	1,500 - 13,000	71156	280

Forets hélicoïdaux extra-longs, série 1

						V63	à droite	130	HSS	listels nitrurés	DIN 1869	2,000 - 13,000	71145	282
						V63	à droite	130	HSS-Co	listels nitrurés	DIN 1869	3,000 - 12,700	71192	284

Forets hélicoïdaux extra-longs, série 2

						V63	à droite	130	HSS	listels nitrurés	DIN 1869	3,000 - 13,000	71146	285
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P	M	K	N	S	H	Type	Sens de coupe	Angle au sommet °	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Forets hélicoïdaux extra-long, série 2



•	○	•	•	•	•	V63	à droite	130	HSS-Co	listels nitrurés	DIN 1869	3,000 - 12,000	71193	286
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Forets hélicoïdaux extra-long, série 3



•	•	•	•	•	•	V63	à droite	130	HSS	listels nitrurés	DIN 1869	3,500 - 13,000	71147	287
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Forets hélicoïdaux extra-long



•	•	•	•	•	•	V63	à droite	130	HSS	listels nitrurés	Norme usine	6,000 - 12,000	71195	288
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•	•	•	•	•	•	V63	à droite	130	HSS	poli	Norme usine	8,000 - 12,000	71196	289
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Forets à canaux de lubrification



•	•	•	•	•	•	V73-IK	à droite	130	HSS	poli	Norme usine	3,000 - 13,000	71584	290
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Microforets



•	•	•	•	•	•	N	à droite	118	HSS-E-PM	poli	DIN 1899	0,050 - 1,450	71187	291
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Forets NC



•	•	•	•	•	•	N	à droite	90	HSS	poli	Norme usine	3,000 - 25,400	71175	293
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•	•	•	•	•	•	N	à droite	90	HSS	TiN	Norme usine	3,000 - 25,000	61175	294
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•	•	•	•	•	•	N	à droite	120	HSS	poli	Norme usine	3,000 - 25,400	71176	295
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P	M	K	N	S	H	Type	Sens de coupe	Angle au sommet °	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Forets hélicoïdaux courts

	•	•	○	○	○	N	à droite	130	HSS-Co8	poli	Norme usine	10,000 - 25,500	71303	296
	•	•	○	○	○	N	à droite	130	HSS-Co8	poli	Norme usine	12,000 - 30,000	71304	297

Forets hélicoïdaux

	•	•	•	○	○	N	à droite	118	HSS	traité vapeur	DIN 345	3,750 - 68,000	71300	298
	•	○	•	○	○	N	à droite	118	HSS-Co	traité vapeur	DIN 345	5,000 - 33,000	71416	301
	•	•	•	○	○	V70	à droite	130	HSS	poli	DIN 345	7,940 - 32,000	71305	302
	•	•	•	○	○	V66 Ti	à droite	130	HSS-Co	poli	DIN 345	8,500 - 32,000	71312	303
	•	•	•	○	○	V66 Ti	à droite	130	HSS-Co	poli	DIN 346	11,000 - 29,000	71313	304

Forets pour perçage par canon

	•	•	•	○	○	N	à droite	118	HSS	traité vapeur	DIN 341	6,000 - 45,000	71320	305
	•	•	•	○	○	V70	à droite	130	HSS	poli	DIN 341	8,000 - 44,000	71322	306

Forets hélicoïdaux extra-long, série 1

	•	•	•	○	○	V63	à droite	130	HSS	listels nitrurés	DIN 1870	8,000 - 30,000	71325	307
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Forets hélicoïdaux extra-long, série 2

	•	•	•	○	○	V63	à droite	130	HSS	listels nitrurés	DIN 1870	8,000 - 43,000	71326	308
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P	M	K	N	S	H	Type	Sens de coupe	Angle au sommet °	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Forets à canaux de lubrification



•	○	•	○			N-IK	à droite	118	HSS	traité vapeur	Norme usine	10,000 - 40,000	71554	309
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Forets à utilisations multiples, série longue



•		•	•			V70-IK	à droite	130	HSS-Co	traité vapeur	Norme usine	14,500 - 32,000	71550	310
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•		•	•			V70-IK	à droite	130	HSS-Co	traité vapeur	Norme usine	8,000 - 31,500	71553	311
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Forets extra-long à hélice, à trous d'huile



•	○	•	○	○		V63-IK	à droite	130	HSS-Co	traité vapeur	Norme usine	14,500 - 31,500	71565	312
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•	○	•	○	○		V63-IK	à droite	130	HSS-Co	traité vapeur	Norme usine	8,000 - 14,000	71567	313
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•	○	•	○	○		V63-IK	à droite	130	HSS-Co	traité vapeur	Norme usine	14,500 - 32,000	71566	314
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•	○	•	○	○		V63-IK	à droite	130	HSS-Co	traité vapeur	Norme usine	8,000 - 31,500	71568	315
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Bagues d'alimentation du liquide de refroidissement



											Norme usine		71560	316
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P	M	K	N	S	H	Type	Sens de coupe	Angle de fraisure °	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Forets étagés à listels continus, queue cyl.

						N	à droite	90	HSS	traité vapeur	DIN 8374	6,000 - 19,000	71501	317
						N	à droite	90	HSS	traité vapeur	DIN 8378	3,400 - 13,500	71503	318
						N	à droite	180	HSS	traité vapeur	DIN 8376	6,000 - 18,000	71500	319

Forets étagés à listels continus, queue CM

						N	à droite	90	HSS	traité vapeur	DIN 8379	9,000 - 22,000	71523	320
						N	à droite	180	HSS	traité vapeur	DIN 8377	11,000 - 26,000	71520	321

P	M	K	N	S	H	Type	Sens de coupe	Forme	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Forets à centrer sans méplat

	•	•	•	•	○	N	à droite	A	HSS	poli	DIN 333	0,500 - 12,500	71600	322
	•	•	•	•	○	N	à gauche	A	HSS	poli	DIN 333	0,500 - 8,000	71601	323
	•	•	•	•	○	N	à droite	R	HSS	poli	DIN 333	0,500 - 10,000	71602	324
	•	•	•	•	•	N	à droite	R	HSS	TiN	DIN 333	0,800 - 6,300	61602	325
	•	•	•	•	○	N	à droite	A	HSS	poli	DIN 333	1,000 - 6,300	71605	326
	•	•	•	•	○	N	à droite	B	HSS	poli	DIN 333	1,000 - 6,300	71604	327

Forets à centrer avec méplat

	•	•	•	•	○	N	à droite	A	HSS	poli	DIN 333	1,600 - 6,300	71607	328
	•	•	•	•	○	N	à droite	R	HSS	poli	DIN 333	1,600 - 8,000	71609	329

P	M	K	N	S	H	Type	Sens de coupe	Angle au sommet °	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Forets aléseurs, queue cylindrique



•		•				N	à droite	120	HSS	traité vapeur	DIN 344	4,800 - 16,000	72200	330
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Forets aléseurs, queue CM



•		•				N	à droite	120	HSS	traité vapeur	DIN 343	9,000 - 48,600	72210	331
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Conseils d'utilisation pour les forets

Gamme d'avance											
Lettre-Code	A	B	C	D	E	F	G	H	I		
Ø outil mm	0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019	Avance f (mm/rev)
	1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025	
	2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	
	2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	
	3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160	
	4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200	
	5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	
	6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	
	8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315	
	10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400	
	12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	
	16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	
	20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630	
	25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800	
	31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	
	40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250	

Les forets dont les lettres sont indiquées en gras doivent être utilisés en priorité pour le groupe de matière correspondant.

- R** coupe à droite
(Codes articles sans symbole du sens de coupe sont toujours avec coupe à droite)
- L** coupe à gauche

Produits de réfrigération:

- Huile de coupe
- Emulsion d'huile à forer
- sans lubrifiant
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de ciment, non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	>850-≤1000 ≥1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/>
Aciers trempés	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		<input checked="" type="checkbox"/>
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		<input checked="" type="checkbox"/>
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		<input checked="" type="checkbox"/>
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes dures	-		≤350 HB	<input checked="" type="checkbox"/>
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Alliages d'Al d'inject. ≤10%Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input checked="" type="checkbox"/>
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input checked="" type="checkbox"/>
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/>
Laiton à copeaux courts à copeaux longs	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren		-	<input type="checkbox"/>
Thermoplastiques	Plexiglas, Hostalen, Novodur, Makralon		-	<input checked="" type="checkbox"/>
Kevlar - plast. renf. de fibres	Kevlar		-	<input type="checkbox"/>
d'aramide, de verre ou de carb.	GFK/CFK		-	<input type="checkbox"/>

≤3×D Profondeur

Référence	71108 71109 <small>L</small>	71110 71111 <small>L</small>	71114 71113 <small>L</small>
Matière de coupe	HSS	HSS	HSS
Version	poli/vap.	poli	poli
DIN/Forme	1897	1897	N. U.
Type	N	N	V72
Page	194/196	190/192	209/210

61118
HSS
TiN
1897
N
197

71112	71168	71169	71303 71304	71106
HSS-Co	HSS-Co	HSS-Co	HSS-Co8	M42
poli/vap.	poli	poli	poli	poli
1897	N. U.	N. U.	N. U.	1897
VX	V72	V72	N	N
206	262	263	296/297	199



v _c m/min	Gamme d'avance		
27	F	F	F
22	E	E	E
30	F	F	F
30	E	E	E
25	E	E	E
25	E	E	E
30	F	F	F
16	D	D	
30	F	F	F
25	F	F	F
20	F	F	F
70			G
70			G
50	G	G	G
50	F	F	F
70	F	F	F
60	E	E	E
40	E	E	E
30	D	D	D
25	D	D	D
15	D	D	D
18	D	D	D
28	E	E	E

v _c m/min	Gamme d'avance
30	F
24	E
33	F
33	E
28	E
28	E
25	D
22	D
33	F
20	D
14	D
18	D
33	F
33	F
28	F
22	F
80	F
65	E
75	E
45	E
33	D
27	D
16	D
15	D
22	D
36	E

v _c m/min	Gamme d'avance				
35	E				E
30	E				E
40	E				E
40	E	E	E		E
40	E				E
40	E				E
35	D	D	D	D	D
20	D	D	D	D	D
16	C	C	C	C	C
36	F				F
20	D	D	D	D	C
15	C	C	C	C	C
16	D	D	D	D	C
12	C	C	C	C	C
15	D	D	D	D	C
12	C	C	C	C	C
15	C	C	C	C	C
8	B	B	B	B	B
4	A			A	A
18	D	D	D		C
14	C	C	C	C	C
16	C	C	C	C	C
35	F				E
30	F				E
30	F				E
25	F				E
10	C			C	C
8	A	A	A	A	A
10	B			B	B
6	B			B	B
90					G
90					G
80					G
70					F
70					F
40					E
60					E
40					E
35	D				D
30	D				D
20	D				D
15	D				D
20	D	D	D		D
30					D

Conseils d'utilisation pour les forets

Les forets dont les lettres sont indiquées en gras doivent être utilisés en priorité pour le groupe de matière correspondant.

Gamme d'avance										
Lettre-Code	A	B	C	D	E	F	G	H	I	
Ø outil mm	0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
	1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
	2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
	2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
	3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
	4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
	5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
	6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
	8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
	10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
	12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
	16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
	20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
	25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
	31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
	40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250	
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000	
Gamme d'avance pour 71187										
Ø outil mm	A	B	C	D	E	F	G	H	I	
0,10	0,002	0,003	0,003	0,004	0,006	0,007	0,010	0,013	0,016	
0,16	0,002	0,003	0,004	0,005	0,007	0,009	0,012	0,016	0,022	
0,25	0,003	0,004	0,005	0,007	0,009	0,011	0,014	0,019	0,024	
0,30	0,004	0,005	0,007	0,009	0,011	0,015	0,019	0,025	0,033	
0,50	0,005	0,007	0,008	0,011	0,014	0,019	0,024	0,031	0,041	
0,63	0,007	0,009	0,012	0,015	0,020	0,026	0,034	0,044	0,057	
0,80	0,010	0,013	0,016	0,020	0,024	0,031	0,038	0,048	0,060	
1,00	0,020	0,024	0,029	0,035	0,041	0,050	0,060	0,072	0,086	
1,50	0,030	0,035	0,040	0,046	0,052	0,060	0,069	0,080	0,092	

Produits de réfrigération:

- Huile de coupe
- Emulsion d'huile à forer
- sans lubrifiant
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de ciment, non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/>
Aciers trempés	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		<input checked="" type="checkbox"/>
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		<input checked="" type="checkbox"/>
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		<input checked="" type="checkbox"/>
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes dures	-		≤350 HB	<input checked="" type="checkbox"/>
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Alliages d'Al d'inject. ≤10%Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input checked="" type="checkbox"/>
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input checked="" type="checkbox"/>
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/>
Laiton à copeaux courts	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		<input checked="" type="checkbox"/>
à copeaux longs	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		<input checked="" type="checkbox"/>
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			<input type="checkbox"/>
Thermoplastiques	Plexiglas, Hostalen, Novodur, Makralon			<input checked="" type="checkbox"/>
Kevlar - plast. renf. de fibres	Kevlar			<input type="checkbox"/>
d'aramide, de verre ou de carb.	GFK/CFK			<input type="checkbox"/>

≤3×D Profondeur

Référence	61112	51159	61120	71220	61220	61131	71187
Matière de coupe	HSS-Co	HSS-Co	HSS-Co	HSS-Co	HSS-Co	HSS-E-PM	HSS-E-PM
Version	TiN	TiAlN	TiN	poli	TiN	TiN	poli
DIN/Forme	1897	1897	N. U.	1897	1897	1897	1899
Type	VX	V97	NX	NX	NX	V-PM	N
Page	207	204	257	200	202	205	291



v _c m/min	Gamme d'avance	v _c m/min	Gamme d'avance	v _c m/min	Gamme d'avance	v _c m/min	Gamme d'avance	v _c m/min	Gamme d'avance	v _c m/min	Gamme d'avance	v _c m/min	Gamme d'avance
38	E	42	F	45	F	35	F	45	F	40	F	21	F
33	D	36	E	35	E	30	E	35	E	32	E	18	E
44	E	48	G	50	F	40	F	50	F	45	F	18	F
38	E	42	F	40	F	30	F	40	F	40	E	16	E
44	E	48	F	40	F	32	F	44	F	42	F	20	E
44	E	48	F	44	F	28	F	44	F	40	E	18	E
38	D	42	E	40	E	20	E	40	E	28	D	14	D
27	D	30	E	27	D	15	D	27	D	25	D	14	D
22	C	24	D	22	C	13	C	22	C	20	C	12	C
44	D	48	D	44	F	30	F	44	F	40	D	18	F
22	D	24	E	22	D	16	D	22	D	22	D	14	D
18	C	20	D	18	C	12	C	18	C	18	C	12	C
22	D	24	E	22	D	15	D	22	D	20	D	14	D
18	C	20	D	16	C	10	C	16	C	15	C	12	C
19	D	21	E	20	D	15	D	20	D	21	D	16	D
14	C	16	D	15	C	10	C	15	C	16	C	14	C
14	C	17	D	13	C	10	C	13	C	15	C	14	C
9	B	11	C							12	B	8	B
4	A												
20	D	17	D	20	D	14	D	20	D	15	D	18	D
15	C	12	C	16	D	10	D	16	D	10	C	14	C
18	C	14	C	18	D	12	D	18	D	12	C	16	C
40	F	50	G	45	F	36	F	45	F	50	F	26	F
35	F	45	G	40	F	30	F	40	F	40	F	22	F
33	F	36	G	40	F	30	F	40	F	44	F	18	F
27	F	29	G	30	F	22	F	30	F	32	F	22	F
12	C	10	D							8	C		
6	B												
11	B												
7	B												
				70	G	50	G	70	G				
				70	G	50	G	70	G				
				85	G	65	G	85	G			26	G
				70	F	60	F	70	F			18	F
				80	F	60	F	80	F			75	F
		96	F	80	E	70	E	80	E	80	E	42	E
		84	F	77	E	45	E	77	E				
		48	F	44	E	30	E	44	E	60	E	22	E
45	E	50	E	50	D	36	D	50	D	50	E	22	D
40	D	45	E	40	D	30	D	40	D	45	D	18	D
23	D	25	E	32	D	30	D	32	D	40	D	13	D
17	D	20	E	28	D	25	D	28	D	32	D		
		24	E	25	D	20	D	25	D	25	D	16	D
		30	E	25	D	15	D	25	D			18	D

Conseils d'utilisation pour les forets

Gamme d'avance										
Lettre-Code	A	B	C	D	E	F	G	H	I	
Ø outil mm	0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
	1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
	2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
	2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
	3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
	4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
	5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
	6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
	8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
	16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
	20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
	25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
	31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
	40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250

Les forets dont les lettres sont indiquées en gras doivent être utilisés en priorité pour le groupe de matière correspondant.

- R** coupe à droite
(Codes articles sans symbole du sens de coupe sont toujours avec coupe à droite)
- L** coupe à gauche

Produits de réfrigération:

- Huile de coupe
- Emulsion d'huile à forer
- sans lubrifiant
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de ciment, non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers trempés	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		<input checked="" type="checkbox"/>
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		<input checked="" type="checkbox"/>
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		<input checked="" type="checkbox"/>
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes dures	-		≤350 HB	<input checked="" type="checkbox"/>
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Alliages d'Al d'inject. ≤10%Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input checked="" type="checkbox"/>
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input checked="" type="checkbox"/>
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Laiton à copeaux courts à copeaux longs	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			- <input type="checkbox"/>
Thermoplastiques	Plexiglas, Hostalen, Novodur, Makralon			- <input checked="" type="checkbox"/>
Kevlar - plast. renf. de fibres	Kevlar			- <input type="checkbox"/>
d'aramide, de verre ou de carb.	GFK/CFK			- <input type="checkbox"/>

≤5×D Profondeur

Référence	71116 71119 ^L	71115	71300	71117	71124 71126 ^L	71305	71128 71129 ^L
Matière de coupe	HSS	HSS	HSS	HSS	HSS	HSS	HSS
Version	poli	poli/vap.	vapeur	poli	poli	poli	poli
DIN/Forme	338	338	345	338	338	345	338
Type	N	N	N	H	V70	V70	V72
Page	212/214	215	298	226	239/241	302	248/250

61116	61124
HSS	HSS
TiN	TiN
338	338
N	V70
218	243

61115
HSS
TiN Kopf.
338
N
220

61223
HSS-Co
TiN
338
V66 Ti
236



v _c m/min	Gamme d'avance						
27	F	F	F	F	F	F	F
22	E	E	E	E	E	E	E
30	F	F	F	F	F	F	F
30	E	E	E	E	E	E	E
25	E	E	E	E	E	E	E
25	E	E	E	E	E	E	E
30	F	F	F	F	F	F	F
16	D	D	D	D	D	D	D
30	F	F	F	G	G	F	F
30	F	F	F	F	F	F	F
25	F	F	F	F	F	F	F
25	F	F	F	F	F	F	F
80				G	G	G	G
80				G	G	G	G
70	G	G	G	G	G	G	G
70	F	F	F	F	F	F	F
50	F	F	F	F	F	F	F
50	E	E	E	F	F	F	E
70				F	F	F	E
40	E	E	E	F	F	F	E
30	D	D	D	D	D	D	D
25	D	D	D	D	D	D	D
15	D	D	D	D	D	D	D
18	D	D	D	D	D	D	D
28	E	E	E	E	E	E	E

v _c m/min	Gamme d'avance	
30	F	F
24	E	E
33	F	F
33	E	E
28	E	E
28	E	E
25	D	D
22	D	D
33	F	F
20	D	D
14	D	D
18	D	D
33	F	G
33	F	F
28	F	F
22	F	F
80	F	F
65	E	E
75	E	E
45	E	E
33	D	D
27	D	D
16	D	D
15	D	D
22	D	D
36	E	E

v _c m/min	Gamme d'avance
30	F
24	E
33	F
33	E
28	E
28	E
25	D
22	D
33	F
20	D
14	D
18	D
33	F
33	F
28	F
22	F
80	F
65	E
75	E
45	E
33	D
27	D
16	D
15	D
22	D
36	E

v _c m/min	Gamme d'avance
22	C
14	C
9	B
20	D
15	C
18	C
12	C
6	B
11	B
7	B
17	D

Conseils d'utilisation pour les forets

Gamme d'avance											
Lettre-Code	A	B	C	D	E	F	G	H	I		
Ø outil mm	0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019	Avance f (mm/rev)
	1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025	
	2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	
	2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	
	3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160	
	4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200	
	5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	
	6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	
	8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315	
	10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400	
	12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	
	16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	
	20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630	
	25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800	
	31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	
	40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250	

Les forets dont les lettres sont indiquées en gras doivent être utilisés en priorité pour le groupe de matière correspondant.

Produits de réfrigération:

- Huile de coupe
- Emulsion d'huile à forer
- sans lubrifiant
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de ciment, non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/>
Aciers trempés	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		<input checked="" type="checkbox"/>
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		<input checked="" type="checkbox"/>
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		<input checked="" type="checkbox"/>
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes dures	-		≤350 HB	<input checked="" type="checkbox"/>
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Alliages d'Al d'inject. ≤10%Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input checked="" type="checkbox"/>
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input checked="" type="checkbox"/>
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/>
Laiton à copeaux courts	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		<input checked="" type="checkbox"/>
à copeaux longs	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		<input checked="" type="checkbox"/>
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			<input type="checkbox"/>
Thermoplastiques	Plexiglas, Hostalen, Novodur, Makralon			<input checked="" type="checkbox"/>
Kevlar - plast. renf. de fibres	Kevlar			<input type="checkbox"/>
d'aramide, de verre ou de carb.	GFK/CFK			<input type="checkbox"/>

≤5×D Profondeur

Référence	71416	71149	71158	71123	71122	71312	71313	71148	71221	61221
Matière de coupe	HSS-Co	HSS-Co	HSS-Co	HSS-Co	HSS-Co	HSS-Co	HSS-Co	M42	HSS-Co	HSS-Co
Version	vapeur	poli/vap.	list. nitr.	poli/l. nitr.	poli	poli	poli	poli	poli	TiN
DIN/Forme	345	338	338	338	338	345	346	338	338	338
Type	N	N	V70	V66	V66 Ti	V66 Ti	V66 Ti	N	NX	NX
Page	301	222	245	232	234	303	304	224	228	230



v _c m/min	Gamme d'avance								v _c m/min	Gamme d'avance	v _c m/min	Gamme d'avance
35	E	E						E	35	F	45	F
30	E	E						E	30	E	35	E
40	E	E						E	40	F	50	F
40	E	E	E					E	30	F	40	F
40	E	E						E	32	F	44	F
40	E	E	E					E	28	F	44	F
35	D	D	D					E	20	E	40	E
20	D	D	D					D	15	D	27	D
16	C	C	C	C	C	C	C	C	13	C	22	C
36	F	F		F	F	F	F	F	30	F	44	F
20	D	D	D					C	16	D	22	D
15	C	C	C	C	C	C	C	C	12	C	18	C
16	D	D	D					C	15	D	22	D
12	C	C	C	C	C	C	C	C	10	C	16	C
15	D	D	D					C	15	D	20	D
12	C	C	C	C	C	C	C	C	10	C	15	C
15	C	C	C	C	C	C	C	C	10	C	13	C
8	B	B		B	B	B	B	B				
4								A				
18	D	D	D	D	D	D	D	C	14	D	20	D
14	C	C		C	C	C	C	C	10	D	16	D
16	C	C	C	C	C	C	C	C	12	D	18	D
35	F	F	F					E	36	F	45	F
30	F	F	F					E	30	F	40	F
30	F	F	F					E	30	F	40	F
28	F	F	F					E	22	F	30	F
10	C	C	C	C	C	C	C	C				
8				A	A	A	A	A				
10				B	B	B	B	B				
6				B	B	B	B	B				
90								G	50	G	70	G
90								G	50	G	70	G
80			G					G	65	G	85	G
70			F					F	60	F	70	F
70								F	60	F	70	F
40	E	E	E					E	25	E	80	E
60								E	70	E	77	E
40	E	E	E					E	30	E	44	E
35	D	D						D	36	D	50	D
33	D	D						D	30	D	40	D
20	D	D	D					D	30	D	32	D
15	D	D	D					D	25	D	28	D
20	D	D	D					D	20	D	25	D
									15	D	27	D

Conseils d'utilisation pour les forets

Gamme d'avance											
Lettre-Code	A	B	C	D	E	F	G	H	I		
Ø outil mm	0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019	Avance f (mm/rev)
	1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025	
	2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	
	2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	
	3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160	
	4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200	
	5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	
	6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	
	8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315	
	10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400	
	12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	
	16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	
	20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630	
	25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800	
	31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	
	40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250	

Les forets dont les lettres sont indiquées en gras doivent être utilisés en priorité pour le groupe de matière correspondant.

Produits de réfrigération:

- Huile de coupe
- Emulsion d'huile à forer
- sans lubrifiant
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de ciment, non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/>
Aciers trempés	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		<input checked="" type="checkbox"/>
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		<input checked="" type="checkbox"/>
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		<input checked="" type="checkbox"/>
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes dures	-		≤350 HB	<input checked="" type="checkbox"/>
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Alliages d'Al d'inject. ≤10%Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input checked="" type="checkbox"/>
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input checked="" type="checkbox"/>
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/>
Laiton à copeaux courts à copeaux longs	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Therm durcissables	Résine époxy, Résopal, Pertinax, Moltopren			<input type="checkbox"/>
Thermoplastiques	Plexiglas, Hostalen, Novodur, Makralon			<input checked="" type="checkbox"/>
Kevlar - plast. renf. de fibres	Kevlar			<input type="checkbox"/>
d'aramide, de verre ou de carb.	GFK/CFK			<input type="checkbox"/>

Conseils d'utilisation pour les forets

Gamme d'avance											
Lettre-Code	A	B	C	D	E	F	G	H	I		
Ø outil mm	0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019	Avance f (mm/rev)
	1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025	
	2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	
	2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	
	3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160	
	4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200	
	5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	
	6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	
	8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315	
	10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400	
	12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	
	16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	
	20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630	
	25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800	
	31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	
	40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250	

Les forets dont les lettres sont indiquées en gras doivent être utilisés en priorité pour le groupe de matière correspondant.

- R** coupe à droite
(Codes articles sans symbole du sens de coupe sont toujours avec coupe à droite)
- L** coupe à gauche

Produits de réfrigération:

- Huile de coupe
- Emulsion d'huile à forer
- sans lubrifiant
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de ciment, non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	>850-≤1000 ≥1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/>
Aciers trempés	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		<input checked="" type="checkbox"/>
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		<input checked="" type="checkbox"/>
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		<input checked="" type="checkbox"/>
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes dures	-		≤350 HB	<input checked="" type="checkbox"/>
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Alliages d'Al d'inject. ≤10%Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input checked="" type="checkbox"/>
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input checked="" type="checkbox"/>
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/>
Laiton à copeaux courts à copeaux longs	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			<input type="checkbox"/>
Thermoplastiques	Plexiglas, Hostalen, Novodur, Makralon			<input checked="" type="checkbox"/>
Kevlar - plast. renf. de fibres	Kevlar			<input type="checkbox"/>
d'aramide, de verre ou de carb.	GFK/CFK			<input type="checkbox"/>

≤10×D Profondeur

Référence	71136	71130	71135	71320	71150 71152	71322	71154	71584	61136	61150	71225	71156	71550 71553
Matière de coupe	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS-Co		HSS-Co
Version	poli	poli/vapeur	vapeur	vapeur	poli	poli	list. nitr.	poli	TiN	TiN	poli	list. nitr.	vapeur
DIN/Forme	340	339	340	341	340	341	340	N. U.	340	340	340	340	N. U.
Type	N	N	N	N	V70	V70	V73	V73-IK	N	V70	V66	V73	V70-IK
Page	265	264	266	305	275/276	306	278	290	268	277	274	280	310/311



v _c m/min	Gamme d'avance							v _c m/min	Gamme d'avance	v _c m/min	Gamme d'avance	v _c m/min	Gamme d'avance	v _c m/min	Gamme d'avance
24	F	F	F	F	F	F	F	26	F	28	F	F		26	F
20	E	E	E	E	E	E	E	22	E	22	E	E		22	E
27	F	F	F	F	F	F	F	30	F	30	F	F		30	F
27	E	E	E	E	E	E	E	30	E	30	E	E	24	E	E
22	E	E	E	E	E	E	E	24	E	25	E	E		24	E
22	E	E	E	E	E	E	E	24	E	25	E	E	24	E	E
								22	D	22	D	D	16	D	D
								20	D	18	D	D	16	D	D
								14	C				14	C	C
								30	F	30	F	F		30	F
27	F	F	F	F	F	F	F	17	D	14	D	D	14	D	D
								12	C				10	C	C
								14	D	12	D	D	12	D	D
								10	C				8	C	C
14	D	D	D	D	D	D	D	15	D	16	D	D	16	D	D
								10	C	10	C	C	8	C	C
								10	C				8	C	C
								7	B				6	B	B
12				D									12	D	D
													8	C	A
													10	C	C
27	F	F	F	F	G	G	F	30	F	30	F	F	30	F	F
27	F	F	F	F	F	F	F	30	F	30	F	F	24	F	F
22	F	F	F	F	F	F	F	24	F	24	F	F	24	F	F
18	F	F	F	F	F	F	F	20	F	20	F	F	20	F	F
								7	C				6	C	C
70					G	G									
70					G	G		80	F					80	F
45	G	G	G	G	G	G	G	50	G	50	G	G	60	G	G
45	F	F	F	F	F	F	F	50	F	50	F	F	50	F	F
63	F	F	F	F	F	F	F			70	F	F	60	E	E
54	E	E	E	E	F	F	F	60	E	60	E	E	30	E	E
36	E	E	E	E	F	F	F	40	E	40	E	E	38	E	E
28	D	D	D	D						30	D				
22	D	D	D	D				24	D	25	D			24	D
22	D	D	D	D	D	D	D	24	D	14	D	D	24	D	D
								22	D	12	D	D	13	D	D
14	D	D	D	D	D	D	D			18	D	D	16	D	D
22	E	E	E	E				24	E	32	E		26	D	D

Conseils d'utilisation pour les forets

Gamme d'avance											
Lettre-Code	A	B	C	D	E	F	G	H	I		
Ø outil mm	0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019	Avance f (mm/rev)
	1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025	
	2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	
	2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	
	3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160	
	4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200	
	5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	
	6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	
	8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315	
	10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400	
	12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	
	16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	
	20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630	
	25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800	
	31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	
	40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250	

Les forets dont les lettres sont indiquées en gras doivent être utilisés en priorité pour le groupe de matière correspondant.

Produits de réfrigération:

- Huile de coupe
- Emulsion d'huile à forer
- sans lubrifiant
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de ciment, non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/>
Aciers trempés	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		<input checked="" type="checkbox"/>
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		<input checked="" type="checkbox"/>
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		<input checked="" type="checkbox"/>
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes dures	-		≤350 HB	<input checked="" type="checkbox"/>
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Alliages d'Al d'inject. ≤10%Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input checked="" type="checkbox"/>
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input checked="" type="checkbox"/>
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/>
Laiton à copeaux courts à copeaux longs	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			<input type="checkbox"/>
Thermoplastiques	Plexiglas, Hostalen, Novodur, Makralon			<input checked="" type="checkbox"/>
Kevlar - plast. renf. de fibres	Kevlar			<input type="checkbox"/>
d'aramide, de verre ou de carb.	GFK/CFK			<input type="checkbox"/>

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux extra-courts



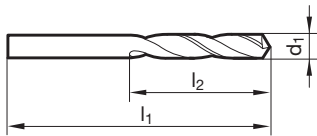
Référence 71110



P	M	K	N	S	H
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Conseils d'util.,
page 176

- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage à dépouille conique
- pour tours automatiques/révolvers
- aussi pour machines portatives



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,500		20,000	3,000	3,300		49,000	18,000
0,600		21,000	3,500	3,400		52,000	20,000
0,700		23,000	4,500	3,500		52,000	20,000
0,750		23,000	4,500	3,600		52,000	20,000
0,800		24,000	5,000	3,700		52,000	20,000
0,900		25,000	5,500	3,750		52,000	20,000
1,000		26,000	6,000	3,800		55,000	22,000
1,050		26,000	6,000	3,900		55,000	22,000
1,100		28,000	7,000	4,000		55,000	22,000
1,150		28,000	7,000	4,100		55,000	22,000
1,200		30,000	8,000	4,200		55,000	22,000
1,250		30,000	8,000	4,250		55,000	22,000
1,300		30,000	8,000	4,300		58,000	24,000
1,350		32,000	9,000	4,400		58,000	24,000
1,400		32,000	9,000	4,500		58,000	24,000
1,450		32,000	9,000	4,600		58,000	24,000
1,500		32,000	9,000	4,700		58,000	24,000
1,550		34,000	10,000	4,800		62,000	26,000
1,600		34,000	10,000	4,900		62,000	26,000
1,650		34,000	10,000	5,000		62,000	26,000
1,700		34,000	10,000	5,100		62,000	26,000
1,750		36,000	11,000	5,150		62,000	26,000
1,800		36,000	11,000	5,200		62,000	26,000
1,900		36,000	11,000	5,250		62,000	26,000
1,950		38,000	12,000	5,300		62,000	26,000
2,000		38,000	12,000	5,400		66,000	28,000
2,050		38,000	12,000	5,500		66,000	28,000
2,100		38,000	12,000	5,600		66,000	28,000
2,150		40,000	13,000	5,700		66,000	28,000
2,200		40,000	13,000	5,750		66,000	28,000
2,250		40,000	13,000	5,800		66,000	28,000
2,300		40,000	13,000	5,900		66,000	28,000
2,400		43,000	14,000	6,000		66,000	28,000
2,450		43,000	14,000	6,100		70,000	31,000
2,500		43,000	14,000	6,200		70,000	31,000
2,550		43,000	14,000	6,250		70,000	31,000
2,600		43,000	14,000	6,300		70,000	31,000
2,650		43,000	14,000	6,400		70,000	31,000
2,700		46,000	16,000	6,500		70,000	31,000
2,750		46,000	16,000	6,600		70,000	31,000
2,800		46,000	16,000	6,700		70,000	31,000
2,850		46,000	16,000	6,750	17/64	74,000	34,000
2,900		46,000	16,000	6,800		74,000	34,000
2,950		46,000	16,000	6,900		74,000	34,000
3,000		46,000	16,000	7,000		74,000	34,000
3,100		49,000	18,000	7,100		74,000	34,000
3,200		49,000	18,000	7,200		74,000	34,000
3,250		49,000	18,000	7,250		74,000	34,000

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
7,300		74,000	34,000	12,000		102,000	51,000
7,400		74,000	34,000	12,500		102,000	51,000
7,500		74,000	34,000	12,750		102,000	51,000
7,600		79,000	37,000	13,000		102,000	51,000
7,700		79,000	37,000	13,500		107,000	54,000
7,750		79,000	37,000	14,000		107,000	54,000
7,800		79,000	37,000	14,500		111,000	56,000
7,900		79,000	37,000	15,000		111,000	56,000
8,000		79,000	37,000	15,500		115,000	58,000
8,100		79,000	37,000	16,000		115,000	58,000
8,200		79,000	37,000	16,500		119,000	60,000
8,250		79,000	37,000	17,000		119,000	60,000
8,300		79,000	37,000	17,500		123,000	62,000
8,400		79,000	37,000	18,000		123,000	62,000
8,500		79,000	37,000	18,500		127,000	64,000
8,600		84,000	40,000	19,000		127,000	64,000
8,700		84,000	40,000	19,500		131,000	66,000
8,750		84,000	40,000	20,000		131,000	66,000
8,800		84,000	40,000	20,500		136,000	68,000
8,900		84,000	40,000	21,000		136,000	68,000
9,000		84,000	40,000	21,500		141,000	70,000
9,100		84,000	40,000	22,000		141,000	70,000
9,200		84,000	40,000	22,500		146,000	72,000
9,250		84,000	40,000	23,000		146,000	72,000
9,300		84,000	40,000	24,000		151,000	75,000
9,400		84,000	40,000	25,000	63/64	151,000	75,000
9,500		84,000	40,000	26,000		156,000	78,000
9,600		89,000	43,000	28,000		162,000	81,000
9,700		89,000	43,000	29,000		168,000	84,000
9,750		89,000	43,000	30,000		168,000	84,000
9,800		89,000	43,000	31,000		174,000	87,000
9,900		89,000	43,000	32,000		180,000	90,000
10,000		89,000	43,000				
10,100		89,000	43,000				
10,200		89,000	43,000				
10,250		89,000	43,000				
10,300		89,000	43,000				
10,400		89,000	43,000				
10,500		89,000	43,000				
10,750		95,000	47,000				
11,000		95,000	47,000				
11,500		95,000	47,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux extra-courts



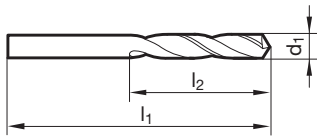
Référence 71111



P	M	K	N	S	H
•		•	•		

Conseils d'util.,
page 176

- Amin. de l'âme $\geq \varnothing 14,300$
- affûtage à dépouille conique
- pour tours automatiques/révolvers
- aussi pour machines portatives



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,500		20,000	3,000	3,000		46,000	16,000
0,550		21,000	3,500	3,100		49,000	18,000
0,600		21,000	3,500	3,150		49,000	18,000
0,650		22,000	4,000	3,200		49,000	18,000
0,700		23,000	4,500	3,300		49,000	18,000
0,750		23,000	4,500	3,450		52,000	20,000
0,800		24,000	5,000	3,500		52,000	20,000
0,850		24,000	5,000	3,550		52,000	20,000
0,900		25,000	5,500	3,600		52,000	20,000
0,950		25,000	5,500	3,650		52,000	20,000
1,000		26,000	6,000	3,700		52,000	20,000
1,050		26,000	6,000	3,750		52,000	20,000
1,100		28,000	7,000	3,800		55,000	22,000
1,150		28,000	7,000	3,850		55,000	22,000
1,200		30,000	8,000	3,900		55,000	22,000
1,250		30,000	8,000	3,950		55,000	22,000
1,300		30,000	8,000	4,000		55,000	22,000
1,350		32,000	9,000	4,100		55,000	22,000
1,400		32,000	9,000	4,200		55,000	22,000
1,450		32,000	9,000	4,300		58,000	24,000
1,500		32,000	9,000	4,500		58,000	24,000
1,550		34,000	10,000	4,600		58,000	24,000
1,600		34,000	10,000	4,700		58,000	24,000
1,650		34,000	10,000	4,750		58,000	24,000
1,700		34,000	10,000	4,800		62,000	26,000
1,750		36,000	11,000	5,000		62,000	26,000
1,800		36,000	11,000	5,100		62,000	26,000
1,850		36,000	11,000	5,200		62,000	26,000
1,900		36,000	11,000	5,300		62,000	26,000
2,000		38,000	12,000	5,400		66,000	28,000
2,050		38,000	12,000	5,500		66,000	28,000
2,100		38,000	12,000	5,600		66,000	28,000
2,150		40,000	13,000	5,700		66,000	28,000
2,200		40,000	13,000	5,750		66,000	28,000
2,250		40,000	13,000	5,800		66,000	28,000
2,300		40,000	13,000	5,900		66,000	28,000
2,350		40,000	13,000	6,200		70,000	31,000
2,400		43,000	14,000	6,250		70,000	31,000
2,450		43,000	14,000	6,300		70,000	31,000
2,500		43,000	14,000	6,500		70,000	31,000
2,550		43,000	14,000	6,600		70,000	31,000
2,600		43,000	14,000	6,700		70,000	31,000
2,650		43,000	14,000	6,800		74,000	34,000
2,700		46,000	16,000	6,900		74,000	34,000
2,800		46,000	16,000	7,000		74,000	34,000
2,850		46,000	16,000	7,100		74,000	34,000
2,900		46,000	16,000	7,300		74,000	34,000
2,950		46,000	16,000	7,400		74,000	34,000

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
7,500		74,000	34,000	12,100		102,000	51,000
7,600		79,000	37,000	12,300	31/64	102,000	51,000
7,700		79,000	37,000	12,400		102,000	51,000
7,750		79,000	37,000	12,750		102,000	51,000
7,800		79,000	37,000	12,900		102,000	51,000
7,900		79,000	37,000	13,000		102,000	51,000
8,000		79,000	37,000	13,100	33/64	102,000	51,000
8,100		79,000	37,000	13,200		102,000	51,000
8,200		79,000	37,000	13,250		107,000	54,000
8,250		79,000	37,000	13,300		107,000	54,000
8,300		79,000	37,000	13,600		107,000	54,000
8,400		79,000	37,000	13,750		107,000	54,000
8,500		79,000	37,000	13,800		107,000	54,000
8,600		84,000	40,000	13,900		107,000	54,000
8,700		84,000	40,000	14,300		111,000	56,000
8,750		84,000	40,000	14,400		111,000	56,000
8,800		84,000	40,000	14,800		111,000	56,000
8,900		84,000	40,000	14,900		111,000	56,000
9,000		84,000	40,000	15,000		111,000	56,000
9,100		84,000	40,000	15,300		115,000	58,000
9,200		84,000	40,000	15,400		115,000	58,000
9,250		84,000	40,000	15,750		115,000	58,000
9,400		84,000	40,000	15,800		115,000	58,000
9,500		84,000	40,000	15,900		115,000	58,000
9,600		89,000	43,000	16,000		115,000	58,000
9,700		89,000	43,000	16,250		119,000	60,000
9,750		89,000	43,000	16,300		119,000	60,000
9,800		89,000	43,000	16,900		119,000	60,000
9,900		89,000	43,000	17,250		123,000	62,000
10,000		89,000	43,000	17,400		123,000	62,000
10,200		89,000	43,000	17,600		123,000	62,000
10,300		89,000	43,000	18,600		127,000	64,000
10,500		89,000	43,000	18,750		127,000	64,000
10,700		95,000	47,000	18,800		127,000	64,000
10,800		95,000	47,000	19,000		127,000	64,000
11,000		95,000	47,000	21,500		141,000	70,000
11,100		95,000	47,000	29,000		168,000	84,000
11,300		95,000	47,000	30,000		168,000	84,000
11,600		95,000	47,000	32,000		180,000	90,000
11,750		95,000	47,000				
11,900		102,000	51,000				
12,000		102,000	51,000				

Forets hélicoïdaux à queue cylindrique

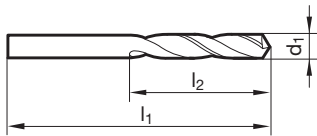
Forets hélicoïdaux extra-courts



Référence **71108**

N	~3xD	DIN 1897	HSS	traité vapeur	118°	h8	R	Cyl
P	M	K	N	S	H	Conseils d'util., page 176		
•		•	•					

- Amin. de l'âme $\geq \varnothing 2,000$
- affûtage à dépouille conique
- pour tours automatiques/révolvers
- aussi pour machines portatives
- poli < 2,36 mm



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
2,000		38,000	12,000	6,400		70,000	31,000
2,100		38,000	12,000	6,500		70,000	31,000
2,200		40,000	13,000	6,600		70,000	31,000
2,300		40,000	13,000	6,700		70,000	31,000
2,400		43,000	14,000	6,800		74,000	34,000
2,500		43,000	14,000	6,900		74,000	34,000
2,550		43,000	14,000	7,000		74,000	34,000
2,600		43,000	14,000	7,100		74,000	34,000
2,700		46,000	16,000	7,200		74,000	34,000
2,800		46,000	16,000	7,300		74,000	34,000
2,900		46,000	16,000	7,400		74,000	34,000
2,950		46,000	16,000	7,500		74,000	34,000
3,000		46,000	16,000	7,600		79,000	37,000
3,100		49,000	18,000	7,700		79,000	37,000
3,200		49,000	18,000	7,800		79,000	37,000
3,250		49,000	18,000	7,900		79,000	37,000
3,300		49,000	18,000	8,000		79,000	37,000
3,400		52,000	20,000	8,100		79,000	37,000
3,500		52,000	20,000	8,200		79,000	37,000
3,600		52,000	20,000	8,300		79,000	37,000
3,700		52,000	20,000	8,400		79,000	37,000
3,800		55,000	22,000	8,500		79,000	37,000
3,900		55,000	22,000	8,600		84,000	40,000
4,000		55,000	22,000	8,700		84,000	40,000
4,100		55,000	22,000	8,750		84,000	40,000
4,200		55,000	22,000	8,800		84,000	40,000
4,300		58,000	24,000	8,900		84,000	40,000
4,400		58,000	24,000	9,000		84,000	40,000
4,500		58,000	24,000	9,100		84,000	40,000
4,600		58,000	24,000	9,200		84,000	40,000
4,700		58,000	24,000	9,300		84,000	40,000
4,800		62,000	26,000	9,400		84,000	40,000
4,900		62,000	26,000	9,500		84,000	40,000
5,000		62,000	26,000	9,600		89,000	43,000
5,100		62,000	26,000	9,700		89,000	43,000
5,200		62,000	26,000	9,800		89,000	43,000
5,250		62,000	26,000	9,900		89,000	43,000
5,300		62,000	26,000	10,000		89,000	43,000
5,400		66,000	28,000	10,100		89,000	43,000
5,500		66,000	28,000	10,200		89,000	43,000
5,600		66,000	28,000	10,500		89,000	43,000
5,700		66,000	28,000	11,000		95,000	47,000
5,800		66,000	28,000	11,500		95,000	47,000
5,900		66,000	28,000	12,000		102,000	51,000
6,000		66,000	28,000	12,500		102,000	51,000
6,100		70,000	31,000	13,000		102,000	51,000
6,200		70,000	31,000	13,500		107,000	54,000
6,300		70,000	31,000	14,000		107,000	54,000

d1 mm	inch	l1 mm	l2 mm
14,500		111,000	56,000
15,000		111,000	56,000
16,000		115,000	58,000
17,000		119,000	60,000
18,000		123,000	62,000
19,500		131,000	66,000

d1 mm	inch	l1 mm	l2 mm
20,000		131,000	66,000
20,500		136,000	68,000
25,000	63/64	151,000	75,000
27,000		162,000	81,000

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux extra-courts



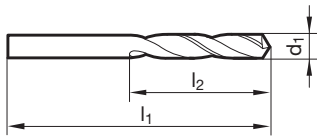
Référence **71109**



P	M	K	N	S	H
•		•	•		

Conseils d'util.,
page 176

- Amin. de l'âme $\geq \varnothing 14,500$
- affûtage à dépouille conique
- pour tours automatiques/révolvers
- poli $< 6,0$ mm



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
2,600		43,000	14,000	7,500		74,000	34,000
2,750		46,000	16,000	7,800		79,000	37,000
3,000		46,000	16,000	7,900		79,000	37,000
3,100		49,000	18,000	8,000		79,000	37,000
3,200		49,000	18,000	8,100		79,000	37,000
3,300		49,000	18,000	8,300		79,000	37,000
3,400		52,000	20,000	8,700		84,000	40,000
3,500		52,000	20,000	8,800		84,000	40,000
4,000		55,000	22,000	8,900		84,000	40,000
4,100		55,000	22,000	9,100		84,000	40,000
4,200		55,000	22,000	9,300		84,000	40,000
4,250		55,000	22,000	9,400		84,000	40,000
4,300		58,000	24,000	9,500		84,000	40,000
4,400		58,000	24,000	9,700		89,000	43,000
4,500		58,000	24,000	10,200		89,000	43,000
4,900		62,000	26,000	10,750		95,000	47,000
5,000		62,000	26,000	11,000		95,000	47,000
5,200		62,000	26,000	11,500		95,000	47,000
5,300		62,000	26,000	12,500		102,000	51,000
5,400		66,000	28,000	13,250		107,000	54,000
5,500		66,000	28,000	14,500		111,000	56,000
5,600		66,000	28,000	15,500		115,000	58,000
5,700		66,000	28,000	15,750		115,000	58,000
6,000		66,000	28,000	16,000		115,000	58,000
6,200		70,000	31,000	17,000		119,000	60,000
6,400		70,000	31,000	17,500		123,000	62,000
6,500		70,000	31,000	21,000		136,000	68,000
6,900		74,000	34,000	22,000		141,000	70,000
7,000		74,000	34,000	24,000		151,000	75,000
7,200		74,000	34,000	26,500		156,000	78,000

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux extra-courts



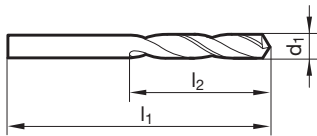
Référence **61118**



P	M	K	N	S	H
●		●	○		

Conseils d'util.,
page 176

- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage à dépouille conique
- pour tours automatiques/révolvers
- aussi pour machines portatives
- meilleure protection contre l'usure



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		26,000	6,000	5,800		66,000	28,000
1,100		28,000	7,000	5,900		66,000	28,000
1,200		30,000	8,000	6,000		66,000	28,000
1,300		30,000	8,000	6,100		70,000	31,000
1,400		32,000	9,000	6,200		70,000	31,000
1,500		32,000	9,000	6,300		70,000	31,000
1,600		34,000	10,000	6,400		70,000	31,000
1,700		34,000	10,000	6,500		70,000	31,000
1,800		36,000	11,000	6,600		70,000	31,000
1,900		36,000	11,000	6,700		70,000	31,000
2,000		38,000	12,000	6,800		74,000	34,000
2,100		38,000	12,000	6,900		74,000	34,000
2,200		40,000	13,000	7,000		74,000	34,000
2,300		40,000	13,000	7,100		74,000	34,000
2,400		43,000	14,000	7,200		74,000	34,000
2,500		43,000	14,000	7,300		74,000	34,000
2,600		43,000	14,000	7,400		74,000	34,000
2,700		46,000	16,000	7,500		74,000	34,000
2,800		46,000	16,000	7,600		79,000	37,000
2,900		46,000	16,000	7,700		79,000	37,000
3,000		46,000	16,000	7,800		79,000	37,000
3,100		49,000	18,000	7,900		79,000	37,000
3,200		49,000	18,000	8,000		79,000	37,000
3,300		49,000	18,000	8,100		79,000	37,000
3,400		52,000	20,000	8,200		79,000	37,000
3,500		52,000	20,000	8,300		79,000	37,000
3,600		52,000	20,000	8,400		79,000	37,000
3,700		52,000	20,000	8,500		79,000	37,000
3,800		55,000	22,000	8,600		84,000	40,000
3,900		55,000	22,000	8,700		84,000	40,000
4,000		55,000	22,000	8,800		84,000	40,000
4,100		55,000	22,000	8,900		84,000	40,000
4,200		55,000	22,000	9,000		84,000	40,000
4,300		58,000	24,000	9,100		84,000	40,000
4,400		58,000	24,000	9,200		84,000	40,000
4,500		58,000	24,000	9,300		84,000	40,000
4,600		58,000	24,000	9,400		84,000	40,000
4,700		58,000	24,000	9,500		84,000	40,000
4,800		62,000	26,000	9,600		89,000	43,000
4,900		62,000	26,000	9,700		89,000	43,000
5,000		62,000	26,000	9,800		89,000	43,000
5,100		62,000	26,000	9,900		89,000	43,000
5,200		62,000	26,000	10,000		89,000	43,000
5,300		62,000	26,000	10,100		89,000	43,000
5,400		66,000	28,000	10,200		89,000	43,000
5,500		66,000	28,000	10,300		89,000	43,000
5,600		66,000	28,000	10,400		89,000	43,000
5,700		66,000	28,000	10,500		89,000	43,000

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
10,600		89,000	43,000	13,000		102,000	51,000
10,800		95,000	47,000	13,100	33/64	102,000	51,000
11,000		95,000	47,000				
11,500		95,000	47,000				
12,000		102,000	51,000				
12,500		102,000	51,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux extra-courts



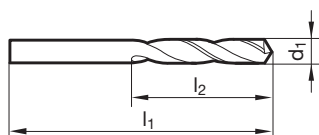
Référence **71106**



P	M	K	N	S	H
•	•	•	•	•	○

Conseils d'util.,
page 176

- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage à dépouille conique
- haut % de Co & Mo
- résistance à l'usure particulièrement élevée



d1 mm	inch	l1 mm	l2 mm
1,000		26,000	6,000
1,500		32,000	9,000
2,000		38,000	12,000
2,500		43,000	14,000
3,000		46,000	16,000
3,300		49,000	18,000
3,500		52,000	20,000
4,000		55,000	22,000
4,200		55,000	22,000
4,500		58,000	24,000
5,000		62,000	26,000
5,500		66,000	28,000

d1 mm	inch	l1 mm	l2 mm
6,000		66,000	28,000
6,500		70,000	31,000
6,800		74,000	34,000
7,000		74,000	34,000
7,500		74,000	34,000
8,000		79,000	37,000
8,500		79,000	37,000
9,000		84,000	40,000
9,500		84,000	40,000
10,000		89,000	43,000

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux extra-courts



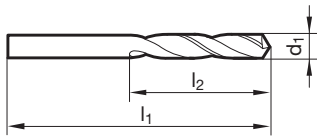
Référence **71220**



P	M	K	N	S	H
•	•	•	•		

Conseils d'util.,
page 178

- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage en pente
- faible effort d'avance nécessaire
- faible effort de couple nécessaire
- pour applications universelles



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		26,000	6,000	5,800		66,000	28,000
1,100		28,000	7,000	5,900		66,000	28,000
1,200		30,000	8,000	6,000		66,000	28,000
1,300		30,000	8,000	6,100		70,000	31,000
1,400		32,000	9,000	6,200		70,000	31,000
1,500		32,000	9,000	6,300		70,000	31,000
1,600		34,000	10,000	6,400		70,000	31,000
1,700		34,000	10,000	6,500		70,000	31,000
1,800		36,000	11,000	6,600		70,000	31,000
1,900		36,000	11,000	6,700		70,000	31,000
2,000		38,000	12,000	6,800		74,000	34,000
2,100		38,000	12,000	6,900		74,000	34,000
2,200		40,000	13,000	7,000		74,000	34,000
2,300		40,000	13,000	7,100		74,000	34,000
2,400		43,000	14,000	7,200		74,000	34,000
2,500		43,000	14,000	7,300		74,000	34,000
2,600		43,000	14,000	7,400		74,000	34,000
2,700		46,000	16,000	7,500		74,000	34,000
2,800		46,000	16,000	7,600		79,000	37,000
2,900		46,000	16,000	7,700		79,000	37,000
3,000		46,000	16,000	7,800		79,000	37,000
3,100		49,000	18,000	7,900		79,000	37,000
3,200		49,000	18,000	8,000		79,000	37,000
3,300		49,000	18,000	8,100		79,000	37,000
3,400		52,000	20,000	8,200		79,000	37,000
3,500		52,000	20,000	8,300		79,000	37,000
3,600		52,000	20,000	8,400		79,000	37,000
3,700		52,000	20,000	8,500		79,000	37,000
3,800		55,000	22,000	8,600		84,000	40,000
3,900		55,000	22,000	8,700		84,000	40,000
4,000		55,000	22,000	8,800		84,000	40,000
4,100		55,000	22,000	8,900		84,000	40,000
4,200		55,000	22,000	9,000		84,000	40,000
4,300		58,000	24,000	9,100		84,000	40,000
4,400		58,000	24,000	9,200		84,000	40,000
4,500		58,000	24,000	9,300		84,000	40,000
4,600		58,000	24,000	9,400		84,000	40,000
4,700		58,000	24,000	9,500		84,000	40,000
4,800		62,000	26,000	9,600		89,000	43,000
4,900		62,000	26,000	9,700		89,000	43,000
5,000		62,000	26,000	9,800		89,000	43,000
5,100		62,000	26,000	9,900		89,000	43,000
5,200		62,000	26,000	10,000		89,000	43,000
5,300		62,000	26,000	10,100		89,000	43,000
5,400		66,000	28,000	10,200		89,000	43,000
5,500		66,000	28,000	10,300		89,000	43,000
5,600		66,000	28,000	10,400		89,000	43,000
5,700		66,000	28,000	10,500		89,000	43,000

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
11,000		95,000	47,000	14,000		107,000	54,000
11,500		95,000	47,000				
12,000		102,000	51,000				
12,500		102,000	51,000				
13,000		102,000	51,000				
13,500		107,000	54,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux extra-courts



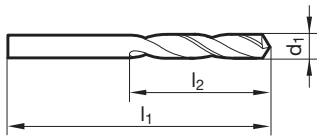
Référence **61220**



P	M	K	N	S	H
•	•	•	•		

Conseils d'util.,
page 178

- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage en pente
- faible effort d'avance nécessaire
- faible effort de couple nécessaire
- pour applications universelles
- meilleure protection contre l'usure



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		26,000	6,000	5,800		66,000	28,000
1,100		28,000	7,000	5,900		66,000	28,000
1,200		30,000	8,000	6,000		66,000	28,000
1,300		30,000	8,000	6,100		70,000	31,000
1,400		32,000	9,000	6,200		70,000	31,000
1,500		32,000	9,000	6,300		70,000	31,000
1,600		34,000	10,000	6,400		70,000	31,000
1,700		34,000	10,000	6,500		70,000	31,000
1,800		36,000	11,000	6,600		70,000	31,000
1,900		36,000	11,000	6,700		70,000	31,000
2,000		38,000	12,000	6,800		74,000	34,000
2,100		38,000	12,000	6,900		74,000	34,000
2,200		40,000	13,000	7,000		74,000	34,000
2,300		40,000	13,000	7,100		74,000	34,000
2,400		43,000	14,000	7,200		74,000	34,000
2,500		43,000	14,000	7,300		74,000	34,000
2,600		43,000	14,000	7,400		74,000	34,000
2,700		46,000	16,000	7,500		74,000	34,000
2,800		46,000	16,000	7,600		79,000	37,000
2,900		46,000	16,000	7,700		79,000	37,000
3,000		46,000	16,000	7,800		79,000	37,000
3,100		49,000	18,000	7,900		79,000	37,000
3,200		49,000	18,000	8,000		79,000	37,000
3,300		49,000	18,000	8,100		79,000	37,000
3,400		52,000	20,000	8,200		79,000	37,000
3,500		52,000	20,000	8,300		79,000	37,000
3,600		52,000	20,000	8,400		79,000	37,000
3,700		52,000	20,000	8,500		79,000	37,000
3,800		55,000	22,000	8,600		84,000	40,000
3,900		55,000	22,000	8,700		84,000	40,000
4,000		55,000	22,000	8,800		84,000	40,000
4,100		55,000	22,000	8,900		84,000	40,000
4,200		55,000	22,000	9,000		84,000	40,000
4,300		58,000	24,000	9,100		84,000	40,000
4,400		58,000	24,000	9,200		84,000	40,000
4,500		58,000	24,000	9,300		84,000	40,000
4,600		58,000	24,000	9,400		84,000	40,000
4,700		58,000	24,000	9,500		84,000	40,000
4,800		62,000	26,000	9,600		89,000	43,000
4,900		62,000	26,000	9,700		89,000	43,000
5,000		62,000	26,000	9,800		89,000	43,000
5,100		62,000	26,000	9,900		89,000	43,000
5,200		62,000	26,000	10,000		89,000	43,000
5,300		62,000	26,000	10,100		89,000	43,000
5,400		66,000	28,000	10,200		89,000	43,000
5,500		66,000	28,000	10,300		89,000	43,000
5,600		66,000	28,000	10,400		89,000	43,000
5,700		66,000	28,000	10,500		89,000	43,000

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
11,000		95,000	47,000	14,000		107,000	54,000
11,500		95,000	47,000				
12,000		102,000	51,000				
12,500		102,000	51,000				
13,000		102,000	51,000				
13,500		107,000	54,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux extra-courts



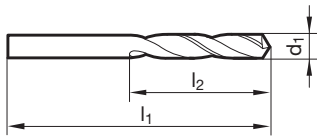
Référence **51159**



P	M	K	N	S	H
●	●	○	○		

Conseils d'util.,
page 178

- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage à dépouille conique
- meilleure résistance à l'usure



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
2,000		38,000	12,000	6,900		74,000	34,000
2,100		38,000	12,000	7,000		74,000	34,000
2,200		40,000	13,000	7,100		74,000	34,000
2,300		40,000	13,000	7,300		74,000	34,000
2,400		43,000	14,000	7,400		74,000	34,000
2,500		43,000	14,000	7,500		74,000	34,000
2,600		43,000	14,000	7,600		79,000	37,000
2,700		46,000	16,000	7,700		79,000	37,000
2,800		46,000	16,000	7,800		79,000	37,000
2,900		46,000	16,000	7,900		79,000	37,000
3,000		46,000	16,000	8,000		79,000	37,000
3,100		49,000	18,000	8,100		79,000	37,000
3,200		49,000	18,000	8,200		79,000	37,000
3,300		49,000	18,000	8,300		79,000	37,000
3,400		52,000	20,000	8,400		79,000	37,000
3,500		52,000	20,000	8,500		79,000	37,000
3,600		52,000	20,000	8,600		84,000	40,000
3,700		52,000	20,000	8,700		84,000	40,000
3,800		55,000	22,000	8,800		84,000	40,000
3,900		55,000	22,000	8,900		84,000	40,000
4,000		55,000	22,000	9,000		84,000	40,000
4,100		55,000	22,000	9,100		84,000	40,000
4,200		55,000	22,000	9,200		84,000	40,000
4,300		58,000	24,000	9,300		84,000	40,000
4,400		58,000	24,000	9,500		84,000	40,000
4,500		58,000	24,000	9,600		89,000	43,000
4,600		58,000	24,000	9,700		89,000	43,000
4,700		58,000	24,000	9,800		89,000	43,000
4,800		62,000	26,000	9,900		89,000	43,000
4,900		62,000	26,000	10,000		89,000	43,000
5,000		62,000	26,000	10,200		89,000	43,000
5,100		62,000	26,000	10,500		89,000	43,000
5,200		62,000	26,000	10,800		95,000	47,000
5,300		62,000	26,000	11,000		95,000	47,000
5,400		66,000	28,000	11,500		95,000	47,000
5,500		66,000	28,000	11,800		95,000	47,000
5,600		66,000	28,000	12,000		102,000	51,000
5,700		66,000	28,000	12,300	31/64	102,000	51,000
5,800		66,000	28,000	12,500		102,000	51,000
5,900		66,000	28,000	13,000		102,000	51,000
6,000		66,000	28,000	13,500		107,000	54,000
6,100		70,000	31,000	14,000		107,000	54,000
6,200		70,000	31,000	14,500		111,000	56,000
6,300		70,000	31,000	15,000		111,000	56,000
6,400		70,000	31,000	15,500		115,000	58,000
6,500		70,000	31,000	16,000		115,000	58,000
6,700		70,000	31,000				
6,800		74,000	34,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux extra-courts



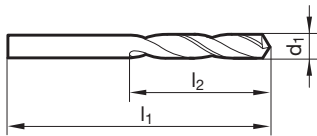
Référence **61131**



P	M	K	N	S	H
●	●	●	○		

Conseils d'util.,
page 178

- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage à dépouille conique
- goujures larges
- résistance à l'usure particulièrement élevée
- particulièrement rigide



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		26,000	6,000	5,800		66,000	28,000
1,100		28,000	7,000	5,900		66,000	28,000
1,200		30,000	8,000	6,000		66,000	28,000
1,300		30,000	8,000	6,100		70,000	31,000
1,400		32,000	9,000	6,200		70,000	31,000
1,500		32,000	9,000	6,300		70,000	31,000
1,600		34,000	10,000	6,400		70,000	31,000
1,700		34,000	10,000	6,500		70,000	31,000
1,800		36,000	11,000	6,600		70,000	31,000
1,900		36,000	11,000	6,700		70,000	31,000
2,000		38,000	12,000	6,800		74,000	34,000
2,100		38,000	12,000	6,900		74,000	34,000
2,200		40,000	13,000	7,000		74,000	34,000
2,300		40,000	13,000	7,100		74,000	34,000
2,400		43,000	14,000	7,200		74,000	34,000
2,500		43,000	14,000	7,300		74,000	34,000
2,600		43,000	14,000	7,400		74,000	34,000
2,700		46,000	16,000	7,500		74,000	34,000
2,800		46,000	16,000	7,600		79,000	37,000
2,900		46,000	16,000	7,700		79,000	37,000
3,000		46,000	16,000	7,800		79,000	37,000
3,100		49,000	18,000	7,900		79,000	37,000
3,200		49,000	18,000	8,000		79,000	37,000
3,300		49,000	18,000	8,100		79,000	37,000
3,400		52,000	20,000	8,200		79,000	37,000
3,500		52,000	20,000	8,300		79,000	37,000
3,600		52,000	20,000	8,400		79,000	37,000
3,700		52,000	20,000	8,500		79,000	37,000
3,800		55,000	22,000	8,800		84,000	40,000
3,900		55,000	22,000	9,000		84,000	40,000
4,000		55,000	22,000	9,300		84,000	40,000
4,100		55,000	22,000	9,500		84,000	40,000
4,200		55,000	22,000	9,800		89,000	43,000
4,300		58,000	24,000	10,000		89,000	43,000
4,400		58,000	24,000	10,200		89,000	43,000
4,500		58,000	24,000	10,500		89,000	43,000
4,600		58,000	24,000	11,000		95,000	47,000
4,700		58,000	24,000	11,500		95,000	47,000
4,800		62,000	26,000	12,000		102,000	51,000
4,900		62,000	26,000	12,500		102,000	51,000
5,000		62,000	26,000	13,000		102,000	51,000
5,100		62,000	26,000	13,500		107,000	54,000
5,200		62,000	26,000	14,000		107,000	54,000
5,300		62,000	26,000				
5,400		66,000	28,000				
5,500		66,000	28,000				
5,600		66,000	28,000				
5,700		66,000	28,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux extra-courts



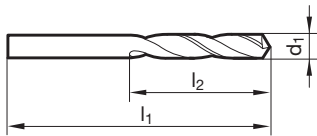
Référence 71112



P	M	K	N	S	H
●	●	●	○	○	

Conseils d'util.,
page 176

- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage à dépouille conique
- poli $< 2,36$ mm



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		26,000	6,000	4,400		58,000	24,000
1,100		28,000	7,000	4,500		58,000	24,000
1,150		28,000	7,000	4,600		58,000	24,000
1,200		30,000	8,000	4,700		58,000	24,000
1,250		30,000	8,000	4,750		58,000	24,000
1,300		30,000	8,000	4,800		62,000	26,000
1,400		32,000	9,000	4,900		62,000	26,000
1,500		32,000	9,000	5,000		62,000	26,000
1,550		34,000	10,000	5,100		62,000	26,000
1,600		34,000	10,000	5,200		62,000	26,000
1,650		34,000	10,000	5,300		62,000	26,000
1,700		34,000	10,000	5,400		66,000	28,000
1,750		36,000	11,000	5,500		66,000	28,000
1,800		36,000	11,000	5,600		66,000	28,000
1,900		36,000	11,000	5,700		66,000	28,000
2,000		38,000	12,000	5,800		66,000	28,000
2,050		38,000	12,000	5,900		66,000	28,000
2,100		38,000	12,000	6,000		66,000	28,000
2,200		40,000	13,000	6,100		70,000	31,000
2,250		40,000	13,000	6,200		70,000	31,000
2,300		40,000	13,000	6,300		70,000	31,000
2,350		40,000	13,000	6,400		70,000	31,000
2,400		43,000	14,000	6,500		70,000	31,000
2,450		43,000	14,000	6,600		70,000	31,000
2,500		43,000	14,000	6,750	17/64	74,000	34,000
2,600		43,000	14,000	6,800		74,000	34,000
2,650		43,000	14,000	6,900		74,000	34,000
2,700		46,000	16,000	7,000		74,000	34,000
2,750		46,000	16,000	7,100		74,000	34,000
2,800		46,000	16,000	7,200		74,000	34,000
2,900		46,000	16,000	7,250		74,000	34,000
2,950		46,000	16,000	7,300		74,000	34,000
3,000		46,000	16,000	7,500		74,000	34,000
3,100		49,000	18,000	7,600		79,000	37,000
3,200		49,000	18,000	7,800		79,000	37,000
3,300		49,000	18,000	8,000		79,000	37,000
3,400		52,000	20,000	8,100		79,000	37,000
3,500		52,000	20,000	8,200		79,000	37,000
3,600		52,000	20,000	8,400		79,000	37,000
3,700		52,000	20,000	8,500		79,000	37,000
3,750		52,000	20,000	8,700		84,000	40,000
3,800		55,000	22,000	8,900		84,000	40,000
3,900		55,000	22,000	9,000		84,000	40,000
4,000		55,000	22,000	9,250		84,000	40,000
4,100		55,000	22,000	9,300		84,000	40,000
4,200		55,000	22,000	9,700		89,000	43,000
4,250		55,000	22,000	9,800		89,000	43,000
4,300		58,000	24,000	10,000		89,000	43,000

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux extra-courts



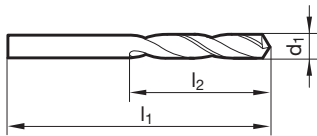
Référence **61112**



P	M	K	N	S	H
●	●	●	○	○	

Conseils d'util.,
page 178

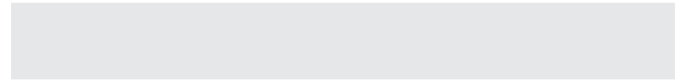
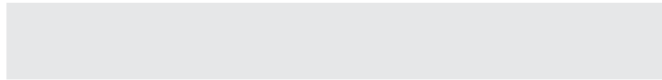
- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage à dépouille conique
- meilleure résistance à l'usure



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		26,000	6,000	5,800		66,000	28,000
1,100		28,000	7,000	5,900		66,000	28,000
1,200		30,000	8,000	6,000		66,000	28,000
1,300		30,000	8,000	6,100		70,000	31,000
1,400		32,000	9,000	6,200		70,000	31,000
1,500		32,000	9,000	6,300		70,000	31,000
1,600		34,000	10,000	6,400		70,000	31,000
1,700		34,000	10,000	6,500		70,000	31,000
1,800		36,000	11,000	6,600		70,000	31,000
1,900		36,000	11,000	6,700		70,000	31,000
2,000		38,000	12,000	6,800		74,000	34,000
2,100		38,000	12,000	6,900		74,000	34,000
2,200		40,000	13,000	7,000		74,000	34,000
2,300		40,000	13,000	7,100		74,000	34,000
2,400		43,000	14,000	7,200		74,000	34,000
2,500		43,000	14,000	7,300		74,000	34,000
2,600		43,000	14,000	7,400		74,000	34,000
2,700		46,000	16,000	7,500		74,000	34,000
2,800		46,000	16,000	7,600		79,000	37,000
2,900		46,000	16,000	7,700		79,000	37,000
3,000		46,000	16,000	7,800		79,000	37,000
3,100		49,000	18,000	7,900		79,000	37,000
3,200		49,000	18,000	8,000		79,000	37,000
3,300		49,000	18,000	8,100		79,000	37,000
3,400		52,000	20,000	8,200		79,000	37,000
3,500		52,000	20,000	8,300		79,000	37,000
3,600		52,000	20,000	8,400		79,000	37,000
3,700		52,000	20,000	8,500		79,000	37,000
3,800		55,000	22,000	8,600		84,000	40,000
3,900		55,000	22,000	8,700		84,000	40,000
4,000		55,000	22,000	8,800		84,000	40,000
4,100		55,000	22,000	9,000		84,000	40,000
4,200		55,000	22,000	9,100		84,000	40,000
4,300		58,000	24,000	9,200		84,000	40,000
4,400		58,000	24,000	9,300		84,000	40,000
4,500		58,000	24,000	9,400		84,000	40,000
4,600		58,000	24,000	9,500		84,000	40,000
4,700		58,000	24,000	9,600		89,000	43,000
4,800		62,000	26,000	9,700		89,000	43,000
4,900		62,000	26,000	9,800		89,000	43,000
5,000		62,000	26,000	9,900		89,000	43,000
5,100		62,000	26,000	10,000		89,000	43,000
5,200		62,000	26,000	10,100		89,000	43,000
5,300		62,000	26,000	10,200		89,000	43,000
5,400		66,000	28,000	10,500		89,000	43,000
5,500		66,000	28,000	11,000		95,000	47,000
5,600		66,000	28,000	11,500		95,000	47,000
5,700		66,000	28,000	12,000		102,000	51,000

d1 mm	inch	l1 mm	l2 mm
12,300	31/64	102,000	51,000
12,500		102,000	51,000

d1 mm	inch	l1 mm	l2 mm

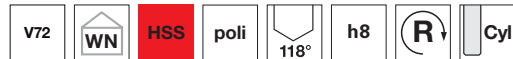


Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux extra-courts



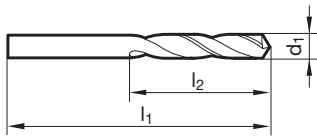
Référence 71114



P	M	K	N	S	H
•		•	•		

Conseils d'util.,
page 176

- sans amincissement
- affûtage à dépouille conique
- optimal pour tours automatiques



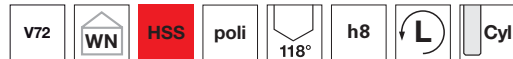
d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		28,000	8,000	4,100		62,000	29,000
1,050		28,000	8,000	4,150		62,000	29,000
1,100		30,000	9,000	4,350		65,000	31,000
1,150		30,000	9,000	4,400		65,000	31,000
1,250		32,000	10,000	4,450		65,000	31,000
1,300		32,000	10,000	4,500		65,000	31,000
1,450		35,000	12,000	4,600		65,000	31,000
1,650		37,000	13,000	4,650		65,000	31,000
1,700		37,000	13,000	4,700		65,000	31,000
1,750		39,000	14,000	4,800		70,000	34,000
1,800		39,000	14,000	4,850		70,000	34,000
1,850		39,000	14,000	4,900		70,000	34,000
1,900		39,000	14,000	4,950		70,000	34,000
1,950		42,000	16,000	5,400		74,000	36,000
2,000		42,000	16,000	5,500		74,000	36,000
2,050		42,000	16,000	5,600		74,000	36,000
2,150		44,000	17,000	5,700		74,000	36,000
2,200		44,000	17,000	5,800		74,000	36,000
2,300		44,000	17,000	5,900		74,000	36,000
2,350		44,000	17,000	6,000		74,000	36,000
2,400		47,000	18,000	6,200		79,000	40,000
2,450		47,000	18,000	6,300		79,000	40,000
2,500		47,000	18,000	6,600		79,000	40,000
2,550		47,000	18,000	6,700		79,000	40,000
2,600		47,000	18,000	6,900		84,000	44,000
2,700		51,000	21,000	7,000		84,000	44,000
2,750		51,000	21,000	7,100		84,000	44,000
2,800		51,000	21,000	8,000		90,000	48,000
2,900		51,000	21,000	8,500		90,000	48,000
2,950		51,000	21,000	9,000		96,000	52,000
3,100		54,000	23,000	9,100		96,000	52,000
3,150		54,000	23,000	9,500		96,000	52,000
3,200		54,000	23,000	10,000		102,000	56,000
3,250		54,000	23,000	11,500		109,000	61,000
3,300		54,000	23,000	13,000		117,000	66,000
3,350		54,000	23,000	14,000		122,000	70,000
3,400		58,000	26,000	14,500		128,000	73,000
3,550		58,000	26,000	15,000		128,000	73,000
3,600		58,000	26,000	15,500		132,000	75,000
3,650		58,000	26,000	16,000		132,000	75,000
3,700		58,000	26,000				
3,750		58,000	26,000				
3,800		62,000	29,000				
3,850		62,000	29,000				
3,900		62,000	29,000				
3,950		62,000	29,000				
4,000		62,000	29,000				
4,050		62,000	29,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux extra-courts



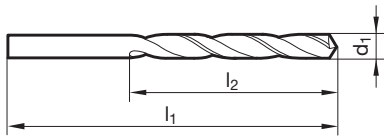
Référence 71113



P	M	K	N	S	H
•		•	•		

Conseils d'util.,
page 176

- sans amincissement
- affûtage à dépouille conique
- optimal pour tours automatiques



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		28,000	8,000	5,300		70,000	34,000
1,100		30,000	9,000	5,500		74,000	36,000
1,250		32,000	10,000	5,600		74,000	36,000
1,300		32,000	10,000	5,700		74,000	36,000
1,350		35,000	12,000	5,800		74,000	36,000
1,400		35,000	12,000	5,900		74,000	36,000
1,600		37,000	13,000	6,200		79,000	40,000
1,650		37,000	13,000	6,300		79,000	40,000
1,700		37,000	13,000	6,500		79,000	40,000
1,750		39,000	14,000	6,700		79,000	40,000
1,800		39,000	14,000	6,900		84,000	44,000
1,900		39,000	14,000	7,100		84,000	44,000
1,950		42,000	16,000	7,200		84,000	44,000
2,000		42,000	16,000	7,300		84,000	44,000
2,050		42,000	16,000	7,400		84,000	44,000
2,100		42,000	16,000	7,500		84,000	44,000
2,150		44,000	17,000	7,600		90,000	48,000
2,200		44,000	17,000	7,700		90,000	48,000
2,300		44,000	17,000	7,800		90,000	48,000
2,350		44,000	17,000	7,900		90,000	48,000
2,400		47,000	18,000	8,000		90,000	48,000
2,550		47,000	18,000	8,300		90,000	48,000
2,600		47,000	18,000	8,500		90,000	48,000
2,650		47,000	18,000	8,600		96,000	52,000
2,700		51,000	21,000	8,700		96,000	52,000
2,800		51,000	21,000	8,800		96,000	52,000
2,850		51,000	21,000	8,900		96,000	52,000
2,900		51,000	21,000	9,100		96,000	52,000
3,100		54,000	23,000	9,200		96,000	52,000
3,200		54,000	23,000	9,300		96,000	52,000
3,300		54,000	23,000	9,500		96,000	52,000
3,400		58,000	26,000	9,600		102,000	56,000
3,500		58,000	26,000	9,700		102,000	56,000
3,550		58,000	26,000	9,800		102,000	56,000
3,600		58,000	26,000	9,900		102,000	56,000
3,700		58,000	26,000	10,400		102,000	56,000
3,900		62,000	29,000	10,500		102,000	56,000
3,950		62,000	29,000	10,800		109,000	61,000
4,100		62,000	29,000	10,900		109,000	61,000
4,200		62,000	29,000	11,200		109,000	61,000
4,250		62,000	29,000	11,300		109,000	61,000
4,300		65,000	31,000	11,400		109,000	61,000
4,400		65,000	31,000	11,500		109,000	61,000
4,600		65,000	31,000	11,800		109,000	61,000
4,700		65,000	31,000	12,200		117,000	66,000
4,900		70,000	34,000	12,250		117,000	66,000
4,950		70,000	34,000	12,300	31/64	117,000	66,000
5,200		70,000	34,000	12,600		117,000	66,000

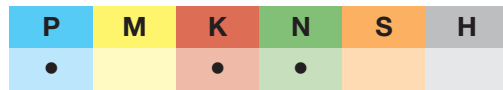
d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
13,500		122,000	70,000				
14,500		128,000	73,000				
14,750		128,000	73,000				
15,000		128,000	73,000				
15,500		132,000	75,000				
16,000		132,000	75,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux courts

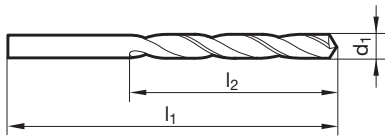


Référence 71116



Conseils d'util.,
page 180

- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage à dépouille conique



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,200		19,000	2,500	1,320		38,000	16,000
0,250		19,000	3,000	1,340		40,000	18,000
0,290		19,000	3,000	1,360		40,000	18,000
0,300		19,000	3,000	1,380		40,000	18,000
0,330		19,000	4,000	1,400		40,000	18,000
0,340		19,000	4,000	1,430		40,000	18,000
0,350		19,000	4,000	1,450		40,000	18,000
0,390		20,000	5,000	1,500		40,000	18,000
0,400		20,000	5,000	1,560		43,000	20,000
0,450		20,000	5,000	1,570		43,000	20,000
0,500		22,000	6,000	1,600		43,000	20,000
0,540		24,000	7,000	1,610		43,000	20,000
0,550		24,000	7,000	1,620		43,000	20,000
0,580		24,000	7,000	1,650		43,000	20,000
0,600		24,000	7,000	1,660		43,000	20,000
0,630		26,000	8,000	1,670		43,000	20,000
0,660		26,000	8,000	1,680		43,000	20,000
0,680		28,000	9,000	1,700		43,000	20,000
0,700		28,000	9,000	1,710		46,000	22,000
0,740		28,000	9,000	1,730		46,000	22,000
0,760		30,000	10,000	1,750		46,000	22,000
0,770		30,000	10,000	1,800		46,000	22,000
0,780		30,000	10,000	1,810		46,000	22,000
0,800		30,000	10,000	1,850		46,000	22,000
0,850		30,000	10,000	1,870		46,000	22,000
0,860		32,000	11,000	1,900		46,000	22,000
0,870		32,000	11,000	1,950		49,000	24,000
0,880		32,000	11,000	1,990		49,000	24,000
0,900		32,000	11,000	2,000		49,000	24,000
0,940		32,000	11,000	2,050		49,000	24,000
0,950		32,000	11,000	2,100		49,000	24,000
0,960		34,000	12,000	2,200		53,000	27,000
1,000		34,000	12,000	2,300		53,000	27,000
1,050		34,000	12,000	2,400		57,000	30,000
1,060		34,000	12,000	2,500		57,000	30,000
1,080		36,000	14,000	2,600		57,000	30,000
1,100		36,000	14,000	2,700		61,000	33,000
1,110		36,000	14,000	2,800		61,000	33,000
1,120		36,000	14,000	2,900		61,000	33,000
1,130		36,000	14,000	3,000		61,000	33,000
1,150		36,000	14,000	3,100		65,000	36,000
1,160		36,000	14,000	3,200		65,000	36,000
1,170		36,000	14,000	3,300		65,000	36,000
1,190	3/64	38,000	16,000	3,400		70,000	39,000
1,200		38,000	16,000	3,500		70,000	39,000
1,230		38,000	16,000	3,600		70,000	39,000
1,250		38,000	16,000	3,700		70,000	39,000
1,300		38,000	16,000	3,800		75,000	43,000

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
3,900		75,000	43,000	8,000		117,000	75,000
4,000		75,000	43,000	8,100		117,000	75,000
4,100		75,000	43,000	8,200		117,000	75,000
4,200		75,000	43,000	8,300		117,000	75,000
4,300		80,000	47,000	8,400		117,000	75,000
4,400		80,000	47,000	8,500		117,000	75,000
4,500		80,000	47,000	8,600		125,000	81,000
4,600		80,000	47,000	8,800		125,000	81,000
4,700		80,000	47,000	9,000		125,000	81,000
4,800		86,000	52,000	9,100		125,000	81,000
4,900		86,000	52,000	9,200		125,000	81,000
5,000		86,000	52,000	9,300		125,000	81,000
5,100		86,000	52,000	9,400		125,000	81,000
5,200		86,000	52,000	9,500		125,000	81,000
5,300		86,000	52,000	9,600		133,000	87,000
5,400		93,000	57,000	9,700		133,000	87,000
5,500		93,000	57,000	9,900		133,000	87,000
5,600		93,000	57,000	10,000		133,000	87,000
5,700		93,000	57,000	10,200		133,000	87,000
5,800		93,000	57,000	10,300		133,000	87,000
5,900		93,000	57,000	10,500		133,000	87,000
6,000		93,000	57,000	10,700		142,000	94,000
6,100		101,000	63,000	10,900		142,000	94,000
6,200		101,000	63,000	11,000		142,000	94,000
6,250		101,000	63,000	11,500		142,000	94,000
6,300		101,000	63,000	11,900		151,000	101,000
6,500		101,000	63,000	12,000		151,000	101,000
6,600		101,000	63,000	12,200		151,000	101,000
6,700		101,000	63,000	12,500		151,000	101,000
6,800		109,000	69,000	13,000		151,000	101,000
6,900		109,000	69,000	14,000		160,000	108,000
7,000		109,000	69,000	14,500		169,000	114,000
7,100		109,000	69,000	15,000		169,000	114,000
7,500		109,000	69,000	15,500		178,000	120,000
7,700		117,000	75,000	16,000		178,000	120,000
7,800		117,000	75,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux courts



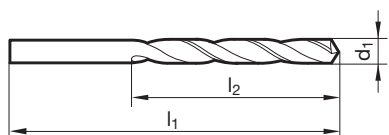
Référence 71119



P	M	K	N	S	H
•		•	•		

Conseils d'util.,
page 180

- Amin. de l'âme $\geq \varnothing 14,010$
- affûtage à dépouille conique



d1 mm	inch	l1 mm	l2 mm
2,800		61,000	33,000
2,900		61,000	33,000
3,600		70,000	39,000
4,300		80,000	47,000
4,600		80,000	47,000
5,200		86,000	52,000
5,400		93,000	57,000
5,600		93,000	57,000
6,000		93,000	57,000
7,000		109,000	69,000
7,250		109,000	69,000
7,300		109,000	69,000

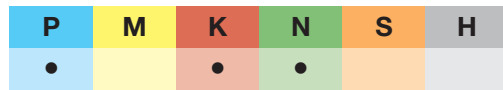
d1 mm	inch	l1 mm	l2 mm
7,800		117,000	75,000
8,000		117,000	75,000
8,800		125,000	81,000
9,000		125,000	81,000
9,500		125,000	81,000
13,500		160,000	108,000

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux courts

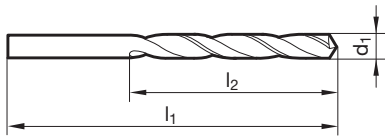


Référence 71115



Conseils d'util.,
page 180

- Amin. de l'âme $\geq \varnothing 2,180$
- affûtage à dépouille conique
- poli $< 2,36$ mm



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
2,000		49,000	24,000	3,550		70,000	39,000
2,050		49,000	24,000	3,570	9/64	70,000	39,000
2,060		49,000	24,000	3,600		70,000	39,000
2,080		49,000	24,000	3,650		70,000	39,000
2,100		49,000	24,000	3,660		70,000	39,000
2,150		53,000	27,000	3,700		70,000	39,000
2,180		53,000	27,000	3,730		70,000	39,000
2,200		53,000	27,000	3,750		70,000	39,000
2,250		53,000	27,000	3,800		75,000	43,000
2,260		53,000	27,000	3,850		75,000	43,000
2,300		53,000	27,000	3,860		75,000	43,000
2,350		53,000	27,000	3,900		75,000	43,000
2,370		57,000	30,000	3,910		75,000	43,000
2,380	3/32	57,000	30,000	3,950		75,000	43,000
2,400		57,000	30,000	3,970	5/32	75,000	43,000
2,440		57,000	30,000	3,990		75,000	43,000
2,450		57,000	30,000	4,000		75,000	43,000
2,490		57,000	30,000	4,040		75,000	43,000
2,500		57,000	30,000	4,050		75,000	43,000
2,530		57,000	30,000	4,090		75,000	43,000
2,550		57,000	30,000	4,100		75,000	43,000
2,580		57,000	30,000	4,150		75,000	43,000
2,600		57,000	30,000	4,200		75,000	43,000
2,640		57,000	30,000	4,220		75,000	43,000
2,650		57,000	30,000	4,250		75,000	43,000
2,700		61,000	33,000	4,300		80,000	47,000
2,710		61,000	33,000	4,350		80,000	47,000
2,750	7/64	61,000	33,000	4,370	11/64	80,000	47,000
2,780		61,000	33,000	4,390		80,000	47,000
2,790		61,000	33,000	4,400		80,000	47,000
2,800		61,000	33,000	4,500		80,000	47,000
2,820		61,000	33,000	4,550		80,000	47,000
2,850		61,000	33,000	4,570		80,000	47,000
2,900		61,000	33,000	4,600		80,000	47,000
2,950		61,000	33,000	4,650		80,000	47,000
3,000		61,000	33,000	4,700		80,000	47,000
3,050		65,000	36,000	4,750		80,000	47,000
3,100		65,000	36,000	4,760	3/16	86,000	52,000
3,150		65,000	36,000	4,800		86,000	52,000
3,170	1/8	65,000	36,000	4,850		86,000	52,000
3,200		65,000	36,000	4,900		86,000	52,000
3,250		65,000	36,000	4,950		86,000	52,000
3,260		65,000	36,000	5,000		86,000	52,000
3,300		65,000	36,000	5,050		86,000	52,000
3,350		65,000	36,000	5,100		86,000	52,000
3,400		70,000	39,000	5,110	13/64	86,000	52,000
3,450		70,000	39,000	5,160		86,000	52,000
3,500		70,000	39,000	5,180		86,000	52,000

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
5,200		86,000	52,000	9,130	23/64	125,000	81,000
5,250		86,000	52,000	9,150		125,000	81,000
5,300		86,000	52,000	9,200		125,000	81,000
5,350		93,000	57,000	9,250		125,000	81,000
5,400		93,000	57,000	9,300		125,000	81,000
5,410		93,000	57,000	9,350		125,000	81,000
5,500		93,000	57,000	9,400		125,000	81,000
5,550		93,000	57,000	9,500		125,000	81,000
5,560	7/32	93,000	57,000	9,520	3/8	133,000	87,000
5,600		93,000	57,000	9,600		133,000	87,000
5,610		93,000	57,000	9,650		133,000	87,000
5,650		93,000	57,000	9,700		133,000	87,000
5,700		93,000	57,000	9,750		133,000	87,000
5,750		93,000	57,000	9,800		133,000	87,000
5,800		93,000	57,000	9,900		133,000	87,000
5,850		93,000	57,000	10,000		133,000	87,000
5,900		93,000	57,000	10,100		133,000	87,000
6,000		93,000	57,000	10,200		133,000	87,000
6,050		101,000	63,000	10,250		133,000	87,000
6,100		101,000	63,000	10,300		133,000	87,000
6,200		101,000	63,000	10,320	13/32	133,000	87,000
6,250		101,000	63,000	10,400		133,000	87,000
6,300		101,000	63,000	10,500		133,000	87,000
6,350	1/4	101,000	63,000	10,600		133,000	87,000
6,400		101,000	63,000	10,700		142,000	94,000
6,450		101,000	63,000	10,750		142,000	94,000
6,500		101,000	63,000	10,800		142,000	94,000
6,600		101,000	63,000	10,900		142,000	94,000
6,650		101,000	63,000	11,000		142,000	94,000
6,700		101,000	63,000	11,100		142,000	94,000
6,750	17/64	109,000	69,000	11,200		142,000	94,000
6,800		109,000	69,000	11,250		142,000	94,000
6,850		109,000	69,000	11,300		142,000	94,000
6,900		109,000	69,000	11,400		142,000	94,000
7,000		109,000	69,000	11,500		142,000	94,000
7,050		109,000	69,000	11,600		142,000	94,000
7,100		109,000	69,000	11,700		142,000	94,000
7,140	9/32	109,000	69,000	11,750		142,000	94,000
7,200		109,000	69,000	11,800		142,000	94,000
7,250		109,000	69,000	11,900		151,000	101,000
7,300		109,000	69,000	11,910	15/32	151,000	101,000
7,400		109,000	69,000	12,000		151,000	101,000
7,500		109,000	69,000	12,100		151,000	101,000
7,540	19/64	117,000	75,000	12,200		151,000	101,000
7,600		117,000	75,000	12,250		151,000	101,000
7,650		117,000	75,000	12,300	31/64	151,000	101,000
7,700		117,000	75,000	12,400		151,000	101,000
7,750		117,000	75,000	12,500		151,000	101,000
7,800		117,000	75,000	12,600		151,000	101,000
7,850		117,000	75,000	12,700	1/2	151,000	101,000
7,900		117,000	75,000	12,750		151,000	101,000
7,940	5/16	117,000	75,000	12,800		151,000	101,000
8,000		117,000	75,000	12,900		151,000	101,000
8,050		117,000	75,000	13,000		151,000	101,000
8,100		117,000	75,000	13,100	33/64	151,000	101,000
8,150		117,000	75,000	13,200		151,000	101,000
8,200		117,000	75,000	13,250		160,000	108,000
8,250		117,000	75,000	13,300		160,000	108,000
8,300		117,000	75,000	13,400		160,000	108,000
8,400		117,000	75,000	13,500		160,000	108,000
8,500		117,000	75,000	13,600		160,000	108,000
8,550		125,000	81,000	13,700		160,000	108,000
8,600		125,000	81,000	13,750		160,000	108,000
8,650		125,000	81,000	13,800		160,000	108,000
8,700		125,000	81,000	13,900		160,000	108,000
8,730	11/32	125,000	81,000	14,000		160,000	108,000
8,750		125,000	81,000	14,100		169,000	114,000
8,800		125,000	81,000	14,200		169,000	114,000
8,900		125,000	81,000	14,250		169,000	114,000
9,000		125,000	81,000	14,300		169,000	114,000
9,050		125,000	81,000	14,400		169,000	114,000
9,100		125,000	81,000	14,500		169,000	114,000

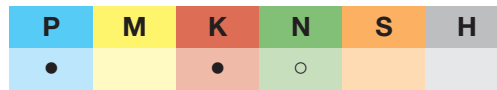
d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
14,700		169,000	114,000	16,200		184,000	125,000
14,750		169,000	114,000	16,250		184,000	125,000
14,800		169,000	114,000	16,500		184,000	125,000
14,900		169,000	114,000	16,700		184,000	125,000
15,000		169,000	114,000	17,000		184,000	125,000
15,100		178,000	120,000	17,250		191,000	130,000
15,200		178,000	120,000	17,500		191,000	130,000
15,250		178,000	120,000	17,750		191,000	130,000
15,300		178,000	120,000	18,000		191,000	130,000
15,400		178,000	120,000	18,250		198,000	135,000
15,500		178,000	120,000	18,500		198,000	135,000
15,600		178,000	120,000	18,750		198,000	135,000
15,700		178,000	120,000	19,000		198,000	135,000
15,750		178,000	120,000	19,050	3/4	205,000	140,000
15,800		178,000	120,000	19,500		205,000	140,000
15,900		178,000	120,000	19,750		205,000	140,000
16,000		178,000	120,000	20,000		205,000	140,000
16,100		184,000	125,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux courts

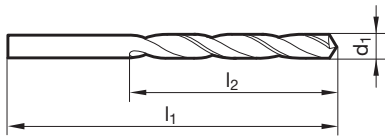


Référence **61116**



Conseils d'util.,
page 180

- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage à dépouille conique
- meilleure résistance à l'usure



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		34,000	12,000	5,700		93,000	57,000
1,100		36,000	14,000	5,800		93,000	57,000
1,200		38,000	16,000	5,900		93,000	57,000
1,300		38,000	16,000	6,000		93,000	57,000
1,400		40,000	18,000	6,100		101,000	63,000
1,500		40,000	18,000	6,200		101,000	63,000
1,600		43,000	20,000	6,300		101,000	63,000
1,700		43,000	20,000	6,400		101,000	63,000
1,800		46,000	22,000	6,500		101,000	63,000
1,900		46,000	22,000	6,600		101,000	63,000
2,000		49,000	24,000	6,700		101,000	63,000
2,100		49,000	24,000	6,800		109,000	69,000
2,200		53,000	27,000	6,900		109,000	69,000
2,300		53,000	27,000	7,000		109,000	69,000
2,400		57,000	30,000	7,100		109,000	69,000
2,500		57,000	30,000	7,200		109,000	69,000
2,600		57,000	30,000	7,300		109,000	69,000
2,700		61,000	33,000	7,400		109,000	69,000
2,800		61,000	33,000	7,500		109,000	69,000
2,900		61,000	33,000	7,600		117,000	75,000
3,000		61,000	33,000	7,700		117,000	75,000
3,100		65,000	36,000	7,800		117,000	75,000
3,200		65,000	36,000	7,900		117,000	75,000
3,300		65,000	36,000	8,000		117,000	75,000
3,400		70,000	39,000	8,100		117,000	75,000
3,500		70,000	39,000	8,200		117,000	75,000
3,600		70,000	39,000	8,300		117,000	75,000
3,700		70,000	39,000	8,400		117,000	75,000
3,800		75,000	43,000	8,500		117,000	75,000
3,900		75,000	43,000	8,600		125,000	81,000
4,000		75,000	43,000	8,700		125,000	81,000
4,100		75,000	43,000	8,800		125,000	81,000
4,200		75,000	43,000	8,900		125,000	81,000
4,250		75,000	43,000	9,000		125,000	81,000
4,300		80,000	47,000	9,100		125,000	81,000
4,400		80,000	47,000	9,200		125,000	81,000
4,500		80,000	47,000	9,300		125,000	81,000
4,600		80,000	47,000	9,400		125,000	81,000
4,700		80,000	47,000	9,500		125,000	81,000
4,800		86,000	52,000	9,600		133,000	87,000
4,900		86,000	52,000	9,700		133,000	87,000
5,000		86,000	52,000	9,800		133,000	87,000
5,100		86,000	52,000	9,900		133,000	87,000
5,200		86,000	52,000	10,000		133,000	87,000
5,300		86,000	52,000	10,200		133,000	87,000
5,400		93,000	57,000	10,500		133,000	87,000
5,500		93,000	57,000	10,800		142,000	94,000
5,600		93,000	57,000	11,000		142,000	94,000

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
11,500		142,000	94,000	13,500		160,000	108,000
11,800		142,000	94,000	14,000		160,000	108,000
12,000		151,000	101,000	14,500		169,000	114,000
12,500		151,000	101,000	15,000		169,000	114,000
12,700	1/2	151,000	101,000	15,500		178,000	120,000
13,000		151,000	101,000	16,000		178,000	120,000

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux courts



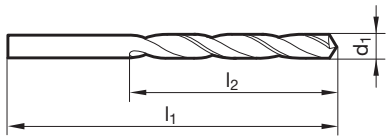
Référence **61115**



P	M	K	N	S	H
●		●	○		

Conseils d'util.,
page 180

- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage à dépouille conique



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		34,000	12,000	5,800		93,000	57,000
1,100		36,000	14,000	5,900		93,000	57,000
1,200		38,000	16,000	6,000		93,000	57,000
1,300		38,000	16,000	6,100		101,000	63,000
1,400		40,000	18,000	6,200		101,000	63,000
1,500		40,000	18,000	6,300		101,000	63,000
1,600		43,000	20,000	6,400		101,000	63,000
1,700		43,000	20,000	6,500		101,000	63,000
1,800		46,000	22,000	6,600		101,000	63,000
1,900		46,000	22,000	6,700		101,000	63,000
2,000		49,000	24,000	6,800		109,000	69,000
2,100		49,000	24,000	6,900		109,000	69,000
2,200		53,000	27,000	7,000		109,000	69,000
2,300		53,000	27,000	7,100		109,000	69,000
2,400		57,000	30,000	7,200		109,000	69,000
2,500		57,000	30,000	7,300		109,000	69,000
2,600		57,000	30,000	7,400		109,000	69,000
2,700		61,000	33,000	7,500		109,000	69,000
2,800		61,000	33,000	7,600		117,000	75,000
2,900		61,000	33,000	7,700		117,000	75,000
3,000		61,000	33,000	7,800		117,000	75,000
3,100		65,000	36,000	7,900		117,000	75,000
3,200		65,000	36,000	8,000		117,000	75,000
3,300		65,000	36,000	8,100		117,000	75,000
3,400		70,000	39,000	8,200		117,000	75,000
3,500		70,000	39,000	8,300		117,000	75,000
3,600		70,000	39,000	8,400		117,000	75,000
3,700		70,000	39,000	8,500		117,000	75,000
3,800		75,000	43,000	8,600		125,000	81,000
3,900		75,000	43,000	8,700		125,000	81,000
4,000		75,000	43,000	8,800		125,000	81,000
4,100		75,000	43,000	8,900		125,000	81,000
4,200		75,000	43,000	9,000		125,000	81,000
4,300		80,000	47,000	9,100		125,000	81,000
4,400		80,000	47,000	9,200		125,000	81,000
4,500		80,000	47,000	9,300		125,000	81,000
4,600		80,000	47,000	9,400		125,000	81,000
4,700		80,000	47,000	9,500		125,000	81,000
4,800		86,000	52,000	9,600		133,000	87,000
4,900		86,000	52,000	9,700		133,000	87,000
5,000		86,000	52,000	9,800		133,000	87,000
5,100		86,000	52,000	9,900		133,000	87,000
5,200		86,000	52,000	10,000		133,000	87,000
5,300		86,000	52,000	10,100		133,000	87,000
5,400		93,000	57,000	10,200		133,000	87,000
5,500		93,000	57,000	10,300		133,000	87,000
5,600		93,000	57,000	10,400		133,000	87,000
5,700		93,000	57,000	10,500		133,000	87,000

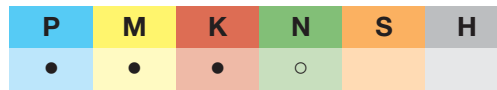
d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
10,600		133,000	87,000	12,500		151,000	101,000
10,700		142,000	94,000	12,600		151,000	101,000
10,800		142,000	94,000	12,800		151,000	101,000
10,900		142,000	94,000	12,900		151,000	101,000
11,000		142,000	94,000	13,000		151,000	101,000
11,100		142,000	94,000	13,200		151,000	101,000
11,200		142,000	94,000	13,300		160,000	108,000
11,300		142,000	94,000	13,400		160,000	108,000
11,400		142,000	94,000	13,500		160,000	108,000
11,500		142,000	94,000	13,600		160,000	108,000
11,600		142,000	94,000	13,700		160,000	108,000
11,700		142,000	94,000	13,800		160,000	108,000
11,800		142,000	94,000	13,900		160,000	108,000
11,900		151,000	101,000	14,000		160,000	108,000
12,000		151,000	101,000	14,500		169,000	114,000
12,100		151,000	101,000	15,000		169,000	114,000
12,200		151,000	101,000	15,500		178,000	120,000
12,400		151,000	101,000	16,000		178,000	120,000

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux courts

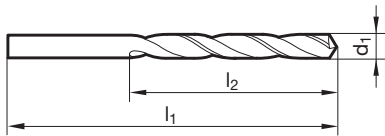


Référence 71149



Conseils d'util.,
page 182

- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage à dépouille conique
- poli $< 2,36$ mm



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		34,000	12,000	5,800		93,000	57,000
1,100		36,000	14,000	5,900		93,000	57,000
1,200		38,000	16,000	6,000		93,000	57,000
1,300		38,000	16,000	6,100		101,000	63,000
1,400		40,000	18,000	6,200		101,000	63,000
1,500		40,000	18,000	6,300		101,000	63,000
1,600		43,000	20,000	6,400		101,000	63,000
1,700		43,000	20,000	6,500		101,000	63,000
1,800		46,000	22,000	6,600		101,000	63,000
1,900		46,000	22,000	6,700		101,000	63,000
2,000		49,000	24,000	6,800		109,000	69,000
2,100		49,000	24,000	6,900		109,000	69,000
2,200		53,000	27,000	7,000		109,000	69,000
2,300		53,000	27,000	7,100		109,000	69,000
2,400		57,000	30,000	7,200		109,000	69,000
2,500		57,000	30,000	7,300		109,000	69,000
2,600		57,000	30,000	7,400		109,000	69,000
2,700		61,000	33,000	7,500		109,000	69,000
2,800		61,000	33,000	7,600		117,000	75,000
2,900		61,000	33,000	7,700		117,000	75,000
3,000		61,000	33,000	7,800		117,000	75,000
3,100		65,000	36,000	8,000		117,000	75,000
3,200		65,000	36,000	8,100		117,000	75,000
3,300		65,000	36,000	8,200		117,000	75,000
3,400		70,000	39,000	8,300		117,000	75,000
3,500		70,000	39,000	8,400		117,000	75,000
3,600		70,000	39,000	8,500		117,000	75,000
3,700		70,000	39,000	8,600		125,000	81,000
3,800		75,000	43,000	8,700		125,000	81,000
3,900		75,000	43,000	8,800		125,000	81,000
4,000		75,000	43,000	8,900		125,000	81,000
4,100		75,000	43,000	9,000		125,000	81,000
4,200		75,000	43,000	9,100		125,000	81,000
4,300		80,000	47,000	9,200		125,000	81,000
4,400		80,000	47,000	9,300		125,000	81,000
4,500		80,000	47,000	9,400		125,000	81,000
4,600		80,000	47,000	9,500		125,000	81,000
4,700		80,000	47,000	9,600		133,000	87,000
4,800		86,000	52,000	9,700		133,000	87,000
4,900		86,000	52,000	9,800		133,000	87,000
5,000		86,000	52,000	9,900		133,000	87,000
5,100		86,000	52,000	10,000		133,000	87,000
5,200		86,000	52,000	10,200		133,000	87,000
5,300		86,000	52,000	10,500		133,000	87,000
5,400		93,000	57,000	11,000		142,000	94,000
5,500		93,000	57,000	11,500		142,000	94,000
5,600		93,000	57,000	12,000		151,000	101,000
5,700		93,000	57,000	12,500		151,000	101,000

d1 mm	inch	l1 mm	l2 mm
12,700	1/2	151,000	101,000
13,000		151,000	101,000
13,500		160,000	108,000
14,000		160,000	108,000
15,000		169,000	114,000

d1 mm	inch	l1 mm	l2 mm
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Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux courts



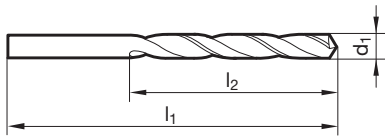
Référence 71148



P	M	K	N	S	H
•	•	•	•	•	○

Conseils d'util.,
page 182

- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage à dépouille conique
- haut % de Co & Mo
- résistance à l'usure particulièrement élevée



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		34,000	12,000	5,800		93,000	57,000
1,100		36,000	14,000	5,900		93,000	57,000
1,200		38,000	16,000	6,000		93,000	57,000
1,300		38,000	16,000	6,100		101,000	63,000
1,400		40,000	18,000	6,200		101,000	63,000
1,500		40,000	18,000	6,300		101,000	63,000
1,600		43,000	20,000	6,400		101,000	63,000
1,700		43,000	20,000	6,500		101,000	63,000
1,800		46,000	22,000	6,600		101,000	63,000
1,900		46,000	22,000	6,700		101,000	63,000
2,000		49,000	24,000	6,800		109,000	69,000
2,100		49,000	24,000	6,900		109,000	69,000
2,200		53,000	27,000	7,000		109,000	69,000
2,300		53,000	27,000	7,100		109,000	69,000
2,400		57,000	30,000	7,200		109,000	69,000
2,500		57,000	30,000	7,300		109,000	69,000
2,600		57,000	30,000	7,400		109,000	69,000
2,700		61,000	33,000	7,500		109,000	69,000
2,800		61,000	33,000	7,600		117,000	75,000
2,900		61,000	33,000	7,700		117,000	75,000
3,000		61,000	33,000	7,800		117,000	75,000
3,100		65,000	36,000	8,000		117,000	75,000
3,200		65,000	36,000	8,100		117,000	75,000
3,300		65,000	36,000	8,200		117,000	75,000
3,400		70,000	39,000	8,300		117,000	75,000
3,500		70,000	39,000	8,400		117,000	75,000
3,600		70,000	39,000	8,500		117,000	75,000
3,700		70,000	39,000	8,600		125,000	81,000
3,800		75,000	43,000	8,700		125,000	81,000
3,900		75,000	43,000	8,800		125,000	81,000
4,000		75,000	43,000	8,900		125,000	81,000
4,100		75,000	43,000	9,000		125,000	81,000
4,200		75,000	43,000	9,100		125,000	81,000
4,300		80,000	47,000	9,200		125,000	81,000
4,400		80,000	47,000	9,300		125,000	81,000
4,500		80,000	47,000	9,400		125,000	81,000
4,600		80,000	47,000	9,500		125,000	81,000
4,700		80,000	47,000	9,600		133,000	87,000
4,800		86,000	52,000	9,700		133,000	87,000
4,900		86,000	52,000	9,800		133,000	87,000
5,000		86,000	52,000	9,900		133,000	87,000
5,100		86,000	52,000	10,000		133,000	87,000
5,200		86,000	52,000	10,200		133,000	87,000
5,300		86,000	52,000	10,500		133,000	87,000
5,400		93,000	57,000	11,000		142,000	94,000
5,500		93,000	57,000	11,500		142,000	94,000
5,600		93,000	57,000	12,000		151,000	101,000
5,700		93,000	57,000	12,500		151,000	101,000

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
12,700	1/2	151,000	101,000	15,500		178,000	120,000
13,000		151,000	101,000	16,000		178,000	120,000
13,500		160,000	108,000				
14,000		160,000	108,000				
14,500		169,000	114,000				
15,000		169,000	114,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux courts

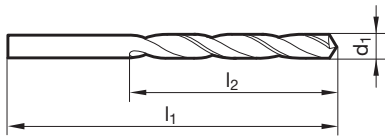


Référence 71117



Conseils d'util.,
page 180

- affûtage à dépouille conique
- pour les matières dures et friables



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		34,000	12,000	5,000		86,000	52,000
1,050		34,000	12,000	5,100		86,000	52,000
1,100		36,000	14,000	5,200		86,000	52,000
1,150		36,000	14,000	5,300		86,000	52,000
1,200		38,000	16,000	5,400		93,000	57,000
1,250		38,000	16,000	5,500		93,000	57,000
1,300		38,000	16,000	5,600		93,000	57,000
1,350		40,000	18,000	5,700		93,000	57,000
1,400		40,000	18,000	5,800		93,000	57,000
1,450		40,000	18,000	5,900		93,000	57,000
1,500		40,000	18,000	6,000		93,000	57,000
1,550		43,000	20,000	6,100		101,000	63,000
1,600		43,000	20,000	6,200		101,000	63,000
1,650		43,000	20,000	6,250		101,000	63,000
1,700		43,000	20,000	6,300		101,000	63,000
1,800		46,000	22,000	6,500		101,000	63,000
1,900		46,000	22,000	6,600		101,000	63,000
2,000		49,000	24,000	6,700		101,000	63,000
2,100		49,000	24,000	6,800		109,000	69,000
2,200		53,000	27,000	6,900		109,000	69,000
2,300		53,000	27,000	7,000		109,000	69,000
2,500		57,000	30,000	7,100		109,000	69,000
2,550		57,000	30,000	7,200		109,000	69,000
2,600		57,000	30,000	7,300		109,000	69,000
2,700		61,000	33,000	7,400		109,000	69,000
2,800		61,000	33,000	7,500		109,000	69,000
2,900		61,000	33,000	7,600		117,000	75,000
3,000		61,000	33,000	7,700		117,000	75,000
3,100		65,000	36,000	7,750		117,000	75,000
3,200		65,000	36,000	7,800		117,000	75,000
3,300		65,000	36,000	7,900		117,000	75,000
3,400		70,000	39,000	8,000		117,000	75,000
3,500		70,000	39,000	8,100		117,000	75,000
3,600		70,000	39,000	8,200		117,000	75,000
3,700		70,000	39,000	8,300		117,000	75,000
3,800		75,000	43,000	8,400		117,000	75,000
3,850		75,000	43,000	8,500		117,000	75,000
3,900		75,000	43,000	8,600		125,000	81,000
4,000		75,000	43,000	8,700		125,000	81,000
4,100		75,000	43,000	8,800		125,000	81,000
4,200		75,000	43,000	8,900		125,000	81,000
4,300		80,000	47,000	9,000		125,000	81,000
4,500		80,000	47,000	9,100		125,000	81,000
4,600		80,000	47,000	9,200		125,000	81,000
4,700		80,000	47,000	9,300		125,000	81,000
4,750		80,000	47,000	9,400		125,000	81,000
4,800		86,000	52,000	9,500		125,000	81,000
4,900		86,000	52,000	9,600		133,000	87,000

d1 mm	inch	l1 mm	l2 mm
9,700		133,000	87,000
9,900		133,000	87,000
10,000		133,000	87,000
11,500		142,000	94,000
12,000		151,000	101,000

d1 mm	inch	l1 mm	l2 mm

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux courts



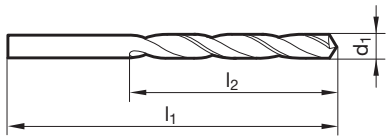
Référence 71221



P	M	K	N	S	H
•	•	•	•		

Conseils d'util.,
page 182

- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage en pente
- faible effort d'avance nécessaire
- faible effort de couple nécessaire
- pour applications universelles



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		34,000	12,000	5,800		93,000	57,000
1,100		36,000	14,000	5,900		93,000	57,000
1,200		38,000	16,000	6,000		93,000	57,000
1,300		38,000	16,000	6,100		101,000	63,000
1,400		40,000	18,000	6,200		101,000	63,000
1,500		40,000	18,000	6,300		101,000	63,000
1,600		43,000	20,000	6,400		101,000	63,000
1,700		43,000	20,000	6,500		101,000	63,000
1,800		46,000	22,000	6,600		101,000	63,000
1,900		46,000	22,000	6,700		101,000	63,000
2,000		49,000	24,000	6,800		109,000	69,000
2,100		49,000	24,000	6,900		109,000	69,000
2,200		53,000	27,000	7,000		109,000	69,000
2,300		53,000	27,000	7,100		109,000	69,000
2,400		57,000	30,000	7,200		109,000	69,000
2,500		57,000	30,000	7,300		109,000	69,000
2,600		57,000	30,000	7,400		109,000	69,000
2,700		61,000	33,000	7,500		109,000	69,000
2,800		61,000	33,000	7,600		117,000	75,000
2,900		61,000	33,000	7,700		117,000	75,000
3,000		61,000	33,000	7,800		117,000	75,000
3,100		65,000	36,000	7,900		117,000	75,000
3,200		65,000	36,000	8,000		117,000	75,000
3,300		65,000	36,000	8,100		117,000	75,000
3,400		70,000	39,000	8,200		117,000	75,000
3,500		70,000	39,000	8,300		117,000	75,000
3,600		70,000	39,000	8,400		117,000	75,000
3,700		70,000	39,000	8,500		117,000	75,000
3,800		75,000	43,000	8,600		125,000	81,000
3,900		75,000	43,000	8,700		125,000	81,000
4,000		75,000	43,000	8,800		125,000	81,000
4,100		75,000	43,000	8,900		125,000	81,000
4,200		75,000	43,000	9,000		125,000	81,000
4,300		80,000	47,000	9,100		125,000	81,000
4,400		80,000	47,000	9,200		125,000	81,000
4,500		80,000	47,000	9,300		125,000	81,000
4,600		80,000	47,000	9,400		125,000	81,000
4,700		80,000	47,000	9,500		125,000	81,000
4,800		86,000	52,000	9,600		133,000	87,000
4,900		86,000	52,000	9,700		133,000	87,000
5,000		86,000	52,000	9,800		133,000	87,000
5,100		86,000	52,000	9,900		133,000	87,000
5,200		86,000	52,000	10,000		133,000	87,000
5,300		86,000	52,000	10,100		133,000	87,000
5,400		93,000	57,000	10,200		133,000	87,000
5,500		93,000	57,000	10,300		133,000	87,000
5,600		93,000	57,000	10,400		133,000	87,000
5,700		93,000	57,000	10,500		133,000	87,000

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
11,000		142,000	94,000	14,000		160,000	108,000
11,500		142,000	94,000				
12,000		151,000	101,000				
12,500		151,000	101,000				
13,000		151,000	101,000				
13,500		160,000	108,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux courts



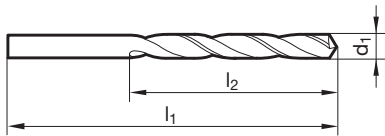
Référence **61221**



P	M	K	N	S	H
•	•	•	•		

Conseils d'util.,
page 182

- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage en pente
- faible effort d'avance nécessaire
- faible effort de couple nécessaire
- meilleure résistance à l'usure
- pour applications universelles



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		34,000	12,000	5,800		93,000	57,000
1,100		36,000	14,000	5,900		93,000	57,000
1,200		38,000	16,000	6,000		93,000	57,000
1,300		38,000	16,000	6,100		101,000	63,000
1,400		40,000	18,000	6,200		101,000	63,000
1,500		40,000	18,000	6,300		101,000	63,000
1,600		43,000	20,000	6,400		101,000	63,000
1,700		43,000	20,000	6,500		101,000	63,000
1,800		46,000	22,000	6,600		101,000	63,000
1,900		46,000	22,000	6,700		101,000	63,000
2,000		49,000	24,000	6,800		109,000	69,000
2,100		49,000	24,000	6,900		109,000	69,000
2,200		53,000	27,000	7,000		109,000	69,000
2,300		53,000	27,000	7,100		109,000	69,000
2,400		57,000	30,000	7,200		109,000	69,000
2,500		57,000	30,000	7,300		109,000	69,000
2,600		57,000	30,000	7,400		109,000	69,000
2,700		61,000	33,000	7,500		109,000	69,000
2,800		61,000	33,000	7,600		117,000	75,000
2,900		61,000	33,000	7,700		117,000	75,000
3,000		61,000	33,000	7,800		117,000	75,000
3,100		65,000	36,000	7,900		117,000	75,000
3,200		65,000	36,000	8,000		117,000	75,000
3,300		65,000	36,000	8,100		117,000	75,000
3,400		70,000	39,000	8,200		117,000	75,000
3,500		70,000	39,000	8,300		117,000	75,000
3,600		70,000	39,000	8,400		117,000	75,000
3,700		70,000	39,000	8,500		117,000	75,000
3,800		75,000	43,000	8,600		125,000	81,000
3,900		75,000	43,000	8,700		125,000	81,000
4,000		75,000	43,000	8,800		125,000	81,000
4,100		75,000	43,000	8,900		125,000	81,000
4,200		75,000	43,000	9,000		125,000	81,000
4,300		80,000	47,000	9,100		125,000	81,000
4,400		80,000	47,000	9,200		125,000	81,000
4,500		80,000	47,000	9,300		125,000	81,000
4,600		80,000	47,000	9,400		125,000	81,000
4,700		80,000	47,000	9,500		125,000	81,000
4,800		86,000	52,000	9,600		133,000	87,000
4,900		86,000	52,000	9,700		133,000	87,000
5,000		86,000	52,000	9,800		133,000	87,000
5,100		86,000	52,000	9,900		133,000	87,000
5,200		86,000	52,000	10,000		133,000	87,000
5,300		86,000	52,000	10,100		133,000	87,000
5,400		93,000	57,000	10,200		133,000	87,000
5,500		93,000	57,000	10,300		133,000	87,000
5,600		93,000	57,000	10,400		133,000	87,000
5,700		93,000	57,000	10,500		133,000	87,000

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
11,000		142,000	94,000	14,000		160,000	108,000
11,500		142,000	94,000				
12,000		151,000	101,000				
12,500		151,000	101,000				
13,000		151,000	101,000				
13,500		160,000	108,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux courts



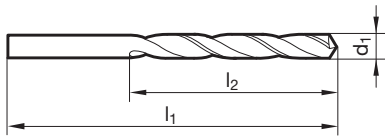
Référence 71123



P	M	K	N	S	H
●	○			○	

Conseils d'util.,
page 182

- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage à dépouille conique
- poli $< 2,0$ mm



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,800		30,000	10,000	4,400		80,000	47,000
0,850		30,000	10,000	4,500		80,000	47,000
0,900		32,000	11,000	4,600		80,000	47,000
1,000		34,000	12,000	4,700		80,000	47,000
1,050		34,000	12,000	4,800		86,000	52,000
1,100		36,000	14,000	4,900		86,000	52,000
1,200		38,000	16,000	5,000		86,000	52,000
1,300		38,000	16,000	5,100		86,000	52,000
1,350		40,000	18,000	5,200		86,000	52,000
1,400		40,000	18,000	5,300		86,000	52,000
1,450		40,000	18,000	5,400		93,000	57,000
1,500		40,000	18,000	5,500		93,000	57,000
1,550		43,000	20,000	5,600		93,000	57,000
1,600		43,000	20,000	5,700		93,000	57,000
1,700		43,000	20,000	5,800		93,000	57,000
1,800		46,000	22,000	5,900		93,000	57,000
1,900		46,000	22,000	6,000		93,000	57,000
1,950		49,000	24,000	6,100		101,000	63,000
2,000		49,000	24,000	6,200		101,000	63,000
2,050		49,000	24,000	6,300		101,000	63,000
2,100		49,000	24,000	6,400		101,000	63,000
2,200		53,000	27,000	6,500		101,000	63,000
2,300		53,000	27,000	6,600		101,000	63,000
2,400		57,000	30,000	6,700		101,000	63,000
2,450		57,000	30,000	6,800		109,000	69,000
2,500		57,000	30,000	6,900		109,000	69,000
2,550		57,000	30,000	7,000		109,000	69,000
2,600		57,000	30,000	7,100		109,000	69,000
2,700		61,000	33,000	7,200		109,000	69,000
2,750		61,000	33,000	7,300		109,000	69,000
2,800		61,000	33,000	7,400		109,000	69,000
2,850		61,000	33,000	7,500		109,000	69,000
2,900		61,000	33,000	7,600		117,000	75,000
2,950		61,000	33,000	7,700		117,000	75,000
3,000		61,000	33,000	7,800		117,000	75,000
3,100		65,000	36,000	7,900		117,000	75,000
3,200		65,000	36,000	8,000		117,000	75,000
3,300		65,000	36,000	8,100		117,000	75,000
3,400		70,000	39,000	8,200		117,000	75,000
3,500		70,000	39,000	8,300		117,000	75,000
3,600		70,000	39,000	8,400		117,000	75,000
3,700		70,000	39,000	8,500		117,000	75,000
3,800		75,000	43,000	8,600		125,000	81,000
3,900		75,000	43,000	8,700		125,000	81,000
4,000		75,000	43,000	8,800		125,000	81,000
4,100		75,000	43,000	8,900		125,000	81,000
4,200		75,000	43,000	9,000		125,000	81,000
4,300		80,000	47,000	9,100		125,000	81,000

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
9,200		125,000	81,000	12,100		151,000	101,000
9,300		125,000	81,000	12,200		151,000	101,000
9,400		125,000	81,000	12,400		151,000	101,000
9,500		125,000	81,000	12,500		151,000	101,000
9,600		133,000	87,000	12,600		151,000	101,000
9,700		133,000	87,000	12,800		151,000	101,000
9,800		133,000	87,000	13,000		151,000	101,000
9,900		133,000	87,000	13,500		160,000	108,000
10,000		133,000	87,000				
10,200		133,000	87,000				
10,500		133,000	87,000				
10,800		142,000	94,000				
11,000		142,000	94,000				
11,500		142,000	94,000				
11,700		142,000	94,000				
11,800		142,000	94,000				
11,900		151,000	101,000				
12,000		151,000	101,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux courts



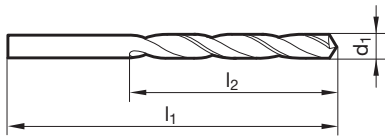
Référence **71122**



P	M	K	N	S	H
○	●			●	

Conseils d'util.,
page 182

- Amin. de l'âme $\geq \varnothing 4,600$
- affûtage à dépouille conique



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		34,000	12,000	5,800		93,000	57,000
1,100		36,000	14,000	5,900		93,000	57,000
1,200		38,000	16,000	6,000		93,000	57,000
1,300		38,000	16,000	6,100		101,000	63,000
1,400		40,000	18,000	6,200		101,000	63,000
1,500		40,000	18,000	6,300		101,000	63,000
1,600		43,000	20,000	6,400		101,000	63,000
1,700		43,000	20,000	6,500		101,000	63,000
1,800		46,000	22,000	6,600		101,000	63,000
1,900		46,000	22,000	6,700		101,000	63,000
2,000		49,000	24,000	6,750	17/64	109,000	69,000
2,100		49,000	24,000	6,800		109,000	69,000
2,200		53,000	27,000	6,900		109,000	69,000
2,300		53,000	27,000	7,000		109,000	69,000
2,400		57,000	30,000	7,100		109,000	69,000
2,500		57,000	30,000	7,200		109,000	69,000
2,600		57,000	30,000	7,400		109,000	69,000
2,700		61,000	33,000	7,500		109,000	69,000
2,800		61,000	33,000	7,600		117,000	75,000
2,900		61,000	33,000	7,800		117,000	75,000
3,000		61,000	33,000	7,900		117,000	75,000
3,100		65,000	36,000	8,000		117,000	75,000
3,200		65,000	36,000	8,100		117,000	75,000
3,300		65,000	36,000	8,200		117,000	75,000
3,400		70,000	39,000	8,300		117,000	75,000
3,500		70,000	39,000	8,400		117,000	75,000
3,600		70,000	39,000	8,500		117,000	75,000
3,700		70,000	39,000	8,600		125,000	81,000
3,800		75,000	43,000	8,700		125,000	81,000
3,900		75,000	43,000	8,800		125,000	81,000
4,000		75,000	43,000	8,900		125,000	81,000
4,100		75,000	43,000	9,000		125,000	81,000
4,200		75,000	43,000	9,100		125,000	81,000
4,300		80,000	47,000	9,300		125,000	81,000
4,400		80,000	47,000	9,400		125,000	81,000
4,500		80,000	47,000	9,500		125,000	81,000
4,600		80,000	47,000	9,600		133,000	87,000
4,700		80,000	47,000	9,700		133,000	87,000
4,800		86,000	52,000	9,800		133,000	87,000
4,900		86,000	52,000	10,000		133,000	87,000
5,000		86,000	52,000	10,200		133,000	87,000
5,100		86,000	52,000	10,500		133,000	87,000
5,200		86,000	52,000	11,000		142,000	94,000
5,300		86,000	52,000	11,500		142,000	94,000
5,400		93,000	57,000	12,000		151,000	101,000
5,500		93,000	57,000	12,500		151,000	101,000
5,600		93,000	57,000	13,000		151,000	101,000
5,700		93,000	57,000	13,500		160,000	108,000

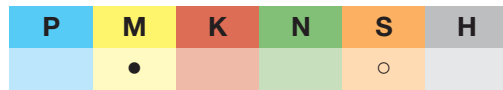
d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
14,000		160,000	108,000				
14,500		169,000	114,000				
15,000		169,000	114,000				
16,000		178,000	120,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux courts

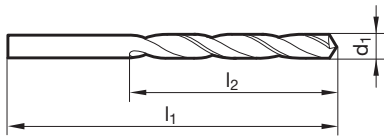


Référence **61223**



Conseils d'util.,
page 180

- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage à dépouille conique
- meilleure résistance à l'usure



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		34,000	12,000	5,000		86,000	52,000
1,050		34,000	12,000	5,100		86,000	52,000
1,100		36,000	14,000	5,200		86,000	52,000
1,150		36,000	14,000	5,300		86,000	52,000
1,200		38,000	16,000	5,400		93,000	57,000
1,250		38,000	16,000	5,500		93,000	57,000
1,300		38,000	16,000	5,600		93,000	57,000
1,350		40,000	18,000	5,700		93,000	57,000
1,400		40,000	18,000	5,800		93,000	57,000
1,500		40,000	18,000	5,900		93,000	57,000
1,550		43,000	20,000	6,000		93,000	57,000
1,600		43,000	20,000	6,100		101,000	63,000
1,650		43,000	20,000	6,200		101,000	63,000
1,700		43,000	20,000	6,300		101,000	63,000
1,750		46,000	22,000	6,400		101,000	63,000
1,800		46,000	22,000	6,500		101,000	63,000
1,900		46,000	22,000	6,600		101,000	63,000
1,950		49,000	24,000	6,700		101,000	63,000
2,000		49,000	24,000	6,800		109,000	69,000
2,100		49,000	24,000	6,900		109,000	69,000
2,200		53,000	27,000	7,000		109,000	69,000
2,300		53,000	27,000	7,100		109,000	69,000
2,400		57,000	30,000	7,200		109,000	69,000
2,500		57,000	30,000	7,300		109,000	69,000
2,600		57,000	30,000	7,400		109,000	69,000
2,700		61,000	33,000	7,500		109,000	69,000
2,800		61,000	33,000	7,600		117,000	75,000
2,900		61,000	33,000	7,700		117,000	75,000
3,000		61,000	33,000	7,800		117,000	75,000
3,100		65,000	36,000	7,900		117,000	75,000
3,200		65,000	36,000	8,000		117,000	75,000
3,300		65,000	36,000	8,100		117,000	75,000
3,400		70,000	39,000	8,200		117,000	75,000
3,500		70,000	39,000	8,300		117,000	75,000
3,600		70,000	39,000	8,400		117,000	75,000
3,700		70,000	39,000	8,500		117,000	75,000
3,800		75,000	43,000	8,600		125,000	81,000
3,900		75,000	43,000	8,700		125,000	81,000
4,000		75,000	43,000	8,800		125,000	81,000
4,100		75,000	43,000	8,900		125,000	81,000
4,200		75,000	43,000	9,000		125,000	81,000
4,300		80,000	47,000	9,100		125,000	81,000
4,400		80,000	47,000	9,200		125,000	81,000
4,500		80,000	47,000	9,300		125,000	81,000
4,600		80,000	47,000	9,400		125,000	81,000
4,700		80,000	47,000	9,500		125,000	81,000
4,800		86,000	52,000	9,600		133,000	87,000
4,900		86,000	52,000	9,700		133,000	87,000

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
9,800		133,000	87,000	11,500		142,000	94,000
9,900		133,000	87,000	12,000		151,000	101,000
10,000		133,000	87,000	12,500		151,000	101,000
10,200		133,000	87,000	13,000		151,000	101,000
10,500		133,000	87,000	13,500		160,000	108,000
11,000		142,000	94,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux courts



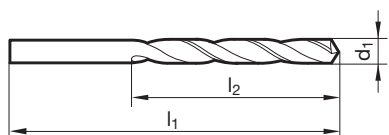
Référence 51122



P	M	K	N	S	H
○	●			○	

Conseils d'util.,
page 184

- Amin. de l'âme $\geq \varnothing 2,000$
- affûtage à dépouille conique
- meilleure résistance à l'usure



d1 mm	inch	l1 mm	l2 mm
2,000		49,000	24,000
2,500		57,000	30,000
3,000		61,000	33,000
3,500		70,000	39,000
4,000		75,000	43,000
4,200		75,000	43,000
4,500		80,000	47,000
5,000		86,000	52,000
5,500		93,000	57,000
6,000		93,000	57,000
6,500		101,000	63,000
6,800		109,000	69,000
7,000		109,000	69,000
7,500		109,000	69,000
8,000		117,000	75,000
8,500		117,000	75,000
9,000		125,000	81,000
9,500		125,000	81,000

d1 mm	inch	l1 mm	l2 mm
10,000		133,000	87,000
10,200		133,000	87,000
10,500		133,000	87,000
11,000		142,000	94,000
11,500		142,000	94,000
12,000		151,000	101,000
12,500		151,000	101,000
13,000		151,000	101,000

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux courts

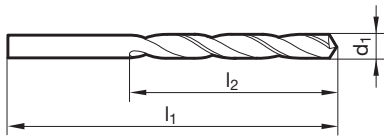


Référence **71124**



Conseils d'util.,
page 180

- Amin. de l'âme $\geq \varnothing 1,500$
- affûtage à dépouille conique
- goujures larges



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,500		40,000	18,000	3,910		75,000	43,000
1,570		43,000	20,000	3,970	5/32	75,000	43,000
1,600		43,000	20,000	3,990		75,000	43,000
1,700		43,000	20,000	4,000		75,000	43,000
1,750		46,000	22,000	4,090		75,000	43,000
1,780		46,000	22,000	4,100		75,000	43,000
1,800		46,000	22,000	4,200		75,000	43,000
1,850		46,000	22,000	4,220		75,000	43,000
1,900		46,000	22,000	4,300		80,000	47,000
1,930		49,000	24,000	4,390		80,000	47,000
1,980	5/64	49,000	24,000	4,400		80,000	47,000
1,990		49,000	24,000	4,500		80,000	47,000
2,000		49,000	24,000	4,570		80,000	47,000
2,050		49,000	24,000	4,600		80,000	47,000
2,080		49,000	24,000	4,700		80,000	47,000
2,100		49,000	24,000	4,800		86,000	52,000
2,180		53,000	27,000	4,850		86,000	52,000
2,200		53,000	27,000	4,900		86,000	52,000
2,260		53,000	27,000	4,980		86,000	52,000
2,300		53,000	27,000	5,000		86,000	52,000
2,370		57,000	30,000	5,100		86,000	52,000
2,400		57,000	30,000	5,110		86,000	52,000
2,490		57,000	30,000	5,180		86,000	52,000
2,500		57,000	30,000	5,200		86,000	52,000
2,580		57,000	30,000	5,220		86,000	52,000
2,600		57,000	30,000	5,300		86,000	52,000
2,700		61,000	33,000	5,310		93,000	57,000
2,710		61,000	33,000	5,400		93,000	57,000
2,780	7/64	61,000	33,000	5,410		93,000	57,000
2,790		61,000	33,000	5,500		93,000	57,000
2,800		61,000	33,000	5,560	7/32	93,000	57,000
2,870		61,000	33,000	5,600		93,000	57,000
2,900		61,000	33,000	5,610		93,000	57,000
2,950		61,000	33,000	5,700		93,000	57,000
3,000		61,000	33,000	5,790		93,000	57,000
3,100		65,000	36,000	5,800		93,000	57,000
3,200		65,000	36,000	5,900		93,000	57,000
3,260		65,000	36,000	5,940		93,000	57,000
3,300		65,000	36,000	5,950	15/64	93,000	57,000
3,400		70,000	39,000	6,000		93,000	57,000
3,450		70,000	39,000	6,050		101,000	63,000
3,500		70,000	39,000	6,100		101,000	63,000
3,600		70,000	39,000	6,200		101,000	63,000
3,700		70,000	39,000	6,300		101,000	63,000
3,730		70,000	39,000	6,350	1/4	101,000	63,000
3,800		75,000	43,000	6,400		101,000	63,000
3,860		75,000	43,000	6,500		101,000	63,000
3,900		75,000	43,000	6,530		101,000	63,000

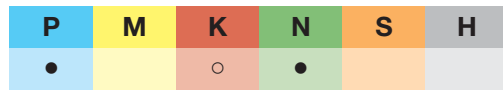
d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
6,600		101,000	63,000	9,520	3/8	133,000	87,000
6,630		101,000	63,000	9,530		133,000	87,000
6,700		101,000	63,000	9,580		133,000	87,000
6,750	17/64	109,000	69,000	9,600		133,000	87,000
6,760		109,000	69,000	9,700		133,000	87,000
6,800		109,000	69,000	9,800		133,000	87,000
6,900		109,000	69,000	9,900		133,000	87,000
6,910		109,000	69,000	9,920	25/64	133,000	87,000
7,000		109,000	69,000	10,000		133,000	87,000
7,040		109,000	69,000	10,080		133,000	87,000
7,100		109,000	69,000	10,100		133,000	87,000
7,140	9/32	109,000	69,000	10,200		133,000	87,000
7,200		109,000	69,000	10,260		133,000	87,000
7,300		109,000	69,000	10,300		133,000	87,000
7,370		109,000	69,000	10,400		133,000	87,000
7,400		109,000	69,000	10,490		133,000	87,000
7,490		109,000	69,000	10,500		133,000	87,000
7,500		109,000	69,000	10,600		133,000	87,000
7,540	19/64	117,000	75,000	10,720	27/64	142,000	94,000
7,600		117,000	75,000	10,900		142,000	94,000
7,670		117,000	75,000	11,000		142,000	94,000
7,700		117,000	75,000	11,100	7/16	142,000	94,000
7,750		117,000	75,000	11,110		142,000	94,000
7,800		117,000	75,000	11,200		142,000	94,000
7,940	5/16	117,000	75,000	11,300		142,000	94,000
8,000		117,000	75,000	11,400		142,000	94,000
8,030		117,000	75,000	11,500		142,000	94,000
8,100		117,000	75,000	11,510	29/64	142,000	94,000
8,200		117,000	75,000	11,600		142,000	94,000
8,300		117,000	75,000	11,800		142,000	94,000
8,330	21/64	117,000	75,000	11,900		151,000	101,000
8,400		117,000	75,000	11,910	15/32	151,000	101,000
8,430		117,000	75,000	12,000		151,000	101,000
8,500		117,000	75,000	12,500		151,000	101,000
8,600		125,000	81,000	12,700	1/2	151,000	101,000
8,610		125,000	81,000	13,000		151,000	101,000
8,700		125,000	81,000	14,000		160,000	108,000
8,800		125,000	81,000	14,500		169,000	114,000
8,840		125,000	81,000	15,000		169,000	114,000
8,900		125,000	81,000	15,500		178,000	120,000
9,000		125,000	81,000				
9,090		125,000	81,000				
9,100		125,000	81,000				
9,130	23/64	125,000	81,000				
9,200		125,000	81,000				
9,300		125,000	81,000				
9,350		125,000	81,000				
9,500		125,000	81,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux courts

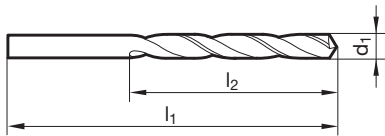


Référence 71126



Conseils d'util.,
page 180

- Amin. de l'âme $\geq \varnothing 1,500$
- affûtage à dépouille conique
- goujures larges



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,500		40,000	18,000	6,800		109,000	69,000
1,600		43,000	20,000	6,900		109,000	69,000
1,700		43,000	20,000	7,000		109,000	69,000
1,750		46,000	22,000	7,100		109,000	69,000
1,800		46,000	22,000	7,200		109,000	69,000
1,900		46,000	22,000	7,300		109,000	69,000
2,000		49,000	24,000	7,400		109,000	69,000
2,100		49,000	24,000	7,500		109,000	69,000
2,200		53,000	27,000	7,600		117,000	75,000
2,300		53,000	27,000	7,700		117,000	75,000
2,400		57,000	30,000	7,800		117,000	75,000
2,500		57,000	30,000	8,000		117,000	75,000
2,600		57,000	30,000	8,100		117,000	75,000
2,900		61,000	33,000	8,200		117,000	75,000
3,000		61,000	33,000	8,300		117,000	75,000
3,100		65,000	36,000	8,400		117,000	75,000
3,200		65,000	36,000	8,500		117,000	75,000
3,300		65,000	36,000	8,600		125,000	81,000
3,500		70,000	39,000	8,700		125,000	81,000
3,600		70,000	39,000	8,800		125,000	81,000
3,700		70,000	39,000	8,900		125,000	81,000
3,800		75,000	43,000	9,000		125,000	81,000
3,900		75,000	43,000	9,100		125,000	81,000
4,000		75,000	43,000	9,200		125,000	81,000
4,100		75,000	43,000	9,300		125,000	81,000
4,200		75,000	43,000	9,400		125,000	81,000
4,400		80,000	47,000	9,500		125,000	81,000
4,500		80,000	47,000	9,600		133,000	87,000
4,600		80,000	47,000	9,700		133,000	87,000
4,700		80,000	47,000	9,800		133,000	87,000
4,800		86,000	52,000	9,900		133,000	87,000
4,900		86,000	52,000	10,000		133,000	87,000
5,000		86,000	52,000	10,100		133,000	87,000
5,200		86,000	52,000	10,200		133,000	87,000
5,300		86,000	52,000	10,300		133,000	87,000
5,400		93,000	57,000	10,400		133,000	87,000
5,500		93,000	57,000	10,500		133,000	87,000
5,600		93,000	57,000	10,600		133,000	87,000
5,700		93,000	57,000	10,700		142,000	94,000
5,800		93,000	57,000	10,800		142,000	94,000
5,900		93,000	57,000	10,900		142,000	94,000
6,000		93,000	57,000	11,000		142,000	94,000
6,100		101,000	63,000	11,100		142,000	94,000
6,200		101,000	63,000	11,300		142,000	94,000
6,300		101,000	63,000	11,400		142,000	94,000
6,500		101,000	63,000	11,500		142,000	94,000
6,600		101,000	63,000	11,600		142,000	94,000
6,700		101,000	63,000	11,700		142,000	94,000

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
11,800		142,000	94,000	14,000		160,000	108,000
11,900		151,000	101,000	14,500		169,000	114,000
12,000		151,000	101,000	15,000		169,000	114,000
12,300	31/64	151,000	101,000	16,000		178,000	120,000
12,500		151,000	101,000				
13,000		151,000	101,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux courts



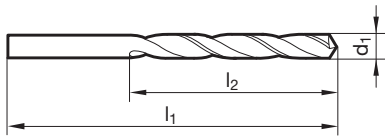
Référence **61124**



P	M	K	N	S	H
●		●	○		

Conseils d'util.,
page 180

- Amin. de l'âme $\geq \varnothing 1,500$
- affûtage à dépouille conique
- goujures larges
- meilleure protection contre l'usure



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,500		40,000	18,000	5,700		93,000	57,000
1,600		43,000	20,000	5,800		93,000	57,000
1,700		43,000	20,000	6,000		93,000	57,000
1,800		46,000	22,000	6,100		101,000	63,000
1,850		46,000	22,000	6,200		101,000	63,000
1,900		46,000	22,000	6,250		101,000	63,000
1,980	5/64	49,000	24,000	6,300		101,000	63,000
2,000		49,000	24,000	6,400		101,000	63,000
2,100		49,000	24,000	6,500		101,000	63,000
2,180		53,000	27,000	6,600		101,000	63,000
2,200		53,000	27,000	6,700		101,000	63,000
2,300		53,000	27,000	6,750	17/64	109,000	69,000
2,400		57,000	30,000	6,800		109,000	69,000
2,500		57,000	30,000	6,900		109,000	69,000
2,600		57,000	30,000	7,000		109,000	69,000
2,700		61,000	33,000	7,100		109,000	69,000
2,800		61,000	33,000	7,200		109,000	69,000
2,900		61,000	33,000	7,300		109,000	69,000
3,000		61,000	33,000	7,400		109,000	69,000
3,100		65,000	36,000	7,500		109,000	69,000
3,200		65,000	36,000	7,600		117,000	75,000
3,300		65,000	36,000	7,700		117,000	75,000
3,400		70,000	39,000	7,800		117,000	75,000
3,500		70,000	39,000	7,900		117,000	75,000
3,570	9/64	70,000	39,000	8,000		117,000	75,000
3,600		70,000	39,000	8,030		117,000	75,000
3,700		70,000	39,000	8,100		117,000	75,000
3,800		75,000	43,000	8,200		117,000	75,000
3,860		75,000	43,000	8,300		117,000	75,000
3,900		75,000	43,000	8,400		117,000	75,000
3,990		75,000	43,000	8,500		117,000	75,000
4,000		75,000	43,000	8,600		125,000	81,000
4,100		75,000	43,000	8,700		125,000	81,000
4,200		75,000	43,000	8,800		125,000	81,000
4,300		80,000	47,000	8,840		125,000	81,000
4,400		80,000	47,000	8,900		125,000	81,000
4,500		80,000	47,000	9,000		125,000	81,000
4,600		80,000	47,000	9,100		125,000	81,000
4,700		80,000	47,000	9,200		125,000	81,000
4,800		86,000	52,000	9,300		125,000	81,000
4,900		86,000	52,000	9,400		125,000	81,000
5,000		86,000	52,000	9,500		125,000	81,000
5,100		86,000	52,000	9,600		133,000	87,000
5,200		86,000	52,000	9,700		133,000	87,000
5,300		86,000	52,000	9,800		133,000	87,000
5,400		93,000	57,000	9,900		133,000	87,000
5,500		93,000	57,000	9,920	25/64	133,000	87,000
5,600		93,000	57,000	10,000		133,000	87,000

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
10,100		133,000	87,000	12,300	31/64	151,000	101,000
10,200		133,000	87,000	12,500		151,000	101,000
10,500		133,000	87,000	12,700	1/2	151,000	101,000
10,600		133,000	87,000	13,000		151,000	101,000
10,720	27/64	142,000	94,000	13,500		160,000	108,000
10,800		142,000	94,000	14,000		160,000	108,000
10,900		142,000	94,000	14,500		169,000	114,000
11,000		142,000	94,000	15,000		169,000	114,000
11,100		142,000	94,000	15,500		178,000	120,000
11,200		142,000	94,000	16,000		178,000	120,000
11,300		142,000	94,000				
11,400		142,000	94,000				
11,500		142,000	94,000				
11,600		142,000	94,000				
11,800		142,000	94,000				
11,900		151,000	101,000				
11,910	15/32	151,000	101,000				
12,000		151,000	101,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux courts



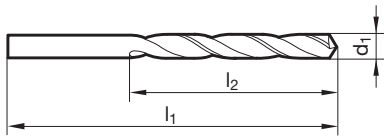
Référence 71158



P	M	K	N	S	H
●		●	○		

Conseils d'util.,
page 182

- Amin. de l'âme $\geq \varnothing 1,500$
- affûtage à dépouille conique
- goujures larges
- poli $< 2,36$ mm



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,500		40,000	18,000	6,100		101,000	63,000
1,590	1/16	43,000	20,000	6,200		101,000	63,000
1,600		43,000	20,000	6,300		101,000	63,000
1,700		43,000	20,000	6,350	1/4	101,000	63,000
1,800		46,000	22,000	6,400		101,000	63,000
1,900		46,000	22,000	6,500		101,000	63,000
2,000		49,000	24,000	6,600		101,000	63,000
2,100		49,000	24,000	6,700		101,000	63,000
2,200		53,000	27,000	6,800		109,000	69,000
2,300		53,000	27,000	6,900		109,000	69,000
2,400		57,000	30,000	7,000		109,000	69,000
2,500		57,000	30,000	7,100		109,000	69,000
2,600		57,000	30,000	7,140	9/32	109,000	69,000
2,700		61,000	33,000	7,200		109,000	69,000
2,800		61,000	33,000	7,300		109,000	69,000
2,900		61,000	33,000	7,400		109,000	69,000
3,000		61,000	33,000	7,500		109,000	69,000
3,100		65,000	36,000	7,600		117,000	75,000
3,170	1/8	65,000	36,000	7,700		117,000	75,000
3,200		65,000	36,000	7,800		117,000	75,000
3,300		65,000	36,000	7,900		117,000	75,000
3,400		70,000	39,000	7,940	5/16	117,000	75,000
3,500		70,000	39,000	8,000		117,000	75,000
3,600		70,000	39,000	8,100		117,000	75,000
3,700		70,000	39,000	8,200		117,000	75,000
3,800		75,000	43,000	8,300		117,000	75,000
3,900		75,000	43,000	8,400		117,000	75,000
4,000		75,000	43,000	8,500		117,000	75,000
4,100		75,000	43,000	8,600		125,000	81,000
4,200		75,000	43,000	8,700		125,000	81,000
4,300		80,000	47,000	8,800		125,000	81,000
4,400		80,000	47,000	8,900		125,000	81,000
4,500		80,000	47,000	9,000		125,000	81,000
4,600		80,000	47,000	9,100		125,000	81,000
4,700		80,000	47,000	9,200		125,000	81,000
4,800		86,000	52,000	9,300		125,000	81,000
4,900		86,000	52,000	9,400		125,000	81,000
5,000		86,000	52,000	9,500		125,000	81,000
5,100		86,000	52,000	9,520	3/8	133,000	87,000
5,200		86,000	52,000	9,600		133,000	87,000
5,300		86,000	52,000	9,700		133,000	87,000
5,400		93,000	57,000	9,800		133,000	87,000
5,500		93,000	57,000	9,900		133,000	87,000
5,600		93,000	57,000	10,000		133,000	87,000
5,700		93,000	57,000	10,200		133,000	87,000
5,800		93,000	57,000	10,500		133,000	87,000
5,900		93,000	57,000	10,800		142,000	94,000
6,000		93,000	57,000	11,000		142,000	94,000

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
11,110	7/16	142,000	94,000	12,700	1/2	151,000	101,000
11,200		142,000	94,000	13,000		151,000	101,000
11,500		142,000	94,000				
11,800		142,000	94,000				
12,000		151,000	101,000				
12,500		151,000	101,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux courts



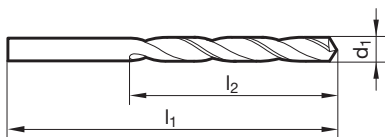
Référence **61158**



P	M	K	N	S	H
●		●	○		

Conseils d'util.,
page 184

- Amin. de l'âme $\geq \varnothing 1,500$
- affûtage à dépouille conique
- goujures larges
- meilleure résistance à l'usure
- parfait pour les profondeurs $> 3xD$



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,500		40,000	18,000	6,300		101,000	63,000
1,600		43,000	20,000	6,400		101,000	63,000
1,700		43,000	20,000	6,500		101,000	63,000
1,800		46,000	22,000	6,600		101,000	63,000
1,900		46,000	22,000	6,700		101,000	63,000
2,000		49,000	24,000	6,800		109,000	69,000
2,100		49,000	24,000	6,900		109,000	69,000
2,200		53,000	27,000	7,000		109,000	69,000
2,300		53,000	27,000	7,100		109,000	69,000
2,400		57,000	30,000	7,200		109,000	69,000
2,500		57,000	30,000	7,300		109,000	69,000
2,600		57,000	30,000	7,400		109,000	69,000
2,700		61,000	33,000	7,500		109,000	69,000
2,800		61,000	33,000	7,600		117,000	75,000
2,900		61,000	33,000	7,700		117,000	75,000
3,000		61,000	33,000	7,800		117,000	75,000
3,100		65,000	36,000	7,900		117,000	75,000
3,200		65,000	36,000	8,000		117,000	75,000
3,300		65,000	36,000	8,100		117,000	75,000
3,400		70,000	39,000	8,200		117,000	75,000
3,500		70,000	39,000	8,300		117,000	75,000
3,600		70,000	39,000	8,400		117,000	75,000
3,700		70,000	39,000	8,500		117,000	75,000
3,800		75,000	43,000	8,600		125,000	81,000
3,900		75,000	43,000	8,700		125,000	81,000
4,000		75,000	43,000	8,800		125,000	81,000
4,100		75,000	43,000	9,000		125,000	81,000
4,200		75,000	43,000	9,200		125,000	81,000
4,300		80,000	47,000	9,500		125,000	81,000
4,400		80,000	47,000	9,600		133,000	87,000
4,500		80,000	47,000	9,800		133,000	87,000
4,600		80,000	47,000	10,000		133,000	87,000
4,700		80,000	47,000	10,200		133,000	87,000
4,800		86,000	52,000	10,500		133,000	87,000
4,900		86,000	52,000	11,000		142,000	94,000
5,000		86,000	52,000	11,500		142,000	94,000
5,100		86,000	52,000	11,800		142,000	94,000
5,200		86,000	52,000	12,000		151,000	101,000
5,300		86,000	52,000	12,500		151,000	101,000
5,400		93,000	57,000	13,000		151,000	101,000
5,500		93,000	57,000				
5,600		93,000	57,000				
5,700		93,000	57,000				
5,800		93,000	57,000				
5,900		93,000	57,000				
6,000		93,000	57,000				
6,100		101,000	63,000				
6,200		101,000	63,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux courts

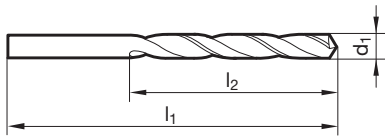


Référence 71128



Conseils d'util.,
page 180

- affûtage à dépouille conique
- optimal pour tours automatiques



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,550		24,000	7,000	3,450		70,000	39,000
0,600		24,000	7,000	3,500		70,000	39,000
0,650		26,000	8,000	3,550		70,000	39,000
0,750		28,000	9,000	3,600		70,000	39,000
0,800		30,000	10,000	3,700		70,000	39,000
0,850		30,000	10,000	3,750		70,000	39,000
0,900		32,000	11,000	3,800		75,000	43,000
0,950		32,000	11,000	3,850		75,000	43,000
1,000		34,000	12,000	3,900		75,000	43,000
1,050		34,000	12,000	4,000		75,000	43,000
1,100		36,000	14,000	4,100		75,000	43,000
1,200		38,000	16,000	4,150		75,000	43,000
1,250		38,000	16,000	4,200		75,000	43,000
1,300		38,000	16,000	4,300		80,000	47,000
1,400		40,000	18,000	4,350		80,000	47,000
1,450		40,000	18,000	4,400		80,000	47,000
1,500		40,000	18,000	4,450		80,000	47,000
1,550		43,000	20,000	4,500		80,000	47,000
1,600		43,000	20,000	4,550		80,000	47,000
1,700		43,000	20,000	4,600		80,000	47,000
1,750		46,000	22,000	4,700		80,000	47,000
1,800		46,000	22,000	4,800		86,000	52,000
1,850		46,000	22,000	4,850		86,000	52,000
1,900		46,000	22,000	4,900		86,000	52,000
1,950		49,000	24,000	4,950		86,000	52,000
2,000		49,000	24,000	5,000		86,000	52,000
2,100		49,000	24,000	5,100		86,000	52,000
2,150		53,000	27,000	5,200		86,000	52,000
2,200		53,000	27,000	5,300		86,000	52,000
2,250		53,000	27,000	5,400		93,000	57,000
2,300		53,000	27,000	5,500		93,000	57,000
2,400		57,000	30,000	5,600		93,000	57,000
2,450		57,000	30,000	5,700		93,000	57,000
2,500		57,000	30,000	5,800		93,000	57,000
2,550		57,000	30,000	5,900		93,000	57,000
2,600		57,000	30,000	6,000		93,000	57,000
2,700		61,000	33,000	6,100		101,000	63,000
2,800		61,000	33,000	6,200		101,000	63,000
2,850		61,000	33,000	6,300		101,000	63,000
2,900		61,000	33,000	6,400		101,000	63,000
2,950		61,000	33,000	6,500		101,000	63,000
3,000		61,000	33,000	6,600		101,000	63,000
3,100		65,000	36,000	6,700		101,000	63,000
3,150		65,000	36,000	6,800		109,000	69,000
3,250		65,000	36,000	6,900		109,000	69,000
3,300		65,000	36,000	7,000		109,000	69,000
3,350		65,000	36,000	7,100		109,000	69,000
3,400		70,000	39,000	7,200		109,000	69,000

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
7,300		109,000	69,000	9,800		133,000	87,000
7,400		109,000	69,000	10,000		133,000	87,000
7,500		109,000	69,000	10,200		133,000	87,000
7,600		117,000	75,000	10,500		133,000	87,000
7,700		117,000	75,000	11,000		142,000	94,000
7,800		117,000	75,000	11,500		142,000	94,000
7,900		117,000	75,000	12,000		151,000	101,000
8,000		117,000	75,000	12,500		151,000	101,000
8,500		117,000	75,000	13,000		151,000	101,000
8,600		125,000	81,000				
9,000		125,000	81,000				
9,500		125,000	81,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux courts

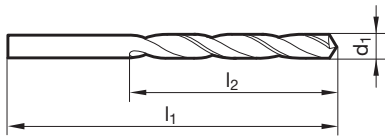


Référence **71129**



Conseils d'util.,
page 180

- affûtage à dépouille conique
- optimal pour tours automatiques



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,500		22,000	6,000	6,600		101,000	63,000
0,550		24,000	7,000	6,700		101,000	63,000
0,600		24,000	7,000	6,800		109,000	69,000
0,650		26,000	8,000	7,000		109,000	69,000
0,700		28,000	9,000	7,100		109,000	69,000
0,750		28,000	9,000	7,400		109,000	69,000
0,900		32,000	11,000	7,500		109,000	69,000
1,000		34,000	12,000	8,000		117,000	75,000
1,250		38,000	16,000	8,100		117,000	75,000
1,550		43,000	20,000	8,200		117,000	75,000
1,650		43,000	20,000	8,300		117,000	75,000
2,150		53,000	27,000	8,700		125,000	81,000
2,200		53,000	27,000	8,800		125,000	81,000
2,300		53,000	27,000	8,900		125,000	81,000
2,500		57,000	30,000	9,000		125,000	81,000
2,650		57,000	30,000	9,500		125,000	81,000
2,700		61,000	33,000	9,600		133,000	87,000
2,850		61,000	33,000	9,800		133,000	87,000
2,950		61,000	33,000	9,900		133,000	87,000
3,000		61,000	33,000	10,000		133,000	87,000
3,100		65,000	36,000	10,600		133,000	87,000
3,300		65,000	36,000	10,700		142,000	94,000
3,550		70,000	39,000	10,800		142,000	94,000
3,600		70,000	39,000	10,900		142,000	94,000
3,950		75,000	43,000	11,000		142,000	94,000
4,000		75,000	43,000	11,100		142,000	94,000
4,250		75,000	43,000	11,200		142,000	94,000
4,500		80,000	47,000	11,500		142,000	94,000
4,550		80,000	47,000	11,700		142,000	94,000
4,600		80,000	47,000	11,800		142,000	94,000
4,650		80,000	47,000	12,000		151,000	101,000
4,700		80,000	47,000	12,100		151,000	101,000
4,800		86,000	52,000	12,200		151,000	101,000
5,000		86,000	52,000	12,300	31/64	151,000	101,000
5,700		93,000	57,000	12,400		151,000	101,000
5,800		93,000	57,000	12,500		151,000	101,000
5,900		93,000	57,000	12,600		151,000	101,000
6,100		101,000	63,000	12,700	1/2	151,000	101,000
6,200		101,000	63,000	12,800		151,000	101,000
6,300		101,000	63,000				
6,400		101,000	63,000				
6,500		101,000	63,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux courts



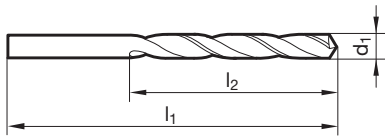
Référence **51158**



P	M	K	N	S	H
●	○	○	○		

Conseils d'util.,
page 184

- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage à dépouille conique
- goujures larges
- meilleure résistance à l'usure
- parfait pour les profondeurs $> 3xD$



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		34,000	12,000	5,800		93,000	57,000
1,100		36,000	14,000	5,900		93,000	57,000
1,200		38,000	16,000	6,000		93,000	57,000
1,300		38,000	16,000	6,100		101,000	63,000
1,400		40,000	18,000	6,200		101,000	63,000
1,500		40,000	18,000	6,300		101,000	63,000
1,600		43,000	20,000	6,400		101,000	63,000
1,700		43,000	20,000	6,500		101,000	63,000
1,800		46,000	22,000	6,600		101,000	63,000
1,900		46,000	22,000	6,700		101,000	63,000
2,000		49,000	24,000	6,800		109,000	69,000
2,100		49,000	24,000	6,900		109,000	69,000
2,200		53,000	27,000	7,000		109,000	69,000
2,300		53,000	27,000	7,100		109,000	69,000
2,400		57,000	30,000	7,400		109,000	69,000
2,500		57,000	30,000	7,500		109,000	69,000
2,600		57,000	30,000	7,600		117,000	75,000
2,700		61,000	33,000	7,700		117,000	75,000
2,800		61,000	33,000	7,800		117,000	75,000
2,900		61,000	33,000	7,900		117,000	75,000
3,000		61,000	33,000	8,000		117,000	75,000
3,100		65,000	36,000	8,100		117,000	75,000
3,200		65,000	36,000	8,200		117,000	75,000
3,300		65,000	36,000	8,300		117,000	75,000
3,400		70,000	39,000	8,500		117,000	75,000
3,500		70,000	39,000	8,600		125,000	81,000
3,600		70,000	39,000	8,700		125,000	81,000
3,700		70,000	39,000	8,800		125,000	81,000
3,800		75,000	43,000	8,900		125,000	81,000
3,900		75,000	43,000	9,000		125,000	81,000
4,000		75,000	43,000	9,100		125,000	81,000
4,100		75,000	43,000	9,200		125,000	81,000
4,200		75,000	43,000	9,300		125,000	81,000
4,300		80,000	47,000	9,400		125,000	81,000
4,400		80,000	47,000	9,500		125,000	81,000
4,500		80,000	47,000	9,600		133,000	87,000
4,600		80,000	47,000	9,700		133,000	87,000
4,700		80,000	47,000	9,800		133,000	87,000
4,800		86,000	52,000	9,900		133,000	87,000
4,900		86,000	52,000	10,000		133,000	87,000
5,000		86,000	52,000	10,100		133,000	87,000
5,100		86,000	52,000	10,200		133,000	87,000
5,200		86,000	52,000	10,300		133,000	87,000
5,300		86,000	52,000	10,400		133,000	87,000
5,400		93,000	57,000	10,500		133,000	87,000
5,500		93,000	57,000	10,700		142,000	94,000
5,600		93,000	57,000	10,800		142,000	94,000
5,700		93,000	57,000	11,000		142,000	94,000

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
11,200		142,000	94,000	13,000		151,000	101,000
11,500		142,000	94,000				
11,700		142,000	94,000				
11,800		142,000	94,000				
12,000		151,000	101,000				
12,500		151,000	101,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux courts



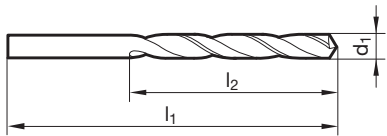
Référence **61232**



P	M	K	N	S	H
○	○	●	○		

Conseils d'util.,
page 184

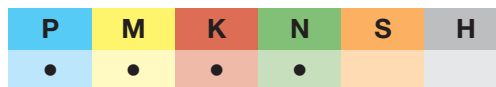
- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage à dépouille conique
- goujures larges
- particulièrement rigide
- résistance à l'usure particulièrement élevée



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		34,000	12,000	5,800		93,000	57,000
1,100		36,000	14,000	5,900		93,000	57,000
1,200		38,000	16,000	6,000		93,000	57,000
1,300		38,000	16,000	6,100		101,000	63,000
1,400		40,000	18,000	6,200		101,000	63,000
1,500		40,000	18,000	6,300		101,000	63,000
1,600		43,000	20,000	6,400		101,000	63,000
1,700		43,000	20,000	6,500		101,000	63,000
1,800		46,000	22,000	6,600		101,000	63,000
1,900		46,000	22,000	6,700		101,000	63,000
2,000		49,000	24,000	6,800		109,000	69,000
2,100		49,000	24,000	6,900		109,000	69,000
2,200		53,000	27,000	7,000		109,000	69,000
2,300		53,000	27,000	7,100		109,000	69,000
2,400		57,000	30,000	7,200		109,000	69,000
2,500		57,000	30,000	7,300		109,000	69,000
2,600		57,000	30,000	7,400		109,000	69,000
2,700		61,000	33,000	7,500		109,000	69,000
2,800		61,000	33,000	7,600		117,000	75,000
2,900		61,000	33,000	7,700		117,000	75,000
3,000		61,000	33,000	7,800		117,000	75,000
3,100		65,000	36,000	7,900		117,000	75,000
3,200		65,000	36,000	8,000		117,000	75,000
3,300		65,000	36,000	8,100		117,000	75,000
3,400		70,000	39,000	8,200		117,000	75,000
3,500		70,000	39,000	8,300		117,000	75,000
3,600		70,000	39,000	8,400		117,000	75,000
3,700		70,000	39,000	8,500		117,000	75,000
3,800		75,000	43,000	8,800		125,000	81,000
3,900		75,000	43,000	9,000		125,000	81,000
4,000		75,000	43,000	9,300		125,000	81,000
4,100		75,000	43,000	9,500		125,000	81,000
4,200		75,000	43,000	9,800		133,000	87,000
4,300		80,000	47,000	10,000		133,000	87,000
4,400		80,000	47,000	10,200		133,000	87,000
4,500		80,000	47,000	10,500		133,000	87,000
4,600		80,000	47,000	11,000		142,000	94,000
4,700		80,000	47,000	11,500		142,000	94,000
4,800		86,000	52,000	12,000		151,000	101,000
4,900		86,000	52,000	12,500		151,000	101,000
5,000		86,000	52,000	13,000		151,000	101,000
5,100		86,000	52,000	13,500		160,000	108,000
5,200		86,000	52,000	14,000		160,000	108,000
5,300		86,000	52,000				
5,400		93,000	57,000				
5,500		93,000	57,000				
5,600		93,000	57,000				
5,700		93,000	57,000				

Forets hélicoïdaux à queue cylindrique

Jeux de forets hélicoïdaux



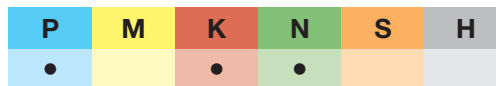
- dans des casiers en matière plastique
- composé des articles n° du catalogue 71221
- affûtage en pente

Référence 79012

N° de code	d1 mm	ascendant par mm	Pièce/jeu
7,014	1,0-13,0	0,5	25
7,018	1,0-10,5	0,5	24

Forets hélicoïdaux à queue cylindrique

Jeux de forets hélicoïdaux



- dans des casiers en matière plastique
- composé des articles n° du catalogue 71115
- affûtage à dépouille conique
- poli < 2,36 mm

Référence 78879

N° de code	d1 mm	ascendant par mm	Pièce/jeu
0,011	1,0-5,0	0,1	41
0,012	5,1-10,0	0,1	50
0,013	1,0-10,0	0,5	19
0,014	1,0-13,0	0,5	25
0,015	1,0-5,9	0,1	50
0,016	6,0-10,0	0,1	41
0,018	1,0-10,5	0,5	24

Forets hélicoïdaux à queue cylindrique

Jeux de forets hélicoïdaux



N	~5xD	DIN 338	HSS	sommet rev. TiN	118°	h8	R	Cyl
P	M	K	N	S	H			
○		●	○					

- dans des casiers en matière plastique
- composé des articles n° du catalogue 61115
- affûtage à dépouille conique

Référence 78880

N° de code	d1 mm	ascendant par mm	Pièce/jeu
6,013	1,0-10,0	0,5	19
6,014	1,0-13,0	0,5	25

Forets hélicoïdaux à queue cylindrique

Jeux de forets hélicoïdaux



- Support en bakélite

Référence 78877

N° de code	d1 mm
0,111	1,0-5,0
0,112	5,1-10,0
0,113	1,0-10,0
0,114	1,0-13,0

Forets hélicoïdaux à queue cylindrique

Jeux de forets hélicoïdaux



- cassette plastique

Référence 78878

N° de code	d1 mm	ascendant par mm	Pièce/jeu
0,213	1,0-10,0	0,5	19
0,214	1,0-13,0	0,5	25
0,215	1,0-5,9	0,1	50
0,216	6,0-10,0	0,1	41

Forets hélicoïdaux à queue cylindrique

Forets hélicoïd. à queue cylind.renforcée



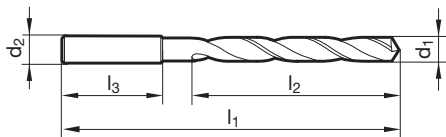
Référence **61120**



P	M	K	N	S	H
•	•	•	•		

Conseils d'util.,
page 178

- Amin. de l'âme $\geq \varnothing 2,000$
- affûtage en pente
- faible effort d'avance nécessaire
- faible effort de couple nécessaire
- meilleure résistance à l'usure
- pour applications universelles
- avec attachement décollé



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
2,000	3,000	44,000	12,000	28,000
2,100	3,000	44,000	12,000	28,000
2,200	3,000	45,000	13,000	28,000
2,300	3,000	45,000	13,000	28,000
2,400	3,000	46,000	14,000	28,000
2,500	3,000	46,000	14,000	28,000
2,600	3,000	46,000	14,000	28,000
2,700	3,000	48,000	16,000	28,000
2,800	3,000	48,000	16,000	28,000
2,900	3,000	48,000	16,000	28,000
3,000	3,000	48,000	16,000	28,000
3,100	4,000	50,000	18,000	28,000
3,200	4,000	50,000	18,000	28,000
3,300	4,000	50,000	18,000	28,000
3,400	4,000	52,000	20,000	28,000
3,500	4,000	52,000	20,000	28,000
3,600	4,000	52,000	20,000	28,000
3,700	4,000	52,000	20,000	28,000
3,800	4,000	54,000	22,000	28,000
3,900	4,000	54,000	22,000	28,000
4,000	4,000	54,000	22,000	28,000
4,100	6,000	66,000	22,000	36,000
4,200	6,000	66,000	22,000	36,000
4,300	6,000	68,000	24,000	36,000
4,400	6,000	68,000	24,000	36,000
4,500	6,000	68,000	24,000	36,000
4,600	6,000	68,000	24,000	36,000
4,700	6,000	68,000	24,000	36,000
4,800	6,000	70,000	26,000	36,000
4,900	6,000	70,000	26,000	36,000
5,000	6,000	70,000	26,000	36,000
5,100	6,000	70,000	26,000	36,000
5,200	6,000	70,000	26,000	36,000
5,300	6,000	70,000	26,000	36,000
5,400	6,000	72,000	28,000	36,000
5,500	6,000	72,000	28,000	36,000
5,600	6,000	72,000	28,000	36,000
5,700	6,000	72,000	28,000	36,000
5,800	6,000	72,000	28,000	36,000
5,900	6,000	72,000	28,000	36,000
6,000	6,000	72,000	28,000	36,000
6,100	8,000	75,000	31,000	36,000
6,200	8,000	75,000	31,000	36,000
6,300	8,000	75,000	31,000	36,000
6,400	8,000	75,000	31,000	36,000
6,500	8,000	75,000	31,000	36,000
6,600	8,000	75,000	31,000	36,000
6,700	8,000	75,000	31,000	36,000

d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
6,800	8,000	78,000	34,000	36,000
6,900	8,000	78,000	34,000	36,000
7,000	8,000	78,000	34,000	36,000
7,100	8,000	78,000	34,000	36,000
7,200	8,000	78,000	34,000	36,000
7,300	8,000	78,000	34,000	36,000
7,400	8,000	78,000	34,000	36,000
7,500	8,000	78,000	34,000	36,000
7,600	8,000	81,000	37,000	36,000
7,700	8,000	81,000	37,000	36,000
7,800	8,000	81,000	37,000	36,000
7,900	8,000	81,000	37,000	36,000
8,000	8,000	81,000	37,000	36,000
8,100	10,000	87,000	37,000	40,000
8,200	10,000	87,000	37,000	40,000
8,300	10,000	87,000	37,000	40,000
8,400	10,000	87,000	37,000	40,000
8,500	10,000	87,000	37,000	40,000
8,600	10,000	91,000	40,000	40,000
8,700	10,000	91,000	40,000	40,000
8,800	10,000	91,000	40,000	40,000
8,900	10,000	91,000	40,000	40,000
9,000	10,000	91,000	40,000	40,000
9,100	10,000	91,000	40,000	40,000
9,200	10,000	91,000	40,000	40,000
9,300	10,000	91,000	40,000	40,000
9,400	10,000	91,000	40,000	40,000
9,500	10,000	91,000	40,000	40,000
9,600	10,000	93,000	43,000	40,000
9,700	10,000	93,000	43,000	40,000
9,800	10,000	93,000	43,000	40,000
9,900	10,000	93,000	43,000	40,000
10,000	10,000	93,000	43,000	40,000
10,100	12,000	100,000	43,000	45,000
10,200	12,000	100,000	43,000	45,000
10,300	12,000	100,000	43,000	45,000
10,400	12,000	100,000	43,000	45,000
10,500	12,000	100,000	43,000	45,000
10,600	12,000	100,000	43,000	45,000
10,700	12,000	104,000	47,000	45,000
10,800	12,000	104,000	47,000	45,000
10,900	12,000	104,000	47,000	45,000
11,000	12,000	104,000	47,000	45,000
11,100	12,000	104,000	47,000	45,000
11,200	12,000	104,000	47,000	45,000
11,300	12,000	104,000	47,000	45,000
11,400	12,000	104,000	47,000	45,000
11,500	12,000	104,000	47,000	45,000

d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
11,600	12,000	104,000	47,000	45,000	14,500	16,000	116,000	56,000	48,000
11,700	12,000	104,000	47,000	45,000	15,000	16,000	116,000	56,000	48,000
11,800	12,000	104,000	47,000	45,000	15,500	16,000	118,000	58,000	48,000
11,900	12,000	108,000	51,000	45,000	16,000	16,000	118,000	58,000	48,000
12,000	12,000	108,000	51,000	45,000	16,500	20,000	126,000	60,000	50,000
12,100	16,000	111,000	51,000	48,000	17,000	20,000	126,000	60,000	50,000
12,200	16,000	111,000	51,000	48,000	17,500	20,000	128,000	62,000	50,000
12,300	16,000	111,000	51,000	48,000	18,000	20,000	128,000	62,000	50,000
12,400	16,000	111,000	51,000	48,000	18,500	20,000	130,000	64,000	50,000
12,500	16,000	111,000	51,000	48,000	19,000	20,000	130,000	64,000	50,000
12,600	16,000	111,000	51,000	48,000	19,500	20,000	132,000	66,000	50,000
12,700	16,000	111,000	51,000	48,000	20,000	20,000	132,000	66,000	50,000
12,800	16,000	111,000	51,000	48,000					
12,900	16,000	111,000	51,000	48,000					
13,000	16,000	111,000	51,000	48,000					
13,100	16,000	111,000	51,000	48,000					
13,500	16,000	114,000	54,000	48,000					
14,000	16,000	114,000	54,000	48,000					

Forets hélicoïdaux à queue cylindrique

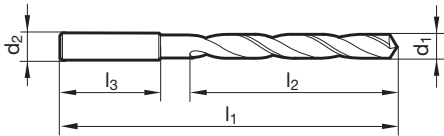
Forets hélicoïd. à queue cylind.renforcée



Référence **61121**

NX	~5xD	WN	HSS-Co	TiN	118°	h8	R	HA
P	M	K	N	S	H	Conseils d'util., page 184		
•	•	•	•					

- Amin. de l'âme $\geq \varnothing 2,000$
- affûtage en pente
- faible effort d'avance nécessaire
- faible effort de couple nécessaire
- meilleure résistance à l'usure
- pour applications universelles
- avec attachement décollété



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
2,000	3,000	56,000	24,000	28,000
2,100	3,000	56,000	24,000	28,000
2,200	3,000	59,000	27,000	28,000
2,300	3,000	59,000	27,000	28,000
2,400	3,000	62,000	30,000	28,000
2,500	3,000	62,000	30,000	28,000
2,600	3,000	62,000	30,000	28,000
2,700	3,000	65,000	33,000	28,000
2,800	3,000	65,000	33,000	28,000
2,900	3,000	65,000	33,000	28,000
3,000	3,000	65,000	33,000	28,000
3,100	4,000	68,000	36,000	28,000
3,200	4,000	68,000	36,000	28,000
3,300	4,000	68,000	36,000	28,000
3,400	4,000	71,000	39,000	28,000
3,500	4,000	71,000	39,000	28,000
3,600	4,000	71,000	39,000	28,000
3,700	4,000	71,000	39,000	28,000
3,800	4,000	75,000	43,000	28,000
3,900	4,000	75,000	43,000	28,000
4,000	4,000	75,000	43,000	28,000
4,100	6,000	87,000	43,000	36,000
4,200	6,000	87,000	43,000	36,000
4,300	6,000	91,000	47,000	36,000
4,400	6,000	91,000	47,000	36,000
4,500	6,000	91,000	47,000	36,000
4,600	6,000	91,000	47,000	36,000
4,700	6,000	91,000	47,000	36,000
4,800	6,000	96,000	52,000	36,000
4,900	6,000	96,000	52,000	36,000
5,000	6,000	96,000	52,000	36,000
5,100	6,000	96,000	52,000	36,000
5,200	6,000	96,000	52,000	36,000
5,300	6,000	96,000	52,000	36,000
5,400	6,000	101,000	57,000	36,000
5,500	6,000	101,000	57,000	36,000
5,600	6,000	101,000	57,000	36,000
5,700	6,000	101,000	57,000	36,000
5,800	6,000	101,000	57,000	36,000
5,900	6,000	101,000	57,000	36,000
6,000	6,000	101,000	57,000	36,000
6,100	8,000	107,000	63,000	36,000
6,200	8,000	107,000	63,000	36,000
6,300	8,000	107,000	63,000	36,000
6,400	8,000	107,000	63,000	36,000
6,500	8,000	107,000	63,000	36,000
6,600	8,000	107,000	63,000	36,000
6,700	8,000	107,000	63,000	36,000

d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
6,800	8,000	113,000	69,000	36,000
6,900	8,000	113,000	69,000	36,000
7,000	8,000	113,000	69,000	36,000
7,100	8,000	113,000	69,000	36,000
7,200	8,000	113,000	69,000	36,000
7,300	8,000	113,000	69,000	36,000
7,400	8,000	113,000	69,000	36,000
7,500	8,000	113,000	69,000	36,000
7,600	8,000	119,000	75,000	36,000
7,700	8,000	119,000	75,000	36,000
7,800	8,000	119,000	75,000	36,000
7,900	8,000	119,000	75,000	36,000
8,000	8,000	119,000	75,000	36,000
8,100	10,000	125,000	75,000	40,000
8,200	10,000	125,000	75,000	40,000
8,300	10,000	125,000	75,000	40,000
8,400	10,000	125,000	75,000	40,000
8,500	10,000	125,000	75,000	40,000
8,600	10,000	131,000	81,000	40,000
8,700	10,000	131,000	81,000	40,000
8,800	10,000	131,000	81,000	40,000
8,900	10,000	131,000	81,000	40,000
9,000	10,000	131,000	81,000	40,000
9,100	10,000	131,000	81,000	40,000
9,200	10,000	131,000	81,000	40,000
9,300	10,000	131,000	81,000	40,000
9,400	10,000	131,000	81,000	40,000
9,500	10,000	131,000	81,000	40,000
9,600	10,000	137,000	87,000	40,000
9,700	10,000	137,000	87,000	40,000
9,800	10,000	137,000	87,000	40,000
10,000	10,000	137,000	87,000	40,000
10,100	12,000	144,000	87,000	45,000
10,200	12,000	144,000	87,000	45,000
10,300	12,000	144,000	87,000	45,000
10,400	12,000	144,000	87,000	45,000
10,500	12,000	144,000	87,000	45,000
10,600	12,000	144,000	87,000	45,000
10,700	12,000	151,000	94,000	45,000
10,800	12,000	151,000	94,000	45,000
10,900	12,000	151,000	94,000	45,000
11,000	12,000	151,000	94,000	45,000
11,100	12,000	151,000	94,000	45,000
11,200	12,000	151,000	94,000	45,000
11,300	12,000	151,000	94,000	45,000
11,400	12,000	151,000	94,000	45,000
11,500	12,000	151,000	94,000	45,000
11,600	12,000	151,000	94,000	45,000

d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
11,700	12,000	151,000	94,000	45,000	15,000	16,000	169,000	109,000	48,000
11,800	12,000	151,000	94,000	45,000	15,500	16,000	172,000	112,000	48,000
11,900	12,000	158,000	101,000	45,000	16,000	16,000	172,000	112,000	48,000
12,000	12,000	158,000	101,000	45,000	16,500	20,000	181,000	115,000	50,000
12,100	16,000	161,000	101,000	48,000	17,000	20,000	181,000	115,000	50,000
12,200	16,000	161,000	101,000	48,000	17,500	20,000	184,000	118,000	50,000
12,300	16,000	161,000	101,000	48,000	18,000	20,000	184,000	118,000	50,000
12,400	16,000	161,000	101,000	48,000	18,500	20,000	188,000	122,000	50,000
12,500	16,000	161,000	101,000	48,000	19,000	20,000	188,000	122,000	50,000
12,600	16,000	161,000	101,000	48,000	19,500	20,000	191,000	125,000	50,000
12,700	16,000	161,000	101,000	48,000	20,000	20,000	191,000	125,000	50,000
12,800	16,000	161,000	101,000	48,000					
12,900	16,000	161,000	101,000	48,000					
13,000	16,000	161,000	101,000	48,000					
13,100	16,000	161,000	101,000	48,000					
13,500	16,000	166,000	106,000	48,000					
14,000	16,000	166,000	106,000	48,000					
14,500	16,000	169,000	109,000	48,000					

Forets hélicoïdaux à queue cylindrique

Forets hélicoïd. à queue cylind.renforcée



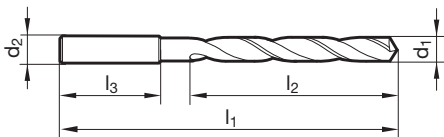
Référence **51132**



P	M	K	N	S	H
●		●		○	

Conseils d'util.,
page 184

- Amin. de l'âme $\geq \varnothing 2,000$
- affûtage à dépouille conique
- particulièrement rigide
- résistance à l'usure particulièrement élevée
- avec attachement décollé



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
2,000	3,000	56,000	24,000	28,000
2,200	3,000	59,000	27,000	28,000
2,500	3,000	62,000	30,000	28,000
3,000	3,000	65,000	33,000	28,000
3,200	4,000	68,000	36,000	28,000
3,300	4,000	68,000	36,000	28,000
3,400	4,000	71,000	39,000	28,000
3,500	4,000	71,000	39,000	28,000
3,700	4,000	71,000	39,000	28,000
3,800	4,000	75,000	43,000	28,000
4,000	4,000	75,000	43,000	28,000
4,200	6,000	87,000	43,000	36,000
4,300	6,000	91,000	47,000	36,000
4,500	6,000	91,000	47,000	36,000
4,600	6,000	91,000	47,000	36,000
4,800	6,000	96,000	52,000	36,000
5,000	6,000	96,000	52,000	36,000
5,100	6,000	96,000	52,000	36,000
5,500	6,000	101,000	57,000	36,000
5,700	6,000	101,000	57,000	36,000
5,800	6,000	101,000	57,000	36,000
6,000	6,000	101,000	57,000	36,000
6,500	8,000	107,000	63,000	36,000
6,800	8,000	113,000	69,000	36,000

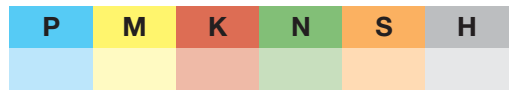
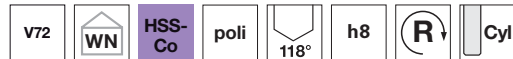
d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
6,900	8,000	113,000	69,000	36,000
7,000	8,000	113,000	69,000	36,000
7,400	8,000	113,000	69,000	36,000
7,500	8,000	113,000	69,000	36,000
7,800	8,000	119,000	75,000	36,000
8,000	8,000	119,000	75,000	36,000
8,500	10,000	125,000	75,000	40,000
8,600	10,000	131,000	81,000	40,000
8,800	10,000	131,000	81,000	40,000
9,000	10,000	131,000	81,000	40,000
9,300	10,000	131,000	81,000	40,000
9,500	10,000	131,000	81,000	40,000
10,000	10,000	137,000	87,000	40,000
10,200	12,000	144,000	87,000	45,000
10,300	12,000	144,000	87,000	45,000
10,500	12,000	144,000	87,000	45,000
11,000	12,000	151,000	94,000	45,000
11,200	12,000	151,000	94,000	45,000
11,500	12,000	151,000	94,000	45,000
12,000	12,000	158,000	101,000	45,000
12,100	14,000	161,000	101,000	45,000
12,500	14,000	161,000	101,000	45,000
13,000	14,000	161,000	101,000	45,000

Forets hélicoïdaux à queue cylindrique

Forets hél. courts, queue cyl. Ø 16,0 mm

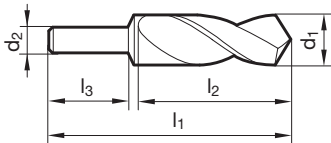


Référence **71168**



Conseils d'util.,
page 176

- pour la transformation, par exemple, rectification du diamètre, affûtage de l'étage, affûtage de forme spéciale
- sans affûtage au sommet, non coupant



d1 mm	l1 mm	l2 mm
16,000	130,000	88,000
16,500	130,000	88,000
17,000	130,000	88,000
17,500	130,000	88,000
18,000	130,000	88,000
19,000	130,000	88,000
20,000	130,000	88,000
20,500	130,000	88,000
21,000	130,000	88,000
21,500	130,000	88,000
22,000	130,000	88,000
23,000	130,000	88,000

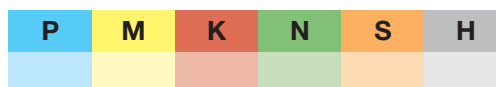
d1 mm	l1 mm	l2 mm
24,000	130,000	88,000
24,500	130,000	88,000
25,000	130,000	88,000
25,500	140,000	98,000
26,000	140,000	98,000
27,000	140,000	98,000
28,000	140,000	98,000
30,000	140,000	98,000

Forets hélicoïdaux à queue cylindrique

Forets hél. courts, queue cyl. Ø 25,4 mm

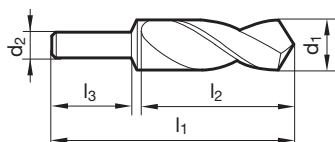


Référence **71169**



Conseils d'util.,
page 176

- avec queue décolletée
- pour la transformation, par exemple, rectification du diamètre, affûtage de l'étagé, affûtage de forme spéciale
- sans affûtage au sommet, non coupant



d1 mm	l1 mm	l2 mm
28,000	140,000	93,000
30,000	140,000	93,000
32,000	140,000	93,000
36,000	140,000	93,000
40,000	140,000	93,000

d1 mm	l1 mm	l2 mm

Forets hélicoïdaux à queue cylindrique

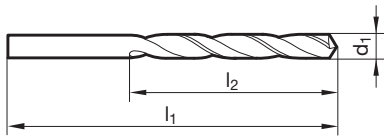
Forets pour perçage par canon



Référence 71130

N	-10xD	DIN 339	HSS	traité va-peur	118°	h8	R	Cyl
P	M	K	N	S	H	Conseils d'util., page 186		
•		•	•					

- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage à dépouille conique
- pour le perçage avec canons de perçage
- à partir du $\varnothing = 3,00$ mm, avec tenon d'entraînement selon Norme DIN 1809
- poli $< 2,36$ mm



d1 mm	l1 mm	l2 mm
1,000	48,000	26,000
1,150	50,000	28,000
1,200	52,000	30,000
1,350	55,000	33,000
1,500	55,000	33,000
1,850	62,000	38,000
2,000	66,000	41,000
2,300	70,000	44,000
2,500	74,000	47,000
2,600	74,000	47,000
2,800	79,000	51,000
2,850	79,000	51,000
2,900	79,000	51,000
3,100	84,000	55,000
3,200	84,000	55,000
3,400	91,000	60,000
3,800	96,000	64,000
3,900	96,000	64,000
4,000	96,000	64,000
4,100	96,000	64,000
4,300	102,000	69,000
4,400	102,000	69,000
4,500	102,000	69,000
4,600	102,000	69,000
4,700	102,000	69,000
4,800	108,000	74,000
4,900	108,000	74,000
5,000	108,000	74,000
5,100	108,000	74,000
5,400	116,000	80,000
5,600	116,000	80,000
5,700	116,000	80,000
5,800	116,000	80,000
5,900	116,000	80,000
6,000	116,000	80,000
6,100	124,000	86,000
6,200	124,000	86,000
6,400	124,000	86,000
6,500	124,000	86,000
6,600	124,000	86,000
6,800	133,000	93,000
7,000	133,000	93,000
7,100	133,000	93,000
7,200	133,000	93,000
7,300	133,000	93,000
7,400	133,000	93,000
7,500	133,000	93,000
7,600	142,000	100,000

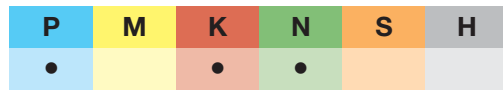
d1 mm	l1 mm	l2 mm
7,700	142,000	100,000
7,800	142,000	100,000
7,900	142,000	100,000
8,000	142,000	100,000
8,100	142,000	100,000
8,200	142,000	100,000
8,300	142,000	100,000
8,500	142,000	100,000
8,700	151,000	107,000
8,800	151,000	107,000
9,000	151,000	107,000
9,100	151,000	107,000
9,200	151,000	107,000
9,300	151,000	107,000
9,400	151,000	107,000
9,500	151,000	107,000
9,600	162,000	116,000
9,900	162,000	116,000
10,000	162,000	116,000
10,200	162,000	116,000
10,500	162,000	116,000
11,000	173,000	125,000
11,200	173,000	125,000
11,800	173,000	125,000
12,000	184,000	134,000
12,200	184,000	134,000
12,500	184,000	134,000
13,000	184,000	134,000
13,500	194,000	142,000
14,000	194,000	142,000
14,500	202,000	147,000
15,000	202,000	147,000
16,000	211,000	153,000
17,000	218,000	159,000
17,500	226,000	165,000
18,000	226,000	165,000
18,500	234,000	171,000
19,000	234,000	171,000
19,200	242,000	177,000
19,500	242,000	177,000

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux longs

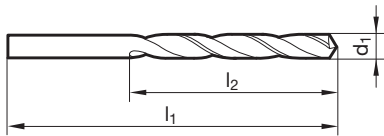


Référence 71136



Conseils d'util.,
page 186

- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage à dépouille conique
- pour les perçages profonds
- pour le perçage avec canons de perçage



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,500		32,000	12,000	5,400		139,000	91,000
0,600		35,000	15,000	5,500		139,000	91,000
0,700		42,000	21,000	5,600		139,000	91,000
0,800		46,000	25,000	5,700		139,000	91,000
0,900		51,000	29,000	5,800		139,000	91,000
1,000		56,000	33,000	5,900		139,000	91,000
1,050		56,000	33,000	6,000		139,000	91,000
1,100		60,000	37,000	6,200		148,000	97,000
1,200		65,000	41,000	6,300		148,000	97,000
1,250		65,000	41,000	6,400		148,000	97,000
1,300		65,000	41,000	6,500		148,000	97,000
1,500		70,000	45,000	6,600		148,000	97,000
1,550		76,000	50,000	6,700		148,000	97,000
1,600		76,000	50,000	6,800		156,000	102,000
1,650		76,000	50,000	6,900		156,000	102,000
1,800		80,000	53,000	7,000		156,000	102,000
1,850		80,000	53,000	7,100		156,000	102,000
1,900		80,000	53,000	7,500		156,000	102,000
1,950		85,000	56,000	7,600		165,000	109,000
2,000		85,000	56,000	8,000		165,000	109,000
2,400		95,000	62,000	8,100		165,000	109,000
2,500		95,000	62,000	8,200		165,000	109,000
2,600		95,000	62,000	8,500		165,000	109,000
2,700		100,000	66,000	8,700		175,000	115,000
2,900		100,000	66,000	8,800		175,000	115,000
3,000		100,000	66,000	8,900		175,000	115,000
3,200		106,000	69,000	9,000		175,000	115,000
3,300		106,000	69,000	9,100		175,000	115,000
3,400		112,000	73,000	9,200		175,000	115,000
3,500		112,000	73,000	9,300		175,000	115,000
3,600		112,000	73,000	9,500		175,000	115,000
3,700		112,000	73,000	9,600		184,000	121,000
3,800		119,000	78,000	9,700		184,000	121,000
3,900		119,000	78,000	9,900		184,000	121,000
4,000		119,000	78,000	10,000		184,000	121,000
4,100		119,000	78,000	10,200		184,000	121,000
4,200		119,000	78,000	10,500		184,000	121,000
4,300		126,000	82,000	11,000		195,000	128,000
4,400		126,000	82,000	11,500		195,000	128,000
4,500		126,000	82,000	12,000		205,000	134,000
4,600		126,000	82,000	12,500		205,000	134,000
4,700		126,000	82,000	13,000		205,000	134,000
4,800		132,000	87,000	13,500		214,000	140,000
4,900		132,000	87,000	14,500		220,000	144,000
5,000		132,000	87,000	15,000		220,000	144,000
5,100		132,000	87,000	15,500		227,000	149,000
5,200		132,000	87,000	16,000		227,000	149,000
5,300		132,000	87,000	16,500		235,000	154,000

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux longs



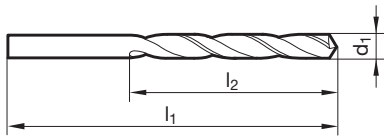
Référence 71135



P	M	K	N	S	H
•		•	•		

Conseils d'util.,
page 186

- Amin. de l'âme $\geq \varnothing 1,800$
- affûtage à dépouille conique
- pour les perçages profonds
- pour le perçage avec canons de perçage
- poli < 2,36 mm



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,800		80,000	53,000	6,250		148,000	97,000
2,000		85,000	56,000	6,300		148,000	97,000
2,050		85,000	56,000	6,400		148,000	97,000
2,100		85,000	56,000	6,500		148,000	97,000
2,300		90,000	59,000	6,600		148,000	97,000
2,400		95,000	62,000	6,700		148,000	97,000
2,500		95,000	62,000	6,800		156,000	102,000
2,600		95,000	62,000	6,900		156,000	102,000
2,800		100,000	66,000	7,000		156,000	102,000
3,000		100,000	66,000	7,100		156,000	102,000
3,050		106,000	69,000	7,200		156,000	102,000
3,100		106,000	69,000	7,250		156,000	102,000
3,200		106,000	69,000	7,300		156,000	102,000
3,250		106,000	69,000	7,400		156,000	102,000
3,300		106,000	69,000	7,500		156,000	102,000
3,400		112,000	73,000	7,600		165,000	109,000
3,500		112,000	73,000	7,700		165,000	109,000
3,550		112,000	73,000	7,800		165,000	109,000
3,600		112,000	73,000	7,900		165,000	109,000
3,700		112,000	73,000	8,000		165,000	109,000
3,800		119,000	78,000	8,100		165,000	109,000
3,850		119,000	78,000	8,200		165,000	109,000
3,900		119,000	78,000	8,300		165,000	109,000
4,000		119,000	78,000	8,400		165,000	109,000
4,100		119,000	78,000	8,500		165,000	109,000
4,200		119,000	78,000	8,600		175,000	115,000
4,250		119,000	78,000	8,700		175,000	115,000
4,300		126,000	82,000	8,750		175,000	115,000
4,500		126,000	82,000	8,800		175,000	115,000
4,600		126,000	82,000	8,900		175,000	115,000
4,650		126,000	82,000	9,000		175,000	115,000
4,750		126,000	82,000	9,100		175,000	115,000
4,800		132,000	87,000	9,200		175,000	115,000
4,850		132,000	87,000	9,300		175,000	115,000
4,900		132,000	87,000	9,400		175,000	115,000
5,000		132,000	87,000	9,500		175,000	115,000
5,100		132,000	87,000	9,600		184,000	121,000
5,200		132,000	87,000	9,700		184,000	121,000
5,300		132,000	87,000	9,800		184,000	121,000
5,400		139,000	91,000	9,900		184,000	121,000
5,500		139,000	91,000	10,000		184,000	121,000
5,600		139,000	91,000	10,100		184,000	121,000
5,700		139,000	91,000	10,200		184,000	121,000
5,800		139,000	91,000	10,250		184,000	121,000
5,900		139,000	91,000	10,300		184,000	121,000
6,000		139,000	91,000	10,400		184,000	121,000
6,100		148,000	97,000	10,500		184,000	121,000
6,200		148,000	97,000	10,600		184,000	121,000

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
10,700		195,000	128,000	15,000		220,000	144,000
10,800		195,000	128,000	15,500		227,000	149,000
10,900		195,000	128,000	16,000		227,000	149,000
11,000		195,000	128,000	17,000		235,000	154,000
11,500		195,000	128,000	18,000		241,000	158,000
11,750		195,000	128,000	20,000		254,000	166,000
12,000		205,000	134,000				
12,500		205,000	134,000				
13,000		205,000	134,000				
13,500		214,000	140,000				
14,000		214,000	140,000				
14,500		220,000	144,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux longs



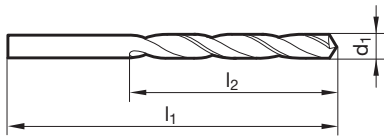
Référence **61136**



P	M	K	N	S	H
●		●	○		

Conseils d'util.,
page 186

- Amin. de l'âme $\geq \text{Ø } 1,000$
- affûtage à dépouille conique
- pour les perçages profonds
- pour le perçage avec canons de perçage
- meilleure résistance à l'usure



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		56,000	33,000	5,800		139,000	91,000
1,100		60,000	37,000	5,900		139,000	91,000
1,200		65,000	41,000	6,000		139,000	91,000
1,300		65,000	41,000	6,100		148,000	97,000
1,400		70,000	45,000	6,200		148,000	97,000
1,500		70,000	45,000	6,300		148,000	97,000
1,600		76,000	50,000	6,400		148,000	97,000
1,700		76,000	50,000	6,500		148,000	97,000
1,800		80,000	53,000	6,600		148,000	97,000
1,900		80,000	53,000	6,700		148,000	97,000
2,000		85,000	56,000	6,800		156,000	102,000
2,100		85,000	56,000	6,900		156,000	102,000
2,200		90,000	59,000	7,000		156,000	102,000
2,300		90,000	59,000	7,100		156,000	102,000
2,400		95,000	62,000	7,200		156,000	102,000
2,500		95,000	62,000	7,300		156,000	102,000
2,600		95,000	62,000	7,400		156,000	102,000
2,700		100,000	66,000	7,500		156,000	102,000
2,800		100,000	66,000	7,600		165,000	109,000
2,900		100,000	66,000	7,700		165,000	109,000
3,000		100,000	66,000	7,800		165,000	109,000
3,100		106,000	69,000	7,900		165,000	109,000
3,200		106,000	69,000	8,000		165,000	109,000
3,300		106,000	69,000	8,100		165,000	109,000
3,400		112,000	73,000	8,200		165,000	109,000
3,500		112,000	73,000	8,300		165,000	109,000
3,600		112,000	73,000	8,400		165,000	109,000
3,700		112,000	73,000	8,500		165,000	109,000
3,800		119,000	78,000	8,600		175,000	115,000
3,900		119,000	78,000	8,700		175,000	115,000
4,000		119,000	78,000	8,800		175,000	115,000
4,100		119,000	78,000	8,900		175,000	115,000
4,200		119,000	78,000	9,000		175,000	115,000
4,300		126,000	82,000	9,100		175,000	115,000
4,400		126,000	82,000	9,200		175,000	115,000
4,500		126,000	82,000	9,300		175,000	115,000
4,600		126,000	82,000	9,400		175,000	115,000
4,700		126,000	82,000	9,500		175,000	115,000
4,800		132,000	87,000	9,600		184,000	121,000
4,900		132,000	87,000	9,700		184,000	121,000
5,000		132,000	87,000	9,800		184,000	121,000
5,100		132,000	87,000	9,900		184,000	121,000
5,200		132,000	87,000	10,000		184,000	121,000
5,300		132,000	87,000	10,200		184,000	121,000
5,400		139,000	91,000	10,500		184,000	121,000
5,500		139,000	91,000	10,800		195,000	128,000
5,600		139,000	91,000	11,000		195,000	128,000
5,700		139,000	91,000	11,500		195,000	128,000

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
12,000		205,000	134,000	15,000		220,000	144,000
12,500		205,000	134,000	15,500		227,000	149,000
13,000		205,000	134,000	16,000		227,000	149,000
13,500		214,000	140,000				
14,000		214,000	140,000				
14,500		220,000	144,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux longs



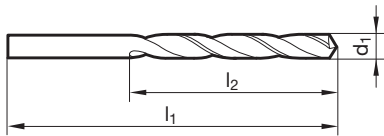
Référence **71222**



P	M	K	N	S	H
•	•	•	•		

Conseils d'util.,
page 184

- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage en pente
- faible effort d'avance nécessaire
- faible effort de couple nécessaire
- pour applications universelles



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		56,000	33,000	5,800		139,000	91,000
1,100		60,000	37,000	5,900		139,000	91,000
1,200		65,000	41,000	6,000		139,000	91,000
1,300		65,000	41,000	6,100		148,000	97,000
1,400		70,000	45,000	6,200		148,000	97,000
1,500		70,000	45,000	6,300		148,000	97,000
1,600		76,000	50,000	6,400		148,000	97,000
1,700		76,000	50,000	6,500		148,000	97,000
1,800		80,000	53,000	6,600		148,000	97,000
1,900		80,000	53,000	6,700		148,000	97,000
2,000		85,000	56,000	6,800		156,000	102,000
2,100		85,000	56,000	6,900		156,000	102,000
2,200		90,000	59,000	7,000		156,000	102,000
2,300		90,000	59,000	7,100		156,000	102,000
2,400		95,000	62,000	7,200		156,000	102,000
2,500		95,000	62,000	7,300		156,000	102,000
2,600		95,000	62,000	7,400		156,000	102,000
2,700		100,000	66,000	7,500		156,000	102,000
2,800		100,000	66,000	7,600		165,000	109,000
2,900		100,000	66,000	7,700		165,000	109,000
3,000		100,000	66,000	7,800		165,000	109,000
3,100		106,000	69,000	7,900		165,000	109,000
3,200		106,000	69,000	8,000		165,000	109,000
3,300		106,000	69,000	8,100		165,000	109,000
3,400		112,000	73,000	8,200		165,000	109,000
3,500		112,000	73,000	8,300		165,000	109,000
3,600		112,000	73,000	8,400		165,000	109,000
3,700		112,000	73,000	8,500		165,000	109,000
3,800		119,000	78,000	8,600		175,000	115,000
3,900		119,000	78,000	8,700		175,000	115,000
4,000		119,000	78,000	8,800		175,000	115,000
4,100		119,000	78,000	8,900		175,000	115,000
4,200		119,000	78,000	9,000		175,000	115,000
4,300		126,000	82,000	9,100		175,000	115,000
4,400		126,000	82,000	9,200		175,000	115,000
4,500		126,000	82,000	9,300		175,000	115,000
4,600		126,000	82,000	9,400		175,000	115,000
4,700		126,000	82,000	9,500		175,000	115,000
4,800		132,000	87,000	9,600		184,000	121,000
4,900		132,000	87,000	9,700		184,000	121,000
5,000		132,000	87,000	9,800		184,000	121,000
5,100		132,000	87,000	9,900		184,000	121,000
5,200		132,000	87,000	10,000		184,000	121,000
5,300		132,000	87,000	10,100		184,000	121,000
5,400		139,000	91,000	10,200		184,000	121,000
5,500		139,000	91,000	10,300		184,000	121,000
5,600		139,000	91,000	10,400		184,000	121,000
5,700		139,000	91,000	10,500		184,000	121,000

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
11,000		195,000	128,000	14,000		214,000	140,000
11,500		195,000	128,000				
12,000		205,000	134,000				
12,500		205,000	134,000				
13,000		205,000	134,000				
13,500		214,000	140,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux longs



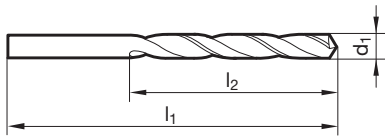
Référence **61222**



P	M	K	N	S	H
•	•	•	•		

Conseils d'util.,
page 184

- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage en pente
- faible effort de couple nécessaire
- faible effort d'avance nécessaire
- meilleure résistance à l'usure
- pour applications universelles



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		56,000	33,000	5,800		139,000	91,000
1,100		60,000	37,000	5,900		139,000	91,000
1,200		65,000	41,000	6,000		139,000	91,000
1,300		65,000	41,000	6,100		148,000	97,000
1,400		70,000	45,000	6,200		148,000	97,000
1,500		70,000	45,000	6,300		148,000	97,000
1,600		76,000	50,000	6,400		148,000	97,000
1,700		76,000	50,000	6,500		148,000	97,000
1,800		80,000	53,000	6,600		148,000	97,000
1,900		80,000	53,000	6,700		148,000	97,000
2,000		85,000	56,000	6,800		156,000	102,000
2,100		85,000	56,000	6,900		156,000	102,000
2,200		90,000	59,000	7,000		156,000	102,000
2,300		90,000	59,000	7,100		156,000	102,000
2,400		95,000	62,000	7,200		156,000	102,000
2,500		95,000	62,000	7,300		156,000	102,000
2,600		95,000	62,000	7,400		156,000	102,000
2,700		100,000	66,000	7,500		156,000	102,000
2,800		100,000	66,000	7,600		165,000	109,000
2,900		100,000	66,000	7,700		165,000	109,000
3,000		100,000	66,000	7,800		165,000	109,000
3,100		106,000	69,000	7,900		165,000	109,000
3,200		106,000	69,000	8,000		165,000	109,000
3,300		106,000	69,000	8,100		165,000	109,000
3,400		112,000	73,000	8,200		165,000	109,000
3,500		112,000	73,000	8,300		165,000	109,000
3,600		112,000	73,000	8,400		165,000	109,000
3,700		112,000	73,000	8,500		165,000	109,000
3,800		119,000	78,000	8,600		175,000	115,000
3,900		119,000	78,000	8,700		175,000	115,000
4,000		119,000	78,000	8,800		175,000	115,000
4,100		119,000	78,000	8,900		175,000	115,000
4,200		119,000	78,000	9,000		175,000	115,000
4,300		126,000	82,000	9,100		175,000	115,000
4,400		126,000	82,000	9,200		175,000	115,000
4,500		126,000	82,000	9,300		175,000	115,000
4,600		126,000	82,000	9,400		175,000	115,000
4,700		126,000	82,000	9,500		175,000	115,000
4,800		132,000	87,000	9,600		184,000	121,000
4,900		132,000	87,000	9,700		184,000	121,000
5,000		132,000	87,000	9,800		184,000	121,000
5,100		132,000	87,000	9,900		184,000	121,000
5,200		132,000	87,000	10,000		184,000	121,000
5,300		132,000	87,000	10,100		184,000	121,000
5,400		139,000	91,000	10,200		184,000	121,000
5,500		139,000	91,000	10,300		184,000	121,000
5,600		139,000	91,000	10,400		184,000	121,000
5,700		139,000	91,000	10,500		184,000	121,000

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
11,000		195,000	128,000	14,000		214,000	140,000
11,500		195,000	128,000				
12,000		205,000	134,000				
12,500		205,000	134,000				
13,000		205,000	134,000				
13,500		214,000	140,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux longs



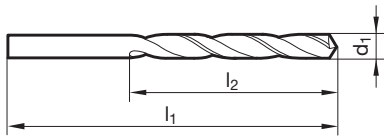
Référence 71225



P	M	K	N	S	H
•	•		•	•	

Conseils d'util.,
page 186

- Amin. de l'âme $\geq \varnothing 1,000$
- affûtage à dépouille conique
- meilleure résistance à l'usure
- de préférence pour les titanes et alliages de titanes
- partiellement valable pour les Hastelloy, Inconel et Nimonic



d1 mm	inch	l1 mm	l2 mm
1,000		56,000	33,000
1,100		60,000	37,000
1,200		65,000	41,000
1,300		65,000	41,000
1,400		70,000	45,000
1,500		70,000	45,000
1,600		76,000	50,000
1,700		76,000	50,000
1,800		80,000	53,000
2,000		85,000	56,000
2,200		90,000	59,000
2,300		90,000	59,000
2,500		95,000	62,000
2,600		95,000	62,000
2,700		100,000	66,000
3,000		100,000	66,000
3,100		106,000	69,000
3,200		106,000	69,000
3,300		106,000	69,000
3,400		112,000	73,000
3,500		112,000	73,000
3,600		112,000	73,000
3,700		112,000	73,000
3,800		119,000	78,000
3,900		119,000	78,000
4,000		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000
4,300		126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,600		126,000	82,000
4,700		126,000	82,000
4,800		132,000	87,000
5,000		132,000	87,000
5,200		132,000	87,000
5,300		132,000	87,000
5,400		139,000	91,000
5,500		139,000	91,000
5,600		139,000	91,000
5,700		139,000	91,000
5,800		139,000	91,000

d1 mm	inch	l1 mm	l2 mm
6,000		139,000	91,000
6,100		148,000	97,000
6,200		148,000	97,000
6,300		148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,700		148,000	97,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,100		156,000	102,000
7,200		156,000	102,000
7,300		156,000	102,000
7,400		156,000	102,000
7,500		156,000	102,000
7,600		165,000	109,000
7,800		165,000	109,000
7,900		165,000	109,000
8,000		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,300		165,000	109,000
8,500		165,000	109,000
9,000		175,000	115,000
9,500		175,000	115,000
10,000		184,000	121,000
10,200		184,000	121,000
10,500		184,000	121,000
11,000		195,000	128,000
12,000		205,000	134,000
13,000		205,000	134,000

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux longs

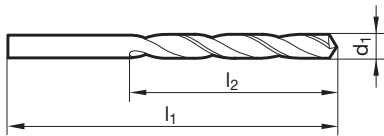


Référence 71150



Conseils d'util.,
page 186

- Amin. de l'âme $\geq \varnothing 1,500$
- affûtage à dépouille conique
- goujures larges



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,500		70,000	45,000	6,100		148,000	97,000
1,600		76,000	50,000	6,200		148,000	97,000
1,700		76,000	50,000	6,300		148,000	97,000
1,750		80,000	53,000	6,400		148,000	97,000
1,800		80,000	53,000	6,500		148,000	97,000
1,900		80,000	53,000	6,600		148,000	97,000
2,000		85,000	56,000	6,700		148,000	97,000
2,050		85,000	56,000	6,800		156,000	102,000
2,100		85,000	56,000	6,900		156,000	102,000
2,200		90,000	59,000	7,000		156,000	102,000
2,300		90,000	59,000	7,100		156,000	102,000
2,400		95,000	62,000	7,200		156,000	102,000
2,500		95,000	62,000	7,300		156,000	102,000
2,600		95,000	62,000	7,400		156,000	102,000
2,700		100,000	66,000	7,500		156,000	102,000
2,800		100,000	66,000	7,600		165,000	109,000
2,900		100,000	66,000	7,700		165,000	109,000
3,000		100,000	66,000	7,800		165,000	109,000
3,100		106,000	69,000	7,900		165,000	109,000
3,200		106,000	69,000	8,000		165,000	109,000
3,300		106,000	69,000	8,100		165,000	109,000
3,400		112,000	73,000	8,200		165,000	109,000
3,500		112,000	73,000	8,300		165,000	109,000
3,600		112,000	73,000	8,400		165,000	109,000
3,700		112,000	73,000	8,500		165,000	109,000
3,800		119,000	78,000	8,600		175,000	115,000
3,900		119,000	78,000	8,700		175,000	115,000
4,000		119,000	78,000	8,800		175,000	115,000
4,100		119,000	78,000	8,900		175,000	115,000
4,200		119,000	78,000	9,000		175,000	115,000
4,300		126,000	82,000	9,100		175,000	115,000
4,400		126,000	82,000	9,200		175,000	115,000
4,500		126,000	82,000	9,300		175,000	115,000
4,600		126,000	82,000	9,400		175,000	115,000
4,700		126,000	82,000	9,500		175,000	115,000
4,800		132,000	87,000	9,600		184,000	121,000
4,900		132,000	87,000	9,700		184,000	121,000
5,000		132,000	87,000	9,800		184,000	121,000
5,100		132,000	87,000	9,900		184,000	121,000
5,200		132,000	87,000	10,000		184,000	121,000
5,300		132,000	87,000	10,200		184,000	121,000
5,400		139,000	91,000	10,500		184,000	121,000
5,500		139,000	91,000	11,000		195,000	128,000
5,600		139,000	91,000	11,500		195,000	128,000
5,700		139,000	91,000	12,000		205,000	134,000
5,800		139,000	91,000				
5,900		139,000	91,000				
6,000		139,000	91,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux longs



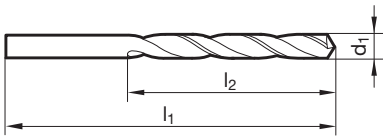
Référence **71152**



P	M	K	N	S	H
●		●	○		

Conseils d'util.,
page 186

- Amin. de l'âme $\geq \varnothing 1,500$
- affûtage à dépouille conique
- goujures larges



d1 mm	inch	l1 mm	l2 mm
1,500		70,000	45,000
1,600		76,000	50,000
1,900		80,000	53,000
2,400		95,000	62,000
2,500		95,000	62,000
2,700		100,000	66,000
2,900		100,000	66,000
3,000		100,000	66,000
3,300		106,000	69,000
3,400		112,000	73,000
3,500		112,000	73,000
4,000		119,000	78,000
4,200		119,000	78,000
4,500		126,000	82,000
5,000		132,000	87,000
6,000		139,000	91,000
6,600		148,000	97,000
6,800		156,000	102,000

d1 mm	inch	l1 mm	l2 mm
7,000		156,000	102,000
8,000		165,000	109,000
9,000		175,000	115,000
10,000		184,000	121,000
10,200		184,000	121,000
11,000		195,000	128,000
12,000		205,000	134,000
13,000		205,000	134,000

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux longs



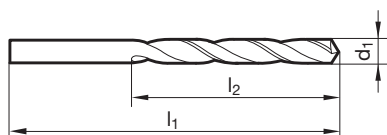
Référence **61150**



P	M	K	N	S	H
•		•	○		

Conseils d'util.,
page 186

- Amin. de l'âme $\geq \varnothing 2,000$
- affûtage à dépouille conique
- goujures larges
- meilleure protection contre l'usure



d1 mm	inch	l1 mm	l2 mm
2,000		85,000	56,000
2,500		95,000	62,000
3,000		100,000	66,000
3,300		106,000	69,000
3,500		112,000	73,000
4,000		119,000	78,000
4,200		119,000	78,000
4,500		126,000	82,000
5,000		132,000	87,000
5,500		139,000	91,000
6,000		139,000	91,000
8,000		165,000	109,000

d1 mm	inch	l1 mm	l2 mm
8,500		165,000	109,000
10,000		184,000	121,000
10,200		184,000	121,000
12,000		205,000	134,000

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux longs



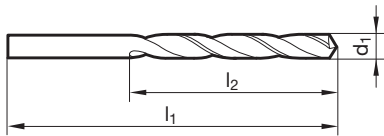
Référence **71154**



P	M	K	N	S	H
●		●	○		

Conseils d'util.,
page 186

- Amin. de l'âme $\geq \varnothing 1,500$
- affûtage à dépouille conique
- goujures larges
- particulièrement rigide



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,500		70,000	45,000	3,600		112,000	73,000
1,590	1/16	76,000	50,000	3,660		112,000	73,000
1,600		76,000	50,000	3,700		112,000	73,000
1,610		76,000	50,000	3,730		112,000	73,000
1,700		76,000	50,000	3,800		119,000	78,000
1,750		80,000	53,000	3,860		119,000	78,000
1,780		80,000	53,000	3,900		119,000	78,000
1,800		80,000	53,000	3,910		119,000	78,000
1,850		80,000	53,000	3,970	5/32	119,000	78,000
1,900		80,000	53,000	3,990		119,000	78,000
1,930		85,000	56,000	4,000		119,000	78,000
1,980	5/64	85,000	56,000	4,040		119,000	78,000
1,990		85,000	56,000	4,090		119,000	78,000
2,000		85,000	56,000	4,100		119,000	78,000
2,050		85,000	56,000	4,200		119,000	78,000
2,060		85,000	56,000	4,300		126,000	82,000
2,080		85,000	56,000	4,310		126,000	82,000
2,100		85,000	56,000	4,370	11/64	126,000	82,000
2,180		90,000	59,000	4,390		126,000	82,000
2,200		90,000	59,000	4,400		126,000	82,000
2,260		90,000	59,000	4,500		126,000	82,000
2,300		90,000	59,000	4,570		126,000	82,000
2,370		95,000	62,000	4,600		126,000	82,000
2,380	3/32	95,000	62,000	4,700		126,000	82,000
2,400		95,000	62,000	4,760	3/16	132,000	87,000
2,440		95,000	62,000	4,800		132,000	87,000
2,490		95,000	62,000	4,850		132,000	87,000
2,500		95,000	62,000	4,900		132,000	87,000
2,580		95,000	62,000	4,920		132,000	87,000
2,600		95,000	62,000	4,980		132,000	87,000
2,700		100,000	66,000	5,000		132,000	87,000
2,710		100,000	66,000	5,060		132,000	87,000
2,780	7/64	100,000	66,000	5,100		132,000	87,000
2,800		100,000	66,000	5,110		132,000	87,000
2,870		100,000	66,000	5,180		132,000	87,000
2,900		100,000	66,000	5,200		132,000	87,000
2,950		100,000	66,000	5,220		132,000	87,000
3,000		100,000	66,000	5,300		132,000	87,000
3,100		106,000	69,000	5,310		139,000	91,000
3,170	1/8	106,000	69,000	5,400		139,000	91,000
3,180		106,000	69,000	5,410		139,000	91,000
3,200		106,000	69,000	5,500		139,000	91,000
3,260		106,000	69,000	5,560	7/32	139,000	91,000
3,300		106,000	69,000	5,600		139,000	91,000
3,400		112,000	73,000	5,610		139,000	91,000
3,450		112,000	73,000	5,700		139,000	91,000
3,500		112,000	73,000	5,790		139,000	91,000
3,570	9/64	112,000	73,000	5,800		139,000	91,000

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
5,900		139,000	91,000	8,610		175,000	115,000
5,940		139,000	91,000	8,700		175,000	115,000
5,950	15/64	139,000	91,000	8,730	11/32	175,000	115,000
6,000		139,000	91,000	8,800		175,000	115,000
6,040		148,000	97,000	8,840		175,000	115,000
6,100		148,000	97,000	8,900		175,000	115,000
6,150		148,000	97,000	9,000		175,000	115,000
6,200		148,000	97,000	9,090		175,000	115,000
6,250		148,000	97,000	9,100		175,000	115,000
6,300		148,000	97,000	9,130	23/64	175,000	115,000
6,350	1/4	148,000	97,000	9,200		175,000	115,000
6,400		148,000	97,000	9,300		175,000	115,000
6,500		148,000	97,000	9,400		175,000	115,000
6,530		148,000	97,000	9,500		175,000	115,000
6,600		148,000	97,000	9,520	3/8	184,000	121,000
6,700		148,000	97,000	9,530		184,000	121,000
6,750	17/64	156,000	102,000	9,580		184,000	121,000
6,760		156,000	102,000	9,600		184,000	121,000
6,800		156,000	102,000	9,700		184,000	121,000
6,900		156,000	102,000	9,800		184,000	121,000
6,910		156,000	102,000	9,900		184,000	121,000
7,000		156,000	102,000	9,920	25/64	184,000	121,000
7,040		156,000	102,000	10,000		184,000	121,000
7,100		156,000	102,000	10,080		184,000	121,000
7,140	9/32	156,000	102,000	10,200		184,000	121,000
7,200		156,000	102,000	10,260		184,000	121,000
7,300		156,000	102,000	10,320	13/32	184,000	121,000
7,370		156,000	102,000	10,490		184,000	121,000
7,400		156,000	102,000	10,500		184,000	121,000
7,490		156,000	102,000	10,720	27/64	195,000	128,000
7,500		156,000	102,000	11,000		195,000	128,000
7,540	19/64	165,000	109,000	11,110	7/16	195,000	128,000
7,600		165,000	109,000	11,500		195,000	128,000
7,670		165,000	109,000	11,510	29/64	195,000	128,000
7,700		165,000	109,000	11,910	15/32	205,000	134,000
7,800		165,000	109,000	12,000		205,000	134,000
7,900		165,000	109,000	12,300	31/64	205,000	134,000
7,940	5/16	165,000	109,000	12,700	1/2	205,000	134,000
8,000		165,000	109,000				
8,030		165,000	109,000				
8,100		165,000	109,000				
8,200		165,000	109,000				
8,300		165,000	109,000				
8,330	21/64	165,000	109,000				
8,400		165,000	109,000				
8,430		165,000	109,000				
8,500		165,000	109,000				
8,600		175,000	115,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux longs



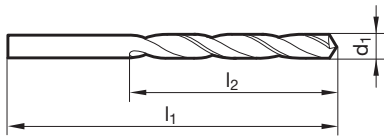
Référence 71156



P	M	K	N	S	H
●	○	●	○		

Conseils d'util.,
page 186

- Amin. de l'âme $\geq \varnothing 1,500$
- affûtage à dépouille conique
- goujures larges
- particulièrement rigide
- meilleure résistance à l'usure



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,500		70,000	45,000	5,800		139,000	91,000
1,590	1/16	76,000	50,000	5,900		139,000	91,000
1,600		76,000	50,000	6,000		139,000	91,000
1,700		76,000	50,000	6,100		148,000	97,000
1,800		80,000	53,000	6,200		148,000	97,000
1,900		80,000	53,000	6,300		148,000	97,000
2,000		85,000	56,000	6,350	1/4	148,000	97,000
2,100		85,000	56,000	6,400		148,000	97,000
2,200		90,000	59,000	6,500		148,000	97,000
2,300		90,000	59,000	6,600		148,000	97,000
2,380	3/32	95,000	62,000	6,700		148,000	97,000
2,500		95,000	62,000	6,800		156,000	102,000
2,600		95,000	62,000	6,900		156,000	102,000
2,700		100,000	66,000	7,000		156,000	102,000
2,800		100,000	66,000	7,100		156,000	102,000
2,900		100,000	66,000	7,140	9/32	156,000	102,000
3,000		100,000	66,000	7,200		156,000	102,000
3,100		106,000	69,000	7,300		156,000	102,000
3,170	1/8	106,000	69,000	7,400		156,000	102,000
3,180		106,000	69,000	7,500		156,000	102,000
3,200		106,000	69,000	7,600		165,000	109,000
3,300		106,000	69,000	7,700		165,000	109,000
3,400		112,000	73,000	7,800		165,000	109,000
3,500		112,000	73,000	7,900		165,000	109,000
3,600		112,000	73,000	7,940	5/16	165,000	109,000
3,700		112,000	73,000	8,000		165,000	109,000
3,800		119,000	78,000	8,100		165,000	109,000
3,900		119,000	78,000	8,200		165,000	109,000
3,970	5/32	119,000	78,000	8,300		165,000	109,000
4,000		119,000	78,000	8,400		165,000	109,000
4,100		119,000	78,000	8,500		165,000	109,000
4,200		119,000	78,000	8,600		175,000	115,000
4,300		126,000	82,000	8,700		175,000	115,000
4,400		126,000	82,000	8,730	11/32	175,000	115,000
4,500		126,000	82,000	8,800		175,000	115,000
4,600		126,000	82,000	8,900		175,000	115,000
4,700		126,000	82,000	9,000		175,000	115,000
4,760	3/16	132,000	87,000	9,100		175,000	115,000
4,800		132,000	87,000	9,200		175,000	115,000
4,900		132,000	87,000	9,300		175,000	115,000
5,000		132,000	87,000	9,400		175,000	115,000
5,100		132,000	87,000	9,500		175,000	115,000
5,200		132,000	87,000	9,520	3/8	184,000	121,000
5,300		132,000	87,000	9,530		184,000	121,000
5,400		139,000	91,000	9,600		184,000	121,000
5,500		139,000	91,000	9,700		184,000	121,000
5,600		139,000	91,000	9,800		184,000	121,000
5,700		139,000	91,000	9,900		184,000	121,000

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
10,000		184,000	121,000	13,000		205,000	134,000
10,200		184,000	121,000				
10,320	13/32	184,000	121,000				
10,500		184,000	121,000				
10,800		195,000	128,000				
11,000		195,000	128,000				
11,110	7/16	195,000	128,000				
11,500		195,000	128,000				
11,910	15/32	205,000	134,000				
12,000		205,000	134,000				
12,500		205,000	134,000				
12,700	1/2	205,000	134,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux extra-longs, série 1



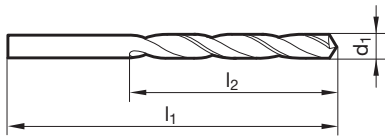
Référence 71145



P	M	K	N	S	H
•		•	•		

Conseils d'util.,
page 188

- Amin. de l'âme $\geq \varnothing 2,000$
- affûtage à dépouille conique
- goujures larges
- pour les perçages très profonds
- pour l'amélioration de l'évacuation des copeaux
- poli $< 2,36$ mm



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
2,000		125,000	85,000	6,400		215,000	150,000
2,100		125,000	85,000	6,500		215,000	150,000
2,200		135,000	90,000	6,600		215,000	150,000
2,300		135,000	90,000	6,700		215,000	150,000
2,400		140,000	95,000	6,750	17/64	225,000	155,000
2,500		140,000	95,000	6,800		225,000	155,000
2,600		140,000	95,000	6,900		225,000	155,000
2,700		150,000	100,000	7,000		225,000	155,000
2,800		150,000	100,000	7,100		225,000	155,000
2,900		150,000	100,000	7,200		225,000	155,000
3,000		150,000	100,000	7,300		225,000	155,000
3,100		155,000	105,000	7,400		225,000	155,000
3,200		155,000	105,000	7,500		225,000	155,000
3,300		155,000	105,000	7,540	19/64	240,000	165,000
3,400		165,000	115,000	7,600		240,000	165,000
3,500		165,000	115,000	7,700		240,000	165,000
3,600		165,000	115,000	7,800		240,000	165,000
3,700		165,000	115,000	7,900		240,000	165,000
3,800		175,000	120,000	7,940	5/16	240,000	165,000
3,900		175,000	120,000	8,000		240,000	165,000
3,970	5/32	175,000	120,000	8,100		240,000	165,000
4,000		175,000	120,000	8,200		240,000	165,000
4,100		175,000	120,000	8,300		240,000	165,000
4,200		175,000	120,000	8,400		240,000	165,000
4,300		185,000	125,000	8,500		240,000	165,000
4,400		185,000	125,000	8,600		250,000	175,000
4,500		185,000	125,000	8,700		250,000	175,000
4,600		185,000	125,000	8,800		250,000	175,000
4,700		185,000	125,000	8,900		250,000	175,000
4,760	3/16	195,000	135,000	9,000		250,000	175,000
4,800		195,000	135,000	9,100		250,000	175,000
4,900		195,000	135,000	9,300		250,000	175,000
5,000		195,000	135,000	9,400		250,000	175,000
5,100		195,000	135,000	9,500		250,000	175,000
5,200		195,000	135,000	9,520	3/8	265,000	185,000
5,300		195,000	135,000	9,600		265,000	185,000
5,400		205,000	140,000	9,700		265,000	185,000
5,500		205,000	140,000	9,800		265,000	185,000
5,600		205,000	140,000	9,900		265,000	185,000
5,700		205,000	140,000	10,000		265,000	185,000
5,800		205,000	140,000	10,100		265,000	185,000
5,900		205,000	140,000	10,200		265,000	185,000
5,950	15/64	205,000	140,000	10,500		265,000	185,000
6,000		205,000	140,000	10,720	27/64	280,000	195,000
6,100		215,000	150,000	10,800		280,000	195,000
6,200		215,000	150,000	11,000		280,000	195,000
6,300		215,000	150,000	11,110	7/16	280,000	195,000
6,350	1/4	215,000	150,000	11,200		280,000	195,000

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
11,500		280,000	195,000	12,700	1/2	295,000	205,000
11,510	29/64	280,000	195,000	13,000		295,000	205,000
11,800		280,000	195,000				
11,910	15/32	295,000	205,000				
12,000		295,000	205,000				
12,300	31/64	295,000	205,000				

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux extra-longs, série 1



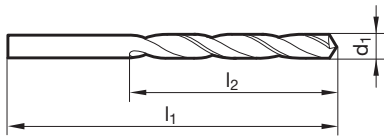
Référence 71192



P	M	K	N	S	H
●	○	●	●		

Conseils d'util.,
page 188

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage à dépouille conique
- goujures larges
- meilleure résistance à l'usure
- pour les perçages très profonds
- pour l'amélioration de l'évacuation des copeaux



d1 mm	inch	l1 mm	l2 mm
3,000		150,000	100,000
3,100		155,000	105,000
3,170	1/8	155,000	105,000
3,200		155,000	105,000
3,300		155,000	105,000
3,400		165,000	115,000
3,500		165,000	115,000
3,600		165,000	115,000
3,700		165,000	115,000
3,800		175,000	120,000
3,900		175,000	120,000
3,970	5/32	175,000	120,000
4,000		175,000	120,000
4,100		175,000	120,000
4,200		175,000	120,000
4,300		185,000	125,000
4,400		185,000	125,000
4,500		185,000	125,000
4,600		185,000	125,000
4,700		185,000	125,000
4,760	3/16	195,000	135,000
4,800		195,000	135,000
4,900		195,000	135,000
5,000		195,000	135,000
5,100		195,000	135,000
5,200		195,000	135,000
5,300		195,000	135,000
5,400		205,000	140,000
5,500		205,000	140,000
5,560	7/32	205,000	140,000
5,600		205,000	140,000
5,700		205,000	140,000
5,800		205,000	140,000
5,900		205,000	140,000
6,000		205,000	140,000
6,100		215,000	150,000
6,200		215,000	150,000
6,300		215,000	150,000
6,350	1/4	215,000	150,000
6,400		215,000	150,000
6,500		215,000	150,000
6,600		215,000	150,000
6,700		215,000	150,000
6,800		225,000	155,000
6,900		225,000	155,000
7,000		225,000	155,000
7,100		225,000	155,000
7,200		225,000	155,000

d1 mm	inch	l1 mm	l2 mm
7,300		225,000	155,000
7,400		225,000	155,000
7,500		225,000	155,000
7,600		240,000	165,000
7,700		240,000	165,000
7,800		240,000	165,000
7,900		240,000	165,000
7,940	5/16	240,000	165,000
8,000		240,000	165,000
8,100		240,000	165,000
8,200		240,000	165,000
8,300		240,000	165,000
8,400		240,000	165,000
8,500		240,000	165,000
8,600		250,000	175,000
8,700		250,000	175,000
8,730	11/32	250,000	175,000
8,800		250,000	175,000
8,900		250,000	175,000
9,000		250,000	175,000
9,100		250,000	175,000
9,200		250,000	175,000
9,300		250,000	175,000
9,400		250,000	175,000
9,500		250,000	175,000
9,530		265,000	185,000
9,600		265,000	185,000
9,700		265,000	185,000
9,900		265,000	185,000
10,000		265,000	185,000
10,100		265,000	185,000
10,200		265,000	185,000
10,320	13/32	265,000	185,000
10,500		265,000	185,000
10,800		280,000	195,000
11,000		280,000	195,000
11,200		280,000	195,000
11,500		280,000	195,000
11,800		280,000	195,000
11,910	15/32	295,000	205,000
12,700	1/2	295,000	205,000

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux extra-longs, série 2



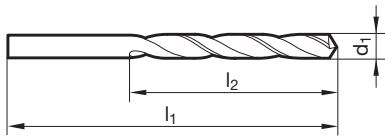
Référence 71146



P	M	K	N	S	H
•		•	•		

Conseils d'util.,
page 188

- Amin. de l'âme $\geq \varnothing 13,000$
- affûtage à dépouille conique
- goujures larges
- pour les perçages très profonds
- pour l'amélioration de l'évacuation des copeaux



d1 mm	inch	l1 mm	l2 mm
3,000		190,000	130,000
3,170	1/8	200,000	135,000
3,500		210,000	145,000
3,570	9/64	210,000	145,000
3,970	5/32	220,000	150,000
4,000		220,000	150,000
4,500		235,000	160,000
4,760	3/16	245,000	170,000
5,000		245,000	170,000
5,500		260,000	180,000
5,950	15/64	260,000	180,000
6,000		260,000	180,000
6,500		275,000	190,000
6,750	17/64	290,000	200,000
6,800		290,000	200,000
7,000		290,000	200,000
7,500		290,000	200,000
7,940	5/16	305,000	210,000

d1 mm	inch	l1 mm	l2 mm
8,000		305,000	210,000
8,500		305,000	210,000
9,000		320,000	220,000
9,500		320,000	220,000
9,520	3/8	340,000	235,000
9,920	25/64	340,000	235,000
10,000		340,000	235,000
10,720	27/64	365,000	250,000
11,000		365,000	250,000
11,910	15/32	375,000	260,000
12,000		375,000	260,000
12,700	1/2	375,000	260,000
13,000		375,000	260,000

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux extra-longs, série 2



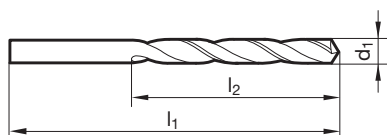
Référence 71193



P	M	K	N	S	H
●	○	●	●		

Conseils d'util.,
page 188

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage à dépouille conique
- goujures larges
- meilleure résistance à l'usure
- pour les perçages très profonds
- pour l'amélioration de l'évacuation des copeaux



d1 mm	inch	l1 mm	l2 mm
3,000		190,000	130,000
3,500		210,000	145,000
4,000		220,000	150,000
4,500		235,000	160,000
5,000		245,000	170,000
5,500		260,000	180,000
6,000		260,000	180,000
6,500		275,000	190,000
7,000		290,000	200,000
7,500		290,000	200,000
8,000		305,000	210,000
8,500		305,000	210,000

d1 mm	inch	l1 mm	l2 mm
9,000		320,000	220,000
9,500		320,000	220,000
10,000		340,000	235,000
12,000		375,000	260,000

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux extra-longs, série 3



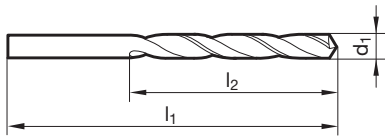
Référence 71147



P	M	K	N	S	H
•		•	•		

Conseils d'util.,
page 188

- Amin. de l'âme $\geq \varnothing 3,500$
- affûtage à dépouille conique
- goujures larges
- pour les perçages très profonds
- pour l'amélioration de l'évacuation des copeaux



d1 mm	inch	l1 mm	l2 mm
3,500		265,000	180,000
4,000		280,000	190,000
4,500		295,000	200,000
5,000		315,000	210,000
5,500		330,000	225,000
6,000		330,000	225,000
6,350	1/4	350,000	235,000
6,500		350,000	235,000
7,000		370,000	250,000
7,500		370,000	250,000
7,940	5/16	390,000	265,000
8,000		390,000	265,000
8,500		390,000	265,000
9,000		410,000	280,000
9,130	23/64	410,000	280,000
9,500		410,000	280,000
9,530		430,000	295,000
9,920	25/64	430,000	295,000

d1 mm	inch	l1 mm	l2 mm
10,000		430,000	295,000
10,720	27/64	455,000	310,000
11,000		455,000	310,000
11,910	15/32	480,000	330,000
12,000		480,000	330,000
12,300	31/64	480,000	330,000
13,000		480,000	330,000

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux extra-long



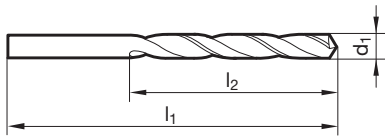
Référence 71195



P	M	K	N	S	H
•		•	•		

Conseils d'util.,
page 188

- Amin. de l'âme $\geq \varnothing 6,000$
- affûtage à dépouille conique
- goujures larges
- pour les perçages très profonds
- pour l'amélioration de l'évacuation des copeaux



d1 mm	l1 mm	l2 mm
6,000	500,000	400,000
8,000	500,000	400,000
10,000	600,000	500,000
12,000	600,000	500,000

d1 mm	l1 mm	l2 mm

Forets hélicoïdaux à queue cylindrique

Forets hélicoïdaux extra-longs



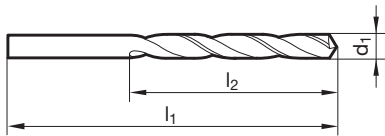
Référence 71196



P	M	K	N	S	H
•		•	•		

Conseils d'util.,
page 188

- Amin. de l'âme $\geq \varnothing 8,000$
- affûtage à dépouille conique
- goujures larges
- pour les perçages très profonds
- pour l'amélioration de l'évacuation des copeaux



d1 mm	l1 mm	l2 mm
8,000	750,000	650,000
10,000	750,000	650,000
12,000	750,000	650,000

d1 mm	l1 mm	l2 mm
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Forets hélicoïdaux à queue cylindrique

Forets à canaux de lubrification



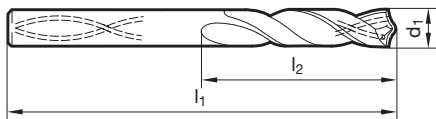
Référence **71584**



P	M	K	N	S	H
•		•	•		

Conseils d'util.,
page 186

- Amin. de l'âme $\geq \varnothing 3,000$
- affûtage à dépouille conique
- goujures larges



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
3,000	3,000	100,000	66,000	34,000
3,300	3,300	106,000	69,000	37,000
3,500	3,500	112,000	73,000	39,000
4,000	4,000	119,000	78,000	41,000
4,200	4,200	119,000	78,000	41,000
4,500	4,500	126,000	82,000	44,000
5,000	5,000	132,000	87,000	45,000
5,500	5,500	139,000	91,000	48,000
6,000	6,000	139,000	91,000	48,000
6,500	6,500	148,000	97,000	51,000
6,800	6,800	156,000	102,000	54,000
7,000	7,000	156,000	102,000	54,000

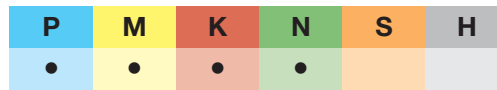
d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
7,500	7,500	156,000	102,000	54,000
8,000	8,000	165,000	109,000	56,000
8,500	8,500	165,000	109,000	56,000
9,000	9,000	175,000	115,000	60,000
9,500	9,500	175,000	115,000	60,000
10,000	10,000	184,000	121,000	63,000
10,200	10,200	184,000	121,000	63,000
10,500	10,500	184,000	121,000	63,000
11,000	11,000	195,000	128,000	67,000
12,000	12,000	205,000	134,000	71,000
13,000	13,000	205,000	134,000	71,000

Forets hélicoïdaux à queue cylindrique

Microforets

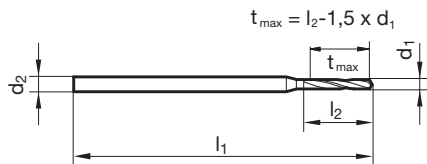


Référence 71187



Conseils d'util.,
page 178

- affûtage en pente
- avec attachement renforcé



d1 mm	d2 mm	l1 mm	l2 mm
0,050	1,000	25,000	0,400
0,060	1,000	25,000	0,400
0,070	1,000	25,000	0,500
0,080	1,000	25,000	0,500
0,090	1,000	25,000	0,500
0,100	1,000	25,000	0,500
0,110	1,000	25,000	0,500
0,120	1,000	25,000	0,500
0,130	1,000	25,000	0,800
0,140	1,000	25,000	0,800
0,150	1,000	25,000	0,800
0,160	1,000	25,000	1,100
0,170	1,000	25,000	1,100
0,180	1,000	25,000	1,100
0,190	1,000	25,000	1,100
0,200	1,000	25,000	1,500
0,210	1,000	25,000	1,500
0,220	1,000	25,000	1,500
0,230	1,000	25,000	1,500
0,240	1,000	25,000	1,500
0,250	1,000	25,000	1,900
0,260	1,000	25,000	1,900
0,270	1,000	25,000	1,900
0,280	1,000	25,000	1,900
0,290	1,000	25,000	1,900
0,300	1,000	25,000	1,900
0,310	1,000	25,000	2,400
0,320	1,000	25,000	2,400
0,330	1,000	25,000	2,400
0,340	1,000	25,000	2,400
0,350	1,000	25,000	2,400
0,360	1,000	25,000	2,400
0,370	1,000	25,000	2,400
0,380	1,000	25,000	2,400
0,390	1,000	25,000	3,000
0,400	1,000	25,000	3,000
0,410	1,000	25,000	3,000
0,420	1,000	25,000	3,000
0,430	1,000	25,000	3,000
0,440	1,000	25,000	3,000
0,450	1,000	25,000	3,000
0,460	1,000	25,000	3,000
0,470	1,000	25,000	3,000
0,480	1,000	25,000	3,000
0,490	1,000	25,000	3,400
0,500	1,000	25,000	3,400
0,510	1,000	25,000	3,400
0,520	1,000	25,000	3,400

d1 mm	d2 mm	l1 mm	l2 mm
0,530	1,000	25,000	3,400
0,540	1,000	25,000	3,900
0,550	1,000	25,000	3,900
0,560	1,000	25,000	3,900
0,570	1,000	25,000	3,900
0,580	1,000	25,000	3,900
0,590	1,000	25,000	3,900
0,600	1,000	25,000	3,900
0,610	1,000	25,000	4,200
0,620	1,000	25,000	4,200
0,630	1,000	25,000	4,200
0,640	1,000	25,000	4,200
0,650	1,000	25,000	4,200
0,660	1,000	25,000	4,200
0,670	1,000	25,000	4,200
0,680	1,000	25,000	4,800
0,690	1,000	25,000	4,800
0,700	1,000	25,000	4,800
0,710	1,000	25,000	4,800
0,720	1,000	25,000	4,800
0,730	1,000	25,000	4,800
0,740	1,000	25,000	4,800
0,750	1,000	25,000	4,800
0,760	1,000	25,000	5,300
0,770	1,000	25,000	5,300
0,780	1,000	25,000	5,300
0,790	1,000	25,000	5,300
0,800	1,500	25,000	5,300
0,810	1,500	25,000	5,300
0,820	1,500	25,000	5,300
0,830	1,500	25,000	5,300
0,840	1,500	25,000	5,300
0,850	1,500	25,000	5,300
0,860	1,500	25,000	6,000
0,870	1,500	25,000	6,000
0,880	1,500	25,000	6,000
0,890	1,500	25,000	6,000
0,900	1,500	25,000	6,000
0,910	1,500	25,000	6,000
0,920	1,500	25,000	6,000
0,930	1,500	25,000	6,000
0,940	1,500	25,000	6,000
0,950	1,500	25,000	6,000
0,960	1,500	25,000	6,800
0,970	1,500	25,000	6,800
0,980	1,500	25,000	6,800
0,990	1,500	25,000	6,800
1,000	1,500	25,000	6,800

d1 mm	d2 mm	l1 mm	l2 mm	d1 mm	d2 mm	l1 mm	l2 mm
1,010	1,500	25,000	6,800	1,250	1,500	25,000	8,500
1,020	1,500	25,000	6,800	1,260	1,500	25,000	8,500
1,030	1,500	25,000	6,800	1,270	1,500	25,000	8,500
1,040	1,500	25,000	6,800	1,280	1,500	25,000	8,500
1,050	1,500	25,000	6,800	1,290	1,500	25,000	8,500
1,060	1,500	25,000	6,800	1,300	1,500	25,000	8,500
1,070	1,500	25,000	7,600	1,310	1,500	25,000	8,500
1,080	1,500	25,000	7,600	1,320	1,500	25,000	8,500
1,090	1,500	25,000	7,600	1,330	1,500	25,000	9,500
1,100	1,500	25,000	7,600	1,340	1,500	25,000	9,500
1,110	1,500	25,000	7,600	1,350	1,500	25,000	9,500
1,120	1,500	25,000	7,600	1,360	1,500	25,000	9,500
1,130	1,500	25,000	7,600	1,370	1,500	25,000	9,500
1,140	1,500	25,000	7,600	1,380	1,500	25,000	9,500
1,150	1,500	25,000	7,600	1,390	1,500	25,000	9,500
1,160	1,500	25,000	7,600	1,400	1,500	25,000	9,500
1,170	1,500	25,000	7,600	1,410	1,500	25,000	9,500
1,180	1,500	25,000	7,600	1,420	1,500	25,000	9,500
1,190	1,500	25,000	8,500	1,430	1,500	25,000	9,500
1,200	1,500	25,000	8,500	1,440	1,500	25,000	9,500
1,210	1,500	25,000	8,500	1,450	1,500	25,000	9,500
1,220	1,500	25,000	8,500				
1,230	1,500	25,000	8,500				
1,240	1,500	25,000	8,500				

Forets hélicoïdaux à queue cylindrique

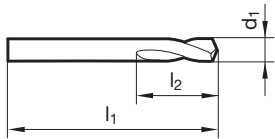
Forets NC



Référence 71175

N	WN	HSS	poli	90°	h6	R	Cyl
P	M	K	N	S	H		
•	•	•	•	•			

- affûtage à dépouille conique
- seulement prévu pour amorcer un perçage



d1 mm	l1 mm	l2 mm
3,000	46,000	12,000
4,000	55,000	12,000
5,000	62,000	14,000
6,000	66,000	16,000
8,000	79,000	21,000
10,000	89,000	25,000

d1 mm	l1 mm	l2 mm
12,000	102,000	30,000
16,000	115,000	37,500
20,000	131,000	45,000
25,000	151,000	53,000
25,400	156,000	53,000

Forets hélicoïdaux à queue cylindrique

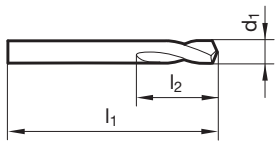
Forets NC



Référence **61175**

N	WN	HSS	TiN	90°	h6	R	Cyl
P	M	K	N	S	H		
•	•	•	•	•			

- affûtage à dépouille conique
- seulement prévu pour amorcer un perçage
- meilleure protection contre l'usure



d1 mm	l1 mm	l2 mm
3,000	46,000	12,000
4,000	55,000	12,000
6,000	66,000	16,000
8,000	79,000	21,000
10,000	89,000	25,000
12,000	102,000	30,000

d1 mm	l1 mm	l2 mm
16,000	115,000	37,500
20,000	131,000	45,000
25,000	151,000	53,000

Forets hélicoïdaux à queue cylindrique

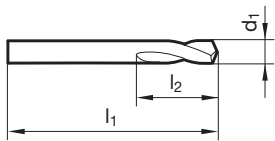
Forets NC



Référence 71176

N	WN	HSS	poli	120°	h6	R	Cyl
P	M	K	N	S	H		
•	•	•	•	•			

- affûtage à dépouille conique
- seulement prévu pour amorcer un perçage



d1 mm	l1 mm	l2 mm
3,000	46,000	12,000
4,000	55,000	12,000
5,000	62,000	14,000
6,000	66,000	16,000
8,000	79,000	21,000
10,000	89,000	25,000

d1 mm	l1 mm	l2 mm
12,000	102,000	30,000
16,000	115,000	37,500
20,000	131,000	45,000
25,400	156,000	53,000

Forets hélicoïdaux à queue CM

Forets hélicoïdaux courts



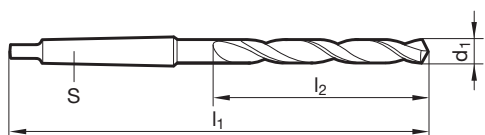
Référence 71303



P	M	K	N	S	H
●	●	○		○	○

Conseils d'util.,
page 176

- Amin. de l'âme $\geq \varnothing 10,000$
- affûtage à dépouille conique
- particulièrement solide et très résistant



d1 mm	S	l1 mm	l2 mm
10,000	MK-1	138,000	57,000
10,200	MK-1	138,000	57,000
10,500	MK-1	138,000	57,000
10,800	MK-1	142,000	61,000
11,000	MK-1	142,000	61,000
11,500	MK-1	142,000	61,000
12,000	MK-1	147,000	66,000
12,500	MK-1	147,000	66,000
13,000	MK-1	147,000	66,000
14,500	MK-2	172,000	74,000
15,000	MK-2	172,000	74,000
16,000	MK-2	176,000	78,000

d1 mm	S	l1 mm	l2 mm
16,500	MK-2	179,000	81,000
17,000	MK-2	179,000	81,000
17,500	MK-2	183,000	85,000
18,000	MK-2	183,000	85,000
18,500	MK-2	186,000	88,000
23,500	MK-3	222,000	101,000
24,000	MK-3	225,000	104,000
24,500	MK-3	225,000	104,000
25,000	MK-3	225,000	104,000
25,500	MK-4	256,000	107,000

Forets hélicoïdaux à queue CM

Forets hélicoïdaux courts



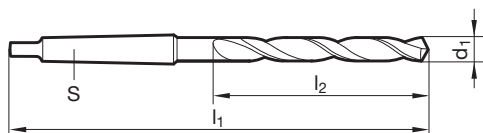
Référence 71304



P	M	K	N	S	H
●	●	○		○	○

Conseils d'util.,
page 176

- Amin. de l'âme $\geq \varnothing 12,000$
- affûtage à dépouille conique
- particulièrement solide et très résistant
- avec cône Morse renforcé



d1 mm	S	l1 mm	l2 mm
12,000	MK-2	164,000	66,000
12,500	MK-2	164,000	66,000
12,800	MK-2	164,000	66,000
13,000	MK-2	164,000	66,000
13,500	MK-2	169,000	70,000
14,000	MK-2	169,000	70,000
19,000	MK-3	211,000	88,000
19,500	MK-3	214,000	91,000
20,000	MK-3	214,000	91,000
20,500	MK-3	217,000	95,000
21,000	MK-3	217,000	95,000
21,500	MK-3	221,000	98,000

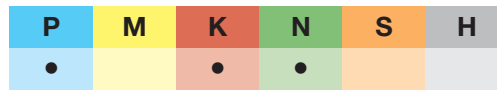
d1 mm	S	l1 mm	l2 mm
22,000	MK-3	221,000	98,000
22,500	MK-3	224,000	101,000
23,000	MK-3	224,000	101,000
26,000	MK-4	256,000	107,000
26,500	MK-4	261,000	107,000
27,000	MK-4	261,000	110,000
27,500	MK-4	261,000	110,000
28,000	MK-4	261,000	110,000
28,500	MK-4	265,000	114,000
29,000	MK-4	265,000	114,000
29,500	MK-4	265,000	114,000
30,000	MK-4	265,000	114,000

Forets hélicoïdaux à queue CM

Forets hélicoïdaux

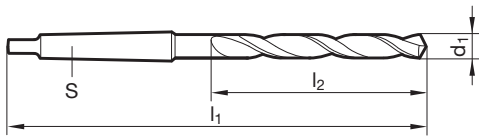


Référence 71300



Conseils d'util.,
page 180

- Amin. de l'âme $\geq \varnothing 14,100$
- affûtage à dépouille conique



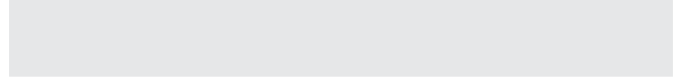
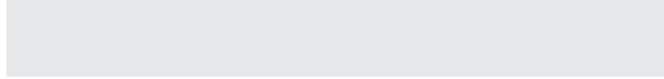
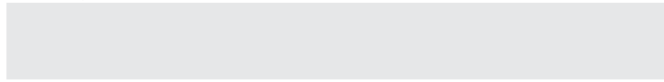
d1 mm	S	l1 mm	l2 mm
3,750	MK-1	120,000	39,000
4,000	MK-1	124,000	43,000
4,100	MK-1	124,000	43,000
4,200	MK-1	124,000	43,000
4,250	MK-1	124,000	43,000
4,500	MK-1	128,000	47,000
4,600	MK-1	128,000	47,000
4,900	MK-1	133,000	52,000
5,000	MK-1	133,000	52,000
5,100	MK-1	133,000	52,000
5,500	MK-1	138,000	57,000
5,750	MK-1	138,000	57,000
5,800	MK-1	138,000	57,000
6,000	MK-1	138,000	57,000
6,500	MK-1	144,000	63,000
6,750	MK-1	150,000	69,000
6,800	MK-1	150,000	69,000
7,000	MK-1	150,000	69,000
7,200	MK-1	150,000	69,000
7,250	MK-1	150,000	69,000
7,400	MK-1	150,000	69,000
7,500	MK-1	150,000	69,000
7,800	MK-1	156,000	75,000
7,900	MK-1	156,000	75,000
8,000	MK-1	156,000	75,000
8,100	MK-1	156,000	75,000
8,200	MK-1	156,000	75,000
8,250	MK-1	156,000	75,000
8,300	MK-1	156,000	75,000
8,500	MK-1	156,000	75,000
8,600	MK-1	162,000	81,000
8,700	MK-1	162,000	81,000
8,750	MK-1	162,000	81,000
8,900	MK-1	162,000	81,000
9,000	MK-1	162,000	81,000
9,200	MK-1	162,000	81,000
9,300	MK-1	162,000	81,000
9,400	MK-1	162,000	81,000
9,500	MK-1	162,000	81,000
9,750	MK-1	168,000	87,000
9,800	MK-1	168,000	87,000
9,900	MK-1	168,000	87,000
10,000	MK-1	168,000	87,000
10,100	MK-1	168,000	87,000
10,200	MK-1	168,000	87,000
10,250	MK-1	168,000	87,000
10,300	MK-1	168,000	87,000
10,400	MK-1	168,000	87,000

d1 mm	S	l1 mm	l2 mm
10,500	MK-1	168,000	87,000
10,600	MK-1	168,000	87,000
10,700	MK-1	175,000	94,000
10,750	MK-1	175,000	94,000
10,800	MK-1	175,000	94,000
10,900	MK-1	175,000	94,000
11,000	MK-1	175,000	94,000
11,100	MK-1	175,000	94,000
11,200	MK-1	175,000	94,000
11,300	MK-1	175,000	94,000
11,400	MK-1	175,000	94,000
11,500	MK-1	175,000	94,000
11,600	MK-1	175,000	94,000
11,700	MK-1	175,000	94,000
11,750	MK-1	175,000	94,000
11,800	MK-1	175,000	94,000
11,900	MK-1	182,000	101,000
12,000	MK-1	182,000	101,000
12,100	MK-1	182,000	101,000
12,200	MK-1	182,000	101,000
12,250	MK-1	182,000	101,000
12,300	MK-1	182,000	101,000
12,400	MK-1	182,000	101,000
12,500	MK-1	182,000	101,000
12,600	MK-1	182,000	101,000
12,700	MK-1	182,000	101,000
12,800	MK-1	182,000	101,000
12,900	MK-1	182,000	101,000
13,000	MK-1	182,000	101,000
13,100	MK-1	182,000	101,000
13,200	MK-1	182,000	101,000
13,300	MK-1	189,000	108,000
13,400	MK-1	189,000	108,000
13,500	MK-1	189,000	108,000
13,600	MK-1	189,000	108,000
13,700	MK-1	189,000	108,000
13,750	MK-1	189,000	108,000
13,800	MK-1	189,000	108,000
13,900	MK-1	189,000	108,000
14,000	MK-1	189,000	108,000
14,100	MK-2	212,000	114,000
14,200	MK-2	212,000	114,000
14,250	MK-2	212,000	114,000
14,300	MK-2	212,000	114,000
14,400	MK-2	212,000	114,000
14,500	MK-2	212,000	114,000
14,600	MK-2	212,000	114,000
14,700	MK-2	212,000	114,000

d1 mm	S	l1 mm	l2 mm	d1 mm	S	l1 mm	l2 mm
14,750	MK-2	212,000	114,000	24,750	MK-3	281,000	160,000
14,800	MK-2	212,000	114,000	25,000	MK-3	281,000	160,000
14,900	MK-2	212,000	114,000	25,250	MK-3	286,000	165,000
15,000	MK-2	212,000	114,000	25,500	MK-3	286,000	165,000
15,100	MK-2	218,000	120,000	25,750	MK-3	286,000	165,000
15,200	MK-2	218,000	120,000	26,000	MK-3	286,000	165,000
15,250	MK-2	218,000	120,000	26,500	MK-3	286,000	165,000
15,300	MK-2	218,000	120,000	27,000	MK-3	291,000	170,000
15,400	MK-2	218,000	120,000	27,250	MK-3	291,000	170,000
15,500	MK-2	218,000	120,000	27,500	MK-3	291,000	170,000
15,600	MK-2	218,000	120,000	27,750	MK-3	291,000	170,000
15,700	MK-2	218,000	120,000	28,000	MK-3	291,000	170,000
15,750	MK-2	218,000	120,000	28,500	MK-3	296,000	175,000
15,800	MK-2	218,000	120,000	28,570	MK-3	296,000	175,000
15,900	MK-2	218,000	120,000	29,000	MK-3	296,000	175,000
16,000	MK-2	218,000	120,000	29,250	MK-3	296,000	175,000
16,100	MK-2	223,000	125,000	29,500	MK-3	296,000	175,000
16,200	MK-2	223,000	125,000	29,750	MK-3	296,000	175,000
16,250	MK-2	223,000	125,000	30,000	MK-3	296,000	175,000
16,300	MK-2	223,000	125,000	30,250	MK-3	301,000	180,000
16,400	MK-2	223,000	125,000	30,500	MK-3	301,000	180,000
16,500	MK-2	223,000	125,000	30,750	MK-3	301,000	180,000
16,600	MK-2	223,000	125,000	31,000	MK-3	301,000	180,000
16,700	MK-2	223,000	125,000	31,500	MK-3	301,000	180,000
16,750	MK-2	223,000	125,000	32,000	MK-4	334,000	185,000
16,800	MK-2	223,000	125,000	32,500	MK-4	334,000	185,000
16,900	MK-2	223,000	125,000	33,000	MK-4	334,000	185,000
17,000	MK-2	223,000	125,000	33,340	MK-4	334,000	185,000
17,100	MK-2	228,000	130,000	33,500	MK-4	334,000	185,000
17,200	MK-2	228,000	130,000	34,000	MK-4	339,000	190,000
17,300	MK-2	228,000	130,000	34,500	MK-4	339,000	190,000
17,400	MK-2	228,000	130,000	35,000	MK-4	339,000	190,000
17,500	MK-2	228,000	130,000	35,500	MK-4	339,000	190,000
17,600	MK-2	228,000	130,000	36,000	MK-4	344,000	195,000
17,700	MK-2	228,000	130,000	36,500	MK-4	344,000	195,000
17,750	MK-2	228,000	130,000	37,000	MK-4	344,000	195,000
17,800	MK-2	228,000	130,000	37,500	MK-4	344,000	195,000
17,900	MK-2	228,000	130,000	38,000	MK-4	349,000	200,000
18,000	MK-2	228,000	130,000	38,500	MK-4	349,000	200,000
18,100	MK-2	233,000	135,000	39,000	MK-4	349,000	200,000
18,200	MK-2	233,000	135,000	39,500	MK-4	349,000	200,000
18,250	MK-2	233,000	135,000	39,690	MK-4	349,000	200,000
18,300	MK-2	233,000	135,000	40,000	MK-4	349,000	200,000
18,500	MK-2	233,000	135,000	40,500	MK-4	354,000	205,000
18,600	MK-2	233,000	135,000	41,000	MK-4	354,000	205,000
18,750	MK-2	233,000	135,000	41,500	MK-4	354,000	205,000
19,000	MK-2	233,000	135,000	42,000	MK-4	354,000	205,000
19,250	MK-2	238,000	140,000	42,500	MK-4	354,000	205,000
19,500	MK-2	238,000	140,000	43,000	MK-4	359,000	210,000
19,750	MK-2	238,000	140,000	43,500	MK-4	359,000	210,000
20,000	MK-2	238,000	140,000	44,000	MK-4	359,000	210,000
20,100	MK-2	243,000	145,000	44,500	MK-4	359,000	210,000
20,250	MK-2	243,000	145,000	45,000	MK-4	359,000	210,000
20,300	MK-2	243,000	145,000	45,500	MK-4	364,000	215,000
20,400	MK-2	243,000	145,000	46,000	MK-4	364,000	215,000
20,500	MK-2	243,000	145,000	46,500	MK-4	364,000	215,000
20,640	MK-2	243,000	145,000	47,000	MK-4	364,000	215,000
20,750	MK-2	243,000	145,000	48,000	MK-4	369,000	220,000
21,000	MK-2	243,000	145,000	48,500	MK-4	369,000	220,000
21,250	MK-2	248,000	150,000	49,000	MK-4	369,000	220,000
21,430	MK-2	248,000	150,000	49,500	MK-4	369,000	220,000
21,500	MK-2	248,000	150,000	50,000	MK-4	369,000	220,000
22,000	MK-2	248,000	150,000	50,500	MK-4	374,000	225,000
22,250	MK-2	248,000	150,000	50,800	MK-4	374,000	225,000
22,500	MK-2	253,000	155,000	51,000	MK-5	412,000	225,000
22,900	MK-2	253,000	155,000	52,000	MK-5	412,000	225,000
23,000	MK-2	253,000	155,000	53,500	MK-5	417,000	230,000
23,500	MK-3	276,000	155,000	54,000	MK-5	417,000	230,000
23,750	MK-3	281,000	160,000	55,000	MK-5	417,000	230,000
24,000	MK-3	281,000	160,000	57,000	MK-5	422,000	235,000
24,250	MK-3	281,000	160,000	58,000	MK-5	422,000	235,000
24,500	MK-3	281,000	160,000	59,000	MK-5	422,000	235,000

d1 mm	S	l1 mm	l2 mm
60,000	MK-5	422,000	235,000
61,000	MK-5	427,000	240,000
68,000	MK-5	437,000	250,000

d1 mm	S	l1 mm	l2 mm
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Forets hélicoïdaux à queue CM

Forets hélicoïdaux



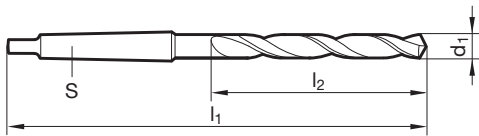
Référence 71416



P	M	K	N	S	H
●	○	●			

Conseils d'util.,
page 182

- Amin. de l'âme $\geq \varnothing 5,000$
- affûtage à dépouille conique
- meilleure résistance à l'usure



d1 mm	S	l1 mm	l2 mm
5,000	MK-1	133,000	52,000
8,000	MK-1	156,000	75,000
8,500	MK-1	156,000	75,000
9,000	MK-1	162,000	81,000
9,500	MK-1	162,000	81,000
10,200	MK-1	168,000	87,000
10,500	MK-1	168,000	87,000
10,600	MK-1	168,000	87,000
11,000	MK-1	175,000	94,000
11,500	MK-1	175,000	94,000
12,000	MK-1	182,000	101,000
12,500	MK-1	182,000	101,000
14,000	MK-1	189,000	108,000
14,500	MK-2	212,000	114,000
14,750	MK-2	212,000	114,000
15,000	MK-2	212,000	114,000
15,500	MK-2	218,000	120,000
16,000	MK-2	218,000	120,000

d1 mm	S	l1 mm	l2 mm
17,000	MK-2	223,000	125,000
17,500	MK-2	228,000	130,000
18,000	MK-2	228,000	130,000
18,500	MK-2	233,000	135,000
19,000	MK-2	233,000	135,000
20,000	MK-2	238,000	140,000
20,500	MK-2	243,000	145,000
21,000	MK-2	243,000	145,000
21,500	MK-2	248,000	150,000
22,000	MK-2	248,000	150,000
23,000	MK-2	253,000	155,000
23,500	MK-3	276,000	155,000
24,000	MK-3	281,000	160,000
25,000	MK-3	281,000	160,000
26,000	MK-3	286,000	165,000
26,500	MK-3	286,000	165,000
30,500	MK-3	301,000	180,000
33,000	MK-4	334,000	185,000

Forets hélicoïdaux à queue CM

Forets hélicoïdaux



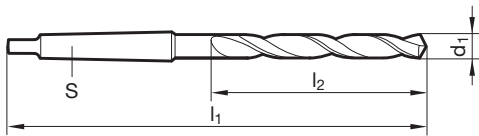
Référence **71305**



P	M	K	N	S	H
•		•	•		

Conseils d'util.,
page 180

- Amin. de l'âme $\geq \varnothing 7,940$
- affûtage à dépouille conique
- goujures larges



d1 mm	S	l1 mm	l2 mm
7,940	MK-1	156,000	75,000
8,000	MK-1	156,000	75,000
8,250	MK-1	156,000	75,000
8,500	MK-1	156,000	75,000
8,750	MK-1	162,000	81,000
9,000	MK-1	162,000	81,000
9,250	MK-1	162,000	81,000
9,500	MK-1	162,000	81,000
10,000	MK-1	168,000	87,000
10,200	MK-1	168,000	87,000
10,250	MK-1	168,000	87,000
10,500	MK-1	168,000	87,000
10,750	MK-1	175,000	94,000
11,000	MK-1	175,000	94,000
11,500	MK-1	175,000	94,000
11,750	MK-1	175,000	94,000
12,000	MK-1	182,000	101,000
12,250	MK-1	182,000	101,000
12,700	MK-1	182,000	101,000
13,000	MK-1	182,000	101,000
13,500	MK-1	189,000	108,000
14,000	MK-1	189,000	108,000
14,500	MK-2	212,000	114,000
15,000	MK-2	212,000	114,000
15,500	MK-2	218,000	120,000
16,000	MK-2	218,000	120,000
16,500	MK-2	223,000	125,000
17,000	MK-2	223,000	125,000
17,500	MK-2	228,000	130,000
18,000	MK-2	228,000	130,000

d1 mm	S	l1 mm	l2 mm
18,500	MK-2	233,000	135,000
19,000	MK-2	233,000	135,000
20,000	MK-2	238,000	140,000
20,500	MK-2	243,000	145,000
21,000	MK-2	243,000	145,000
22,000	MK-2	248,000	150,000
23,000	MK-2	253,000	155,000
24,000	MK-3	281,000	160,000
25,000	MK-3	281,000	160,000
25,500	MK-3	286,000	165,000
26,000	MK-3	286,000	165,000
26,500	MK-3	286,000	165,000
26,990	MK-3	291,000	170,000
27,000	MK-3	291,000	170,000
27,500	MK-3	291,000	170,000
28,000	MK-3	291,000	170,000
28,570	MK-3	296,000	175,000
29,000	MK-3	296,000	175,000
29,500	MK-3	296,000	175,000
31,000	MK-3	301,000	180,000
31,500	MK-3	301,000	180,000
32,000	MK-4	334,000	185,000

Forets hélicoïdaux à queue CM

Forets hélicoïdaux



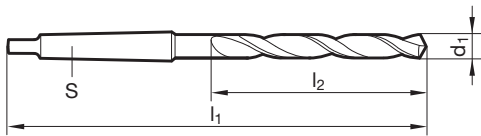
Référence 71312



P	M	K	N	S	H
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Conseils d'util.,
page 182

- Amin. de l'âme $\geq \varnothing 8,500$
- affûtage à dépouille conique
- haute stabilité



d1 mm	S	l1 mm	l2 mm
8,500	MK-1	156,000	75,000
9,000	MK-1	162,000	81,000
9,500	MK-1	162,000	81,000
10,000	MK-1	168,000	87,000
10,200	MK-1	168,000	87,000
10,500	MK-1	168,000	87,000
11,000	MK-1	175,000	94,000
11,250	MK-1	175,000	94,000
11,500	MK-1	175,000	94,000
12,000	MK-1	182,000	101,000
12,500	MK-1	182,000	101,000
13,000	MK-1	182,000	101,000
13,500	MK-1	189,000	108,000
14,000	MK-1	189,000	108,000
14,500	MK-2	212,000	114,000
15,000	MK-2	212,000	114,000
15,500	MK-2	218,000	120,000
16,000	MK-2	218,000	120,000
16,250	MK-2	223,000	125,000
16,500	MK-2	223,000	125,000
17,000	MK-2	223,000	125,000
17,500	MK-2	228,000	130,000
18,000	MK-2	228,000	130,000
18,500	MK-2	233,000	135,000

d1 mm	S	l1 mm	l2 mm
19,000	MK-2	233,000	135,000
19,500	MK-2	238,000	140,000
20,000	MK-2	238,000	140,000
20,250	MK-2	243,000	145,000
21,000	MK-2	243,000	145,000
22,000	MK-2	248,000	150,000
23,000	MK-2	253,000	155,000
24,000	MK-3	281,000	160,000
25,000	MK-3	281,000	160,000
26,000	MK-3	286,000	165,000
27,000	MK-3	291,000	170,000
27,500	MK-3	291,000	170,000
28,000	MK-3	291,000	170,000
30,000	MK-3	296,000	175,000
32,000	MK-4	334,000	185,000

Forets hélicoïdaux à queue CM

Forets hélicoïdaux



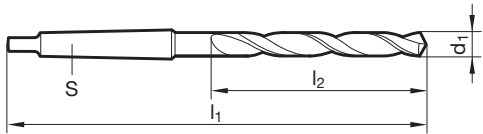
Référence 71313



P	M	K	N	S	H
•	•	•		•	

Conseils d'util.,
page 182

- Amin. de l'âme $\geq \varnothing 11,000$
- affûtage à dépouille conique
- haute stabilité
- avec cône Morse renforcé



d1 mm	S	l1 mm	l2 mm
11,000	MK-2	192,000	94,000
12,000	MK-2	199,000	101,000
12,500	MK-2	199,000	101,000
12,800	MK-2	199,000	101,000
13,000	MK-2	199,000	101,000
13,500	MK-2	206,000	108,000
14,000	MK-2	206,000	108,000
20,000	MK-3	261,000	140,000
20,500	MK-3	266,000	145,000
21,500	MK-3	271,000	150,000
23,000	MK-3	276,000	155,000
26,000	MK-4	314,000	165,000

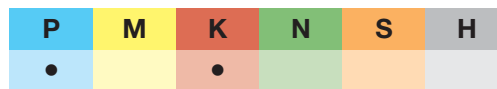
d1 mm	S	l1 mm	l2 mm
27,000	MK-4	319,000	170,000
29,000	MK-4	324,000	175,000

Forets hélicoïdaux à queue CM

Forets pour perçage par canon

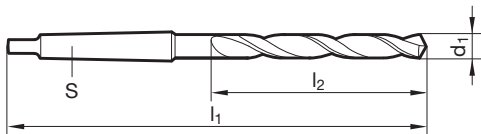


Référence 71320



Conseils d'util.,
page 186

- Amin. de l'âme $\geq \varnothing 14,500$
- affûtage à dépouille conique
- aussi pour le perçage avec canons de perçage



d1 mm	S	l1 mm	l2 mm
6,000	MK-1	161,000	80,000
6,500	MK-1	167,000	86,000
6,800	MK-1	174,000	93,000
7,000	MK-1	174,000	93,000
8,000	MK-1	181,000	100,000
8,200	MK-1	181,000	100,000
8,500	MK-1	181,000	100,000
8,750	MK-1	188,000	107,000
8,800	MK-1	188,000	107,000
9,000	MK-1	188,000	107,000
9,500	MK-1	188,000	107,000
10,000	MK-1	197,000	116,000
10,100	MK-1	197,000	116,000
10,200	MK-1	197,000	116,000
11,000	MK-1	206,000	125,000
11,500	MK-1	206,000	125,000
12,000	MK-1	215,000	134,000
12,500	MK-1	215,000	134,000
12,750	MK-1	215,000	134,000
13,000	MK-1	215,000	134,000
13,500	MK-1	223,000	142,000
13,750	MK-1	223,000	142,000
13,800	MK-1	223,000	142,000
13,900	MK-1	223,000	142,000
14,000	MK-1	223,000	142,000
14,500	MK-2	245,000	147,000
15,000	MK-2	245,000	147,000
16,000	MK-2	251,000	153,000
16,250	MK-2	257,000	159,000
16,500	MK-2	257,000	159,000
16,750	MK-2	257,000	159,000
17,000	MK-2	257,000	159,000
17,500	MK-2	263,000	165,000
18,000	MK-2	263,000	165,000
18,500	MK-2	269,000	171,000
18,750	MK-2	269,000	171,000

d1 mm	S	l1 mm	l2 mm
19,000	MK-2	269,000	171,000
19,250	MK-2	275,000	177,000
19,500	MK-2	275,000	177,000
20,000	MK-2	275,000	177,000
21,000	MK-2	282,000	184,000
22,000	MK-2	289,000	191,000
22,500	MK-2	296,000	198,000
23,000	MK-2	296,000	198,000
24,000	MK-3	327,000	206,000
25,000	MK-3	327,000	206,000
26,000	MK-3	335,000	214,000
26,500	MK-3	335,000	214,000
27,000	MK-3	343,000	222,000
28,000	MK-3	343,000	222,000
29,500	MK-3	351,000	230,000
30,000	MK-3	351,000	230,000
31,000	MK-3	360,000	239,000
32,000	MK-4	397,000	248,000
33,000	MK-4	397,000	248,000
34,000	MK-4	406,000	257,000
35,000	MK-4	406,000	257,000
36,000	MK-4	416,000	267,000
38,000	MK-4	426,000	277,000
40,000	MK-4	426,000	277,000
45,000	MK-4	447,000	298,000

Forets hélicoïdaux à queue CM

Forets pour perçage par canon



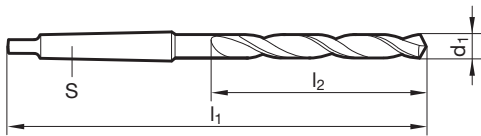
Référence 71322



P	M	K	N	S	H
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Conseils d'util.,
page 186

- Amin. de l'âme $\geq \varnothing 8,000$
- affûtage à dépouille conique
- goujures larges



d1 mm	S	l1 mm	l2 mm
8,000	MK-1	181,000	100,000
8,500	MK-1	181,000	100,000
8,730	MK-1	188,000	107,000
8,750	MK-1	188,000	107,000
9,000	MK-1	188,000	107,000
9,500	MK-1	188,000	107,000
9,920	MK-1	197,000	116,000
10,000	MK-1	197,000	116,000
10,250	MK-1	197,000	116,000
10,320	MK-1	197,000	116,000
10,500	MK-1	197,000	116,000
10,720	MK-1	206,000	125,000
10,750	MK-1	206,000	125,000
11,000	MK-1	206,000	125,000
11,750	MK-1	206,000	125,000
12,500	MK-1	215,000	134,000
12,700	MK-1	215,000	134,000
12,750	MK-1	215,000	134,000
13,000	MK-1	215,000	134,000
13,750	MK-1	223,000	142,000
14,000	MK-1	223,000	142,000
14,500	MK-2	245,000	147,000
15,000	MK-2	245,000	147,000
16,000	MK-2	251,000	153,000
16,500	MK-2	257,000	159,000
17,500	MK-2	263,000	165,000
17,750	MK-2	263,000	165,000
18,000	MK-2	263,000	165,000
18,260	MK-2	269,000	171,000
18,650	MK-2	269,000	171,000

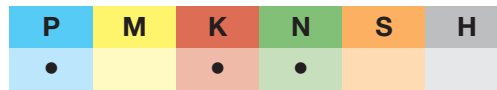
d1 mm	S	l1 mm	l2 mm
19,000	MK-2	269,000	171,000
19,250	MK-2	275,000	177,000
20,000	MK-2	275,000	177,000
21,750	MK-2	289,000	191,000
22,000	MK-2	289,000	191,000
22,250	MK-2	289,000	191,000
23,020	MK-2	296,000	198,000
23,420	MK-3	319,000	198,000
23,500	MK-3	319,000	198,000
24,000	MK-3	327,000	206,000
25,000	MK-3	327,000	206,000
26,000	MK-3	335,000	214,000
28,000	MK-3	343,000	222,000
28,500	MK-3	351,000	230,000
29,500	MK-3	351,000	230,000
30,000	MK-3	351,000	230,000
31,500	MK-3	360,000	239,000
31,750	MK-3	369,000	248,000
32,000	MK-4	397,000	248,000
37,000	MK-4	416,000	267,000
37,500	MK-4	416,000	267,000
39,000	MK-4	426,000	277,000
40,000	MK-4	426,000	277,000
44,000	MK-4	447,000	298,000

Forets hélicoïdaux à queue CM

Forets hélicoïdaux extra-longs, série 1

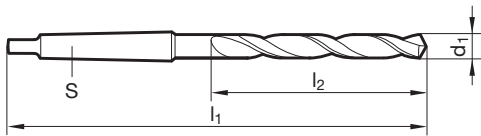


Référence 71325



Conseils d'util.,
page 188

- Amin. de l'âme $\geq \varnothing 8,000$
- affûtage à dépouille conique
- goujures larges
- pour les perçages très profonds
- pour l'amélioration de l'évacuation des copeaux
- traité vapeur $> \varnothing 16 \text{ mm}$



d1 mm	S	l1 mm	l2 mm
8,000	MK-1	265,000	165,000
8,330	MK-1	265,000	165,000
8,500	MK-1	265,000	165,000
9,000	MK-1	275,000	175,000
10,000	MK-1	285,000	185,000
10,500	MK-1	285,000	185,000
11,000	MK-1	300,000	195,000
11,500	MK-1	300,000	195,000
12,000	MK-1	310,000	205,000
12,300	MK-1	310,000	205,000
12,500	MK-1	310,000	205,000
13,000	MK-1	310,000	205,000
13,500	MK-1	325,000	220,000
14,000	MK-1	325,000	220,000
14,500	MK-2	340,000	220,000
15,000	MK-2	340,000	220,000
15,500	MK-2	355,000	230,000
16,000	MK-2	355,000	230,000

d1 mm	S	l1 mm	l2 mm
17,000	MK-2	355,000	230,000
17,500	MK-2	370,000	245,000
18,000	MK-2	370,000	245,000
18,500	MK-2	370,000	245,000
19,000	MK-2	370,000	245,000
19,500	MK-2	385,000	260,000
20,000	MK-2	385,000	260,000
21,000	MK-2	385,000	260,000
21,500	MK-2	405,000	270,000
22,000	MK-2	405,000	270,000
23,000	MK-2	405,000	270,000
24,000	MK-3	440,000	290,000
25,000	MK-3	440,000	290,000
26,000	MK-3	440,000	290,000
26,990	MK-3	460,000	305,000
28,000	MK-3	460,000	305,000
30,000	MK-3	460,000	305,000

Forets hélicoïdaux à queue CM

Forets hélicoïdaux extra-longs, série 2



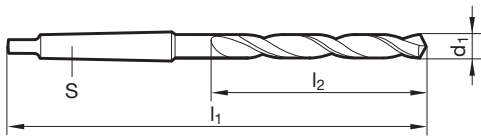
Référence 71326



P	M	K	N	S	H
•		•	•		

Conseils d'util.,
page 188

- Amin. de l'âme $\geq \varnothing 8,000$
- affûtage à dépouille conique
- goujures larges
- pour les perçages très profonds
- pour l'amélioration de l'évacuation des copeaux
- traité vapeur $> \varnothing 16 \text{ mm}$



d1 mm	S	l1 mm	l2 mm
8,000	MK-1	330,000	210,000
8,730	MK-1	345,000	220,000
9,000	MK-1	345,000	220,000
10,000	MK-1	360,000	235,000
11,000	MK-1	375,000	250,000
11,500	MK-1	375,000	250,000
12,000	MK-1	395,000	260,000
12,700	MK-1	395,000	260,000
13,000	MK-1	395,000	260,000
13,500	MK-1	410,000	275,000
14,000	MK-1	410,000	275,000
14,500	MK-2	425,000	275,000
15,000	MK-2	425,000	275,000
15,500	MK-2	445,000	295,000
16,000	MK-2	445,000	295,000
16,500	MK-2	445,000	295,000
17,000	MK-2	445,000	295,000
17,500	MK-2	465,000	310,000

d1 mm	S	l1 mm	l2 mm
17,860	MK-2	465,000	310,000
18,000	MK-2	465,000	310,000
19,000	MK-2	465,000	310,000
20,000	MK-2	490,000	325,000
20,500	MK-2	490,000	325,000
21,000	MK-2	490,000	325,000
22,000	MK-2	515,000	345,000
23,000	MK-2	515,000	345,000
24,000	MK-3	555,000	365,000
25,000	MK-3	555,000	365,000
26,000	MK-3	555,000	365,000
26,500	MK-3	555,000	365,000
30,000	MK-3	580,000	385,000
31,750	MK-3	610,000	410,000
43,000	MK-4	735,000	490,000

Forets hélicoïdaux à queue CM

Forets à canaux de lubrification



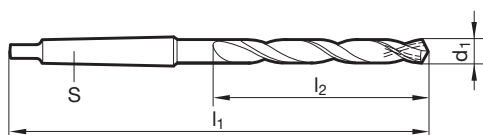
Référence 71554



P	M	K	N	S	H
●	○	●	○		

Conseils d'util.,
page 188

- Amin. de l'âme $\geq \varnothing 10,000$
- affûtage à dépouille conique
- aussi pour le perçage avec canons de perçage



d1 mm	S	l1 mm	l2 mm
10,000	MK-2	233,000	116,000
11,000	MK-2	242,000	125,000
12,000	MK-2	251,000	134,000
13,000	MK-2	251,000	134,000
14,000	MK-2	259,000	142,000
15,000	MK-2	264,000	147,000
16,000	MK-2	270,000	153,000
17,000	MK-2	276,000	159,000
18,000	MK-2	282,000	165,000
19,000	MK-3	307,000	171,000
20,000	MK-3	313,000	177,000
21,000	MK-3	320,000	184,000
22,000	MK-3	327,000	191,000
23,000	MK-3	334,000	198,000
24,000	MK-3	342,000	206,000
25,000	MK-3	342,000	206,000
26,000	MK-3	350,000	214,000
27,000	MK-4	385,000	222,000

d1 mm	S	l1 mm	l2 mm
28,000	MK-4	385,000	222,000
29,000	MK-4	393,000	230,000
30,000	MK-4	393,000	230,000
32,000	MK-4	421,000	248,000
33,000	MK-4	421,000	248,000
34,000	MK-4	430,000	257,000
35,000	MK-4	430,000	257,000
40,000	MK-4	450,000	277,000

Forets hélicoïdaux à queue CM

Forets à utilisations multiples, série longue



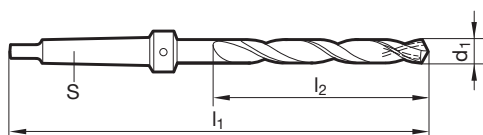
Référence 71550



P	M	K	N	S	H
•		•	•		

Conseils d'util.,
page 186

- Amin. de l'âme $\geq \varnothing 14,500$
- affûtage à dépouille conique
- refroidissement par bague d'adduction du produit de lubrification et de refroidissement, n° de catalogue 71560 (à commander séparément)



d1 mm	S	l1 mm	l2 mm
14,500	MK-2	297,000	147,000
15,000	MK-2	297,000	147,000
15,500	MK-2	303,000	153,000
16,000	MK-2	303,000	153,000
17,000	MK-2	309,000	159,000
18,000	MK-2	315,000	165,000

d1 mm	S	l1 mm	l2 mm
24,000	MK-3	374,000	206,000
24,500	MK-3	374,000	206,000
25,000	MK-3	374,000	206,000
26,000	MK-3	382,000	214,000
32,000	MK-4	461,000	248,000

Forets hélicoïdaux à queue CM

Forets à utilisations multiples, série longue



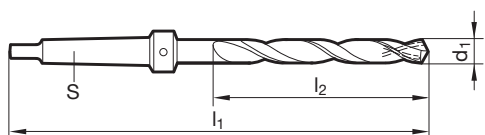
Référence 71553



P	M	K	N	S	H
•		•	•		

Conseils d'util.,
page 186

- Amin. de l'âme $\geq \varnothing 8,000$
- affûtage à dépouille conique
- refroidissement par bague d'adduction du produit de lubrification et de refroidissement, n° de catalogue 71560 (à commander séparément)



d1 mm	S	l1 mm	l2 mm
8,000	MK-2	250,000	100,000
8,500	MK-2	250,000	100,000
9,000	MK-2	257,000	107,000
9,500	MK-2	257,000	107,000
10,000	MK-2	266,000	116,000
10,500	MK-2	266,000	116,000
11,500	MK-2	275,000	125,000
12,000	MK-2	284,000	134,000
12,500	MK-2	284,000	134,000
13,000	MK-2	284,000	134,000
14,000	MK-2	292,000	142,000
19,500	MK-3	345,000	177,000

d1 mm	S	l1 mm	l2 mm
20,000	MK-3	345,000	177,000
20,500	MK-3	352,000	184,000
21,000	MK-3	352,000	184,000
21,500	MK-3	359,000	191,000
22,000	MK-3	359,000	191,000
23,000	MK-3	366,000	198,000
27,000	MK-4	435,000	222,000
27,500	MK-4	435,000	222,000
28,500	MK-4	443,000	230,000
29,000	MK-4	443,000	230,000
29,500	MK-4	443,000	230,000
31,500	MK-4	452,000	239,000

Forets hélicoïdaux à queue CM

Forets extra-longs à hélice, à trous d'huile



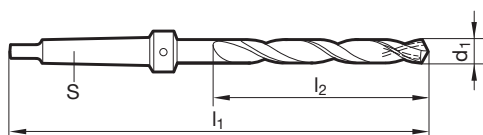
Référence 71565



P	M	K	N	S	H
●	○	●	○	○	

Conseils d'util.,
page 188

- Amin. de l'âme $\geq \varnothing 14,500$
- affûtage à dépouille conique
- refroidissement par bague d'adduction du produit de lubrification et de refroidissement, n° de catalogue 71560 (à commander séparément)



d1 mm	S	l1 mm	l2 mm
14,500	MK-2	370,000	220,000
15,000	MK-2	370,000	220,000
15,480	MK-2	380,000	230,000
15,500	MK-2	380,000	230,000
16,000	MK-2	380,000	230,000
17,860	MK-2	395,000	245,000
18,000	MK-2	395,000	245,000
19,000	MK-2	395,000	245,000
19,840	MK-2	410,000	260,000
20,000	MK-2	410,000	260,000
21,430	MK-2	420,000	270,000
21,500	MK-2	420,000	270,000
22,000	MK-2	420,000	270,000
22,220	MK-2	420,000	270,000
22,500	MK-2	420,000	270,000
23,500	MK-3	438,000	270,000
23,810	MK-3	458,000	290,000
25,000	MK-3	458,000	290,000

d1 mm	S	l1 mm	l2 mm
25,500	MK-3	458,000	290,000
26,000	MK-3	458,000	290,000
27,780	MK-3	473,000	305,000
28,500	MK-3	473,000	305,000
28,570	MK-3	473,000	305,000
29,000	MK-3	473,000	305,000
29,370	MK-3	473,000	305,000
29,500	MK-3	473,000	305,000
30,000	MK-3	473,000	305,000
31,000	MK-3	488,000	320,000
31,500	MK-3	488,000	320,000

Forets hélicoïdaux à queue CM

Forets extra-longs à hélice, à trous d'huile



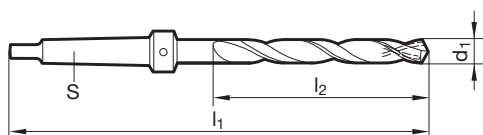
Référence 71567



P	M	K	N	S	H
●	○	●	○	○	○

Conseils d'util.,
page 188

- Amin. de l'âme $\geq \varnothing 8,000$
- affûtage à dépouille conique
- refroidissement par bague d'adduction du produit de lubrification et de refroidissement, n° de catalogue 71560 (à commander séparément)



d1 mm	S	l1 mm	l2 mm
8,000	MK-2	315,000	165,000
9,000	MK-2	325,000	175,000
9,500	MK-2	325,000	175,000
10,000	MK-2	335,000	185,000
10,320	MK-2	335,000	185,000
10,500	MK-2	335,000	185,000
10,720	MK-2	345,000	195,000
11,000	MK-2	345,000	195,000
11,110	MK-2	345,000	195,000
11,500	MK-2	345,000	195,000
11,510	MK-2	345,000	195,000
12,000	MK-2	355,000	205,000

d1 mm	S	l1 mm	l2 mm
12,500	MK-2	355,000	205,000
13,000	MK-2	355,000	205,000
13,100	MK-2	355,000	205,000
13,490	MK-2	370,000	220,000
14,000	MK-2	370,000	220,000

Forets hélicoïdaux à queue CM

Forets extra-longs à hélice, à trous d'huile



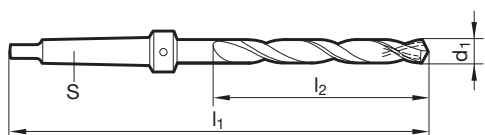
Référence 71566



P	M	K	N	S	H
●	○	●	○	○	

Conseils d'util.,
page 188

- Amin. de l'âme $\geq \varnothing 14,500$
- affûtage à dépouille conique
- refroidissement par bague d'adduction du produit de lubrification et de refroidissement, n° de catalogue 71560 (à commander séparément)



d1 mm	S	l1 mm	l2 mm
14,500	MK-2	425,000	275,000
15,000	MK-2	425,000	275,000
15,500	MK-2	445,000	295,000
16,000	MK-2	445,000	295,000
17,500	MK-2	460,000	310,000
18,000	MK-2	460,000	310,000

d1 mm	S	l1 mm	l2 mm
23,500	MK-3	513,000	345,000
24,000	MK-3	533,000	365,000
25,000	MK-3	533,000	365,000
25,500	MK-3	533,000	365,000
27,000	MK-4	598,000	385,000
32,000	MK-4	623,000	410,000

Forets hélicoïdaux à queue CM

Forets extra-longs à hélice, à trous d'huile



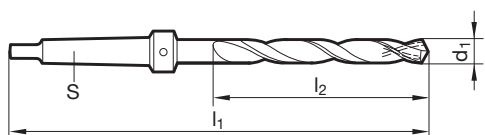
Référence 71568



P	M	K	N	S	H
●	○	●	○	○	

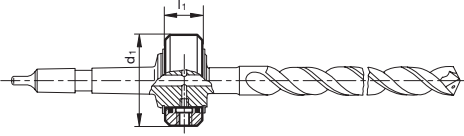
Conseils d'util.,
page 188

- Amin. de l'âme $\geq \varnothing 8,000$
- affûtage à dépouille conique
- refroidissement par bague d'adduction du produit de lubrification et de refroidissement, n° de catalogue 71560 (à commander séparément)



d1 mm	S	l1 mm	l2 mm
8,000	MK-2	360,000	210,000
8,500	MK-2	360,000	210,000
9,000	MK-2	370,000	220,000
10,000	MK-2	385,000	235,000
10,500	MK-2	385,000	235,000
11,000	MK-2	400,000	250,000
11,500	MK-2	400,000	250,000
13,000	MK-2	410,000	260,000
14,000	MK-2	425,000	275,000
19,000	MK-3	478,000	310,000
19,500	MK-3	493,000	325,000
21,000	MK-3	493,000	325,000

d1 mm	S	l1 mm	l2 mm
21,500	MK-3	513,000	345,000
28,000	MK-4	598,000	385,000
29,000	MK-4	598,000	385,000
29,500	MK-4	598,000	385,000
30,000	MK-4	598,000	385,000
31,000	MK-4	623,000	410,000
31,500	MK-4	623,000	410,000

Bagues d'alimentation du liquide de refroidissement**Bagues d'alimentation du liquide de refroidissement****Référence 71560**

Taille	N° de code	d1 mm	l1 mm
MK-2	1,000	58,000	24,000
MK-3	2,000	58,000	24,000
MK-4	3,000	80,000	28,000

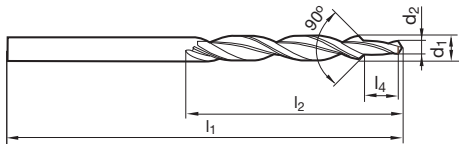
Forets étagés

Forets étagés à listels continus, queue cyl.



Référence 71501

N	DIN 8374	HSS	traité vapeur	118°	h8	R	Cyl
P	M	K	N	S	H		
•		•					



- Amin. de l'âme $\geq \varnothing 6,000$
- affûtage à dépouille conique
- pour les perçages débouchants selon norme DIN EN 20 273, tolérance fine
- pour le chanfreinage des têtes de vis à 90°
- f en fonction du plus petit diamètre
- vc calculée sur le grand diamètre

d1 mm	d2 mm	l1 mm	l2 mm	l4 mm	Taille
6,000	3,200	93,000	57,000	9,000	M 3
8,000	4,300	117,000	75,000	11,000	M 4
10,000	5,300	133,000	87,000	13,000	M 5
11,500	6,400	142,000	94,000	15,000	M 6
15,000	8,400	169,000	114,000	19,000	M 8
19,000	10,500	198,000	135,000	23,000	M 10

Forets étagés

Forets étagés à listels continus, queue cyl.

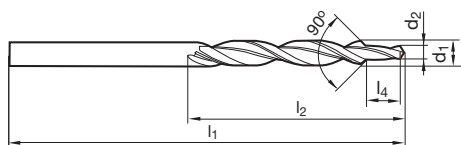


Référence 71503



P	M	K	N	S	H
•		•			

- Amin. de l'âme $\geq \varnothing 3,400$
- affûtage à dépouille conique
- pour les perçages avant filetages, selon Norme DIN 336
- pour chanfreinages à 90°
- f en fonction du plus petit diamètre
- vc calculée sur le grand diamètre



d1 mm	d2 mm	l1 mm	l2 mm	l4 mm	Taille
3,400	2,500	70,000	39,000	8,800	M 3
4,500	3,300	80,000	47,000	11,400	M 4
5,500	4,200	93,000	57,000	13,600	M 5
6,600	5,000	101,000	63,000	16,500	M 6
9,000	6,800	125,000	81,000	21,000	M 8
11,000	8,500	142,000	94,000	25,500	M 10
13,500	10,200	160,000	108,000	30,000	M 12

Forets étagés

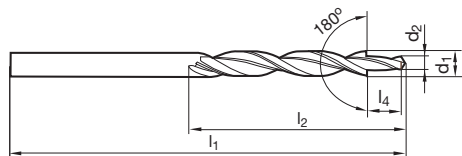
Forets étagés à listels continus, queue cyl.



Référence 71500



P	M	K	N	S	H
•		•			



- Amin. de l'âme $\geq \varnothing 6,000$
- affûtage à dépouille conique
- pour les perçages débouchants selon norme DIN EN 20 273, tolérance moyenne
- pour le lamage des têtes de vis à 180°
- pour les vis selon Norme DIN 6912, 7984, 34821, DIN EN ISO 1207, 4762, 14579, 14580 et DIN 7513, 7516, 7500 - 1
- f en fonction du plus petit diamètre
- vc calculée sur le grand diamètre

d1 mm	d2 mm	l1 mm	l2 mm	l4 mm	Taille
6,000	3,400	93,000	57,000	9,000	M 3
8,000	4,500	117,000	75,000	11,000	M 4
10,000	5,500	133,000	87,000	13,000	M 5
11,000	6,600	142,000	94,000	15,000	M 6
15,000	9,000	169,000	114,000	19,000	M 8
18,000	11,000	191,000	130,000	23,000	M 10

Forets étagés

Forets étagés à listels continus, queue CM

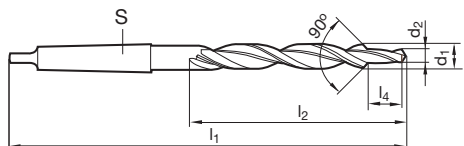


Référence 71523



P	M	K	N	S	H
•		•			

- Amin. de l'âme $\geq \varnothing 9,000$
- affûtage à dépouille conique
- pour les perçages avant filetages, selon Norme DIN 336
- pour chanfreinages à 90°
- f en fonction du plus petit diamètre
- vc calculée sur le grand diamètre



d1 mm	d2 mm	S	l1 mm	l2 mm	l4 mm	Taille
9,000	6,800	MK-1	162,000	81,000	21,000	M 8
11,000	8,500	MK-1	175,000	94,000	25,500	M 10
13,500	10,200	MK-1	189,000	108,000	30,000	M 12
15,500	12,000	MK-2	218,000	120,000	34,500	M 14
17,500	14,000	MK-2	228,000	130,000	38,500	M 16
20,000	15,500	MK-2	238,000	140,000	43,500	M 18
22,000	17,500	MK-2	248,000	150,000	47,500	M 20

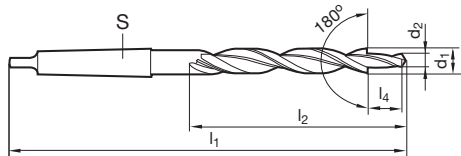
Forets étagés

Forets étagés à listels continus, queue CM



Référence 71520

N	DIN 8377	HSS	traité vapeur	118°	h8	R	MK
P	M	K	N	S	H		
•		•					



- Amin. de l'âme $\geq \varnothing 11,000$
- affûtage à dépouille conique
- pour les perçages débouchants selon norme DIN EN 20 273, tolérance moyenne
- pour le lamage des têtes de vis à 180°
- pour les vis selon Norme DIN 6912, 7984, 34821, DIN EN ISO 1207, 4762, 14579, 14580 et DIN 7513, 7516, 7500 - 1
- f en fonction du plus petit diamètre
- vc calculée sur le grand diamètre

d1 mm	d2 mm	S	l1 mm	l2 mm	l4 mm	Taille
11,000	6,600	MK-1	175,000	94,000	15,000	M 6
15,000	9,000	MK-2	212,000	114,000	19,000	M 8
18,000	11,000	MK-2	228,000	130,000	23,000	M 10
20,000	13,500	MK-2	238,000	140,000	27,000	M 12
24,000	15,500	MK-3	281,000	160,000	31,000	M 14
26,000	17,500	MK-3	286,000	165,000	35,000	M 16

Forets à centrer

Forets à centrer sans méplat

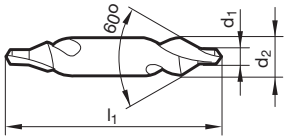


Référence 71600



P	M	K	N	S	H
•	•	•	•	○	

- Amin. de l'âme $\geq \varnothing 2,000$
- affûtage à dépouille conique
- selon DIN 332, page 1, forme A
- $d1 \leq 0,8$ mm : avec une seule pointe



d1 mm	d2 mm	l1 mm
0,500	3,150	25,000
0,800	3,150	25,000
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000
2,500	6,300	45,000
3,150	8,000	50,000
4,000	10,000	56,000
5,000	12,500	63,000
6,300	16,000	71,000
8,000	20,000	80,000

d1 mm	d2 mm	l1 mm
10,000	25,000	100,000
12,500	31,500	125,000

Forets à centrer

Forets à centrer sans méplat

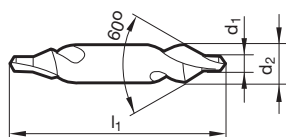


Référence 71601



P	M	K	N	S	H
•	•	•	•	○	

- Amin. de l'âme $\geq \varnothing 2,000$
- affûtage à dépouille conique
- selon DIN 332, page 1, forme A
- $d1 \leq 0,8$ mm : avec une seule pointe



d1 mm	d2 mm	l1 mm
0,500	3,150	25,000
0,800	3,150	25,000
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000

d1 mm	d2 mm	l1 mm
2,500	6,300	45,000
3,150	8,000	50,000
4,000	10,000	56,000
5,000	12,500	63,000
6,300	16,000	71,000
8,000	20,000	80,000

Forets à centrer

Forets à centrer sans méplat

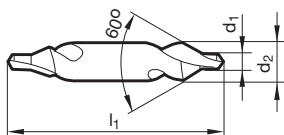


Référence 71602



P	M	K	N	S	H
•	•	•	•	○	

- Amin. de l'âme $\geq \text{Ø } 2,000$
- affûtage à dépouille conique
- dispositif correct entre pointes de centrage
- pour les centrages selon Norme DIN 332, Partie 1, Forme R
- $d_1 \leq 0,8 \text{ mm}$: avec une seule pointe



d1 mm	d2 mm	l1 mm
0,500	3,150	25,000
0,800	3,150	25,000
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000
2,500	6,300	45,000
3,150	8,000	50,000
4,000	10,000	56,000
5,000	12,500	63,000
6,300	16,000	71,000
8,000	20,000	80,000

d1 mm	d2 mm	l1 mm
10,000	25,000	100,000

Forets à centrer

Forets à centrer sans méplat

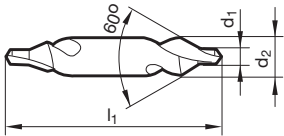


Référence **61602**



P	M	K	N	S	H
•	•	•	•	•	

- Amin. de l'âme $\geq \varnothing 2,000$
- affûtage à dépouille conique
- dispositif correct entre pointes de centrage
- pour les centrages selon Norme DIN 332, Partie 1, Forme R
- meilleure protection contre l'usure
- $d1 \leq 0,8$ mm : avec une seule pointe



d1 mm	d2 mm	l1 mm
0,800	3,150	25,000
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000
2,500	6,300	45,000

d1 mm	d2 mm	l1 mm
3,150	8,000	50,000
4,000	10,000	56,000
5,000	12,500	63,000
6,300	16,000	71,000

Forets à centrer

Forets à centrer sans méplat

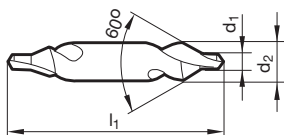


Référence 71605



P	M	K	N	S	H
•	•	•	•	○	

- Amin. de l'âme $\geq \varnothing 2,000$
- affûtage à dépouille conique
- avec épaulement, plus résistant à la casse
- chambrage entre chanfr. et perç. p. réserve de lubrif., graisse
- selon DIN 332, page 1, forme A



d1 mm	d2 mm	l1 mm
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000
2,500	6,300	45,000
3,150	8,000	50,000

d1 mm	d2 mm	l1 mm
4,000	10,000	56,000
5,000	12,500	63,000
6,300	16,000	71,000

Forets à centrer

Forets à centrer sans méplat

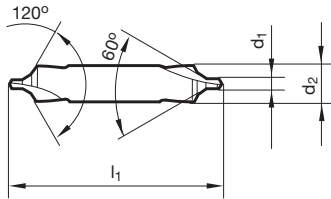


Référence **71604**



P	M	K	N	S	H
•	•	•	•	○	

- Amin. de l'âme $\geq \varnothing 2,000$
- affûtage à dépouille conique
- selon DIN 332, page 1, forme B
- avec chanfrein de protection 120°



d1 mm	d2 mm	l1 mm
1,000	4,000	35,500
1,250	5,000	40,000
1,600	6,300	45,000
2,000	8,000	50,000
2,500	10,000	56,000
3,150	11,200	60,000

d1 mm	d2 mm	l1 mm
4,000	14,000	67,000
5,000	18,000	75,000
6,300	20,000	80,000

Forets à centrer

Forets à centrer avec méplat

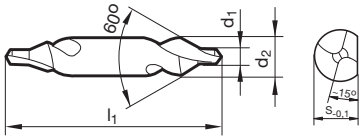


Référence **71607**



P	M	K	N	S	H
●	●	●	●	○	○

- Amin. de l'âme $\geq \varnothing 2,000$
- affûtage à dépouille conique
- selon DIN 332, page 1, forme A



d1 mm	d2 mm	l1 mm
1,600	4,000	35,500
2,000	5,000	40,000
2,500	6,300	45,000
3,150	8,000	50,000
4,000	10,000	56,000
5,000	12,500	63,000

d1 mm	d2 mm	l1 mm
6,300	16,000	71,000

Forets à centrer

Forets à centrer avec méplat

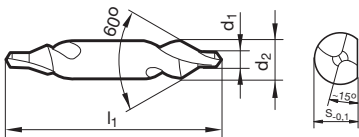


Référence **71609**



P	M	K	N	S	H
●	●	●	●	○	

- Amin. de l'âme $\geq \varnothing 2,000$
- affûtage à dépouille conique
- dispositif correct entre pointes de centrage
- pour les centrages selon Norme DIN 332, Partie 1, Forme R



d1 mm	d2 mm	l1 mm
1,600	4,000	35,500
2,000	5,000	40,000
2,500	6,300	45,000
3,150	8,000	50,000
4,000	10,000	56,000
5,000	12,500	63,000

d1 mm	d2 mm	l1 mm
6,300	16,000	71,000
8,000	20,000	80,000

Forets aléateurs

Forets aléateurs, queue cylindrique

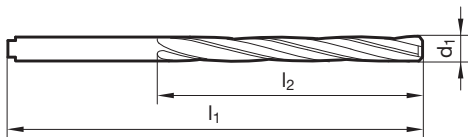


Référence 72200



P	M	K	N	S	H
•		•			

- affûtage à dépouille conique
- particulièrement rigide
- avec tenon suiv. DIN 1809
- pour les perçages préalablement coulés, percés ou estampés
- précision d'alignement corrigée
- erreur de circularité corrigée
- état de surface du perçage amélioré
- \varnothing d'entrée < que le \varnothing du perçage à aléser
- respecter le \varnothing minimum de l'avant-perçage



d1 mm	d0 mm	l1 mm	l2 mm
4,800	3,5	108,000	74,000
5,000	3,5	108,000	74,000
5,800	4,2	116,000	80,000
6,000	4,2	116,000	80,000
6,800	4,9	133,000	93,000
7,000	4,9	133,000	93,000
7,800	5,6	142,000	100,000
8,000	5,6	142,000	100,000
8,800	6,3	151,000	107,000
9,000	6,3	151,000	107,000
9,800	7,0	162,000	116,000
10,000	7,0	162,000	116,000

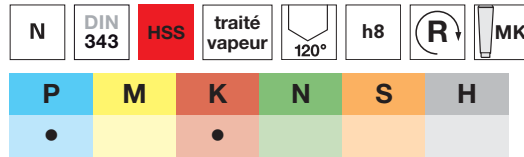
d1 mm	d0 mm	l1 mm	l2 mm
10,750	7,7	173,000	125,000
11,000	7,7	173,000	125,000
11,750	8,4	184,000	134,000
12,000	8,4	184,000	134,000
12,750	9,1	184,000	134,000
13,000	9,1	184,000	134,000
13,750	9,8	194,000	142,000
14,750	10,5	202,000	147,000
16,000	11,2	211,000	153,000

Forets aléateurs

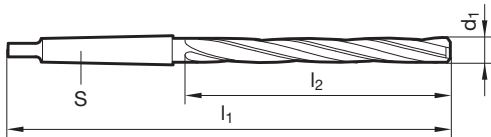
Forets aléateurs, queue CM



Référence **72210**



- affûtage à dépouille conique
- particulièrement rigide
- pour les perçages préalablement coulés, percés ou estampés
- précision d'alignement corrigée
- erreur de circularité corrigée
- état de surface du perçage amélioré
- Ø d'entrée < que le Ø du perçage à aléser
- respecter le Ø minimum de l'avant-perçage



d1 mm	d0 mm	S	l1 mm	l2 mm
9,000	6,3	MK-1	162,000	81,000
9,800	7,0	MK-1	168,000	87,000
10,000	7,0	MK-1	168,000	87,000
11,750	8,4	MK-1	182,000	101,000
12,750	9,1	MK-1	182,000	101,000
13,750	9,8	MK-1	189,000	108,000
14,000	9,8	MK-1	189,000	108,000
14,750	10,5	MK-2	212,000	114,000
15,000	10,5	MK-2	212,000	114,000
15,750	11,2	MK-2	218,000	120,000
16,000	11,2	MK-2	218,000	120,000
16,750	11,9	MK-2	223,000	125,000
17,000	11,9	MK-2	223,000	125,000
17,750	12,6	MK-2	228,000	130,000
18,000	12,6	MK-2	228,000	130,000
18,700	13,3	MK-2	233,000	135,000
19,000	13,3	MK-2	233,000	135,000
19,700	14,0	MK-2	238,000	140,000
20,000	14,0	MK-2	238,000	140,000
21,000	14,6	MK-2	243,000	145,000
21,700	15,3	MK-2	248,000	150,000
22,000	15,3	MK-2	248,000	150,000
22,500	16,0	MK-2	253,000	155,000
22,700	16,0	MK-2	253,000	155,000

d1 mm	d0 mm	S	l1 mm	l2 mm
23,000	16,0	MK-2	253,000	155,000
23,700	16,6	MK-3	281,000	160,000
24,000	16,6	MK-3	281,000	160,000
24,700	17,3	MK-3	281,000	160,000
25,700	18,0	MK-3	286,000	165,000
26,000	18,0	MK-3	286,000	165,000
26,700	18,6	MK-3	291,000	170,000
27,700	19,3	MK-3	291,000	170,000
29,700	20,5	MK-3	296,000	175,000
31,600	22,0	MK-4	334,000	185,000
34,600	25,0	MK-4	339,000	190,000
38,000	26,5	MK-4	349,000	200,000
48,600	34,0	MK-4	369,000	220,000





OUTILS DE TARAUDAGE



ISO-CODES

P	Aciers communs, aciers hautement alliés
M	Aciers inoxydables
K	Fontes grises, fontes à graphite sphéroïdal et fontes malléables
N	Aluminium et ses alliages ainsi que d'autres métaux non ferreux
S	Alliages de titane, spéciaux et superalliages
H	Aciers trempés et fontes dures

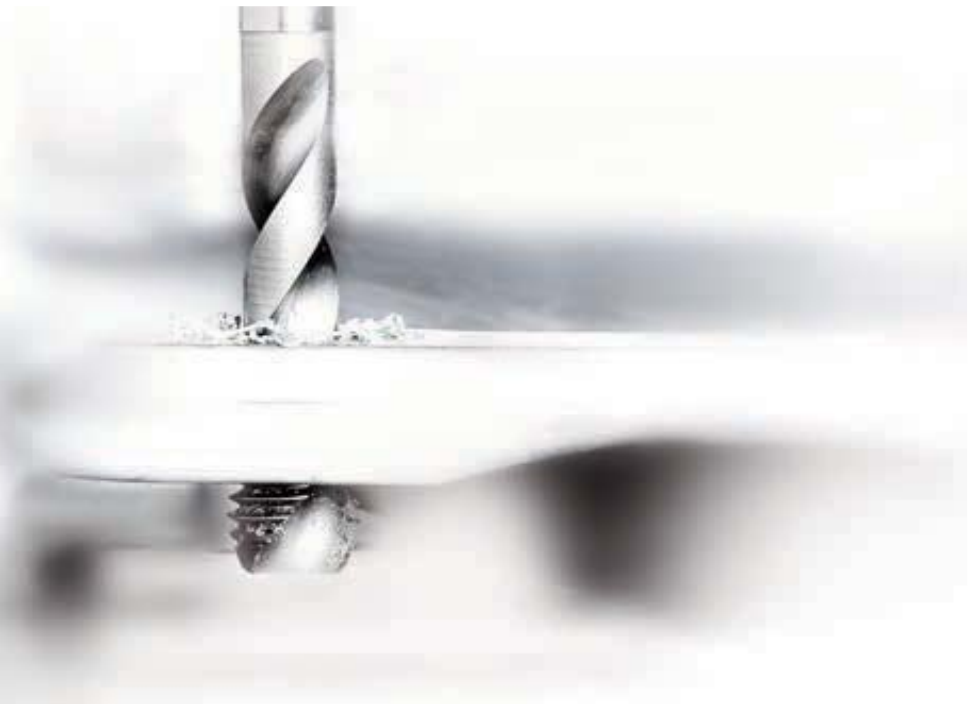
Sur les pages suivantes prix et programmes, sont mentionnées pour chacune des fraises, les recommandations d'utilisation pour chacun des groupes d'usinage par enlèvement de copeaux :

- particulièrement recommandé
- sous réserve



PICTOGRAMMES

MATIERE DE COUPE	VHM	HSS	HSS-E	HSS-E-PM											
	CW monobloc														
REVETEMENT	poli	ni-truré	traité vapeur	TiCN	Al-TiZrN	TiAlN	TiN	Al-TiN	Al-CrN						
TOLLERANZKLASSE	ISO2/6H	6HX	ISO3/6G	2B	6GX	6g									
FORME	B	C	D	E											
SENS DE COUPE															
	à droite		à gauche												
FORME D'ATTACHEMENT															
PROFONDEURS	1xD	2xD													
NORME	DIN 371	DIN 376	DIN 374	DIN 371/376	~DIN 371	~DIN 376	~DIN 371/376	~DIN 374	DIN 5156						
	DIN 40432	DIN 2180	DIN 352	~DIN 352	DIN 357	DIN 5157	DIN EN 22568								
	Norme usine														
TYPE	Produktiv Synchro	Produktiv N-X	Produktiv N	Intensiv Synchro	Intensiv N-X	Intensiv N	Produktiv HX	Produktiv HDX	N	Massiv N	Intensiv HX	Intensiv HDX			
	HCX	H	Produktiv H	HR15	Produktiv HD	Intensiv HD	GG	Produktiv W	Intensiv W	Durativ	VA	TMC SP	TM SP		



Nos outils de taraudage

Les outils de taraudage STOCK appartiennent, à côté de nos outils de perçage et de fraisage à notre groupe de produits le plus important de notre gamme. La multitude des types combinée avec les différentes sortes de filetages en diverses tolérances selon DIN ou norme usine,

offre un vaste choix de solutions pour la plupart des cas problématiques dans l'usinage de filetages. La qualité de l'avant-trou concernant la tolérance, la concentricité, le parallélisme et l'état de surface qui est souvent réalisé avec un outil de perçage, a

une grande influence sur la qualité du filetage réalisé. Pour être sûr, il faudrait utiliser des forets STOCK. Demandez le catalogue complet STOCK ou laissez-vous conseiller par un de nos techniciens.



STOCK-

Outils de taraudage

Tarauds machine
Tarauds à refouler
Fraises à fileter
Tarauds à main
Filières

STOCK-

Matières de coupe

HSS
HSS-E
HSS-E-PM
Carbure monobloc







STOCK-

Types de filetages

M, MF
UNC, UNF
BSW, G
PG, NPT


STOCK-

Bagues couleur corresp. aux matériaux à usiner

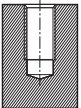
-  Aciers en général $\leq 800 \text{ N/mm}^2$
-  Aciers très tenaces $> 1100 \dots 1400 \text{ N/mm}^2$
-  Aciers résist. à la rouille et aux acides
-  Utilisation universelle $> 1100 \text{ N/mm}^2$
-  Aluminium et alliages d'Al
-  Fontes

Explication des pictogrammes des types de taraudage

 = filetage débouchant, court

 = filetage borgne 1 x D

 = filetage débouchant 1 x D

 = filetage borgne 2 x D

 = filetage débouchant 2 x D

 = filetage borgne jusqu'au fond du taraudage

STOCK-

Types de base

PRODUKTIV

Type N, W, H, HD, HDX, HX et Synchro
Taraud à goujures droites et entrée hélicoïdale GUN Forme B pour filetages débouchant

INTENSIV

Type N, W, H, HD, HDX, HX, HCX et Synchro
Taraud avec hélice à droite 10°, 15°, 25°, 40°, 45° et 50° pour trous borgnes

MASSIV

Type N
Taraud à goujures courtes et entrée hélicoïdale GUN forme B pour l'usinage de tôles et de pièces à faible épaisseur en générale

DURATIV

Type N
Ceci est notre appellation pour un taraud à refouler avec et sans rainures de lubrification

STOCK-

Solutions aux problèmes

Sur votre demande nous fabriquons également des pièces spéciales pour la coupe de filetage, pour refouler, pour le fraisage circulaire ainsi que des outils avec trous d'huile pour l'usinage dur et la lubrification minimale. En version polie ou avec surface traitée telle que : nitrurée, traitée vapeur, revêtue de substance dure ou avec une couche glissante (base MoS₂).

P	M	K	N	S	H	Type	Forme	Classe de tolérance	Matière de coupe	Surface	Norme	d1	Référence	Progr., page
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Tarauds pour filetage métrique ISO

	•	•	•	•	○	Produktiv Synchro	B	ISO2/6H	HSS-E-PM	TiCN	DIN 371	M 2 - M10	53053	362
	•	•	•	•	○	Produktiv Synchro	B	ISO2/6H	HSS-E-PM	TiCN	DIN 376	M12 - M20	53054	363
	•	•	•	○	•	Produktiv N-X	B	6HX	HSS-E	AlTiZrN	~DIN 371/~DIN 376	M 2 - M30	53733	364
	•	○	○	○	○	Produktiv N	B	ISO2/6H	HSS-E	TiN	DIN 371	M 3 - M10	63033	365
	•	○	○	○	○	Produktiv N	B	ISO2/6H	HSS-E	traité vapeur	DIN 371	M 3 - M10	73033	366
	•	○	○	○	○	Produktiv N	B	ISO2/6H	HSS-E	traité vapeur	DIN 376	M12 - M24	73038	367
	•	•	•	•	○	Intensiv Synchro	C	6HX	HSS-E-PM	TiCN	DIN 371	M 5 - M10	53050	368
	•	•	•	•	○	Intensiv Synchro	C	6HX	HSS-E-PM	TiCN	DIN 376	M12 - M20	53051	369
	•	•	•	○	○	Intensiv N-X	C	6HX	HSS-E	TiAlN	~DIN 371/~DIN 376	M 2 - M30	53746	370
	•	○	○	○	○	Intensiv N	C	ISO2/6H	HSS-E	TiN	DIN 371	M 3 - M10	63046	371
	•	○	○	○	○	Intensiv N	C	ISO2/6H	HSS-E	traité vapeur	DIN 371	M 3 - M10	73046	372
	•	○	○	○	○	Intensiv N	C	6HX	HSS-E	TiN	DIN 376	M12 - M20	63048	373
	•	○	○	○	○	Intensiv N	C	ISO2/6H	HSS-E	traité vapeur	DIN 376	M12 - M24	73048	374
	•	○	○	○	○	Intensiv N	E	ISO2/6H	HSS-E	poli	DIN 371	M 4 - M10	73047	375
	•	○	○	○	•	Produktiv HX	B	6HX	HSS-E-PM	AlTiN	DIN 371/ DIN 376	M 3 - M16	53669	376
	•	○	○	○	•	Intensiv HDX	B	6HX	HSS-E-PM	TiCN	DIN 371/ DIN 376	M 3 - M16	53667	377

P	M	K	N	S	H	Type	Forme	Classe de tolérance	Matière de coupe	Surface	Norme	d1	Référence	Progr., page
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Tarauts pour filetage métrique ISO

	•			○			N	C	ISO2/6H	HSS-E	poli	DIN 371	M 1 - M10	73185	378
	•			○			N	C	ISO2/6H	HSS-E	poli	DIN 376	M 6 - M22	73191	379
	•			○			Massiv N	B	ISO2/6H	HSS-E	poli	DIN 371	M 2,3 - M10	73126	380
			○		•	•	Intensiv HX	C	6HX	HSS-E-PM	AlTiN	DIN 371/ DIN 376	M 3 - M16	53668	381
		•			•		Intensiv HDX	C	6HX	HSS-E-PM	TiCN	DIN 371/ DIN 376	M 3 - M16	53666	382
	•			○	•	○	HCX	C	6HX	HSS-E-PM	TiCN	DIN 371	M 5 - M10	53670	383
				•			H	C	6HX	CW monobloc	poli	DIN 371	M 3 - M10	73011	384
	•			○			Produktiv N	B	ISO2/6H	HSS-E	TiN	DIN 371	M 3 - M10	63133	385
	•			○			Produktiv N	B	ISO3/6G	HSS-E	poli	DIN 371	M 2,5 - M10	73132	386
	•			○			Produktiv N	B	ISO2/6H	HSS-E	poli	DIN 371	M 2 - M10	73133	387
	•			○			Produktiv N	B	ISO2/6H	HSS-E	TiN	DIN 376	M12 - M20	63138	388
	•			○			Produktiv N	B	ISO2/6H	HSS-E	poli	DIN 376	M 2 - M24	73138	389
	•			○			Intensiv N	C	ISO2/6H	HSS-E	TiN	DIN 371	M 3 - M10	63146	390
	•			○			Intensiv N	C	ISO3/6G	HSS-E	poli	DIN 371	M 3 - M10	73145	391
	•			○			Intensiv N	C	ISO2/6H	HSS-E	poli	DIN 371	M 2 - M10	73146	392
	•			○			Intensiv N	C	ISO2/6H	HSS-E	poli	DIN 371	M 2 - M10	73221	393

P	M	K	N	S	H	Type	Forme	Classe de tolérance	Matière de coupe	Surface	Norme	d1	Référence	Progr., page
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Tarands pour filetage métrique ISO

	•			○			Intensiv N	C	ISO2/6H	HSS-E	TiN	DIN 376	M12 - M20	63148	394
	•			○			Intensiv N	C	ISO2/6H	HSS-E	poli	DIN 376	M 3 - M30	73148	395
	•			○			Intensiv N	C	ISO2/6H	HSS-E	poli	DIN 376	M 3 - M20	73227	396
	•		○				Produktiv H	B	ISO2/6H	HSS-E-PM	TiCN	DIN 371/ DIN 376	M 3 - M10	53640	397
	•		○				Produktiv H	B	ISO2/6H	HSS-E	TiCN	DIN 371	M 2 - M10	53642	398
	•		○				Produktiv H	B	ISO2/6H	HSS-E-PM	TiN	DIN 371	M 3 - M10	63641	399
	•		○				Produktiv H	B	ISO2/6H	HSS-E-PM	poli	DIN 371	M 3 - M10	73640	400
	•		○				Produktiv H	B	ISO2/6H	HSS-E	nituré	DIN 371	M 2 - M10	73642	401
	•		○				Produktiv H	B	ISO2/6H	HSS-E-PM	TiN	DIN 376	M12 - M20	63643	402
	•		○				Produktiv H	B	ISO2/6H	HSS-E	nituré	DIN 376	M12 - M20	73645	403
	•		○				Intensiv H	C	ISO2/6H	HSS-E	TiCN	DIN 371/ DIN 376	M 2 - M10	53661	404
	•						Intensiv H	C	ISO2/6H	HSS-E	TiN	DIN 371	M 3 - M10	63674	405
	•		○				H R15	C	ISO2/6H	HSS-E-PM	poli	DIN 371	M 3 - M10	73619	406
	•		○				Intensiv H	C	ISO2/6H	HSS-E	poli	DIN 371	M 3 - M10	73661	407
	•		○				Intensiv H	C	ISO2/6H	HSS-E	TiN	DIN 376	M12 - M20	63675	408
	•		○				Intensiv H	C	ISO2/6H	HSS-E	poli	DIN 376	M12 - M20	73664	409

P	M	K	N	S	H	Type	Forme	Classe de tolérance	Matière de coupe	Surface	Norme	d1	Référence	Progr., page
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Tarands pour filetage métrique ISO

						H R15	C	ISO2/6H	HSS-E-PM	poli	DIN 376	M12 - M20	73666	410
						H	D	ISO2/6H	CW monobloc	TiCN	~DIN 371	M 3 - M12	63010	411
						Produktiv HD	B	ISO2/6H	HSS-E-PM	TiCN	DIN 371	M 3 - M10	53641	412
						Produktiv HD	B	ISO2/6H	HSS-E	TiN	DIN 371	M 3 - M10	63176	413
						Produktiv HD	B	ISO2/6H	HSS-E	traité vapeur	DIN 371	M 3 - M10	73176	414
						Produktiv HD	B	ISO2/6H	HSS-E-PM	poli	DIN 371	M 3 - M10	73641	415
						Produktiv HD	B	ISO2/6H	HSS-E-PM	TiCN	DIN 376	M12 - M16	53643	416
						Produktiv HD	B	6HX	HSS-E	TiN	DIN 376	M12 - M16	63177	417
						Produktiv HD	B	ISO2/6H	HSS-E	traité vapeur	DIN 376	M12 - M20	73177	418
						Produktiv HD	B	ISO2/6H	HSS-E-PM	poli	DIN 376	M12 - M22	73643	419
						Intensiv HD	C	ISO2/6H	HSS-E-PM	TiCN	DIN 371	M 3 - M10	53662	420
						Intensiv HD	C	ISO2/6H	HSS-E-PM	TiN	DIN 371	M 3 - M10	63662	421
						Intensiv HD	C	ISO2/6H	HSS-E	traité vapeur	DIN 371	M 3 - M10	73660	422
						Intensiv HD	C	ISO2/6H	HSS-E-PM	poli	DIN 371	M 3 - M10	73662	423
						Intensiv HD	C	ISO2/6H	HSS-E-PM	TiCN	DIN 376	M12 - M16	53665	424
						Intensiv HD	C	ISO2/6H	HSS-E-PM	TiN	DIN 376	M12 - M16	63665	425

P	M	K	N	S	H	Type	Forme	Classe de tolérance	Matière de coupe	Surface	Norme	d1	Référence	Progr., page
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Tarauts pour filetage métrique ISO

						Intensiv HD	C	ISO2/6H	HSS-E	traité vapeur	DIN 376	M12 - M20	73659	426
						Intensiv HD	C	ISO2/6H	HSS-E-PM	poli	DIN 376	M12 - M24	73665	427
						GG	C	6HX	HSS-E	AlTiN	DIN 371	M 3 - M10	63201	428
						GG	C	6HX	HSS-E	nituré	DIN 371	M 3 - M10	73201	429
						GG	C	6HX	HSS-E	nituré	DIN 376	M12 - M20	73211	430
						Produktiv W	B	ISO2/6H	HSS-E	poli	DIN 371	M 2 - M10	73131	431
						Produktiv W	B	ISO2/6H	HSS-E	poli	DIN 376	M12 - M20	73189	432
						Intensiv W	C	ISO2/6H	HSS-E	poli	DIN 371	M 2 - M10	73156	433
						Intensiv W	C	ISO2/6H	HSS-E	poli	DIN 376	M12 - M20	73136	434

Tarauts pour filetage métrique ISO fin

						Intensiv N-X	C	6HX	HSS-E	TiAlN	DIN 374	M 6 X0,75 - M24 X1,5	53780	435
						Produktiv N-X	B	6HX	HSS-E	AlTiZrN	DIN 374	M 6 X0,75 - M24 X1,5	53778	436
						Produktiv Synchro	B	ISO2/6H	HSS-E-PM	TiCN	DIN 374	M 8 X1 - M16 X1,5	53055	437
						Intensiv Synchro	C	6HX	HSS-E-PM	TiCN	DIN 374	M 8 X1 - M20 X1,5	53052	438
						Produktiv N	B	ISO2/6H	HSS-E	traité vapeur	DIN 374	M 6 X0,75 - M20 X1,5	73183	439
						Intensiv N	C	ISO2/6H	HSS-E	traité vapeur	DIN 374	M 6 X0,75 - M20 X1,5	73187	440

P	M	K	N	S	H	Type	Forme	Classe de tolérance	Matière de coupe	Surface	Norme	d1	Référence	Progr., page
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Tarauds pour filetage métrique ISO fin

	•			○			N	C	ISO2/6H	HSS-E	poli	DIN 374	M 8 X0,75 - M24 X1,5	73237	441
	•			○			Produktiv N	B	ISO2/6H	HSS-E	poli	DIN 374	M 4 X0,5 - M36 X1,5	73250	442
	•			○			Intensiv N	C	ISO2/6H	HSS-E	poli	DIN 374	M 3 X0,35 - M30 X2	73173	443
	•			○			Intensiv N	C	ISO2/6H	HSS-E	TiN	DIN 374	M 8 X1 - M20 X1,5	63173	444
	•		○				Produktiv H	B	ISO2/6H	HSS-E	nituré	DIN 374	M 3 X0,35 - M22 X1,5	73646	445
		•			○		Produktiv HD	B	ISO2/6H	HSS-E	traité vapeur	DIN 374	M 5 X0,5 - M20 X1,5	73178	446
		•			○		Intensiv HD	C	ISO2/6H	HSS-E	traité vapeur	DIN 374	M 8 X1 - M20 X1,5	73180	447
			•				GG	C	6HX	HSS-E	nituré	DIN 374	M 8 X1 - M20 X1,5	73194	448

Tarauds pour filetage UNC

	•	○	○	○			Produktiv N	B	2B	HSS-E	traité vapeur	~DIN 371	4 -40 - 3/8 -16	73308	449
	•	○	○	○			Produktiv N	B	2B	HSS-E	traité vapeur	~DIN 376	1/2 -13 - 3/4 -10	73309	450
	•	○	○	○			Intensiv N	C	2B	HSS-E	traité vapeur	~DIN 371	4 -40 - 3/8 -16	73322	451
	•	○	○	○			Intensiv N	C	2B	HSS-E	traité vapeur	~DIN 376	1/2 -13 - 3/4 -10	73323	452
		•			○		Produktiv HD	B	2B	HSS-E	traité vapeur	~DIN 371	4 -40 - 3/8 -16	73297	453
		•			○		Produktiv HD	B	2B	HSS-E	traité vapeur	~DIN 376	1/2 -13 - 1 - 8	73298	454
		•			○		Intensiv HD	C	2B	HSS-E	traité vapeur	~DIN 371	4 -40 - 3/8 -16	73304	455

P	M	K	N	S	H	Type	Forme	Classe de tolérance	Matière de coupe	Surface	Norme	d1	Référence	Progr., page
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Tarauts pour filetage UNC

	•			○		Intensiv HD	C	2B	HSS-E	traité vapeur	~DIN 376	1/2 -13 - 3/4 -10	73305	456
		•				GG	C	2B	HSS-E	nitruré	~DIN 371	8 -32 - 3/8 -16	73326	457
	•					GG	C	2B	HSS-E	nitruré	~DIN 376	1/2 -13 - 1 - 8	73327	458

Tarauts pour filetage UNF

	•	○	○	○		Produktiv N	B	2B	HSS-E	traité vapeur	~DIN 374	10 -32 - 5/8 -18	73310	459
	•	○	○	○		Intensiv N	C	2B	HSS-E	traité vapeur	~DIN 374	10 -32 - 5/8 -18	73324	460
		•				Produktiv HD	B	2B	HSS-E	traité vapeur	~DIN 374	10 -32 - 5/8 -18	73299	461
		•				Intensiv HD	C	2B	HSS-E	traité vapeur	~DIN 374	10 -32 - 3/4 -16	73306	462

Tarauts pour filetage NPT

	○	•	○	○		VA	C		HSS-E	traité vapeur	Norme usine	1/8 - 3/4	73293	463
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Tarauts pour filetage BSP

	•	○	○	○		Produktiv N	B		HSS-E	traité vapeur	DIN 5156	G 1/8 - G1	73321	464
	•	○	○	○		Intensiv N	C		HSS-E	traité vapeur	DIN 5156	G 1/8 - G1	73325	465
	•	•	•	○	○	Intensiv N-X	C	X	HSS-E	TiAIN	DIN 5156	G 1/16 - G1	53788	466
	•			○		Intensiv N	C		HSS-E	poli	DIN 5156	G 1/8 - G1 1/2	73286	467
		•				Produktiv HD	B		HSS-E	traité vapeur	DIN 5156	G 1/8 - G1	73300	468

P	M	K	N	S	H	Type	Forme	Classe de tolérance	Matière de coupe	Surface	Norme	d1	Référence	Progr., page
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Tarauts pour filetage BSP

	•			○		Intensiv HD	C		HSS-E	traité vapeur	DIN 5156	G 1/8 - G1	73288	469
		•				GG	C		HSS-E	nitruré	DIN 5156	G 1/8 - G1	73345	470
	•	•	•	○	○	Produktiv N-X	B	X	HSS-E	AlTiZrN	DIN 5156	G 1/16 - G1	53787	471

Tarauts courts pour filetage Pg

	•		○	○		N	B		HSS-E	poli	DIN 40432	PG 7 - PG 16	73296	472
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Taraut court pour les filetages NPT

	•		○	○		N	C		HSS-E	poli	Norme usine	1/16 - 1	73295	473
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Tarauts à refouler avec rainures de lubr. p. filetage métrique ISO

	•	•		•		Durativ	C	6HX	HSS-E	poli	~DIN 371	M 3 - M10	73120	474
	•	•		•		Durativ	C	6HX	HSS-E	TiN	~DIN 371	M 3 - M10	63120	475
	•	•		•		Durativ	C	6GX	HSS-E	TiN	~DIN 371	M 3 - M10	63119	476
	•	•		•		Durativ	C	6HX	HSS-E	TiN	~DIN 376	M12 - M16	63122	477
	•	•		•		Durativ	C	6HX	HSS-E-PM	AlCrN	~DIN 371	M 3 - M10	53620	478
	•	•		•		Durativ	C	6GX	HSS-E-PM	AlCrN	~DIN 371	M 3 - M10	53621	479
	•	•		•		Durativ	C	6HX	HSS-E-PM	AlCrN	~DIN 376	M12 - M20	53622	480

P	M	K	N	S	H	Type	Forme	Classe de tolérance	Matière de coupe	Surface	Norme	d1	Référence	Progr., page
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Tarauts à refouler à canaux de lubrif. et avec rainures de lubr. métr. ISO



•	•	•	•	•	•	Durativ	C	6HX	CW monobloc	TiCN	~DIN 371	M 3 - M10	63013	481
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Tarauts à refouler sans rainures de lubr. p. filetage métrique ISO



•	•	•	•	•	•	Durativ	C	6HX	HSS-E	poli	DIN 371	M 2 - M10	73121	482
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•	•	•	•	•	•	Durativ	C	6HX	HSS-E	TiN	DIN 371	M 2 - M10	63121	483
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•	•	•	•	•	•	Durativ	C	6HX	HSS-E	TiN	~DIN 376	M12 - M20	63123	484
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Fraises à fileter avec chanfrein p. filetage métrique ISO



•	•	•	•	•	•	TMC SP			CW monobloc	poli	Norme usine	M 3 - M20	73810	485
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•	•	•	•	•	•	TMC SP			CW monobloc	TiCN	Norme usine	M 3 - M20	53810	486
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Fraises à fileter avec chanfrein p. filetage métrique ISO fin



•	•	•	•	•	•	TMC SP			CW monobloc	TiCN	Norme usine	M 4 X0,5 - M16 X1,5	53820	487
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•	•	•	•	•	•	TMC SP			CW monobloc	poli	Norme usine	M 4 X0,5 - M16 X1,5	73820	488
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Fraises à fileter sans chanfrein p. filetage métrique ISO



•	•	•	•	•	•	TM SP			CW monobloc	poli	Norme usine	M 6 - M20 X1,5	73830	489
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•	•	•	•	•	•	TM SP			CW monobloc	TiCN	Norme usine	M 6 - M20 X1,5	53830	490
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P	M	K	N	S	H	Type	Forme	Classe de tolérance	Matière de coupe	Surface	Norme	d1	Référence	Progr., page
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Jeux de tarauds à main pour filetages métriques ISO, coupe à droite



•	○	•	•	•	•	N	A/D/C	ISO2/6H	HSS	poli	DIN 352	M 1 - M24	73531	491
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Jeux de tarauds à main pour filetages métriques ISO, coupe à gauche



•	○	•	•	•	•	N	A/D/C	ISO2/6H	HSS	poli	DIN 352	M 4 - M16	73532	492
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Jeux de tarauds à main pour filetages métriques ISO fins



•	○	•	•	•	•	N	D/C	ISO2/6H	HSS	poli	DIN 2181	M 5 X0,5 - M18 X1,5	73521	493
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Jeux de tarauds à main pour filetages UNC



•	○	•	•	•	•	N	A/D/C	2B	HSS	poli	~DIN 352	4 - 40 - 3/4 - 10	73535	494
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Jeux de tarauds à main pour filetages BSW



•	○	•	•	•	•	N	A/D/C		HSS	poli	~DIN 352	W 1/8 - W 3/4	73534	495
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P	M	K	N	S	H	Type	Forme	Classe de tolérance	Matière de coupe	Surface	Norme	d1	Référence	Progr., page
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Jeux de tarauds à main pour filetages BSP



•	○	•	•	•	•	N	D/C		HSS	poli	DIN 5157	G 1/8 - G 1/2	73522	496
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Forets taraudeur machine p.filetage métr. ISO



•	○	•	•	•	•	N	D	ISO2/6H	HSS-E	poli	Norme usine	M 3 - M12	73248	497
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Tarauds machine à l'enfilade pour filetages métriques ISO



•	○	•	•	•	•	N		ISO2/6H	HSS-E	poli	DIN 357	M 3 - M18	73243	498
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Filières pour filetage métrique ISO



•	○	•	•	•	•		B	6h	HSS	poli	DIN EN 22568	M 1 - M30	73400	499
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•	○	•	•	•	•		B	6g	HSS	poli	DIN EN 22568	M 3 - M18	73410	500
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•	•	•	•	•	•		B	6g	HSS-E	nituré	DIN EN 22568	M 2,5 - M20	73413	501
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Application

Classement selon les matières

Bagues couleur	Référence		Métaux non ferreux, Aluminium	Aciers	GG, GGG	Aciers inoxydables/ résistants à l'acide	Nickel, alliages de Ti	Aciers trempés	
	Produktiv	Intensiv							
vert	73033	73046							
	73038	73048							
	73183	73187							
	73308	73322							
	73309	73323							
	73310	73324							
	73321	73325							
	63033	63046							
		63048							
		73047							
	53733	53746							
	53778	53780							
	53787	53788							
	53053	53050							
vert Synchro	53054	53051							
	53055	53052							
jaune	73133	73146							
	73132	73145							
	73138	73148							
	73250	73173							
		73227							
		73286							
	63133	63146							
	63138	63148							
	63173								
bleu	73176	73660							
	73177	73659							
	73178	73180							
	73297	73304							
	73298	73305							
	73299	73306							
	73300	73288							
	63176	73662							
	63177	73665							
	73641	63662							
	73643	63665							
		73293							
	53641	53662							
	53643	53665							
	ohne Ring	53667	53666						
		53669	53668						
rouge	73642	53661							
	73645	73619							
	73646	73661							
	53642	73664							
	73640	73666							
	63641	63010							
	63643	63674							
	53640	63675							
53670	53670								
noir	73131	73156							
	73189	73136							
	73011	73011							
	53670	53670							
blanc	73201	73201							
	73211	73211							
	73194	73194							
	73326	73326							
	73327	73327							
	73345	73345							
	63201	63201							
	53670	53670							
pour trous débouchants et trous borgnes									
tarauds à refouler	73121	63122							
	63121	53620							
	63123	53621							
	73120	53622							
	63120	63013							
	63119								
fraises à fileter	73810	53820							
	73820	73830							
	53810	53830							

■ optimale ■ bien adapté

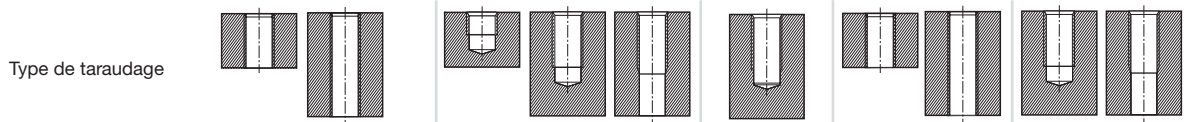
Conseils d'utilisation pour tarauds



Exemples de matières

pour usinage universelle de matières < 1100 MPa, p.ex. :
 aciers de construction, aciers de décolletage
 aciers de cémentation, aciers de traitement
 aciers nitrurés
 fonte à graphite sphéroïdal

pour usinage Synchron
 pour usinage universelle de matières
 1200 MPa

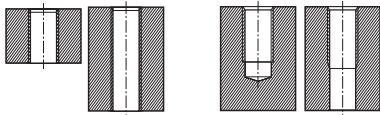


Type de taraudage	HSS-E					HSS-E-PM	HSS-E-PM
Type	Produktiv N		Intensiv N		Intensiv N	Produktiv-Synchro	Intensiv-Synchro
Forme	B		C		E	B	C
Version	trait. vapeur	TiN	trait. vapeur	TiN	poli	TiCN	TiCN
v _c m/min	≤ 15	≤ 20	≤ 15	≤ 20	≤ 15	≤ 20	≤ 20

Type de filetage	Cotes de constr. selon DIN 2184-1	Champ de tolérance	Référence/Diamètres/Page						
M	DIN 371	ISO 2 6H	73033 M3 - M10 366	63033 M3 - M10 365	73046 M3 - M10 372	63046 M3 - M10 371	73047 M4 - M10 375	53053 M2 - M10 362	53050 M5 - M10 368
		6HX							
	DIN 376	ISO 2 6H	73038 M12 - M24 367		73048 M12 - M24 374	63048 M12 - M20 373		53054 M12 - M20 363	
		6HX							53051 M12 - M20 369
MF	DIN 374	ISO 2 6H	73183 M6x0,75 - M20x1,5 439		73187 M6x0,75 - M20x1,5 440		53055 M8x1 - M16x1,5 437		
		6HX						53052 M8x1 - M20x1,5 438	
UNC	DIN ~ 371	2B	73308 Nr.4-40 - 3/8-16 449		73322 Nr.4-40 - 3/8-16 451				
	DIN ~ 376	2B	73309 1/2-13 - 3/4-10 450		73323 1/2-13 - 3/4-10 452				
UNF	DIN ~ 374	2B	73310 Nr.10-32 - 5/8-18 459		73324 Nr.10-32 - 5/8-18 460				
G	DIN 5156	-	73321 G1/8 - G1 464		73325 G1/8 - G1 465				



usinage universelle
 aciers < 1300 N/mm²
 incl. aciers inoxydables et inaltérables aux acides,
 fonte, métaux non ferreux



HSS-E	HSS-E
ProduktivN-X	IntensivN-X
B	C
AlTiZrN	TiAlN
≤ 20	≤ 20
Référence/Diamètres/Page	
53733 M2 - M10 364	53746 M2 - M10 370
53733 M12 - M30 364	53746 M12 - M30 370
53778 MF 6x0,75 - MF 24x1,5 436	53780 MF 6x0,75 - MF 24x1,5 435
53787 G1/16 - G1 471	53788 G1/16 - G1 466

STOCK ProduktivN-X

Pour trous débouchant, forme B,
 avec entrée GUN, HSS-E, TiAlN



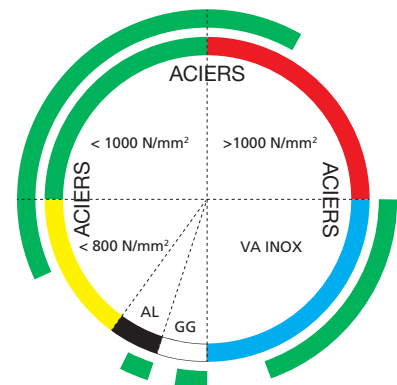
STOCK IntensivN-X

Pour trous borgnes, forme C,
 45° d'hélice, HSS-E, TiAlN



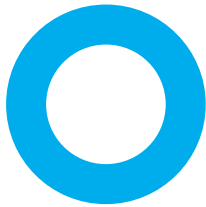
Le plus performant de tous les « all - rounder » pour la réalisation des filetages intérieurs dans tous les domaines d'utilisation. Aussi bien pour les aciers de décolletage, les aciers au carbone, les aciers de cémentation, les aciers d'amélioration, les aciers inoxydables et inaltérables aux acides que pour les matériaux de fonderies et divers non - ferreux avec des résistances à la traction variant de < 600 N/mm² jusqu'à 1300 N/mm², avec fiabilité du procédé d'usinage et d'évacuation des copeaux, excellente tenue de coupe et haute précision du filetage intérieur, réalisé.

Cette nouvelle géométrie de coupe associée au revêtement de protection très résistant à l'usure, à base de TiAlN, assurant la précision de la réalisation de la valeur de la tolérance du filetage intérieur, sans agrandir ou recouper les filets, permet la réalisation de diamètres sur flancs selon la classe de tolérances 6HX, afin d'obtenir de plus hauts rendements pour une rentabilité améliorée dans un domaine d'utilisations universelles en garantissant la fiabilité absolue du procédé d'usinage.



Domaine d'application

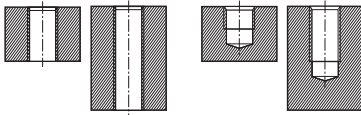
Conseils d'utilisation pour tarauds



Exemples de matières		pour aciers résistants à la corrosion et aux acides p.ex : aciers sulfurés aciers austénitiques aciers martensitiques aciers ferritiques				pour aciers résistants à la corrosion et aux acides p.ex : aciers sulfurés aciers austénitiques aciers martensitiques aciers ferritiques				
Type de taraudage										
Type de taraudage		HSS-E		HSS-E-PM		HSS-E		HSS-E-PM		
Type		Produktiv HD				Intensiv HD				
Forme		B				C				
Version		trait. vapeur	TiN	poli	TiCN	trait. vapeur	poli	TiCN	TiN	
v _c m/min		≤ 15	≤ 20	≤ 15	≤ 20	≤ 15	≤ 15	≤ 20	≤ 20	
Type de filetage	Cotes de constr. selon DIN 2184-1	Référence/Diamètres/Page								
M	DIN 371	ISO 2 6H	73176 M3 - M10 414	63176 M3 - M10 413	73641 M3 - M10 415	53641 M3 - M10 412	73660 M3 - M10 422	73662 M3 - M10 423	53662 M3 - M10 420	63662 M3 - M10 421
		6HX								
	DIN 376	ISO 2 6H	73177 M12 - M20 418	63177 M12 - M16 417	73643 M12 - M22 419	53643 M12 - M16 416	73659 M12 - M20 426	73665 M12 - M24 427	53665 M12 - M16 424	63665 M12 - M16 425
		6HX								
MF	DIN 374	ISO 2 6H	73178 M5x0,5 - M20x1,5 446					73180 M8x1 - M20x1,5 447		
UNC	DIN ~ 371	2B	73297 Nr.4-40 - 3/8-16 453					73304 Nr.4-40 - 3/8-16 455		
	DIN ~ 376	2B	73298 1/2-13 - 1-8 454					73305 1/2-13 - 3/4-10 456		
UNF	DIN ~ 374	2B	73299 Nr.10-32- 5/8-18 461					73306 Nr.10-32- 3/4-16 462		
G	DIN 5156	-	73300 G1/8 - G1 468					73288 G1/8 - G1 469		
NPT	Norme usine	-	73293 1/8 - 3/4 463							



Pour titane et ses alliages



Résistant dans des matériaux difficiles.

Spécialement conçus pour l'usinage fiable de titane et ses alliages, les tarauds de type HDX complètent notre série de tarauds.

HSS-E-PM	
Produktiv HDX	Intensiv HDX
B	C
TiCN	TiCN
≤ 20	≤ 20
Référence/Diamètres/Page	
53667 M3 - M10 377	53666 M3 - M10 382
53667 M12 - M16 377	53666 M12 - M16 382

Avantages :

- Filetages très précis
- Evacuation optimale des copeaux
- Pas de grippage
- Faible usure
- Longues durées de vie
- Une sécurité du process maximale



Conseils d'utilisation pour tarauds

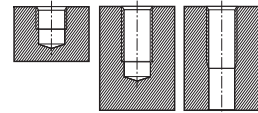
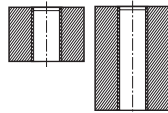


Exemples de matières

Pour aciers très tenaces
>1100...1400 MPa, p.ex. :
aciers de traitement
aciers alliés pour usinage à froid
aciers rapides

Pour aciers très tenaces
>1100...1400 MPa, p.ex. :
aciers de traitement
aciers alliés pour usinage à froid
aciers rapides

Type de taraudage



Type de taraudage

Type de taraudage	HSS-E		HSS-E-PM			HSS-E			HSS-E-PM
Type	Produktiv H								
Forme	B					C			HR 15
Version	nitriert	TiCN	poli	TiN	TiCN	poli	TiCN	TiN	poli
v _c m/min	≤ 15	≤ 20	≤ 15	≤ 20	≤ 20	≤ 15	≤ 20	≤ 20	≤ 15

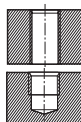
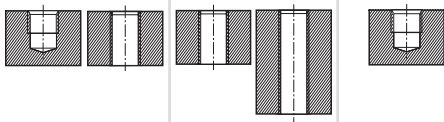
Type de filetage	Cotes de constr. selon DIN 2184-1	Champ de tolérance	Référence/Diamètres/Page									
M	DIN 371	ISO 2 6H	73642 M2 - M10 401	53642 M2 - M10 398	73640 M3 - M10 400	63641 M3 - M10 399	53640 M3 - M10 397	73661 M3 - M10 407	53661 M2 - M10 404	63674 M3 - M10 405	73619 M3 - M10 406	
		6HX										
	DIN 376	ISO 2 6H	73645 M12 - M20 403				63643 M12 - M20 402	73664 M12 - M20 409		63675 M12 - M20 408		73666 M12 - M20 410
		6HX				53640 M12 - M16 397		53661 M12 - M16 404				
	Norme usine	ISO 2 6H										
MF	DIN 374	ISO 2 6H	73646 M3x0,35 - M22x1,5 445									
UNC	DIN ~ 371	2B										
	DIN ~ 376	2B										
UNF	DIN ~ 374	2B										
G	DIN 5156	-										



Pour aciers très tenaces ≥ 1400 MPa

Pour alliages spéciaux très tenaces ≥ 1400 MPa, p.ex. : Inconel

Pour aciers très tenaces 54-62 HRC



HSS-E-PM		HSS-E-PM		Carbure mono
HCX	Produktiv HX	Intensiv HX		H
C	B	B		D
TiCN	AlTiN	AlTiN		TiCN
≤ 20	≤ 20	≤ 20		≤ 2

Référence/Diamètres/Page

53670 M5 - M10 383	53669 M3 - M10 376	53668 M3 - M10 381	
	53669 M12 - M16 376	53668 M12 - M16 381	
			63010 M3 - M12 411

Pour les cas durs

Avec les tarauds bague rouge du type HX et HCX, Stock offre des solutions spécifiques pour l'usinage de matériaux durs-tenaces. Le revêtement dur spécial leur procure une grande résistance à l'usure vis-à-vis des exigences élevées lors de l'usinage dur.

Utilisation **HX**:

- Inconel
- Hastelloy
- Waspalloy
- Alliages à base de nickel

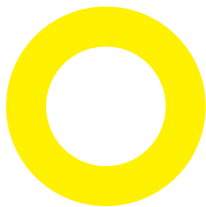
Utilisation **HCX**:

- Aciers à outils
- Acier améliorés alliés
- Aciers rapides
- Fonte malléable
- Fonte à graphite vermiculaire
- Fonte à graphite sphéroïdale
- Bronze dure
- Matériaux durs, spéciaux
- Ampco >21

Avantages :

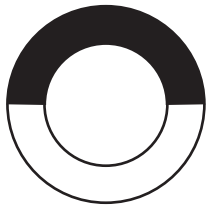
- Filetage fiable
- Longues durées de vie
- Précision

Conseils d'utilisation pour tarauds



Exemples de matières	pour aciers en générales ≤ 800 MPa et alliages légers non-ferreux.		pour aciers en générales ≤ 800 MPa, p.ex. : aciers de construction, aciers de décolletage, aciers de cémentation, aciers de traitement		pour aciers en générales ≤ 800 MPa, p.ex. : aciers de construction, aciers de décolletage, aciers de cémentation, aciers de traitement		pour aciers en générales ≤ 800 MPa et métaux lourds non ferreux		pour aciers en générales ≤ 800 MPa, p.ex. : aciers de construction, aciers de décolletage, aciers de cémentation, aciers de traitement	
Type de taraudage	HSS-E									
Type	Massiv N		N		Produktiv N		Intensiv N			
Forme	B		C		B		C			
Version	poli		poli		poli TiN		poli		poli TiN	
v_c m/min	≤ 15		≤ 15		≤ 15 ≤ 20		≤ 15		≤ 15 ≤ 20	

Type de filetage	Cotes de constr. selon DIN 2184-1	Champ de tolérance	Référence/Diamètres/Page						
M	DIN 371	ISO 2 6H	73126 M2,3 - M10 380	73185 M1 - M10 378	73133 M2 - M10 387	63133 M3 - M10 385	73221 M2 - M10 393	73146 M2 - M10 392	63146 M3 - M10 390
		ISO 3 6G			73132 M2,5 - M10 386			73145 M3 - M10 391	
	DIN 376	ISO 2 6H		73191 M6 - M22 379	73138 M2 - M24 389	63138 M12 - M20 388	73227 M3 - M20 396	73148 M3 - M30 395	63148 M12 - M20 394
MF	DIN 374	ISO 2 6H	73237 M8x0,75 - M24x1,5 441	73250 M4x0,50 - M36x1,5 442				73173 M3x0,35 - M30x2 443	63173 M8x1 - M20x1,5 444
G	DIN 5156	-						73286 G1/8 - G1 1/2 467	



Exemples de matières	pour alliages Ne durs à copeaux courts, p.ex.: AISi >10% Si		pour aluminium et alliages d'aluminium, p.ex.: alliages d'aluminium pur alliages corroyés d'aluminium alliages d'aluminium < 10% Si		pour aluminium et alliages d'aluminium métaux lourds non ferreux, plastiques		pour matières en fonte, p.ex.: fonte grise fonte malléable fonte à graphite sphéroïdal fonte aciérée	
Type de taraudage	HSS-E-PM		HSS-E		Carbure monobloc		HSS-E-PM	
Type	HCX		Produktiv W Intensiv W		H		HCX	
Forme	C		B C				C	
Version	TICN		poli poli		poli		TICN	
v _c m/min	≤ 20		≤ 15 ≤ 15		≤ 15		≤ 20 ≤ 20 ≤ 30	

Type de filetage	Cotes de constr. selon DIN 2184-1	Champ de tolérance	Référence/Diamètres/Page					
M	DIN 371	ISO 2 6H	73131	73156				
			M2 - M10 431	M2 - M10 433				
	DIN 376	6HX	53670		73011	53670	73201	63201
			M5 - M10 383		M3 - M10 384	M5 - M10 383	M3 - M10 429	M3 - M10 428
MF	DIN 374	ISO 2 6H	73189	73136				
			M12 - M20 432	M12 - M20 434				
UNC	DIN ~ 371	6HX			73211			
					M12 - M20 430			
G	DIN 5156	2B			73194			
					M8x1 - M20x1,5 448			
G	DIN ~ 376	2B			73326			
					Nr.8-32 - 3/8-16 457			
G	DIN 5156	-			73327			
					1/2-13 - 1-8 458			
G	DIN 5156	-			73345			
					G1/8 - G1 470			

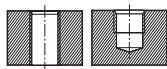
Conseils d'utilisation pour tarauds à main, tarauds machines courts et tarauds spéciaux



Exemples de matières pour aciers en gén. < 800 MPa, p.ex. : aciers de constr., aciers de décollet., aciers de ciment., aciers de traitement. Les jeux réf. 73531 et 73532 sont également indiqués pour des aciers très tenaces résist. à la rouille et aux acides

pour aciers en général < 800 MPa, p.ex. : aciers de construction aciers de décolletage aciers de cimentation aciers de traitement

Type de taraudage



Type de taraudage

HSS

HSS-E

Type

N

N

Forme

-

B

Foret tar.

-

Version

poli

poli

poli

poli

v_c m/min

-

≤ 15

≤ 15

≤ 15

Type de filetage	Cotes de constr. selon DIN 2184-1	Champ de tolérance	Référence/Diamètres/Page		
M	DIN 352	ISO 2 6H	73531 (Jeu) RH: V 73101 M 73102 F 73103 M1 - M24 491	73532 (Jeu) LH: V 73105 M 73106 F 73107 M4 - M16 492	73243 M3 - M18 498
	Norme usine	ISO 2 6H			73248 M3 - M12 497
MF	DIN 2181	ISO 2 6H	73521 (Jeu): V 73110 / F 73111 M5x0,5 - M18x1,5 493		
UNC	~DIN 352	2B	73535 (Jeu): V 73301 / M 73302 / F 73303 Nr.4-40 - 3/4-10 494		
BSW	~DIN 352	-	73534 (Jeu): V 73311 / M 73312 / F 73313 W1/8 - W3/4 495		
G	DIN 5157	-	73522 (Jeu): V 73315 / F 73316 G1/8 - G1/2 496		
Pg	DIN 40432	-	73296 Pg7 - PG16 472		
NPT	Norme usine	-	73295 1 1/16 - 1 473		

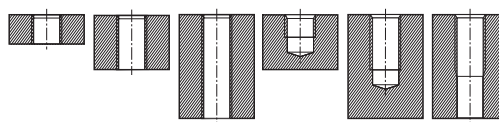


Aussi livrable chez STOCK:
MANDRINS DE FILETAGE

Conseils d'utilisation pour tarauds à refouler



Type de filetage



Exemples de matières

pour aciers en général > 800...1000 MPa,
aciers résistants à la corrosion et aux acides,
usinage universel de matières < 1000 MPa,
aluminium et alliages d'aluminium

Type de taraudage	HSS-E				HSS-E-PM	Carbure monobloc
Type	Durativ					
Forme	C sans rainures de lubrification			C avec rainures de lubrification		
Version	poli	TiN	poli	TiN	AlCrN	TiCN
v _c m/min	4-50	4-50	4-50	4-50	4-50	4-50

Type de filetage	Cotes de constr. selon DIN 2174	Champ de tolérance	Référence/Diamètres/Page					
M	~ DIN 371	6HX	73121 M2 - M10 482	63121 M2 - M10 483	73120 M3 - M10 474	63120 M3 - M10 475	53620 M3 - M10 478	63013 M3 - M10 481
		6GX			63119 M3 - M10 476	53621 M3 - M10 479		
	~ DIN 376	6HX		63123 M12 - M20 484		63122 M12 - M16 477	53622 M12 - M20 480	

Conseils d'utilisation pour fraises à fileter



Type de taraudage

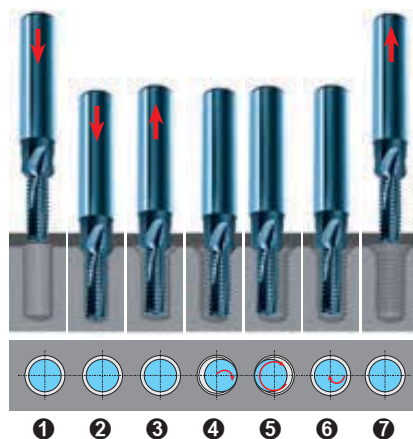


Exemples de matières

pour aciers en général, p. ex.
 aciers de construction, aciers de décolletage
 aciers de cémentation, aciers de traitement, aciers à outils, aciers rapides,
 aciers sulfurés, austénitiques et martensitiques, alliages spéciaux
 pour aluminium et alliages d'aluminium,
 matières en fonte, métaux lourds non ferreux,
 plastiques, alliages de magnésium, Titane

Type de taraudage	Carbure monobloc		Carbure monobloc	
Type	TMC SP		TM SP	
Forme	-	-	-	-
Version	poli	TiCN	poli	TiCN
v _c m/min	100 - 300 (Ti: 40-60)	50 - 200	100 - 300 (Ti: 40-60)	50 - 200

Type de filetage	Cotes de constr. selon	Profondeur de filetage	Référence/Diamètres/Page			
M	Norme usine	2,0 x D	73810 M3 - M20 485	53810 M3 - M20 486	73830 M6 - M20 489	53830 M6 - M20 490
MF	Norme usine	2,0 x D	73820 M4x0,5 - M16x1,5 488	53820 M4x0,5 - M16x1,5 487	73830 M8x1 - M20x1,5 489	53830 M8x1 - M20x1,5 490



Tarauts machine

Tarauts pour filetage métrique ISO



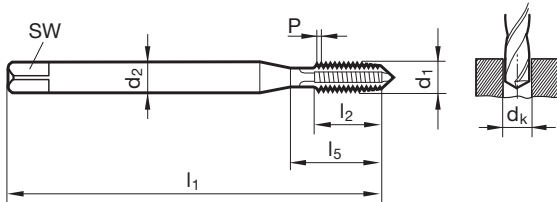
Référence **53053**



P	M	K	N	S	H
●	●	●	●	○	○

Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- pour applications universelles
- aciers avec une résistance jusqu'à 1200 N/mm²



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 2	0,400	2,800	2,100	1,60	45,000	8,000	13,500
M 2,2	0,450	2,800	2,100	1,75	45,000	9,000	14,500
M 2,5	0,450	2,800	2,100	2,05	50,000	9,000	14,500
M 3	0,500	3,500	2,700	2,50	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M 10	1,500	10,000	8,000	8,50	100,000	20,000	39,000

Tarauds machine

Tarauds pour filetage métrique ISO



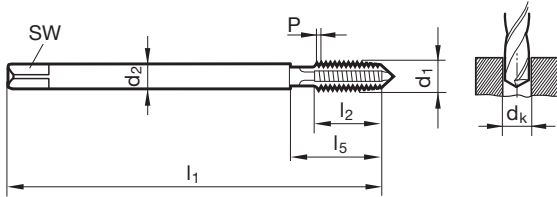
Référence **53054**



P	M	K	N	S	H
•	•	•	•	○	○

Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- pour applications universelles
- aciers avec une résistance jusqu'à 1200 N/mm²



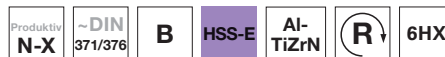
d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M12	1,750	9,000	7,000	10,20	110,000	24,000	49,000
M14	2,000	11,000	9,000	12,00	110,000	26,000	53,000
M16	2,000	12,000	9,000	14,00	110,000	26,000	54,000
M18	2,500	14,000	11,000	15,50	125,000	30,000	62,000
M20	2,500	16,000	12,000	17,50	140,000	32,000	62,000

Tarauts machine

Tarauts pour filetage métrique ISO

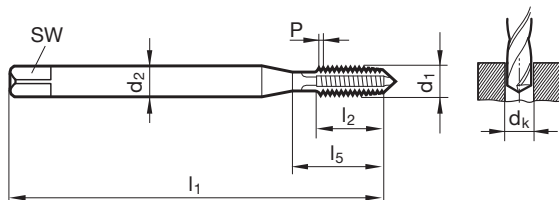


Référence **53733**



P	M	K	N	S	H
●	●	●	○	●	

Conseils d'util.,
page 348



- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- pour applications universelles
- aciers avec une résistance de 600 à 1300 N/mm²
- aciers inoxydables, inaltérables aux acides
- métaux non ferreux
- fontes

d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 2	0,400	2,800	2,100	1,60	45,000	8,000	13,500
M 2,5	0,450	2,800	2,100	2,05	50,000	9,000	14,500
M 3	0,500	3,500	2,700	2,50	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	20,000	39,000
M12	1,750	9,000	7,000	10,20	110,000	24,000	49,000
M14	2,000	11,000	9,000	12,00	110,000	26,000	53,000
M16	2,000	12,000	9,000	14,00	110,000	26,000	54,000
M18	2,500	14,000	11,000	15,50	125,000	30,000	62,000
M20	2,500	16,000	12,000	17,50	140,000	32,000	62,000
M24	3,000	18,000	14,500	21,00	160,000	36,000	73,000
M30	3,500	22,000	18,000	26,50	180,000	40,000	85,000

Tarauts machine

Tarauts pour filetage métrique ISO



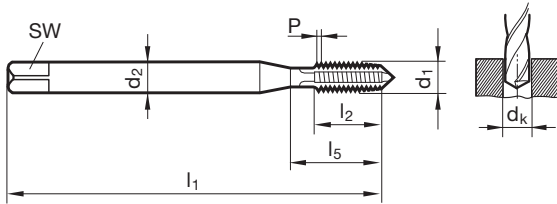
Référence **63033**

Produktiv N	DIN 371	B	HSS-E	TiN	R	ISO2/6H
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P	M	K	N	S	H
●	○	○	○		

Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- pour applications universelles
- aciers avec une résistance jusqu'à 1100 N/mm²



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	20,000	39,000

Tarauts machine

Tarauts pour filetage métrique ISO



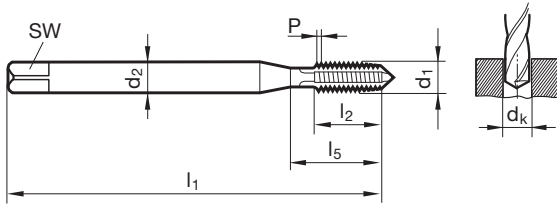
Référence **73033**

Produktiv N	DIN 371	B	HSS-E	traité vapeur	R	ISO2/6H
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P	M	K	N	S	H
●	○	○	○		

Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- pour applications universelles
- aciers avec une résistance jusqu'à 1100 N/mm²



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	20,000	39,000

Tarauts machine

Tarauts pour filetage métrique ISO



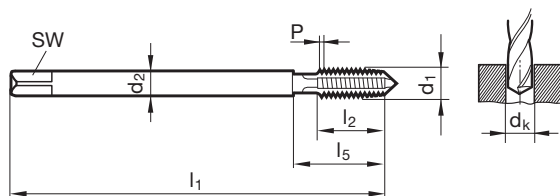
Référence **73038**

Produktiv N	DIN 376	B	HSS-E	traité vapeur	R	ISO2/6H
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P	M	K	N	S	H
●	○	○	○	○	

Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- pour applications universelles
- aciers avec une résistance jusqu'à 1100 N/mm²



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M12	1,750	9,000	7,000	10,20	110,000	24,000	49,000
M14	2,000	11,000	9,000	12,00	110,000	26,000	53,000
M16	2,000	12,000	9,000	14,00	110,000	26,000	54,000
M18	2,500	14,000	11,000	15,50	125,000	30,000	62,000
M20	2,500	16,000	12,000	17,50	140,000	32,000	62,000
M22	2,500	18,000	14,500	19,50	140,000	32,000	62,000
M24	3,000	18,000	14,500	21,00	160,000	36,000	73,000

Tarauds machine

Tarauds pour filetage métrique ISO

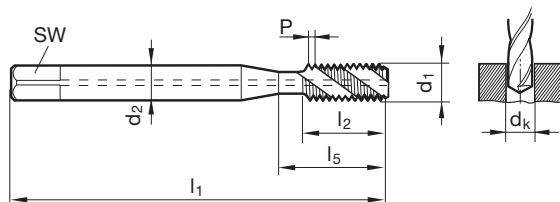


Référence **53050**



P	M	K	N	S	H
●	●	●	●	○	○

Conseils d'util.,
page 348



- pour trous borgnes
- goujures hélicoïdales à droite à environ 50°
- partie coupante très courte, c'est pourquoi à utiliser «seulement» avec une assistance de guidage synchronisée
- évacuation des copeaux en direction de l'attachement
- pour applications universelles
- aciers avec une résistance jusqu'à 1200 N/mm²

d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 5	0,800	6,000	4,900	4,20	70,000	4,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	5,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	6,300	35,000
M10	1,500	10,000	8,000	8,50	100,000	7,500	39,000

Tarauts machine

Tarauts pour filetage métrique ISO

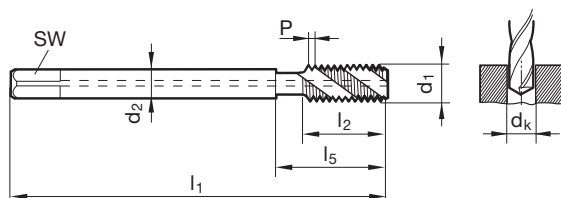


Référence **53051**



P	M	K	N	S	H
●	●	●	●	○	○

Conseils d'util.,
page 348



- pour trous borgnes
- goujures hélicoïdales à droite à environ 50°
- partie coupante très courte, c'est pourquoi à utiliser «seulement» avec une assistance de guidage synchronisée
- évacuation des copeaux en direction de l'attachement
- pour applications universelles
- aciers avec une résistance jusqu'à 1200 N/mm²

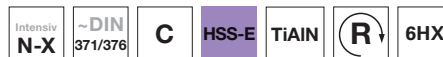
d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M12	1,750	9,000	7,000	10,20	110,000	8,800	63,000
M14	2,000	11,000	9,000	12,00	110,000	10,000	58,000
M16	2,000	12,000	9,000	14,00	110,000	10,000	58,000
M20	2,500	16,000	12,000	17,50	140,000	12,500	85,000

Tarauts machine

Tarauts pour filetage métrique ISO

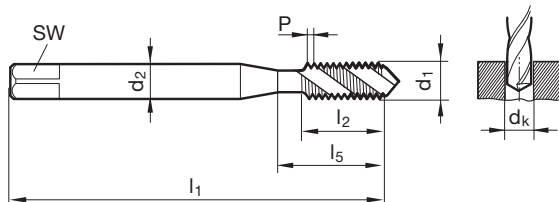


Référence **53746**



P	M	K	N	S	H
●	●	●	○	○	○

Conseils d'util.,
page 348



- pour trous borgnes
- goujures hélicoïdales à droite à environ 45°
- évacuation des copeaux en direction de l'attache
- pour applications universelles
- aciers avec une résistance de 600 à 1300 N/mm²
- aciers inoxydables, inaltérables aux acides
- métaux non ferreux
- fontes

d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 2	0,400	2,800	2,100	1,60	45,000	4,500	13,500
M 2,5	0,450	2,800	2,100	2,05	50,000	5,000	14,500
M 3	0,500	3,500	2,700	2,50	56,000	6,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	7,500	21,000
M 5	0,800	6,000	4,900	4,20	70,000	8,500	25,000
M 6	1,000	6,000	4,900	5,00	80,000	11,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	14,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	16,000	39,000
M12	1,750	9,000	7,000	10,20	110,000	18,500	49,000
M14	2,000	11,000	9,000	12,00	110,000	20,000	53,000
M16	2,000	12,000	9,000	14,00	110,000	20,000	54,000
M18	2,500	14,000	11,000	15,50	125,000	25,000	62,000
M20	2,500	16,000	12,000	17,50	140,000	25,000	62,000
M24	3,000	18,000	14,500	21,00	160,000	30,000	73,000
M30	3,500	22,000	18,000	26,50	180,000	35,000	85,000

Tarauts machine

Tarauts pour filetage métrique ISO



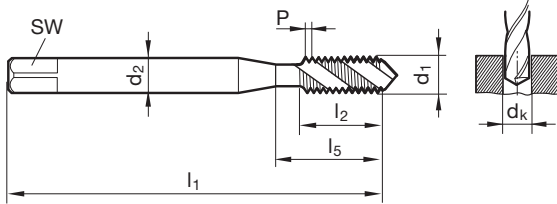
Référence **63046**



P	M	K	N	S	H
●	○	○	○		

Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- pour applications universelles
- aciers avec une résistance jusqu'à 1100 N/mm²



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	6,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	7,500	21,000
M 5	0,800	6,000	4,900	4,20	70,000	8,500	25,000
M 6	1,000	6,000	4,900	5,00	80,000	11,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	14,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	16,000	39,000

Tarauts machine

Tarauts pour filetage métrique ISO



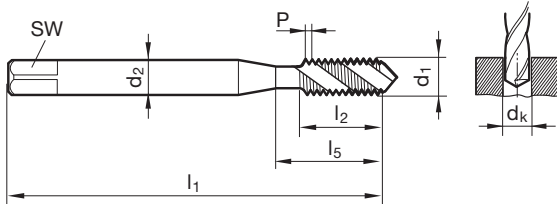
Référence **73046**

Intensiv N	DIN 371	C	HSS-E	traité vapeur	R	ISO2/6H
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P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- pour applications universelles
- aciers avec une résistance jusqu'à 1100 N/mm²



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	6,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	7,500	21,000
M 5	0,800	6,000	4,900	4,20	70,000	8,500	25,000
M 6	1,000	6,000	4,900	5,00	80,000	11,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	14,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	16,000	39,000

Tarauds machine

Tarauds pour filetage métrique ISO



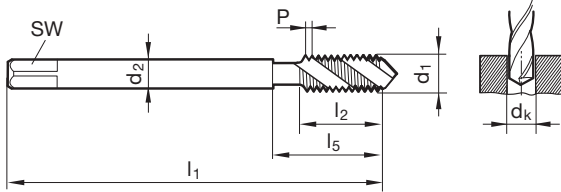
Référence **63048**



P	○	○	○	○	○
●	○	○	○	○	○

Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attachement
- pour applications universelles
- aciers avec une résistance jusqu'à 1100 N/mm²



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M12	1,750	9,000	7,000	10,20	110,000	18,500	49,000
M16	2,000	12,000	9,000	14,00	110,000	20,000	54,000
M20	2,500	16,000	12,000	17,50	140,000	25,000	62,000

Tarauts machine

Tarauts pour filetage métrique ISO



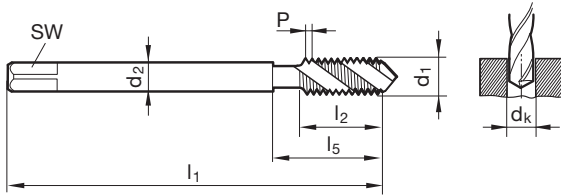
Référence **73048**



P	M	K	N	S	H
●	○	○	○		

Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attachement
- pour applications universelles
- aciers avec une résistance jusqu'à 1100 N/mm²



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M12	1,750	9,000	7,000	10,20	110,000	18,500	49,000
M14	2,000	11,000	9,000	12,00	110,000	20,000	53,000
M16	2,000	12,000	9,000	14,00	110,000	20,000	54,000
M18	2,500	14,000	11,000	15,50	125,000	25,000	62,000
M20	2,500	16,000	12,000	17,50	140,000	25,000	62,000
M22	2,500	18,000	14,500	19,50	140,000	27,000	62,000
M24	3,000	18,000	14,500	21,00	160,000	30,000	73,000

Tarauts machine

Tarauts pour filetage métrique ISO

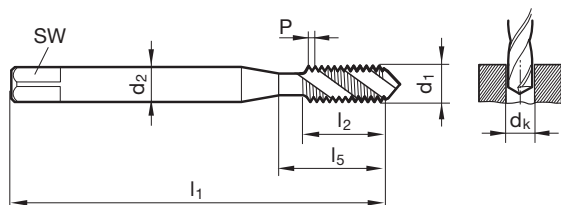


Référence **73047**



P	○	○	○	○	○
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Conseils d'util.,
page 348



- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- pour applications universelles
- entrée courte, pour les filetages avec une profondeur jusqu'au fond du perçage
- aciers avec une résistance jusqu'à 1100 N/mm²

d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 4	0,700	4,500	3,400	3,30	63,000	7,500	21,000
M 5	0,800	6,000	4,900	4,20	70,000	8,500	25,000
M 6	1,000	6,000	4,900	5,00	80,000	11,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	14,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	16,000	39,000

Tarauts machine

Tarauts pour filetage métrique ISO



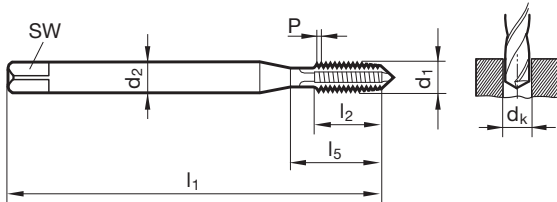
Référence **53669**

Produktiv HX	DIN 371/376	B	HSS-E- PM	Al- TiN	R	6HX
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P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- alliages spéciaux, aciers trempés
- nickel et alliages à base de Nickel
- Ampco > 21, fontes dures, Inconel



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	20,000	39,000
M12	1,750	9,000	7,000	10,20	110,000	24,000	49,000
M16	2,000	12,000	9,000	14,00	110,000	26,000	54,000

Tarauts machine

Tarauts pour filetage métrique ISO



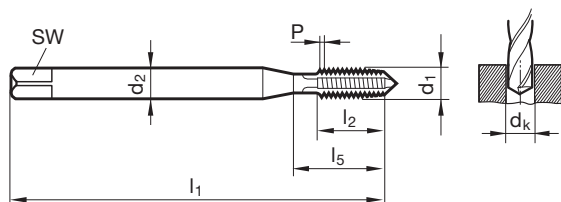
Référence **53667**



P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- alliages spéciaux
- titane et ses alliages
- matériaux durs et tenaces avec une résistance jusqu'à 1400 N/mm²



d1	P	d2	SW	dk	l1	l2	l5
	mm	mm	mm	mm	mm	mm	mm
M 3	0,500	3,500	2,700	2,50	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	20,000	39,000
M12	1,750	9,000	7,000	10,20	110,000	24,000	49,000
M16	2,000	12,000	9,000	14,00	110,000	26,000	54,000

Tarauds machine

Tarauds pour filetage métrique ISO

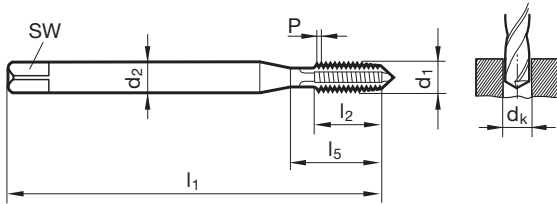


Référence **73185**



Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- pour des profondeurs de filetage jusqu'à 1xD
- aciers jusqu'à 800 N/mm²



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 1	0,250	2,500	2,100	0,75	40,000	5,500	
M 1,2	0,250	2,500	2,100	0,95	40,000	5,500	
M 1,4	0,300	2,500	2,100	1,10	40,000	7,000	
M 1,6	0,350	2,500	2,100	1,25	40,000	4,500	
M 2	0,400	2,800	2,100	1,60	45,000	4,500	13,500
M 2,3	0,400	2,800	2,100	1,90	45,000	4,500	14,500
M 2,5	0,450	2,800	2,100	2,05	50,000	5,000	14,500
M 2,6	0,450	2,800	2,100	2,15	50,000	5,000	14,500
M 3	0,500	3,500	2,700	2,50	56,000	6,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	7,500	21,000
M 5	0,800	6,000	4,900	4,20	70,000	8,500	25,000
M 6	1,000	6,000	4,900	5,00	80,000	11,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	14,000	35,000
M 10	1,500	10,000	8,000	8,50	100,000	16,000	39,000

Tarauts machine

Tarauts pour filetage métrique ISO

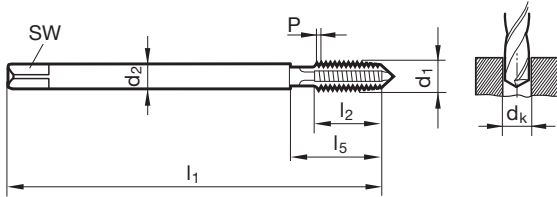


Référence **73191**



Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- pour des profondeurs de filetage jusqu'à 1xD
- aciers jusqu'à 800 N/mm²



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 6	1,000	4,500	3,400	5,00	80,000	11,000	30,000
M 8	1,250	6,000	4,900	6,80	90,000	14,000	35,000
M10	1,500	7,000	5,500	8,50	100,000	16,000	39,000
M12	1,750	9,000	7,000	10,20	110,000	18,500	49,000
M14	2,000	11,000	9,000	12,00	110,000	20,000	53,000
M16	2,000	12,000	9,000	14,00	110,000	20,000	54,000
M18	2,500	14,000	11,000	15,50	125,000	25,000	62,000
M20	2,500	16,000	12,000	17,50	140,000	25,000	62,000
M22	2,500	18,000	14,500	19,50	140,000	27,000	62,000

Tarauds machine

Tarauds pour filetage métrique ISO

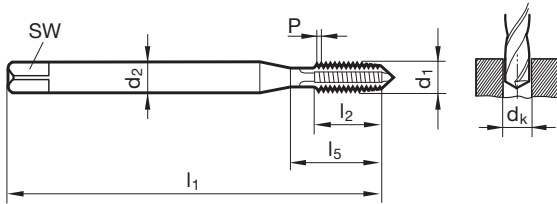


Référence **73126**



Conseils d'util.,
page 348

- pour trous débouchant
- Pour des profondeurs de filetage jusqu'à 1xD
- particulièrement pour les tôles et les soyages sur tôles



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 2,3	0,400	2,800	2,100	1,90	45,000	9,000	14,500
M 2,5	0,450	2,800	2,100	2,05	50,000	9,000	14,500
M 2,6	0,450	2,800	2,100	2,15	50,000	9,000	14,500
M 3	0,500	3,500	2,700	2,50	56,000	10,000	18,000
M 3,5	0,600	4,000	3,000	2,90	56,000	12,000	20,000
M 4	0,700	4,500	3,400	3,30	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	20,000	39,000

Tarauts machine

Tarauts pour filetage métrique ISO

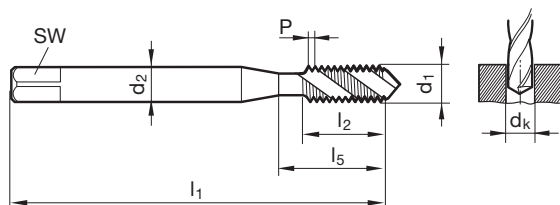


Référence **53668**



P	M	K	N	S	H
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Conseils d'util.,
page 348



- pour trous borgnes
- goujures hélicoïdales à droite, à environ 10°
- évacuation des copeaux en direction de l'attachement
- alliages spéciaux, aciers trempés
- nickel et alliages à base de Nickel
- Ampco > 21, fontes dures, Inconel

d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	20,000	39,000
M12	1,750	9,000	7,000	10,20	110,000	24,000	49,000
M16	2,000	12,000	9,000	14,00	110,000	26,000	54,000

Tarauts machine

Tarauts pour filetage métrique ISO

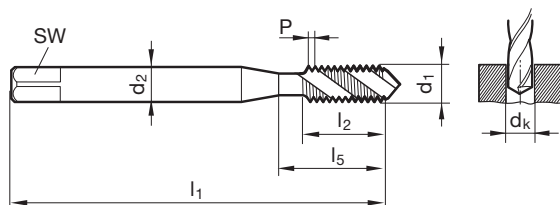


Référence **53666**



P	M	K	N	S	H
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Conseils d'util.,
page 348



- pour trous borgnes
- goujures hélicoïdales à droite à environ 15°
- évacuation des copeaux en direction de l'attachement
- alliages spéciaux
- titane et ses alliages
- matériaux durs et tenaces avec une résistance jusqu'à 1400 N/mm²

d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	20,000	39,000
M12	1,750	9,000	7,000	10,20	110,000	24,000	49,000
M16	2,000	12,000	9,000	14,00	110,000	26,000	54,000

Tarauts machine

Tarauts pour filetage métrique ISO



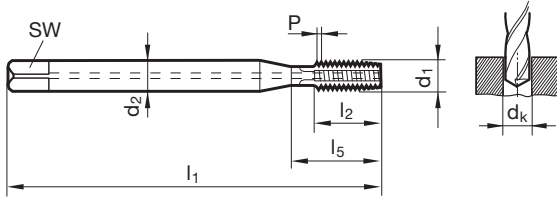
Référence **53670**

HCX	DIN 371	C	HSS-E-PM	TiCN	R	6HX
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P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- avec canal de lubrification intérieur \geq M5
- sortie frontale du lubrifiant
- aciers très résistants, jusqu'à une résistance de 1600 N/mm²
- matériaux durs à copeaux courts, comme les fontes, les bronzes, les alliages d'aluminiums avec haut pourcentage de silice



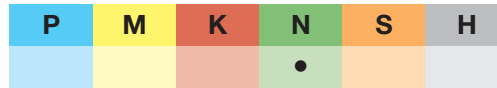
d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	20,000	39,000

Tarauds machine

Tarauds pour filetage métrique ISO

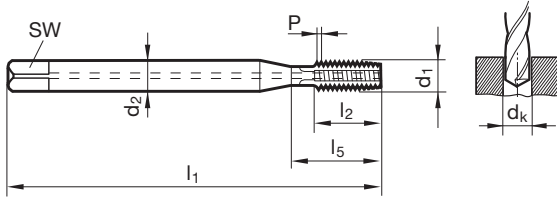


Référence **73011**



Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- avec canal de lubrification intérieur \geq M5
- sortie frontale du lubrifiant
- aluminiums et alliages d'aluminiums à copeaux courts, non - ferreux friables à copeaux courts



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	8,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	10,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	10,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	12,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	16,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	18,000	39,000

Tarauts machine

Tarauts pour filetage métrique ISO



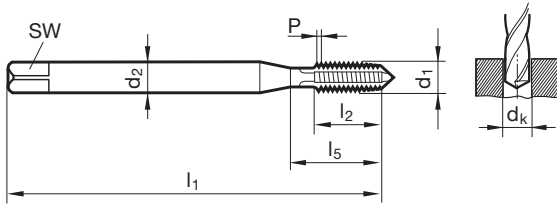
Référence **63133**

Produktiv N	DIN 371	B	HSS-E	TiN	R	ISO2/6H
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P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- utilisation universelle
- aciers jusqu'à 800 N/mm²



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	20,000	39,000

Tarauds machine

Tarauds pour filetage métrique ISO



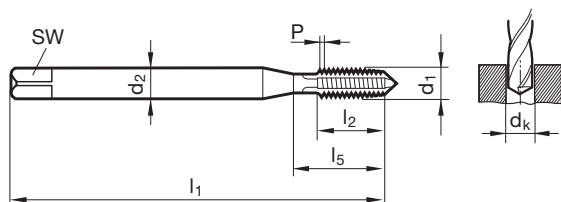
Référence **73132**

Produktiv N	DIN 371	B	HSS-E	poli	R	ISO3/6G
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P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- utilisation universelle
- aciers jusqu'à 800 N/mm²



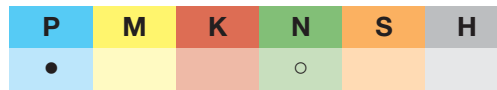
d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 2,5	0,450	2,800	2,100	2,05	50,000	9,000	14,500
M 3	0,500	3,500	2,700	2,50	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	20,000	39,000

Tarauds machine

Tarauds pour filetage métrique ISO

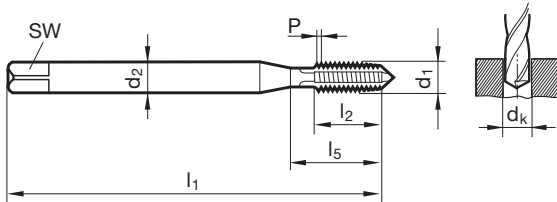


Référence **73133**



Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- utilisation universelle
- aciers jusqu'à 800 N/mm²



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 2	0,400	2,800	2,100	1,60	45,000	8,000	13,500
M 2,5	0,450	2,800	2,100	2,05	50,000	9,000	14,500
M 3	0,500	3,500	2,700	2,50	56,000	10,000	18,000
M 3,5	0,600	4,000	3,000	2,90	56,000	12,000	20,000
M 4	0,700	4,500	3,400	3,30	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 7	1,000	7,000	5,500	6,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	20,000	39,000

Tarauts machine

Tarauts pour filetage métrique ISO



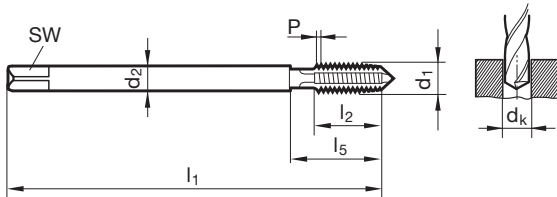
Référence **63138**

Produktiv N	DIN 376	B	HSS-E	TiN	R	ISO2/6H
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P	M	K	N	S	H
●			○		

Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- utilisation universelle
- aciers jusqu'à 800 N/mm²



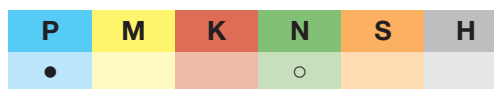
d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M12	1,750	9,000	7,000	10,20	110,000	24,000	49,000
M14	2,000	11,000	9,000	12,00	110,000	26,000	53,000
M16	2,000	12,000	9,000	14,00	110,000	26,000	54,000
M20	2,500	16,000	12,000	17,50	140,000	32,000	62,000

Tarauds machine

Tarauds pour filetage métrique ISO

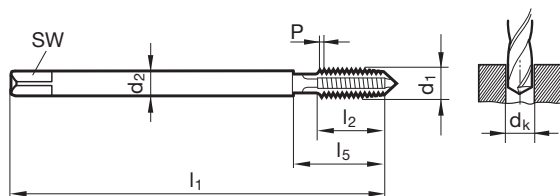


Référence **73138**



Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- utilisation universelle
- aciers jusqu'à 800 N/mm²



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 2	0,400	1,400		1,60	45,000	8,000	13,500
M 2,5	0,450	1,800		2,05	50,000	9,000	14,500
M 3	0,500	2,200		2,50	56,000	10,000	18,000
M 3,5	0,600	2,500	2,100	2,90	56,000	12,000	20,000
M 4	0,700	2,800	2,100	3,30	63,000	12,000	21,000
M 5	0,800	3,500	2,700	4,20	70,000	14,000	25,000
M 6	1,000	4,500	3,400	5,00	80,000	16,000	30,000
M 8	1,250	6,000	4,900	6,80	90,000	17,000	35,000
M10	1,500	7,000	5,500	8,50	100,000	20,000	39,000
M12	1,750	9,000	7,000	10,20	110,000	24,000	49,000
M14	2,000	11,000	9,000	12,00	110,000	26,000	53,000
M16	2,000	12,000	9,000	14,00	110,000	26,000	54,000
M18	2,500	14,000	11,000	15,50	125,000	30,000	62,000
M20	2,500	16,000	12,000	17,50	140,000	32,000	62,000
M22	2,500	18,000	14,500	19,50	140,000	32,000	62,000
M24	3,000	18,000	14,500	21,00	160,000	36,000	73,000

Tarauts machine

Tarauts pour filetage métrique ISO



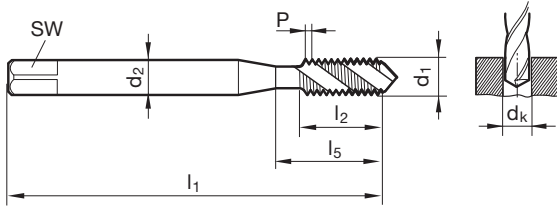
Référence **63146**



P	M	K	N	S	H
●			○		

Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attachement
- utilisation universelle
- aciers jusqu'à 800 N/mm²



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	6,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	7,500	21,000
M 5	0,800	6,000	4,900	4,20	70,000	8,500	25,000
M 6	1,000	6,000	4,900	5,00	80,000	11,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	14,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	16,000	39,000

Tarauts machine

Tarauts pour filetage métrique ISO



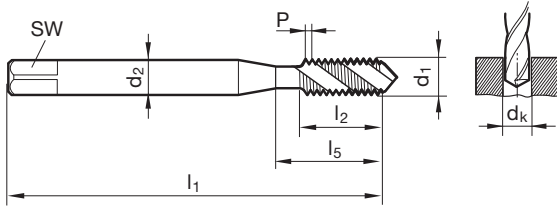
Référence **73145**



P	M	K	N	S	H
●			○		

Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attachement
- utilisation universelle
- aciers jusqu'à 800 N/mm²



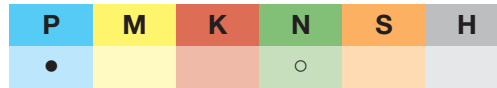
d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	6,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	7,500	21,000
M 5	0,800	6,000	4,900	4,20	70,000	8,500	25,000
M 6	1,000	6,000	4,900	5,00	80,000	11,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	14,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	16,000	39,000

Tarauts machine

Tarauts pour filetage métrique ISO

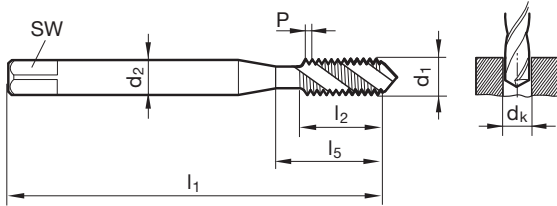


Référence **73146**



Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- utilisation universelle
- aciers jusqu'à 800 N/mm²



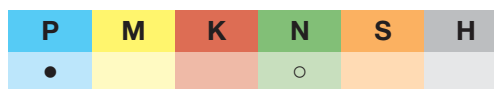
d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 2	0,400	2,800	2,100	1,60	45,000	4,500	13,500
M 2,2	0,450	2,800	2,100	1,75	45,000	5,000	14,500
M 2,5	0,450	2,800	2,100	2,05	50,000	5,000	14,500
M 3	0,500	3,500	2,700	2,50	56,000	6,000	18,000
M 3,5	0,600	4,000	3,000	2,90	56,000	7,000	20,000
M 4	0,700	4,500	3,400	3,30	63,000	7,500	21,000
M 5	0,800	6,000	4,900	4,20	70,000	8,500	25,000
M 6	1,000	6,000	4,900	5,00	80,000	11,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	14,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	16,000	39,000

Tarauts machine

Tarauts pour filetage métrique ISO

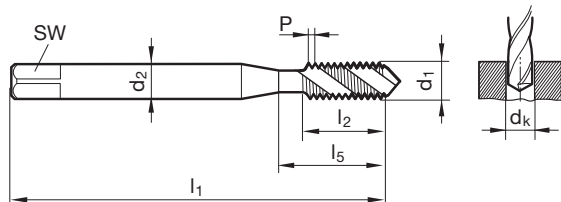


Référence **73221**



Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 15°
- évacuation des copeaux en direction de l'attache
- utilisation universelle
- aciers jusqu'à 800 N/mm²



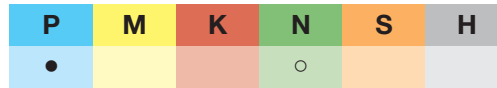
d1	P	d2	SW	dk	l1	l2	l5
	mm	mm	mm	mm	mm	mm	mm
M 2	0,400	2,800	2,100	1,60	45,000	4,500	13,500
M 2,2	0,450	2,800	2,100	1,75	45,000	5,000	14,500
M 2,5	0,450	2,800	2,100	2,05	50,000	5,000	14,500
M 3	0,500	3,500	2,700	2,50	56,000	6,000	18,000
M 3,5	0,600	4,000	3,000	2,90	56,000	7,000	20,000
M 4	0,700	4,500	3,400	3,30	63,000	7,500	21,000
M 5	0,800	6,000	4,900	4,20	70,000	8,500	25,000
M 6	1,000	6,000	4,900	5,00	80,000	11,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	14,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	16,000	39,000

Tarauds machine

Tarauds pour filetage métrique ISO

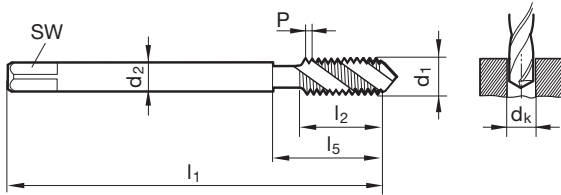


Référence **63148**



Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- utilisation universelle
- aciers jusqu'à 800 N/mm²



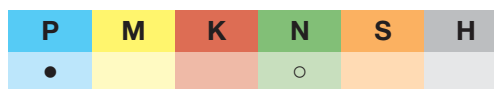
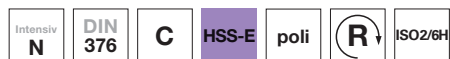
d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M12	1,750	9,000	7,000	10,20	110,000	18,500	49,000
M16	2,000	12,000	9,000	14,00	110,000	20,000	54,000
M20	2,500	16,000	12,000	17,50	140,000	25,000	62,000

Tarauts machine

Tarauts pour filetage métrique ISO

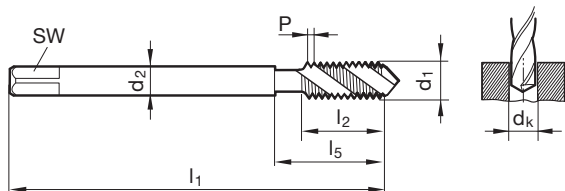


Référence **73148**



Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- utilisation universelle
- aciers jusqu'à 800 N/mm²



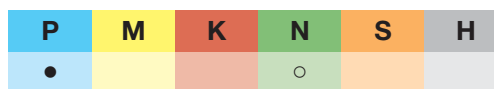
d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	2,200		2,50	56,000	6,000	18,000
M 4	0,700	2,800	2,100	3,30	63,000	7,500	21,000
M 5	0,800	3,500	2,700	4,20	70,000	8,500	25,000
M 6	1,000	4,500	3,400	5,00	80,000	11,000	30,000
M 8	1,250	6,000	4,900	6,80	90,000	14,000	35,000
M10	1,500	7,000	5,500	8,50	100,000	16,000	39,000
M12	1,750	9,000	7,000	10,20	110,000	18,500	49,000
M14	2,000	11,000	9,000	12,00	110,000	20,000	53,000
M16	2,000	12,000	9,000	14,00	110,000	20,000	54,000
M18	2,500	14,000	11,000	15,50	125,000	25,000	62,000
M20	2,500	16,000	12,000	17,50	140,000	25,000	62,000
M22	2,500	18,000	14,500	19,50	140,000	27,000	62,000
M24	3,000	18,000	14,500	21,00	160,000	30,000	73,000
M27	3,000	20,000	16,000	24,00	160,000	30,000	73,000
M30	3,500	22,000	18,000	26,50	180,000	35,000	85,000

Tarauts machine

Tarauts pour filetage métrique ISO

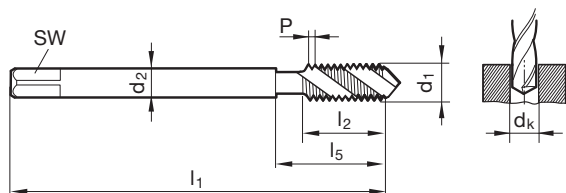


Référence **73227**



Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 15°
- évacuation des copeaux en direction de l'attachement
- utilisation universelle
- aciers jusqu'à 800 N/mm²



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	2,200		2,50	56,000	6,000	18,000
M 4	0,700	2,800	2,100	3,30	63,000	7,500	21,000
M 5	0,800	3,500	2,700	4,20	70,000	8,500	25,000
M 6	1,000	4,500	3,400	5,00	80,000	11,000	30,000
M 8	1,250	6,000	4,900	6,80	90,000	14,000	35,000
M10	1,500	7,000	5,500	8,50	100,000	16,000	39,000
M12	1,750	9,000	7,000	10,20	110,000	18,500	49,000
M16	2,000	12,000	9,000	14,00	110,000	20,000	54,000
M18	2,500	14,000	11,000	15,50	125,000	25,000	62,000
M20	2,500	16,000	12,000	17,50	140,000	25,000	62,000

Tarauts machine

Tarauts pour filetage métrique ISO



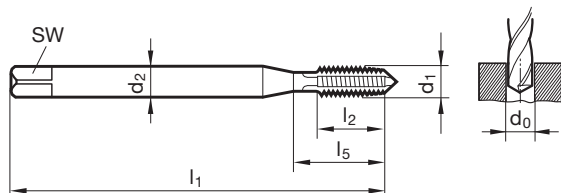
Référence **53640**

Produktiv H	DIN 371/376	B	HSS-E- PM	TiCN	R	ISO2/6H
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P	M	K	N	S	H
●		○			

Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- matériaux très résistants
- aciers avec une résistance de 1100 à 1600 N/mm²



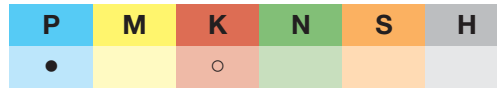
d1	P	d2	SW	dk	l1	l2	l5
	mm	mm	mm	mm	mm	mm	mm
M 3	0,500	3,500	2,700	2,50	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	20,000	39,000

Tarauds machine

Tarauds pour filetage métrique ISO

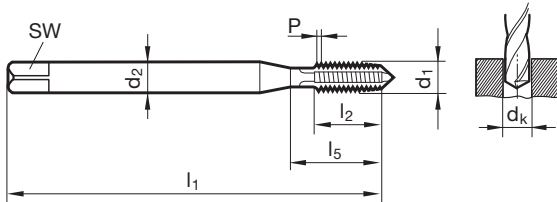


Référence **53642**



Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- alliages spéciaux, alliages à base de nickel
- matériaux durs et tenaces avec une résistance jusqu'à 1400 N/mm²



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 2	0,400	2,800	2,100	1,60	45,000	8,000	13,500
M 3	0,500	3,500	2,700	2,50	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	20,000	39,000

Tarauds machine

Tarauds pour filetage métrique ISO



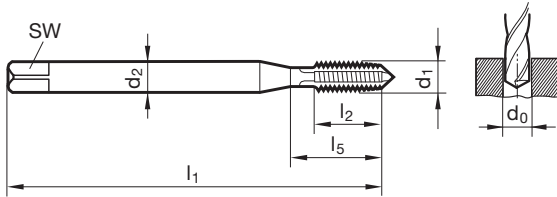
Référence **63641**



P	M	K	N	S	H
●		○			

Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- alliages spéciaux, alliages à base de nickel
- matériaux durs et tenaces avec une résistance jusqu'à 1400 N/mm²



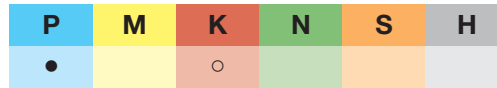
d1	P	d2	SW	dk	l1	l2	l5
	mm	mm	mm	mm	mm	mm	mm
M 3	0,500	3,500	2,700	2,50	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	20,000	39,000

Tarauts machine

Tarauts pour filetage métrique ISO

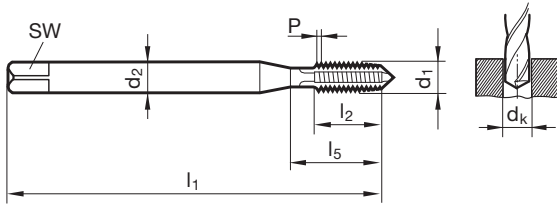


Référence **73640**



Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- matériaux très résistants
- aciers avec une résistance de 1100 à 1600 N/mm²



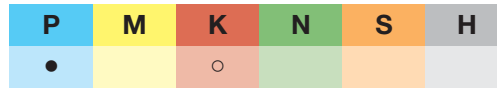
d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	20,000	39,000

Tarauds machine

Tarauds pour filetage métrique ISO

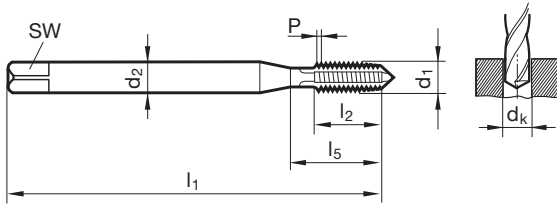


Référence **73642**



Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- matériaux très résistants
- aciers avec une résistance de 1100 à 1600 N/mm²



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 2	0,400	2,800	2,100	1,60	45,000	8,000	13,500
M 3	0,500	3,500	2,700	2,50	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	20,000	39,000

Tarauds machine

Tarauds pour filetage métrique ISO



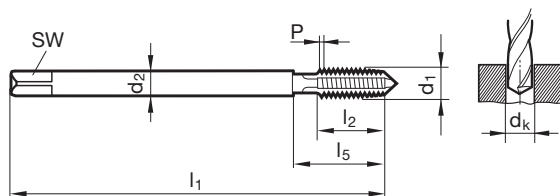
Référence **63643**



P	M	K	N	S	H
●		○			

Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- matériaux très résistants
- aciers avec une résistance de 1100 à 1600 N/mm²



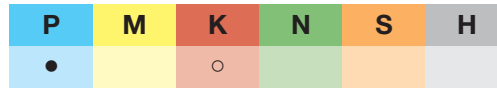
d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M12	1,750	9,000	7,000	10,20	110,000	24,000	49,000
M16	2,000	12,000	9,000	14,00	110,000	26,000	54,000
M20	2,500	16,000	12,000	17,50	140,000	32,000	62,000

Tarauts machine

Tarauts pour filetage métrique ISO

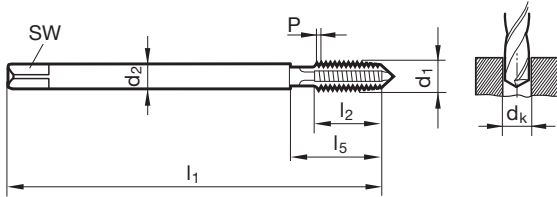


Référence **73645**



Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- matériaux très résistants
- aciers avec une résistance de 1100 à 1600 N/mm²



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M12	1,750	9,000	7,000	10,20	110,000	24,000	49,000
M16	2,000	12,000	9,000	14,00	110,000	26,000	54,000
M20	2,500	16,000	12,000	17,50	140,000	32,000	62,000

Tarauds machine

Tarauds pour filetage métrique ISO



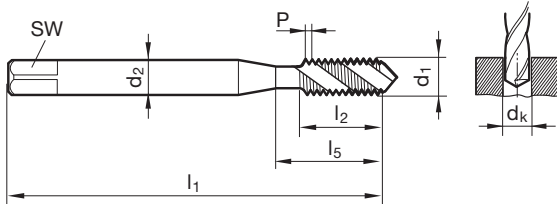
Référence **53661**



P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- matériaux très résistants
- aciers avec une résistance de 1100 à 1600 N/mm²



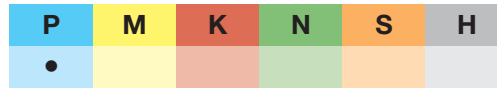
d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 2	0,400	2,800	2,100	1,60	45,000	4,500	13,500
M 3	0,500	3,500	2,700	2,50	56,000	6,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	7,500	21,000
M 5	0,800	6,000	4,900	4,20	70,000	8,500	25,000
M 6	1,000	6,000	4,900	5,00	80,000	11,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	14,000	35,000
M 10	1,500	10,000	8,000	8,50	100,000	16,000	39,000

Tarauds machine

Tarauds pour filetage métrique ISO

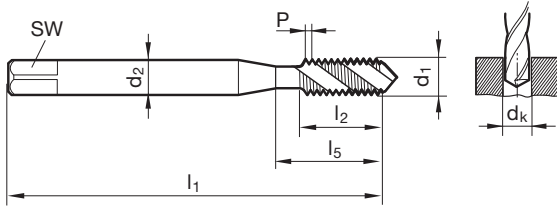


Référence **63674**



Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- matériaux très résistants
- aciers avec une résistance de 1100 à 1600 N/mm²



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	6,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	7,500	21,000
M 5	0,800	6,000	4,900	4,20	70,000	8,500	25,000
M 6	1,000	6,000	4,900	5,00	80,000	11,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	14,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	16,000	39,000

Tarauds machine

Tarauds pour filetage métrique ISO



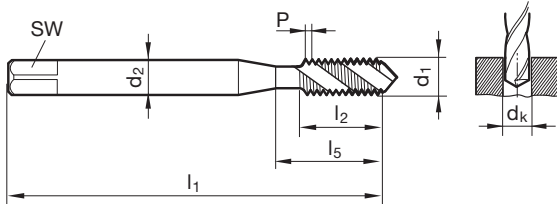
Référence **73619**



P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 15°
- évacuation des copeaux en direction de l'attache
- matériaux très résistants
- aciers avec une résistance de 1100 à 1600 N/mm²



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	6,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	7,500	21,000
M 5	0,800	6,000	4,900	4,20	70,000	8,500	25,000
M 6	1,000	6,000	4,900	5,00	80,000	11,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	14,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	16,000	39,000

Tarauds machine

Tarauds pour filetage métrique ISO



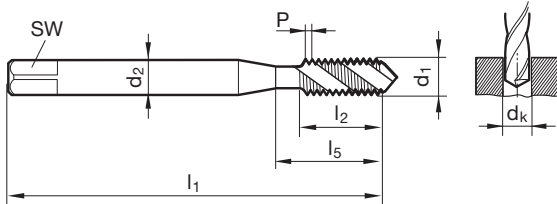
Référence **73661**



P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- matériaux très résistants
- aciers avec une résistance de 1100 à 1600 N/mm²



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	6,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	7,500	21,000
M 5	0,800	6,000	4,900	4,20	70,000	8,500	25,000
M 6	1,000	6,000	4,900	5,00	80,000	11,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	14,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	16,000	39,000

Tarauds machine

Tarauds pour filetage métrique ISO



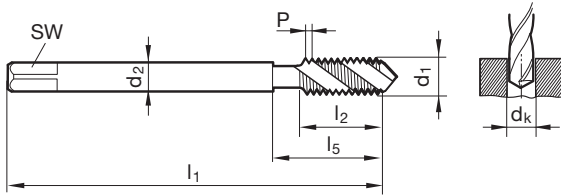
Référence **63675**



P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- matériaux très résistants
- aciers avec une résistance de 1100 à 1600 N/mm²



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M12	1,750	9,000	7,000	10,20	110,000	18,500	49,000
M16	2,000	12,000	9,000	14,00	110,000	20,000	54,000
M20	2,500	16,000	12,000	17,50	140,000	25,000	62,000

Tarauds machine

Tarauds pour filetage métrique ISO



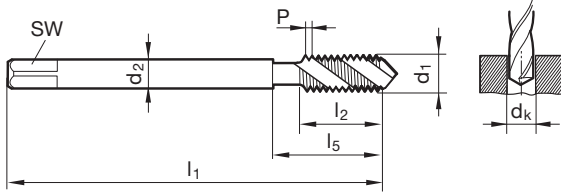
Référence **73664**



P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- matériaux très résistants
- aciers avec une résistance de 1100 à 1600 N/mm²



d1	P	d2	SW	dk	l1	l2	l5
	mm	mm	mm	mm	mm	mm	mm
M12	1,750	9,000	7,000	10,20	110,000	18,500	49,000
M14	2,000	11,000	9,000	12,00	110,000	20,000	53,000
M16	2,000	12,000	9,000	14,00	110,000	20,000	54,000
M20	2,500	16,000	12,000	17,50	140,000	25,000	62,000

Tarauts machine

Tarauts pour filetage métrique ISO



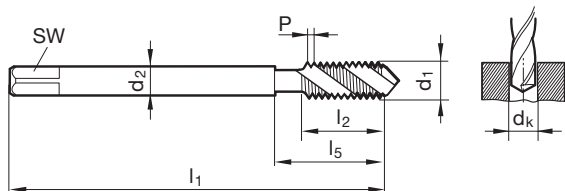
Référence **73666**



P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 15°
- évacuation des copeaux en direction de l'attachement
- matériaux très résistants
- aciers avec une résistance de 1100 à 1600 N/mm²



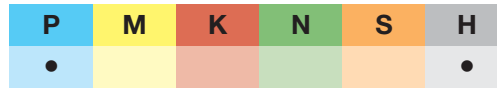
d1	P	d2	SW	dk	l1	l2	l5
	mm	mm	mm	mm	mm	mm	mm
M12	1,750	9,000	7,000	10,20	110,000	18,500	49,000
M16	2,000	12,000	9,000	14,00	110,000	20,000	54,000
M20	2,500	16,000	12,000	17,50	140,000	25,000	62,000

Tarauds machine

Tarauds pour filetage métrique ISO

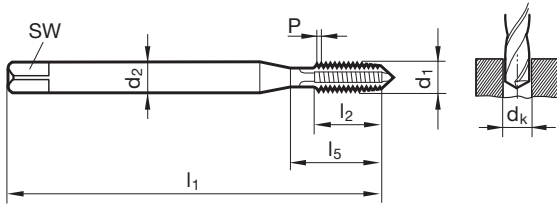


Référence **63010**



Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- pour des profondeurs de filetage jusqu'à 1xD
- aciers trempés de 48 à 62 HRC



d1	P	d2	SW	dk	l1	l2
	mm	mm	mm	mm	mm	mm
M 3	0,500	3,500	2,700	2,60	56,000	12,000
M 4	0,700	4,500	3,400	3,40	63,000	14,000
M 5	0,800	6,000	4,900	4,30	70,000	17,000
M 6	1,000	6,000	4,900	5,10	80,000	20,000
M 8	1,250	8,000	6,200	6,90	90,000	20,000
M10	1,500	10,000	8,000	8,60	100,000	24,000
M12	1,750	12,000	9,000	10,40	110,000	28,000

Tarauds machine

Tarauds pour filetage métrique ISO



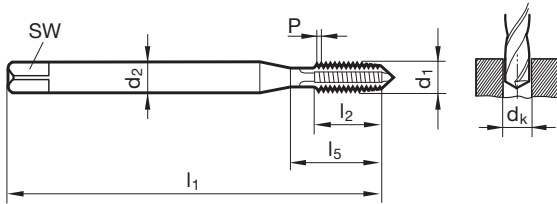
Référence **53641**



P	•	K	N	○	H
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Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	20,000	39,000

Tarauts machine

Tarauts pour filetage métrique ISO



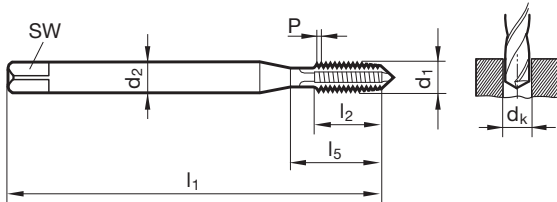
Référence **63176**



P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	20,000	39,000

Tarauts machine

Tarauts pour filetage métrique ISO



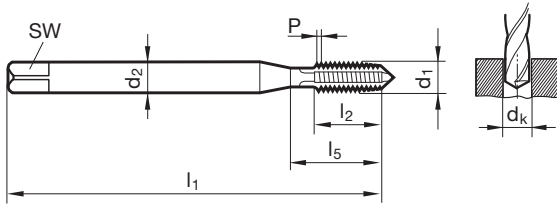
Référence **73176**

Produktiv HD	DIN 371	B	HSS-E	traité vapeur	R	ISO26H
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P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	20,000	39,000

Tarauds machine

Tarauds pour filetage métrique ISO



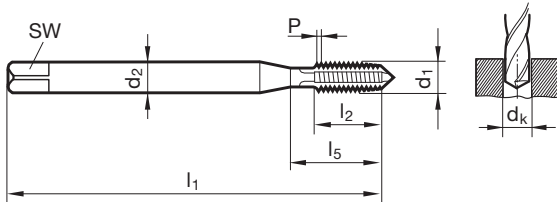
Référence **73641**



P	•	K	N	○	H
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Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	20,000	39,000

Tarauds machine

Tarauds pour filetage métrique ISO



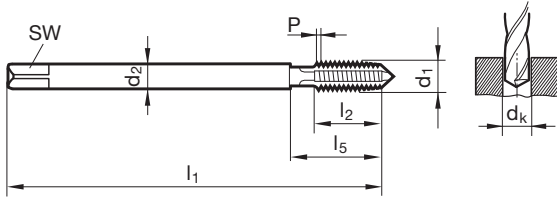
Référence **53643**



P	M	K	N	S	H
	•			○	

Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M12	1,750	9,000	7,000	10,20	110,000	24,000	49,000
M14	2,000	11,000	9,000	12,00	110,000	26,000	53,000
M16	2,000	12,000	9,000	14,00	110,000	26,000	54,000

Tarauts machine

Tarauts pour filetage métrique ISO



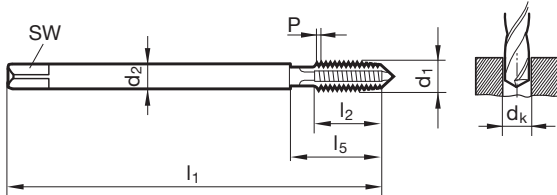
Référence **63177**



P	M	K	N	S	H
	•		○	○	

Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



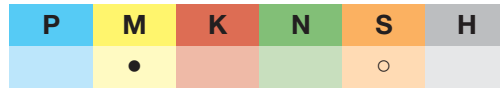
d1	P	d2	SW	dk	l1	l2	l5
	mm	mm	mm	mm	mm	mm	mm
M12	1,750	9,000	7,000	10,20	110,000	24,000	49,000
M16	2,000	12,000	9,000	14,00	110,000	26,000	54,000

Tarauds machine

Tarauds pour filetage métrique ISO

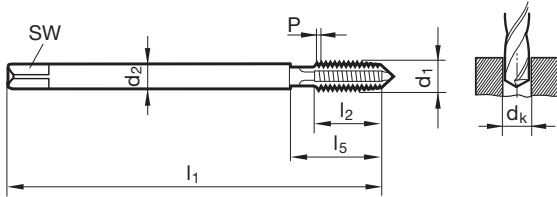


Référence **73177**



Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M12	1,750	9,000	7,000	10,20	110,000	24,000	49,000
M14	2,000	11,000	9,000	12,00	110,000	26,000	53,000
M16	2,000	12,000	9,000	14,00	110,000	26,000	54,000
M20	2,500	16,000	12,000	17,50	140,000	32,000	62,000

Tarauts machine

Tarauts pour filetage métrique ISO



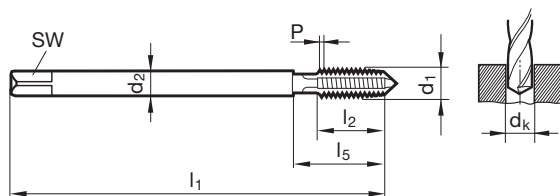
Référence **73643**



P	M	K	N	S	H
	•		○	○	

Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M12	1,750	9,000	7,000	10,20	110,000	24,000	49,000
M14	2,000	11,000	9,000	12,00	110,000	26,000	53,000
M16	2,000	12,000	9,000	14,00	110,000	26,000	54,000
M18	2,500	14,000	11,000	15,50	125,000	30,000	62,000
M20	2,500	16,000	12,000	17,50	140,000	32,000	62,000
M22	2,500	18,000	14,500	19,50	140,000	32,000	62,000

Tarauts machine

Tarauts pour filetage métrique ISO



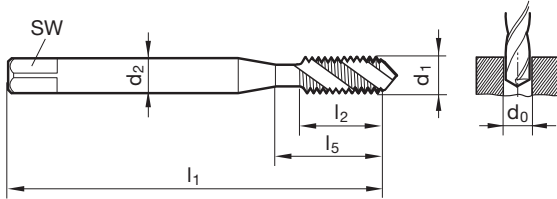
Référence **53662**



P	M	K	N	S	H
	•		○	○	

Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	6,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	7,500	21,000
M 5	0,800	6,000	4,900	4,20	70,000	8,500	25,000
M 6	1,000	6,000	4,900	5,00	80,000	11,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	14,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	16,000	39,000

Tarauds machine

Tarauds pour filetage métrique ISO



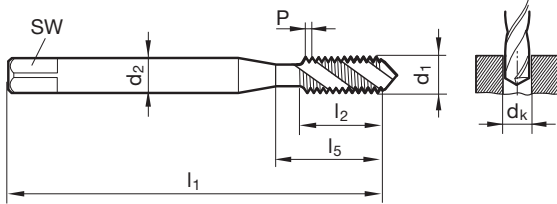
Référence **63662**



P	•	K	N	○	H
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Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	6,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	7,500	21,000
M 5	0,800	6,000	4,900	4,20	70,000	8,500	25,000
M 6	1,000	6,000	4,900	5,00	80,000	11,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	14,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	16,000	39,000

Tarauds machine

Tarauds pour filetage métrique ISO



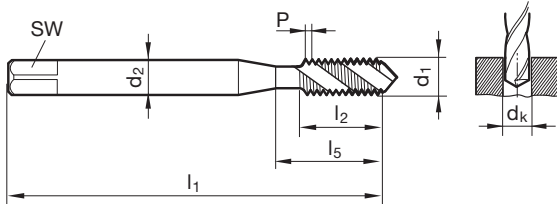
Référence 73660



P	M	K	N	S	H
	•			○	

Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	6,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	7,500	21,000
M 5	0,800	6,000	4,900	4,20	70,000	8,500	25,000
M 6	1,000	6,000	4,900	5,00	80,000	11,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	14,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	16,000	39,000

Tarauds machine

Tarauds pour filetage métrique ISO



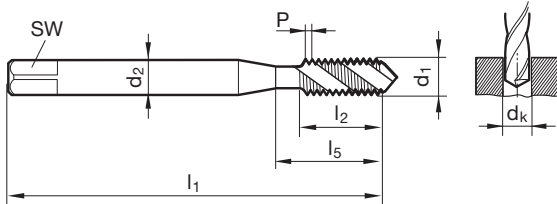
Référence **73662**



P	•		○	○	
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Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	6,000	18,000
M 3,5	0,600	4,000	3,000	2,90	56,000	7,000	20,000
M 4	0,700	4,500	3,400	3,30	63,000	7,500	21,000
M 5	0,800	6,000	4,900	4,20	70,000	8,500	25,000
M 6	1,000	6,000	4,900	5,00	80,000	11,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	14,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	16,000	39,000

Tarauds machine

Tarauds pour filetage métrique ISO



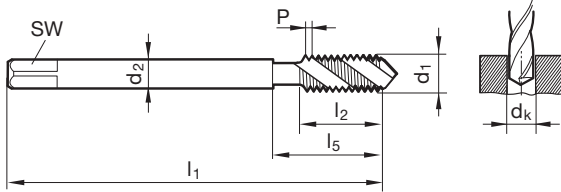
Référence **53665**



P	•	K	N	○	H
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Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M12	1,750	9,000	7,000	10,20	110,000	18,500	49,000
M14	2,000	11,000	9,000	12,00	110,000	20,000	53,000
M16	2,000	12,000	9,000	14,00	110,000	20,000	54,000

Tarauds machine

Tarauds pour filetage métrique ISO



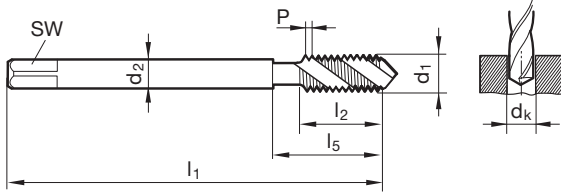
Référence **63665**



P	•			•	
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Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



d1	P	d2	SW	dk	l1	l2	l5
	mm	mm	mm	mm	mm	mm	mm
M12	1,750	9,000	7,000	10,20	110,000	18,500	49,000
M16	2,000	12,000	9,000	14,00	110,000	20,000	54,000

Tarauts machine

Tarauts pour filetage métrique ISO



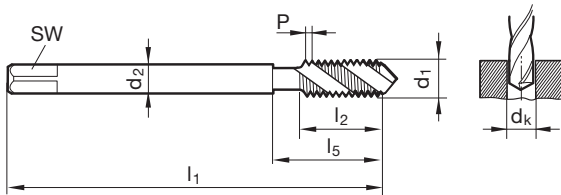
Référence **73659**



P	•	K	N	○	H
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Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



d1	P	d2	SW	dk	l1	l2	l5
	mm	mm	mm	mm	mm	mm	mm
M12	1,750	9,000	7,000	10,20	110,000	18,500	49,000
M14	2,000	11,000	9,000	12,00	110,000	20,000	53,000
M16	2,000	12,000	9,000	14,00	110,000	20,000	54,000
M20	2,500	16,000	12,000	17,50	140,000	25,000	62,000

Tarauds machine

Tarauds pour filetage métrique ISO



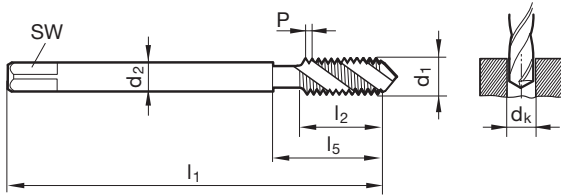
Référence **73665**



P	•		○	○	
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Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attachement
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



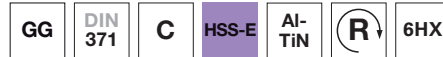
d1	P	d2	SW	dk	l1	l2	l5
	mm	mm	mm	mm	mm	mm	mm
M12	1,750	9,000	7,000	10,20	110,000	18,500	49,000
M14	2,000	11,000	9,000	12,00	110,000	20,000	53,000
M16	2,000	12,000	9,000	14,00	110,000	20,000	54,000
M18	2,500	14,000	11,000	15,50	125,000	25,000	62,000
M20	2,500	16,000	12,000	17,50	140,000	25,000	62,000
M22	2,500	18,000	14,500	19,50	140,000	27,000	62,000
M24	3,000	18,000	14,500	21,00	160,000	30,000	73,000

Tarauds machine

Tarauds pour filetage métrique ISO



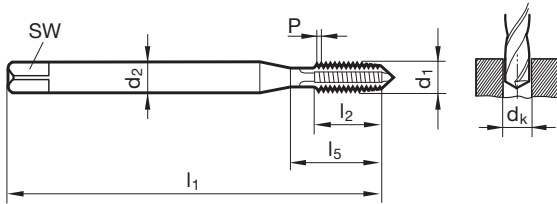
Référence **63201**



P	M	K	N	S	H
		•	○		

Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- matériaux de fonderies: fontes grises, fontes malléables, fontes à graphite sphéroïdal



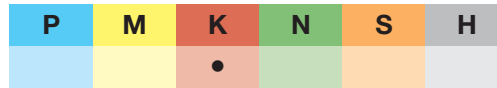
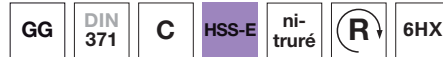
d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	20,000	39,000

Tarauds machine

Tarauds pour filetage métrique ISO

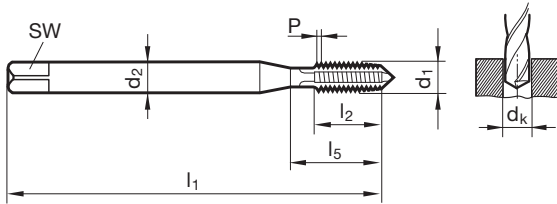


Référence **73201**



Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- matériaux de fonderies: fontes grises, fontes malléables, fontes à graphite sphéroïdal



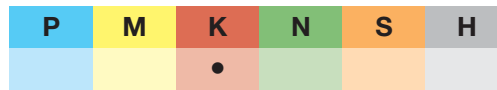
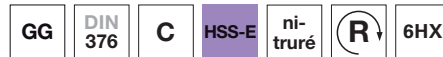
d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,50	56,000	10,000	18,000
M 3,5	0,600	4,000	3,000	2,90	56,000	12,000	20,000
M 4	0,700	4,500	3,400	3,30	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	20,000	39,000

Tarauds machine

Tarauds pour filetage métrique ISO

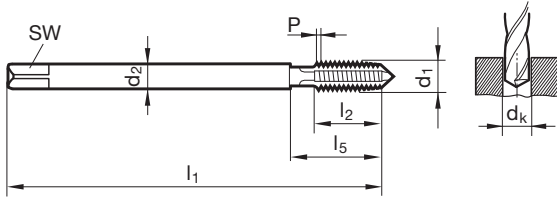


Référence **73211**



Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- matériaux de fonderies: fontes grises, fontes malléables, fontes à graphite sphéroïdal



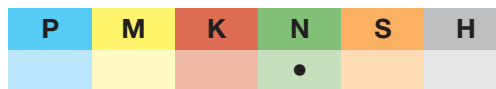
d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M12	1,750	9,000	7,000	10,20	110,000	24,000	49,000
M14	2,000	11,000	9,000	12,00	110,000	26,000	53,000
M16	2,000	12,000	9,000	14,00	110,000	26,000	54,000
M18	2,500	14,000	11,000	15,50	125,000	30,000	62,000
M20	2,500	16,000	12,000	17,50	140,000	32,000	62,000

Tarauts machine

Tarauts pour filetage métrique ISO

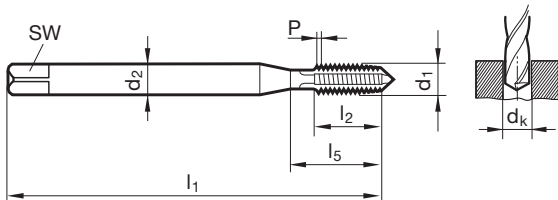


Référence 73131



Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- matériaux mous, à copeaux longs, comme l'aluminium, les alliages d'aluminiums, les non - ferreux



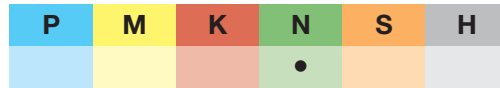
d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 2	0,400	2,800	2,100	1,60	45,000	8,000	13,500
M 2,3	0,400	2,800	2,100	1,90	45,000	9,000	14,500
M 2,5	0,450	2,800	2,100	2,05	50,000	9,000	14,500
M 2,6	0,450	2,800	2,100	2,15	50,000	9,000	14,500
M 3	0,500	3,500	2,700	2,50	56,000	10,000	18,000
M 3,5	0,600	4,000	3,000	2,90	56,000	12,000	20,000
M 4	0,700	4,500	3,400	3,30	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,20	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,00	80,000	16,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	17,000	35,000
M 10	1,500	10,000	8,000	8,50	100,000	20,000	39,000

Tarauds machine

Tarauds pour filetage métrique ISO

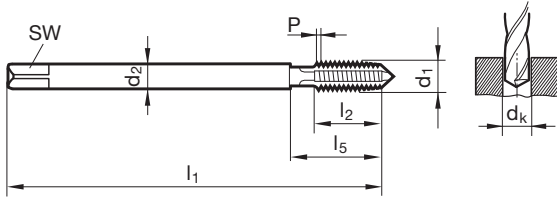


Référence **73189**



Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- matériaux mous, à copeaux longs, comme l'aluminium, les alliages d'aluminiums, les non - ferreux



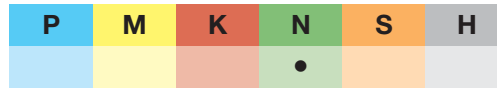
d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M12	1,750	9,000	7,000	10,20	110,000	24,000	49,000
M16	2,000	12,000	9,000	14,00	110,000	26,000	54,000
M20	2,500	16,000	12,000	17,50	140,000	32,000	62,000

Tarauts machine

Tarauts pour filetage métrique ISO

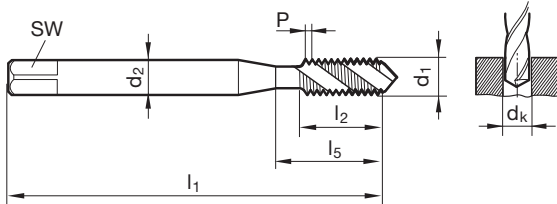


Référence **73156**



Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 45°
- évacuation des copeaux en direction de l'attachement
- matériaux mous, à copeaux longs, comme l'aluminium, les alliages d'aluminiums, les non - ferreux



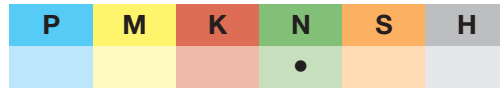
d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 2	0,400	2,800	2,100	1,60	45,000	4,500	13,500
M 2,3	0,400	2,800	2,100	1,90	45,000	4,500	14,500
M 2,5	0,450	2,800	2,100	2,05	50,000	5,000	14,500
M 3	0,500	3,500	2,700	2,50	56,000	6,000	18,000
M 4	0,700	4,500	3,400	3,30	63,000	7,500	21,000
M 5	0,800	6,000	4,900	4,20	70,000	8,500	25,000
M 6	1,000	6,000	4,900	5,00	80,000	11,000	30,000
M 8	1,250	8,000	6,200	6,80	90,000	14,000	35,000
M10	1,500	10,000	8,000	8,50	100,000	16,000	39,000

Tarauds machine

Tarauds pour filetage métrique ISO

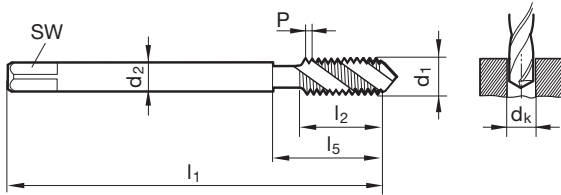


Référence **73136**



Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 45°
- évacuation des copeaux en direction de l'attache
- matériaux mous, à copeaux longs, comme l'aluminium, les alliages d'aluminiums, les non-ferreux



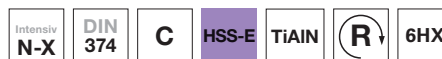
d1	P	d2	SW	dk	l1	l2	l5
	mm	mm	mm	mm	mm	mm	mm
M12	1,750	9,000	7,000	10,20	110,000	18,500	49,000
M16	2,000	12,000	9,000	14,00	110,000	20,000	54,000
M20	2,500	16,000	12,000	17,50	140,000	25,000	62,000

Tarauts machine

Tarauts pour filetage métrique ISO fin

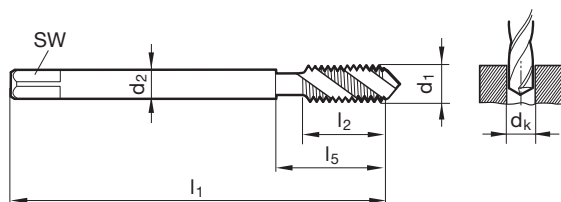


Référence **53780**



P	M	K	N	S	H
●	●	●	○	○	

Conseils d'util.,
page 348



- pour trous borgnes
- goujures hélicoïdales à droite à environ 45°
- évacuation des copeaux en direction de l'attache
- pour applications universelles
- aciers avec une résistance de 600 à 1300 N/mm²
- aciers inoxydables, inaltérables aux acides
- métaux non ferreux
- fontes

N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
6,004	M 6 X0,75	4,500	3,400	5,20	80,000	8,000	30,000
8,004	M 8 X0,75	6,000	4,900	7,20	80,000	8,000	30,000
8,005	M 8 X1	6,000	4,900	7,00	90,000	11,000	35,000
10,005	M10 X1	7,000	5,500	9,00	90,000	11,000	35,000
10,006	M10 X1,25	7,000	5,500	8,80	100,000	14,000	39,000
12,005	M12 X1	9,000	7,000	11,00	100,000	11,000	40,000
12,006	M12 X1,25	9,000	7,000	10,80	100,000	16,000	40,000
12,007	M12 X1,5	9,000	7,000	10,50	100,000	16,000	40,000
14,007	M14 X1,5	11,000	9,000	12,50	100,000	15,000	40,000
16,007	M16 X1,5	12,000	9,000	14,50	100,000	15,000	44,000
18,007	M18 X1,5	14,000	11,000	16,50	110,000	16,000	44,000
20,007	M20 X1,5	16,000	12,000	18,50	125,000	16,000	44,000
24,007	M24 X1,5	18,000	14,500	22,50	140,000	16,000	48,000

Tarauds machine

Tarauds pour filetage métrique ISO fin

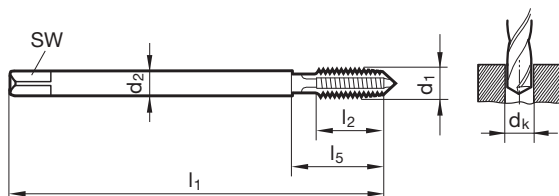


Référence **53778**

Produktiv N-X	DIN 374	B	HSS-E	Al- TiZrN	R	6HX
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P	M	K	N	S	H
●	●	●	○	○	

Conseils d'util.,
page 348



- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- pour applications universelles
- aciers avec une résistance de 600 à 1300 N/mm²
- aciers inoxydables, inaltérables aux acides
- métaux non ferreux
- fontes

N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
6,004	M 6 X0,75	4,500	3,400	5,20	80,000	13,000	30,000
8,004	M 8 X0,75	6,000	4,900	7,20	80,000	14,000	30,000
8,005	M 8 X1	6,000	4,900	7,00	90,000	16,000	35,000
10,005	M10 X1	7,000	5,500	9,00	90,000	16,000	35,000
10,006	M10 X1,25	7,000	5,500	8,80	100,000	20,000	39,000
12,005	M12 X1	9,000	7,000	11,00	100,000	20,000	40,000
12,006	M12 X1,25	9,000	7,000	10,80	100,000	20,000	40,000
12,007	M12 X1,5	9,000	7,000	10,50	100,000	20,000	40,000
14,007	M14 X1,5	11,000	9,000	12,50	100,000	20,000	40,000
16,007	M16 X1,5	12,000	9,000	14,50	100,000	22,000	44,000
18,007	M18 X1,5	14,000	11,000	16,50	110,000	25,000	44,000
20,007	M20 X1,5	16,000	12,000	18,50	125,000	25,000	44,000
24,007	M24 X1,5	18,000	14,500	22,50	140,000	28,000	48,000

Tarauds machine

Tarauds pour filetage métrique ISO fin



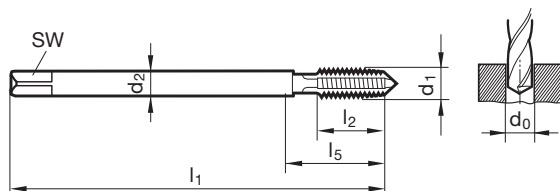
Référence **53055**



P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- pour applications universelles
- aciers avec une résistance jusqu'à 1200 N/mm²



N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
8,005	M 8 X1	6,000	4,900	7,00	90,000	16,000	35,000
10,005	M10 X1	7,000	5,500	9,00	90,000	16,000	35,000
12,005	M12 X1	9,000	7,000	11,00	100,000	20,000	40,000
12,007	M12 X1,5	9,000	7,000	10,50	100,000	20,000	40,000
14,007	M14 X1,5	11,000	9,000	12,50	100,000	20,000	40,000
16,007	M16 X1,5	12,000	9,000	14,50	100,000	22,000	44,000

Tarauts machine

Tarauts pour filetage métrique ISO fin

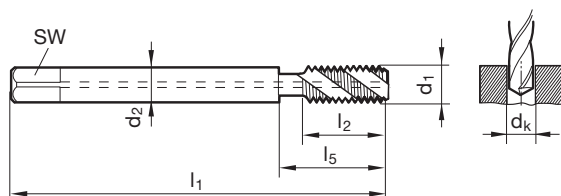


Référence **53052**



P	M	K	N	S	H
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Conseils d'util.,
page 348



- pour trous borgnes
- goujures hélicoïdales à droite à environ 50°
- partie coupante très courte, c'est pourquoi à utiliser «seulement» avec une assistance de guidage synchronisée
- évacuation des copeaux en direction de l'attachement
- pour applications universelles
- aciers avec une résistance jusqu'à 1200 N/mm²

N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
8,005	M 8 X1	6,000	4,900	7,00	90,000	5,000	44,000
10,005	M10 X1	7,000	5,500	9,00	90,000	5,000	44,000
12,005	M12 X1	9,000	7,000	11,00	100,000	5,000	53,000
12,007	M12 X1,5	9,000	7,000	10,50	100,000	7,500	53,000
14,007	M14 X1,5	11,000	9,000	12,50	100,000	7,500	48,000
16,007	M16 X1,5	12,000	9,000	14,50	100,000	7,500	48,000
18,007	M18 X1,5	14,000	11,000	16,50	110,000	7,500	58,000
20,007	M20 X1,5	16,000	12,000	18,50	125,000	7,500	70,000

Tarauts machine

Tarauts pour filetage métrique ISO fin



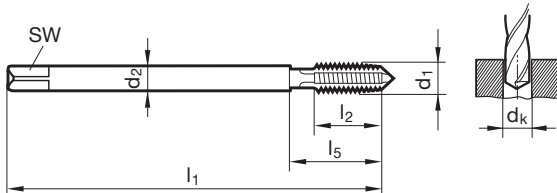
Référence **73183**

Produktiv N	DIN 374	B	HSS-E	traité vapeur	R	ISO2/6H
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P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- pour applications universelles
- aciers avec une résistance jusqu'à 1100 N/mm²



N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
6,004	M 6 X0,75	4,500	3,400	5,20	80,000	13,000	30,000
8,004	M 8 X0,75	6,000	4,900	7,20	80,000	14,000	30,000
8,005	M 8 X1	6,000	4,900	7,00	90,000	16,000	35,000
10,005	M10 X1	7,000	5,500	9,00	90,000	16,000	35,000
12,005	M12 X1	9,000	7,000	11,00	100,000	20,000	40,000
12,007	M12 X1,5	9,000	7,000	10,50	100,000	20,000	40,000
14,007	M14 X1,5	11,000	9,000	12,50	100,000	20,000	40,000
16,007	M16 X1,5	12,000	9,000	14,50	100,000	22,000	44,000
20,007	M20 X1,5	16,000	12,000	18,50	125,000	25,000	44,000

Tarauts machine

Tarauts pour filetage métrique ISO fin



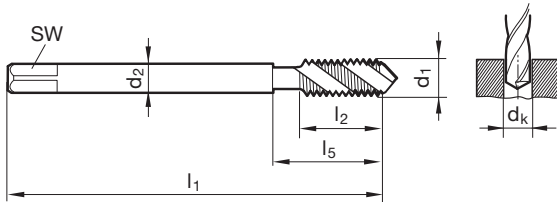
Référence **73187**



P	M	K	N	S	H
●	○	○	○		

Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attachement
- pour applications universelles
- aciers avec une résistance jusqu'à 1100 N/mm²



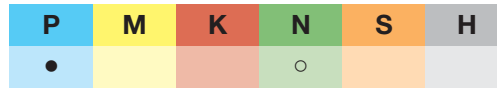
N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
6,004	M 6 X0,75	4,500	3,400	5,20	80,000	8,000	30,000
8,005	M 8 X1	6,000	4,900	7,00	90,000	11,000	35,000
10,005	M10 X1	7,000	5,500	9,00	90,000	11,000	35,000
10,006	M10 X1,25	7,000	5,500	8,80	100,000	14,000	39,000
12,005	M12 X1	9,000	7,000	11,00	100,000	11,000	40,000
12,006	M12 X1,25	9,000	7,000	10,80	100,000	16,000	40,000
12,007	M12 X1,5	9,000	7,000	10,50	100,000	16,000	40,000
14,005	M14 X1	11,000	9,000	13,00	100,000	11,000	40,000
14,007	M14 X1,5	11,000	9,000	12,50	100,000	15,000	40,000
16,007	M16 X1,5	12,000	9,000	14,50	100,000	15,000	44,000
18,007	M18 X1,5	14,000	11,000	16,50	110,000	16,000	44,000
20,007	M20 X1,5	16,000	12,000	18,50	125,000	16,000	44,000

Tarauds machine

Tarauds pour filetage métrique ISO fin

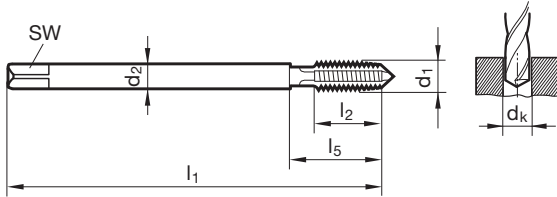


Référence **73237**



Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- aciers jusqu'à 800 N/mm²



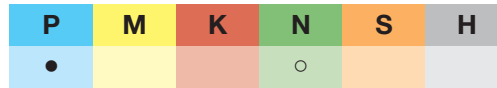
N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
8,004	M 8 X0,75	6,000	4,900	7,20	80,000	14,000	30,000
10,005	M10 X1	7,000	5,500	9,00	90,000	16,000	35,000
10,006	M10 X1,25	7,000	5,500	8,80	100,000	20,000	39,000
12,006	M12 X1,25	9,000	7,000	10,80	100,000	16,000	40,000
12,007	M12 X1,5	9,000	7,000	10,50	100,000	16,000	40,000
16,007	M16 X1,5	12,000	9,000	14,50	100,000	15,000	44,000
20,007	M20 X1,5	16,000	12,000	18,50	125,000	16,000	44,000
22,007	M22 X1,5	18,000	14,500	20,50	125,000	16,000	44,000
24,007	M24 X1,5	18,000	14,500	22,50	140,000	16,000	48,000

Tarauts machine

Tarauts pour filetage métrique ISO fin

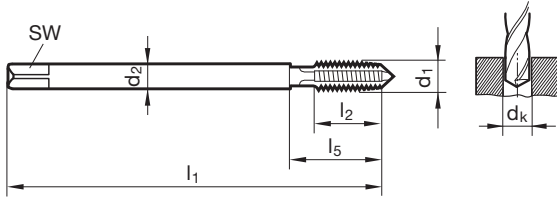


Référence **73250**



Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- utilisation universelle
- aciers jusqu'à 800 N/mm²



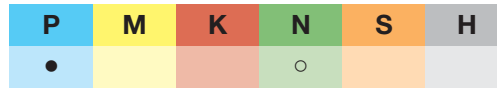
N° de code	d1	d2	SW	dk	l1	l2	l5
		mm	mm	mm	mm	mm	mm
4,003	M 4 X0,5	2,800	2,100	3,50	63,000	8,000	21,000
5,003	M 5 X0,5	3,500	2,700	4,50	70,000	10,000	25,000
6,003	M 6 X0,5	4,500	3,400	5,50	80,000	13,000	30,000
6,004	M 6 X0,75	4,500	3,400	5,20	80,000	13,000	30,000
8,004	M 8 X0,75	6,000	4,900	7,20	80,000	14,000	30,000
8,005	M 8 X1	6,000	4,900	7,00	90,000	16,000	35,000
9,005	M 9 X1	7,000	5,500	8,00	90,000	16,000	35,000
10,005	M10 X1	7,000	5,500	9,00	90,000	16,000	35,000
10,006	M10 X1,25	7,000	5,500	8,80	100,000	20,000	39,000
12,005	M12 X1	9,000	7,000	11,00	100,000	20,000	40,000
12,006	M12 X1,25	9,000	7,000	10,80	100,000	20,000	40,000
12,007	M12 X1,5	9,000	7,000	10,50	100,000	20,000	40,000
14,005	M14 X1	11,000	9,000	13,00	100,000	20,000	40,000
14,006	M14 X1,25	11,000	9,000	12,80	100,000	20,000	40,000
14,007	M14 X1,5	11,000	9,000	12,50	100,000	20,000	40,000
16,005	M16 X1	12,000	9,000	15,00	100,000	22,000	44,000
16,007	M16 X1,5	12,000	9,000	14,50	100,000	22,000	44,000
18,005	M18 X1	14,000	11,000	17,00	110,000	25,000	44,000
18,007	M18 X1,5	14,000	11,000	16,50	110,000	25,000	44,000
20,005	M20 X1	16,000	12,000	19,00	125,000	25,000	44,000
20,007	M20 X1,5	16,000	12,000	18,50	125,000	25,000	44,000
20,008	M20 X2	16,000	12,000	18,00	140,000	32,000	60,000
22,005	M22 X1	18,000	14,500	21,00	125,000	25,000	44,000
22,007	M22 X1,5	18,000	14,500	20,50	125,000	25,000	44,000
24,007	M24 X1,5	18,000	14,500	22,50	140,000	28,000	48,000
24,008	M24 X2	18,000	14,500	22,00	140,000	28,000	48,000
27,007	M27 X1,5	20,000	16,000	25,50	140,000	28,000	53,000
30,007	M30 X1,5	22,000	18,000	28,50	150,000	28,000	53,000
30,008	M30 X2	22,000	18,000	28,00	150,000	28,000	53,000
36,007	M36 X1,5	28,000	22,000	34,50	170,000	30,000	56,000

Tarauts machine

Tarauts pour filetage métrique ISO fin

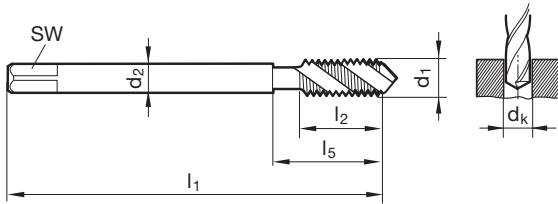


Référence **73173**



Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- pour applications universelles
- aciers avec une résistance jusqu'à 1100 N/mm²



N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
3,002	M 3 X0,35	2,200		2,65	56,000	4,000	18,000
4,003	M 4 X0,5	2,800	2,100	3,50	63,000	5,000	21,000
5,003	M 5 X0,5	3,500	2,700	4,50	70,000	5,000	25,000
6,003	M 6 X0,5	4,500	3,400	5,50	80,000	5,000	30,000
6,004	M 6 X0,75	4,500	3,400	5,20	80,000	8,000	30,000
8,004	M 8 X0,75	6,000	4,900	7,20	80,000	8,000	30,000
8,005	M 8 X1	6,000	4,900	7,00	90,000	11,000	35,000
10,005	M10 X1	7,000	5,500	9,00	90,000	11,000	35,000
10,006	M10 X1,25	7,000	5,500	8,80	100,000	14,000	39,000
11,005	M11 X1	8,000	6,200	10,00	90,000	11,000	33,000
12,005	M12 X1	9,000	7,000	11,00	100,000	11,000	40,000
12,006	M12 X1,25	9,000	7,000	10,80	100,000	16,000	40,000
12,007	M12 X1,5	9,000	7,000	10,50	100,000	16,000	40,000
14,005	M14 X1	11,000	9,000	13,00	100,000	11,000	40,000
14,006	M14 X1,25	11,000	9,000	12,80	100,000	15,000	40,000
14,007	M14 X1,5	11,000	9,000	12,50	100,000	15,000	40,000
16,005	M16 X1	12,000	9,000	15,00	100,000	11,000	44,000
16,007	M16 X1,5	12,000	9,000	14,50	100,000	15,000	44,000
18,005	M18 X1	14,000	11,000	17,00	110,000	12,000	44,000
18,007	M18 X1,5	14,000	11,000	16,50	110,000	16,000	44,000
20,007	M20 X1,5	16,000	12,000	18,50	125,000	16,000	44,000
22,007	M22 X1,5	18,000	14,500	20,50	125,000	16,000	44,000
24,007	M24 X1,5	18,000	14,500	22,50	140,000	16,000	48,000
24,008	M24 X2	18,000	14,500	22,00	140,000	22,000	48,000
26,007	M26 X1,5	18,000	14,500	24,50	140,000	20,000	50,000
30,007	M30 X1,5	22,000	18,000	28,50	150,000	20,000	53,000
30,008	M30 X2	22,000	18,000	28,00	150,000	20,000	53,000

Tarauts machine

Tarauts pour filetage métrique ISO fin



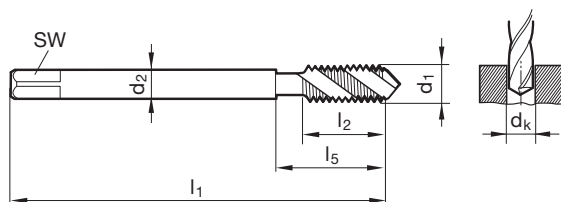
Référence **63173**



P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attachement
- utilisation universelle
- aciers jusqu'à 800 N/mm²



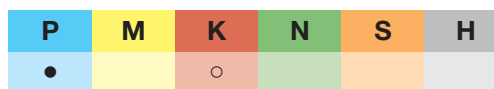
N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
8,005	M 8 X1	6,000	4,900	7,00	90,000	11,000	35,000
10,005	M10 X1	7,000	5,500	9,00	90,000	11,000	35,000
10,006	M10 X1,25	7,000	5,500	8,80	100,000	14,000	39,000
12,005	M12 X1	9,000	7,000	11,00	100,000	11,000	40,000
12,007	M12 X1,5	9,000	7,000	10,50	100,000	16,000	40,000
14,007	M14 X1,5	11,000	9,000	12,50	100,000	15,000	40,000
16,007	M16 X1,5	12,000	9,000	14,50	100,000	15,000	44,000
20,007	M20 X1,5	16,000	12,000	18,50	125,000	16,000	44,000

Tarauts machine

Tarauts pour filetage métrique ISO fin

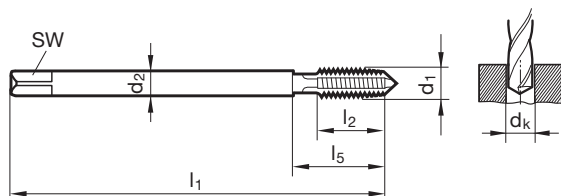


Référence **73646**



Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- matériaux très résistants
- aciers avec une résistance de 1100 à 1600 N/mm²



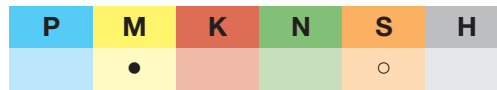
N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
3,002	M 3 X0,35	2,200		2,65	56,000	7,000	18,000
4,003	M 4 X0,5	2,800	2,100	3,50	63,000	8,000	21,000
5,003	M 5 X0,5	3,500	2,700	4,50	70,000	10,000	25,000
6,004	M 6 X0,75	4,500	3,400	5,20	80,000	13,000	30,000
8,004	M 8 X0,75	6,000	4,900	7,20	80,000	14,000	30,000
8,005	M 8 X1	6,000	4,900	7,00	90,000	16,000	35,000
10,005	M10 X1	7,000	5,500	9,00	90,000	16,000	35,000
12,007	M12 X1,5	9,000	7,000	10,50	100,000	20,000	40,000
14,007	M14 X1,5	11,000	9,000	12,50	100,000	20,000	40,000
16,007	M16 X1,5	12,000	9,000	14,50	100,000	22,000	44,000
18,007	M18 X1,5	14,000	11,000	16,50	110,000	25,000	44,000
20,007	M20 X1,5	16,000	12,000	18,50	125,000	25,000	44,000
22,007	M22 X1,5	18,000	14,500	20,50	125,000	25,000	44,000

Tarauds machine

Tarauds pour filetage métrique ISO fin

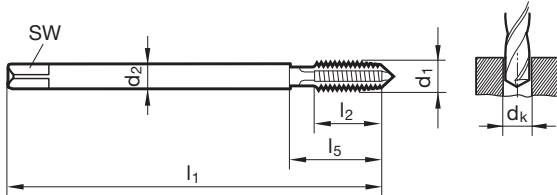


Référence **73178**



Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
5,003	M 5 X0,5	3,500	2,700	4,50	70,000	10,000	25,000
6,004	M 6 X0,75	4,500	3,400	5,20	80,000	13,000	30,000
8,005	M 8 X1	6,000	4,900	7,00	90,000	16,000	35,000
10,005	M10 X1	7,000	5,500	9,00	90,000	16,000	35,000
12,005	M12 X1	9,000	7,000	11,00	100,000	20,000	40,000
12,007	M12 X1,5	9,000	7,000	10,50	100,000	20,000	40,000
14,007	M14 X1,5	11,000	9,000	12,50	100,000	20,000	40,000
16,007	M16 X1,5	12,000	9,000	14,50	100,000	22,000	44,000
18,007	M18 X1,5	14,000	11,000	16,50	110,000	25,000	44,000
20,007	M20 X1,5	16,000	12,000	18,50	125,000	25,000	44,000

Tarands machine

Tarands pour filetage métrique ISO fin



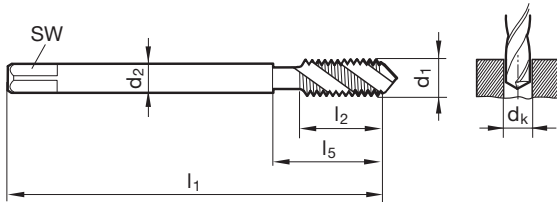
Référence **73180**



P	M	K	N	S	H
	•			○	

Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



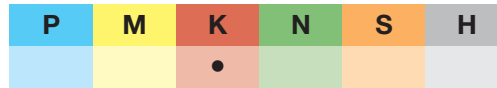
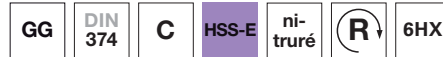
N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
8,005	M 8 X1	6,000	4,900	7,00	90,000	11,000	35,000
10,005	M10 X1	7,000	5,500	9,00	90,000	11,000	35,000
12,005	M12 X1	9,000	7,000	11,00	100,000	11,000	40,000
12,007	M12 X1,5	9,000	7,000	10,50	100,000	16,000	40,000
14,007	M14 X1,5	11,000	9,000	12,50	100,000	15,000	40,000
16,007	M16 X1,5	12,000	9,000	14,50	100,000	15,000	44,000
18,007	M18 X1,5	14,000	11,000	16,50	110,000	16,000	44,000
20,007	M20 X1,5	16,000	12,000	18,50	125,000	16,000	44,000

Tarauts machine

Tarauts pour filetage métrique ISO fin

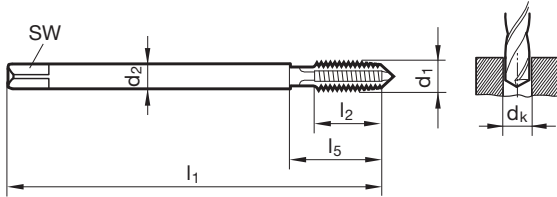


Référence **73194**



Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- matériaux de fonderies: fontes grises, fontes malléables, fontes à graphite sphéroïdal



N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
8,005	M 8 X1	6,000	4,900	7,00	90,000	16,000	35,000
10,005	M10 X1	7,000	5,500	9,00	90,000	16,000	35,000
12,007	M12 X1,5	9,000	7,000	10,50	100,000	20,000	40,000
14,007	M14 X1,5	11,000	9,000	12,50	100,000	20,000	40,000
16,007	M16 X1,5	12,000	9,000	14,50	100,000	22,000	44,000
18,007	M18 X1,5	14,000	11,000	16,50	110,000	25,000	44,000
20,007	M20 X1,5	16,000	12,000	18,50	125,000	25,000	44,000

Tarauts machine

Tarauts pour filetage UNC



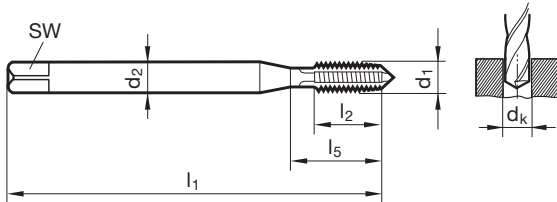
Référence **73308**

Produktiv N	~DIN 371	B	HSS-E	traité vapeur	R	2B
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P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- pour applications universelles
- aciers avec une résistance jusqu'à 1100 N/mm²



N° de code	d1	d2	SW	dk	l1	l2	l5
		mm	mm	mm	mm	mm	mm
2,845	4 -40	3,500	2,700	2,35	56,000	11,000	18,000
3,505	6 -32	4,000	3,000	2,85	56,000	12,000	20,000
4,166	8 -32	4,500	3,400	3,50	63,000	12,000	21,000
4,826	10 -24	6,000	4,900	3,90	70,000	14,000	25,000
6,350	1/4 -20	7,000	5,500	5,10	80,000	16,000	30,000
7,938	5/16-18	8,000	6,200	6,60	90,000	18,000	35,000
9,525	3/8 -16	10,000	8,000	8,00	100,000	20,000	39,000

Tarauts machine

Tarauts pour filetage UNC



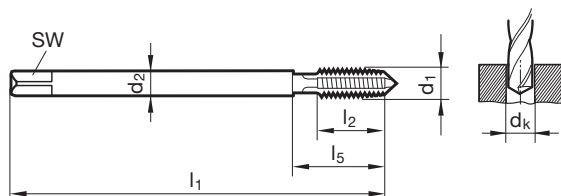
Référence **73309**

Produktiv N	~DIN 376	B	HSS-E	traité vapeur	R	2B
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P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- pour applications universelles
- aciers avec une résistance jusqu'à 1100 N/mm²



N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
12,700	1/2 -13	9,000	7,000	10,80	110,000	25,000	49,000
15,875	5/8 -11	12,000	9,000	13,50	110,000	30,000	53,000
19,050	3/4 -10	14,000	11,000	16,50	125,000	33,000	62,000

Tarauts machine

Tarauts pour filetage UNC



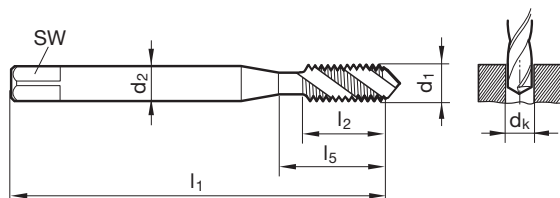
Référence **73322**

Intensiv N	~DIN 371	C	HSS-E	traité vapeur	R	2B
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P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- pour applications universelles
- aciers avec une résistance jusqu'à 1100 N/mm²



N° de code	d1	d2	SW	dk	l1	l2	l5
		mm	mm	mm	mm	mm	mm
2,845	4 -40	3,500	2,700	2,35	56,000	7,000	18,000
3,505	6 -32	4,000	3,000	2,85	56,000	8,000	20,000
4,166	8 -32	4,500	3,400	3,50	63,000	8,000	21,000
4,826	10 -24	6,000	4,900	3,90	70,000	11,000	25,000
6,350	1/4 -20	7,000	5,500	5,10	80,000	13,000	30,000
7,938	5/16-18	8,000	6,200	6,60	90,000	14,000	35,000
9,525	3/8 -16	10,000	8,000	8,00	100,000	16,000	39,000

Tarauds machine

Tarauds pour filetage UNC



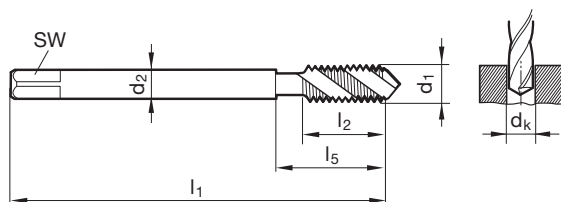
Référence **73323**

Intensiv N	~DIN 376	C	HSS-E	traité vapeur	R	2B
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P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attachement
- pour applications universelles
- aciers avec une résistance jusqu'à 1100 N/mm²



N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
12,700	1/2 -13	9,000	7,000	10,80	110,000	20,000	49,000
15,875	5/8 -11	12,000	9,000	13,50	110,000	24,000	53,000
19,050	3/4 -10	14,000	11,000	16,50	125,000	25,000	62,000

Tarauts machine

Tarauts pour filetage UNC



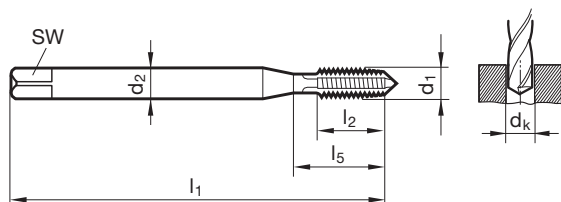
Référence **73297**

Produktiv HD	~DIN 371	B	HSS-E	traité vapeur	R	2B
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P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



N° de code	d1	d2	SW	dk	l1	l2	l5
		mm	mm	mm	mm	mm	mm
2,845	4 -40	3,500	2,700	2,35	56,000	11,000	18,000
3,505	6 -32	4,000	3,000	2,85	56,000	12,000	20,000
4,166	8 -32	4,500	3,400	3,50	63,000	12,000	21,000
4,826	10 -24	6,000	4,900	3,90	70,000	14,000	25,000
6,350	1/4 -20	7,000	5,500	5,10	80,000	16,000	30,000
7,938	5/16-18	8,000	6,200	6,60	90,000	18,000	35,000
9,525	3/8 -16	10,000	8,000	8,00	100,000	20,000	39,000

Tarauds machine

Tarauds pour filetage UNC



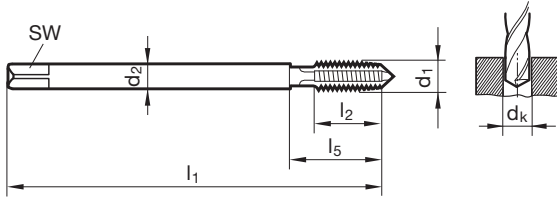
Référence **73298**

Produktiv HD	~DIN 376	B	HSS-E	traité vapeur	R	2B
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P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
12,700	1/2 -13	9,000	7,000	10,80	110,000	25,000	49,000
15,875	5/8 -11	12,000	9,000	13,50	110,000	30,000	53,000
19,050	3/4 -10	14,000	11,000	16,50	125,000	33,000	62,000
25,400	1 - 8	18,000	14,500	22,25	160,000	38,000	73,000

Tarauts machine

Tarauts pour filetage UNC



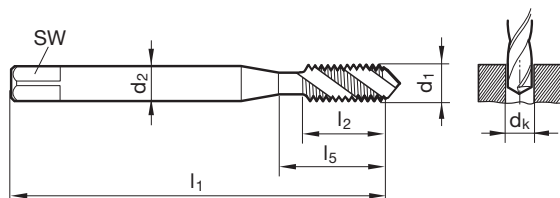
Référence **73304**



P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



N° de code	d1	d2	SW	dk	l1	l2	l5
		mm	mm	mm	mm	mm	mm
2,845	4 -40	3,500	2,700	2,35	56,000	7,000	18,000
3,505	6 -32	4,000	3,000	2,85	56,000	8,000	20,000
4,166	8 -32	4,500	3,400	3,50	63,000	8,000	21,000
4,826	10 -24	6,000	4,900	3,90	70,000	11,000	25,000
6,350	1/4 -20	7,000	5,500	5,10	80,000	13,000	30,000
7,938	5/16-18	8,000	6,200	6,60	90,000	14,000	35,000
9,525	3/8 -16	10,000	8,000	8,00	100,000	16,000	39,000

Tarauts machine

Tarauts pour filetage UNC



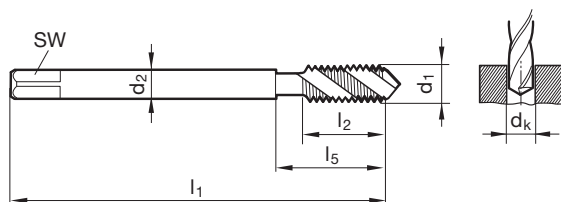
Référence 73305



P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
12,700	1/2 -13	9,000	7,000	10,80	110,000	20,000	49,000
15,875	5/8 -11	12,000	9,000	13,50	110,000	24,000	53,000
19,050	3/4 -10	14,000	11,000	16,50	125,000	25,000	62,000

Tarauds machine

Tarauds pour filetage UNC



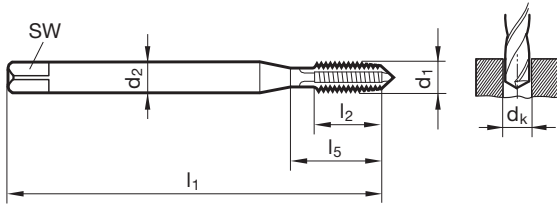
Référence **73326**

GG	~DIN 371	C	HSS-E	ni- truré		2B
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P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- matériaux de fonderies: fontes grises, fontes malléables, fontes à graphite sphéroïdal



N° de code	d1	d2	SW	dk	l1	l2	l5
		mm	mm	mm	mm	mm	mm
4,166	8 -32	4,500	3,400	3,50	63,000	12,000	21,000
4,826	10 -24	6,000	4,900	3,90	70,000	14,000	25,000
6,350	1/4 -20	7,000	5,500	5,10	80,000	16,000	30,000
7,938	5/16-18	8,000	6,200	6,60	90,000	18,000	35,000
9,525	3/8 -16	10,000	8,000	8,00	100,000	20,000	39,000

Tarauds machine

Tarauds pour filetage UNC

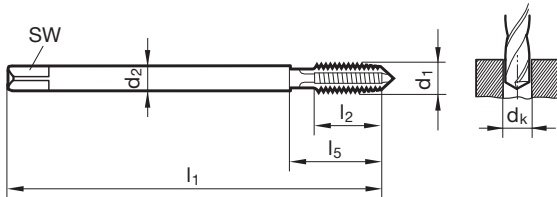


Référence **73327**



Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- matériaux de fonderies: fontes grises, fontes malléables, fontes à graphite sphéroïdal



N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
12,700	1/2 -13	9,000	7,000	10,80	110,000	25,000	49,000
15,875	5/8 -11	12,000	9,000	13,50	110,000	30,000	53,000
19,050	3/4 -10	14,000	11,000	16,50	125,000	33,000	62,000
25,400	1 - 8	18,000	14,500	22,25	160,000	38,000	73,000

Tarauts machine

Tarauts pour filetage UNF



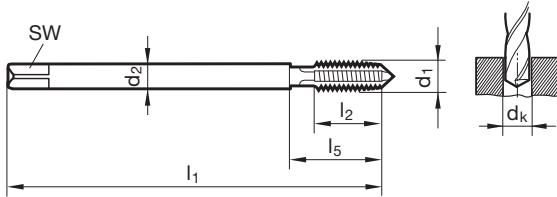
Référence **73310**

Produktiv N	~DIN 374	B	HSS-E	traité vapeur	R	2B
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P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- pour applications universelles
- aciers avec une résistance jusqu'à 1100 N/mm²



N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
4,826	10 -32	3,500	2,700	4,10	70,000	14,000	25,000
6,350	1/4 -28	4,500	3,400	5,50	80,000	16,000	30,000
9,525	3/8 -24	7,000	5,500	8,50	90,000	18,000	35,000
15,875	5/8 -18	12,000	9,000	14,50	100,000	22,000	44,000

Tarauts machine

Tarauts pour filetage UNF



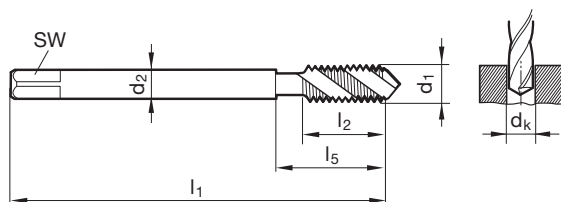
Référence **73324**

Intensiv N	~DIN 374	C	HSS-E	traité vapeur	R	2B
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P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- pour applications universelles
- aciers avec une résistance jusqu'à 1100 N/mm²



N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
4,826	10 -32	3,500	2,700	4,10	70,000	8,500	25,000
6,350	1/4 -28	4,500	3,400	5,50	80,000	9,000	30,000
7,938	5/16-24	6,000	4,900	6,90	90,000	11,000	35,000
9,525	3/8 -24	7,000	5,500	8,50	90,000	11,000	35,000
11,113	7/16-20	8,000	6,200	9,90	100,000	13,000	42,000
12,700	1/2 -20	9,000	7,000	11,50	100,000	13,000	40,000
15,875	5/8 -18	12,000	9,000	14,50	100,000	15,000	44,000

Tarauds machine

Tarauds pour filetage UNF



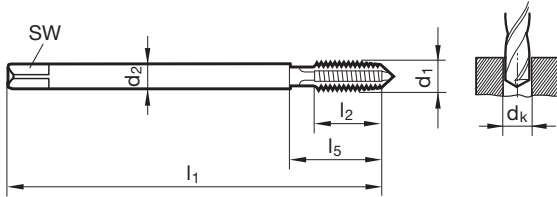
Référence **73299**

Produktiv HD	~DIN 374	B	HSS-E	traité vapeur	R	2B
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P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



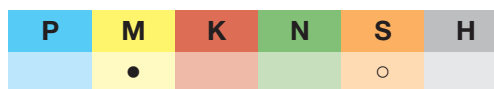
N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
4,826	10 -32	3,500	2,700	4,10	70,000	14,000	25,000
6,350	1/4 -28	4,500	3,400	5,50	80,000	16,000	30,000
9,525	3/8 -24	7,000	5,500	8,50	90,000	18,000	35,000
15,875	5/8 -18	12,000	9,000	14,50	100,000	22,000	44,000

Tarands machine

Tarands pour filetage UNF

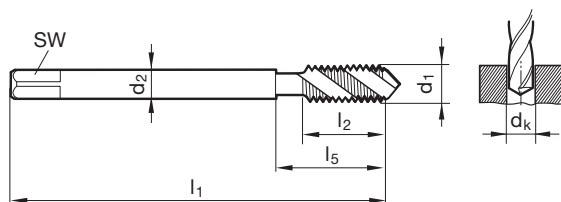


Référence **73306**



Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attache
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
4,826	10 -32	3,500	2,700	4,10	70,000	8,500	25,000
6,350	1/4 -28	4,500	3,400	5,50	80,000	9,000	30,000
7,938	5/16-24	6,000	4,900	6,90	90,000	11,000	35,000
9,525	3/8 -24	7,000	5,500	8,50	90,000	11,000	35,000
11,113	7/16-20	8,000	6,200	9,90	100,000	13,000	42,000
12,700	1/2 -20	9,000	7,000	11,50	100,000	13,000	40,000
15,875	5/8 -18	12,000	9,000	14,50	100,000	15,000	44,000
19,050	3/4 -16	14,000	11,000	17,50	110,000	16,000	44,000

Tarauts machine

Tarauts pour filetage NPT



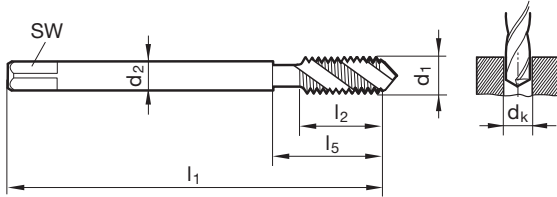
Référence **73293**



P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 25°
- pour des profondeurs de filetage jusqu'à 2xD.
- évacuation des copeaux en direction de l'attachement



N° de code	d1	P G/inch	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
10,620	1/8	27,000	11,000	9,000	8,50	90,000	15,000	29,000
14,140	1/4	18,000	14,000	11,000	11,20	100,000	21,000	40,000
17,570	3/8	18,000	16,000	12,000	14,40	110,000	21,000	35,000
21,900	1/2	14,000	18,000	14,500	18,00	125,000	27,000	44,000
27,230	3/4	14,000	22,000	18,000	23,40	140,000	27,000	52,000

Tarauts machine

Tarauts pour filetage BSP



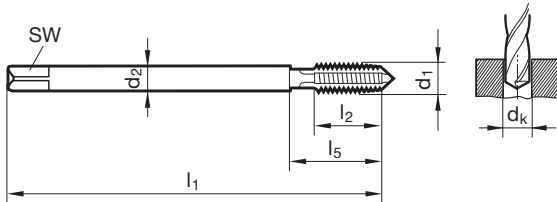
Référence **73321**



P	○	○	○	○	○
●	○	○	○	○	○

Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- pour applications universelles
- aciers avec une résistance jusqu'à 1100 N/mm²



N° de code	d1	P G/inch	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
9,728	G 1/8	28,000	7,000	5,500	8,80	90,000	18,000	35,000
13,157	G 1/4	19,000	11,000	9,000	11,80	100,000	20,000	40,000
16,662	G 3/8	19,000	12,000	9,000	15,25	100,000	22,000	44,000
20,955	G 1/2	14,000	16,000	12,000	19,00	125,000	25,000	44,000
26,441	G 3/4	14,000	20,000	16,000	24,50	140,000	28,000	53,000
33,249	G1	11,000	25,000	20,000	30,75	160,000	30,000	56,000

Tarauts machine

Tarauts pour filetage BSP



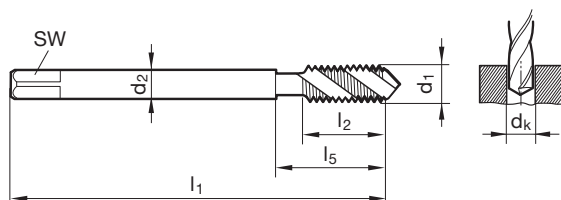
Référence **73325**



P	○	K	N	○	H
●		○	○		

Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attachement
- pour applications universelles
- aciers avec une résistance jusqu'à 1100 N/mm²



N° de code	d1	P G/inch	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
9,728	G 1/8	28,000	7,000	5,500	8,80	90,000	11,000	35,000
13,157	G 1/4	19,000	11,000	9,000	11,80	100,000	14,000	40,000
16,662	G 3/8	19,000	12,000	9,000	15,25	100,000	14,000	44,000
20,955	G 1/2	14,000	16,000	12,000	19,00	125,000	18,000	44,000
26,441	G 3/4	14,000	20,000	16,000	24,50	140,000	20,000	53,000
33,249	G1	11,000	25,000	20,000	30,75	160,000	24,000	56,000

Tarauts machine

Tarauts pour filetage BSP

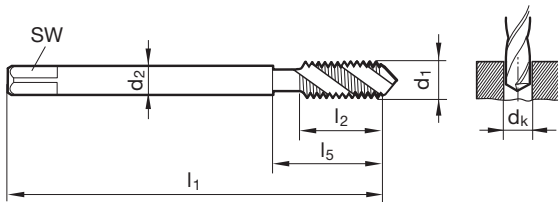


Référence **53788**



P	M	K	N	S	H
●	●	●	○	○	

Conseils d'util.,
page 348



- pour trous borgnes
- goujures hélicoïdales à droite à environ 45°
- évacuation des copeaux en direction de l'attachement
- pour applications universelles
- aciers avec une résistance de 600 à 1300 N/mm²
- aciers inoxydables, inaltérables aux acides
- métaux non ferreux
- fontes

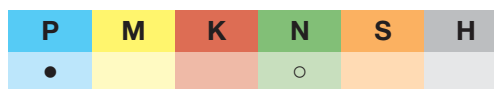
N° de code	d1	P G/inch	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
7,723	G 1/16	28,000	6,000	4,900	6,80	90,000	11,000	30,000
9,728	G 1/8	28,000	7,000	5,500	8,80	90,000	11,000	35,000
13,157	G 1/4	19,000	11,000	9,000	11,80	100,000	14,000	40,000
16,662	G 3/8	19,000	12,000	9,000	15,25	100,000	14,000	44,000
20,955	G 1/2	14,000	16,000	12,000	19,00	125,000	18,000	44,000
22,911	G 5/8	14,000	18,000	14,500	21,00	125,000	18,000	48,000
26,441	G 3/4	14,000	20,000	16,000	24,50	140,000	20,000	53,000
30,201	G 7/8	14,000	22,000	18,000	28,25	150,000	22,000	53,000
33,249	G1	11,000	25,000	20,000	30,75	160,000	24,000	56,000

Tarauts machine

Tarauts pour filetage BSP

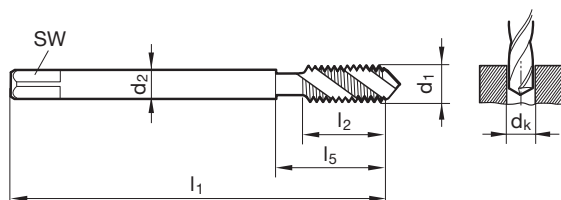


Référence **73286**



Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attachement
- utilisation universelle
- aciers jusqu'à 800 N/mm²



N° de code	d1	P G/inch	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
9,728	G 1/8	28,000	7,000	5,500	8,80	90,000	11,000	35,000
13,157	G 1/4	19,000	11,000	9,000	11,80	100,000	14,000	40,000
16,662	G 3/8	19,000	12,000	9,000	15,25	100,000	14,000	44,000
20,955	G 1/2	14,000	16,000	12,000	19,00	125,000	18,000	44,000
26,441	G 3/4	14,000	20,000	16,000	24,50	140,000	20,000	53,000
33,249	G1	11,000	25,000	20,000	30,75	160,000	24,000	56,000
41,910	G1 1/4	11,000	32,000	24,000	39,50	170,000	25,000	57,000
47,803	G1 1/2	11,000	36,000	29,000	45,25	190,000	27,000	60,000

Tarauts machine

Tarauts pour filetage BSP



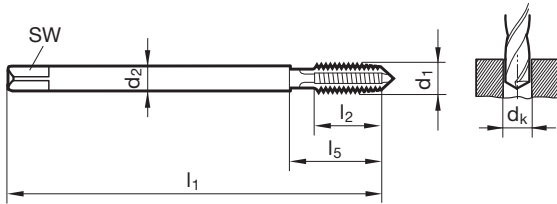
Référence **73300**



P	M	K	N	S	H
	•			○	

Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



N° de code	d1	P	d2	SW	dk	l1	l2	l5
		G/inch	mm	mm	mm	mm	mm	mm
9,728	G 1/8	28,000	7,000	5,500	8,80	90,000	18,000	35,000
13,157	G 1/4	19,000	11,000	9,000	11,80	100,000	20,000	40,000
16,662	G 3/8	19,000	12,000	9,000	15,25	100,000	22,000	44,000
20,955	G 1/2	14,000	16,000	12,000	19,00	125,000	25,000	44,000
26,441	G 3/4	14,000	20,000	16,000	24,50	140,000	28,000	53,000
33,249	G1	11,000	25,000	20,000	30,75	160,000	30,000	56,000

Tarauts machine

Tarauts pour filetage BSP



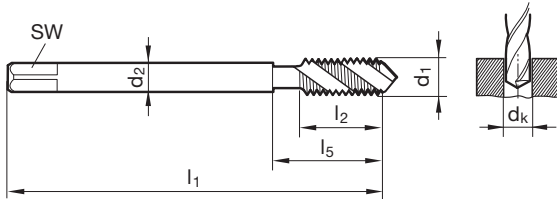
Référence **73288**



P	M	K	N	S	H
	•			○	

Conseils d'util.,
page 348

- pour trous borgnes
- goujures hélicoïdales à droite à environ 40°
- évacuation des copeaux en direction de l'attachement
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



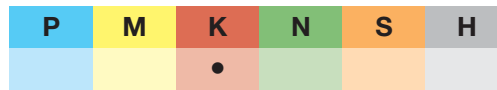
N° de code	d1	P G/inch	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
9,728	G 1/8	28,000	7,000	5,500	8,80	90,000	11,000	35,000
13,157	G 1/4	19,000	11,000	9,000	11,80	100,000	14,000	40,000
16,662	G 3/8	19,000	12,000	9,000	15,25	100,000	14,000	44,000
20,955	G 1/2	14,000	16,000	12,000	19,00	125,000	18,000	44,000
26,441	G 3/4	14,000	20,000	16,000	24,50	140,000	20,000	53,000
33,249	G1	11,000	25,000	20,000	30,75	160,000	24,000	56,000

Tarauts machine

Tarauts pour filetage BSP

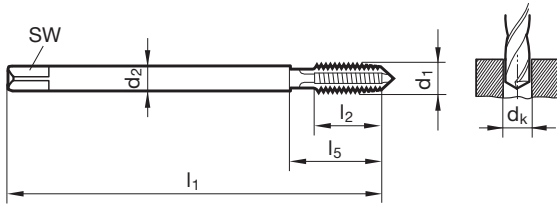


Référence **73345**



Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- matériaux de fonderies: fontes grises, fontes malléables, fontes à graphite sphéroïdal



N° de code	d1	P G/inch	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
9,728	G 1/8	28,000	7,000	5,500	8,80	90,000	18,000	35,000
13,157	G 1/4	19,000	11,000	9,000	11,80	100,000	20,000	40,000
16,662	G 3/8	19,000	12,000	9,000	15,25	100,000	22,000	44,000
20,955	G 1/2	14,000	16,000	12,000	19,00	125,000	25,000	44,000
26,441	G 3/4	14,000	20,000	16,000	24,50	140,000	28,000	53,000
33,249	G1	11,000	25,000	20,000	30,75	160,000	30,000	56,000

Tarauts machine

Tarauts pour filetage BSP

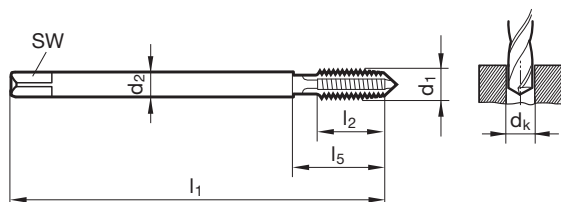


Référence **53787**



P	M	K	N	S	H
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Conseils d'util.,
page 348



- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- pour applications universelles
- aciers avec une résistance de 600 à 1300 N/mm²
- aciers inoxydables, inaltérables aux acides
- métaux non ferreux
- fontes

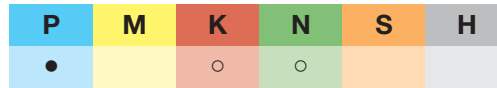
N° de code	d1	P	d2	SW	dk	l1	l2	l5
		G/inch	mm	mm	mm	mm	mm	mm
7,723	G 1/16	28,000	6,000	4,900	6,80	90,000	18,000	30,000
9,728	G 1/8	28,000	7,000	5,500	8,80	90,000	18,000	35,000
13,157	G 1/4	19,000	11,000	9,000	11,80	100,000	20,000	40,000
16,662	G 3/8	19,000	12,000	9,000	15,25	100,000	22,000	44,000
20,955	G 1/2	14,000	16,000	12,000	19,00	125,000	25,000	44,000
22,911	G 5/8	14,000	18,000	14,500	21,00	125,000	25,000	48,000
26,441	G 3/4	14,000	20,000	16,000	24,50	140,000	28,000	53,000
30,201	G 7/8	14,000	22,000	18,000	28,25	150,000	28,000	53,000
33,249	G1	11,000	25,000	20,000	30,75	160,000	30,000	56,000

Tarauts machine

Tarauts courts pour filetage Pg

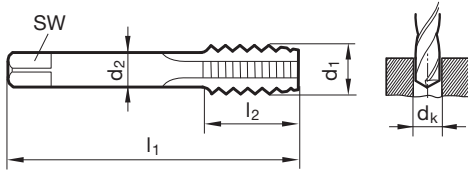


Référence **73296**



Conseils d'util.,
page 348

- pour trous débouchant
- avec entrée GUN
- évacuation des copeaux en direction de l'avance
- pour applications universelles
- aciers avec une résistance jusqu'à 1100 N/mm²



N° de code	d1	P	d2	SW	dk	l1	l2
		G/inch	mm	mm	mm	mm	mm
12,500	PG 7	20,000	9,000	7,000	11,40	70,000	22,000
15,200	PG 9	18,000	12,000	9,000	14,00	70,000	22,000
18,600	PG 11	18,000	14,000	11,000	17,30	80,000	22,000
20,400	PG 13,5	18,000	16,000	12,000	19,00	80,000	22,000
22,500	PG 16	18,000	18,000	14,500	21,30	80,000	22,000

Tarauts machine

Taraut court pour les filetages NPT

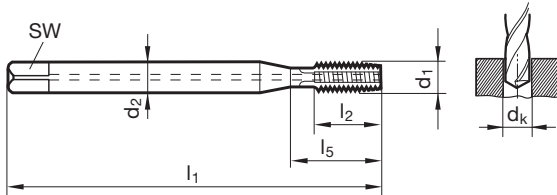


Référence **73295**



Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- pour des profondeurs de filetage jusqu'à 1xD
- pour applications universelles
- aciers avec une résistance jusqu'à 1100 N/mm²



N° de code	d1	P G/inch	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
8,190	1/16	27,000	6,000	4,900	6,15	56,000	14,000	27,000
10,620	1/8	27,000	7,000	5,500	8,40	63,000	15,000	29,000
14,140	1/4	18,000	11,000	9,000	11,10	63,000	21,000	33,000
17,570	3/8	18,000	12,000	9,000	14,30	70,000	21,000	35,000
21,900	1/2	14,000	16,000	12,000	17,90	80,000	27,000	41,000
27,230	3/4	14,000	20,000	16,000	23,30	100,000	27,000	42,000
34,180	1	11,500	25,000	20,000	29,00	110,000	32,000	53,000

Tarauts à refouler

Tarauts à refouler avec rainures de lubr. p. filetage métrique ISO



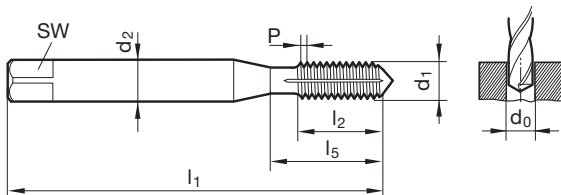
Référence 73120

Durativ	~DIN 371	C	HSS-E	poli	R	6HX
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P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- pour les profondeurs de filetages très profonds
- pour applications universelles
- aciers avec une résistance jusqu'à 1000 N/mm²
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,80	56,000	10,000	18,000
M 3,5	0,600	4,000	3,000	3,25	56,000	12,000	20,000
M 4	0,700	4,500	3,400	3,70	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,65	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,55	80,000	16,000	30,000
M 8	1,250	8,000	6,200	7,40	90,000	17,000	35,000
M10	1,500	10,000	8,000	9,30	100,000	20,000	39,000

Tarauds à refouler

Tarauds à refouler avec rainures de lubr. p. filetage métrique ISO



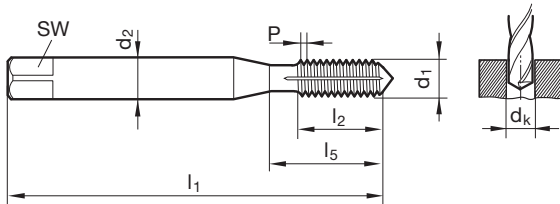
Référence **63120**

Durativ	~DIN 371	C	HSS-E	TiN		6HX
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P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- pour les profondeurs de filetages très profonds
- pour applications universelles
- aciers avec une résistance jusqu'à 1000 N/mm²
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,80	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,70	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,65	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,55	80,000	16,000	30,000
M 8	1,250	8,000	6,200	7,40	90,000	17,000	35,000
M10	1,500	10,000	8,000	9,30	100,000	20,000	39,000

Tarauds à refouler

Tarauds à refouler avec rainures de lubr. p. filetage métrique ISO



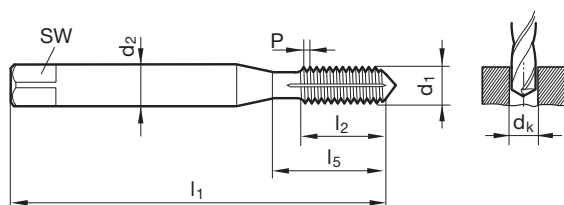
Référence **63119**

Durativ	~DIN 371	C	HSS-E	TiN		6GX
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P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- pour les profondeurs de filetages très profonds
- pour applications universelles
- aciers avec une résistance jusqu'à 1000 N/mm²
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



d1	P	d2	SW	dk	l1	l2	l5
	mm	mm	mm	mm	mm	mm	mm
M 3	0,500	3,500	2,700	2,80	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,70	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,65	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,55	80,000	16,000	30,000
M 8	1,250	8,000	6,200	7,40	90,000	17,000	35,000
M10	1,500	10,000	8,000	9,30	100,000	20,000	39,000

Tarauds à refouler

Tarauds à refouler avec rainures de lubr. p. filetage métrique ISO



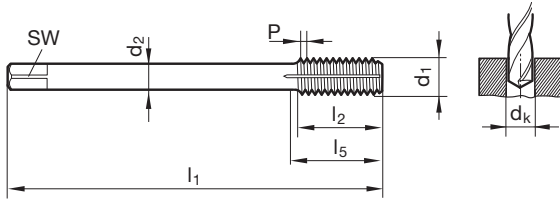
Référence **63122**

Durativ	~DIN 376	C	HSS-E	TiN		6HX
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P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- pour les profondeurs de filetages très profonds
- pour applications universelles
- aciers avec une résistance jusqu'à 1000 N/mm²
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M12	1,750	9,000	7,000	11,20	110,000	24,000	49,000
M14	2,000	11,000	9,000	13,10	110,000	26,000	53,000
M16	2,000	12,000	9,000	15,10	110,000	26,000	54,000

Tarauds à refouler

Tarauds à refouler avec rainures de lubr. p. filetage métrique ISO



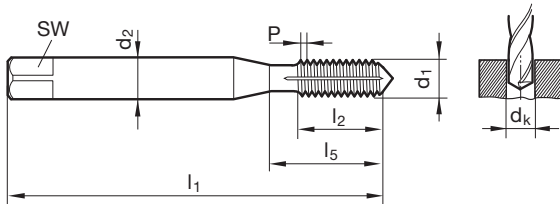
Référence **53620**

Durativ	~DIN 371	C	HSS-E- PM	AlCrN	R	6HX
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P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- pour les profondeurs de filetages très profonds
- pour applications universelles
- aciers avec une résistance jusqu'à 1000 N/mm²
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,80	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,70	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,65	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,55	80,000	16,000	30,000
M 8	1,250	8,000	6,200	7,40	90,000	17,000	35,000
M10	1,500	10,000	8,000	9,30	100,000	20,000	39,000

Tarauds à refouler

Tarauds à refouler avec rainures de lubr. p. filetage métrique ISO



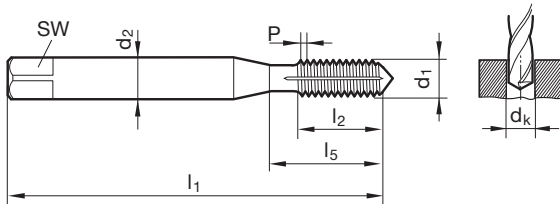
Référence **53621**

Durativ	~DIN 371	C	HSS-E- PM	AlCrN	R	6GX
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P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- pour les profondeurs de filetages très profonds
- pour applications universelles
- aciers avec une résistance jusqu'à 1000 N/mm²
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,80	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,70	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,65	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,55	80,000	16,000	30,000
M 8	1,250	8,000	6,200	7,40	90,000	17,000	35,000
M10	1,500	10,000	8,000	9,30	100,000	20,000	39,000

Tarauds à refouler

Tarauds à refouler avec rainures de lubr. p. filetage métrique ISO



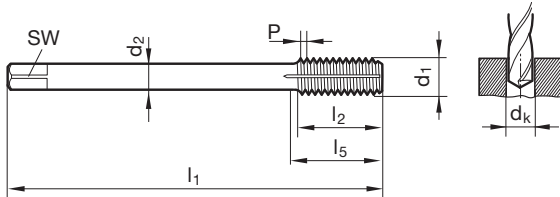
Référence **53622**

Durativ	~DIN 376	C	HSS-E- PM	AlCrN	R	6HX
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P	M	K	N	S	H
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Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- pour les profondeurs de filetages très profonds
- pour applications universelles
- aciers avec une résistance jusqu'à 1000 N/mm²
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M12	1,750	9,000	7,000	11,20	110,000	24,000	49,000
M14	2,000	11,000	9,000	13,10	110,000	26,000	53,000
M16	2,000	12,000	9,000	15,10	110,000	26,000	54,000
M20	2,500	16,000	12,000	18,90	140,000	32,000	62,000

Tarauds à refouler

Tarauds à refouler à canaux de lubrif. métr. ISO



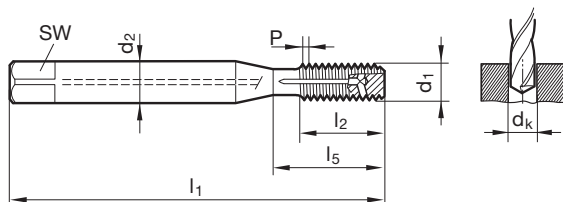
Référence **63013**

Durativ	~DIN 371	C	VHM	TiCN	R	6HX
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P	M	K	N	S	H
•	•		•		

Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- pour les profondeurs de filetages très profonds
- pour applications universelles
- aciers avec une résistance jusqu'à 1000 N/mm²
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



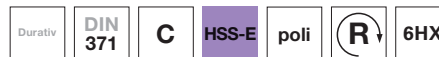
d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	3,500	2,700	2,80	56,000	6,000	18,000
M 4	0,700	4,500	3,400	3,70	63,000	7,500	21,000
M 5	0,800	6,000	4,900	4,65	70,000	8,500	25,000
M 6	1,000	6,000	4,900	5,55	80,000	11,000	30,000
M 8	1,250	8,000	6,200	7,40	90,000	14,000	35,000
M10	1,500	10,000	8,000	9,30	100,000	16,000	39,000

Tarauds à refouler

Tarauds à refouler sans rainures de lubr. p. filetage métrique ISO



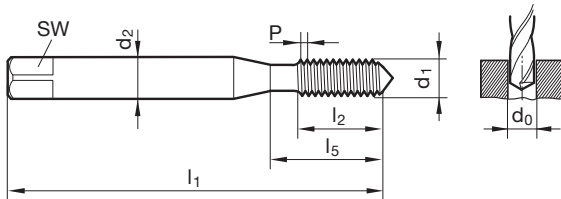
Référence **73121**



P	M	K	N	S	H
•	•		•		

Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- pour les profondeurs de filetages très profonds
- pour applications universelles
- aciers avec une résistance jusqu'à 1000 N/mm²
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 2	0,400	2,800	2,100	1,85	45,000	8,000	13,500
M 2,2	0,450	2,800	2,100	2,03	45,000	9,000	14,500
M 2,3	0,400	2,800	2,100	2,10	45,000	9,000	14,500
M 2,5	0,450	2,800	2,100	2,30	50,000	9,000	14,500
M 3	0,500	3,500	2,700	2,80	56,000	10,000	18,000
M 3,5	0,600	4,000	3,000	3,25	56,000	12,000	20,000
M 4	0,700	4,500	3,400	3,70	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,65	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,55	80,000	16,000	30,000
M 8	1,250	8,000	6,200	7,40	90,000	17,000	35,000
M 10	1,500	10,000	8,000	9,30	100,000	20,000	39,000

Tarauts à refouler

Tarauts à refouler sans rainures de lubr. p. filetage métrique ISO



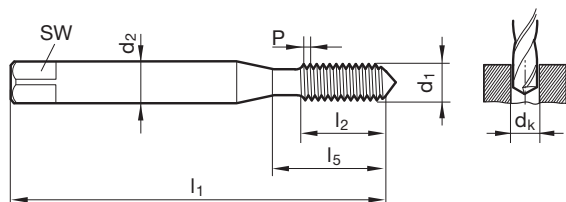
Référence **63121**



P	M	K	N	S	H
•	•		•		

Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- pour les profondeurs de filetages très profonds
- pour applications universelles
- aciers avec une résistance jusqu'à 1000 N/mm²
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 2	0,400	2,800	2,100	1,85	45,000	8,000	13,500
M 3	0,500	3,500	2,700	2,80	56,000	10,000	18,000
M 4	0,700	4,500	3,400	3,70	63,000	12,000	21,000
M 5	0,800	6,000	4,900	4,65	70,000	14,000	25,000
M 6	1,000	6,000	4,900	5,55	80,000	16,000	30,000
M 8	1,250	8,000	6,200	7,40	90,000	17,000	35,000
M10	1,500	10,000	8,000	9,30	100,000	20,000	39,000

Tarauds à refouler

Tarauds à refouler sans rainures de lubr. p. filetage métrique ISO



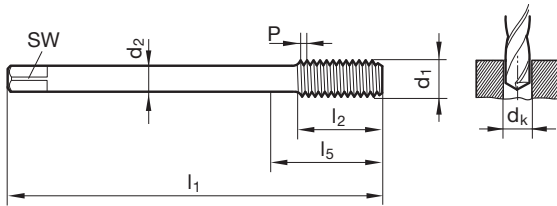
Référence **63123**

Durativ	~DIN 376	C	HSS-E	TiN	R	6HX
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P	M	K	N	S	H
•	•		•		

Conseils d'util.,
page 348

- pour trous débouchant et borgnes
- pour les profondeurs de filetages très profonds
- pour applications universelles
- aciers avec une résistance jusqu'à 1000 N/mm²
- aciers inoxydables, inaltérables aux acides
- matériaux tenaces à copeaux longs



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M12	1,750	9,000	7,000	11,20	110,000	24,000	49,000
M16	2,000	12,000	9,000	15,10	110,000	26,000	54,000
M20	2,500	16,000	12,000	18,90	140,000	32,000	62,000

Fraises à fileter

Fraises à fileter avec chanfrein p. filetage métrique ISO



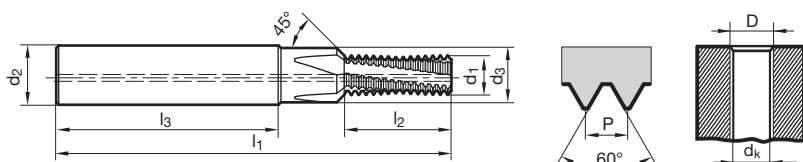
Référence **73810**



P	M	K	N	S	H
•	•	•	•	•	

Conseils d'util.,
page 348

- fraise à fileter avec chanfrein à 45°, à goujures hélicoïdales et adduction intérieure du produit de lubrification / refroidissement, avec sortie axiale
- pour applications universelles



N° de code	D	P mm	d1 mm	d2 mm	d3 mm	dk mm	l1 mm	l2 mm	l3 mm	Z
3,000	M 3	0,500	2,300	6,000	3,400	2,50	48,000	6,800	36,000	3
4,000	M 4	0,700	3,000	6,000	4,500	3,30	48,000	8,800	36,000	3
5,000	M 5	0,800	4,000	6,000	5,500	4,20	54,000	10,800	36,000	3
6,000	M 6	1,000	4,800	8,000	6,600	5,00	62,000	13,500	36,000	3
8,000	M 8	1,250	6,400	10,000	9,000	6,80	74,000	18,100	40,000	3
10,000	M10	1,500	7,950	12,000	11,000	8,50	80,000	21,800	45,000	4
12,000	M12	1,750	9,950	14,000	13,500	10,20	90,000	25,400	45,000	4
14,000	M14	2,000	11,200	16,000	15,500	12,00	102,000	31,000	48,000	4
16,000	M16	2,000	12,800	18,000	17,500	14,00	102,000	35,000	48,000	4
20,000	M20	2,500	14,500	20,000	21,500	17,50	125,000	41,300	50,000	4

Fraises à fileter

Fraises à fileter avec chanfrein p. filetage métrique ISO



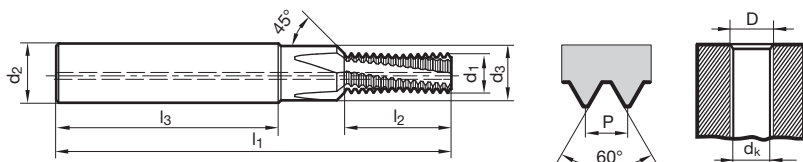
Référence **53810**



P	M	K	N	S	H
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Conseils d'util.,
page 348

- fraise à fileter avec chanfrein à 45°, à goujures hélicoïdales et adduction intérieure du produit de lubrification / refroidissement, avec sortie axiale
- utilisation universelle



N° de code	D	P mm	d1 mm	d2 mm	d3 mm	dk mm	l1 mm	l2 mm	l3 mm	Z
3,000	M 3	0,500	2,300	6,000	3,400	2,50	48,000	6,800	36,000	3
4,000	M 4	0,700	3,000	6,000	4,500	3,30	48,000	8,800	36,000	3
5,000	M 5	0,800	4,000	6,000	5,500	4,20	54,000	10,800	36,000	3
6,000	M 6	1,000	4,800	8,000	6,600	5,00	62,000	13,500	36,000	3
8,000	M 8	1,250	6,400	10,000	9,000	6,80	74,000	18,100	40,000	3
10,000	M10	1,500	7,950	12,000	11,000	8,50	80,000	21,800	45,000	4
12,000	M12	1,750	9,950	14,000	13,500	10,20	90,000	25,400	45,000	4
14,000	M14	2,000	11,200	16,000	15,500	12,00	102,000	31,000	48,000	4
16,000	M16	2,000	12,800	18,000	17,500	14,00	102,000	35,000	48,000	4
20,000	M20	2,500	14,500	20,000	21,500	17,50	125,000	41,300	50,000	4

Fraises à fileter

Fraises à fileter avec chanfrein p. filetage métrique ISO fin



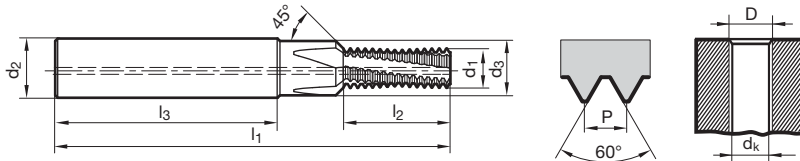
Référence **53820**



P	M	K	N	S	H
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Conseils d'util.,
page 348

- fraise à fileter avec chanfrein à 45°, à goujures hélicoïdales et adduction intérieure du produit de lubrification / refroidissement, avec sortie axiale
- utilisation universelle



N° de code	D	d1 mm	d2 mm	d3 mm	dk mm	l1 mm	l2 mm	l3 mm	Z
4,003	M 4 X0,5	3,000	6,000	4,500	3,50	48,000	8,800	36,000	3
5,003	M 5 X0,5	4,000	6,000	5,500	4,50	54,000	10,800	36,000	3
6,003	M 6 X0,5	4,800	8,000	6,600	5,50	62,000	12,800	36,000	3
6,004	M 6 X0,75	4,800	8,000	6,600	5,20	62,000	13,100	36,000	3
8,004	M 8 X0,75	6,400	10,000	9,000	7,20	74,000	16,900	40,000	3
8,005	M 8 X1	6,400	10,000	9,000	7,00	74,000	17,500	40,000	3
10,005	M10 X1	7,950	12,000	11,000	9,00	80,000	21,500	45,000	4
10,006	M10 X1,25	7,950	12,000	11,000	8,80	80,000	21,900	45,000	4
12,005	M12 X1	9,950	14,000	13,500	11,00	90,000	25,500	45,000	4
12,007	M12 X1,5	9,950	14,000	13,500	10,50	90,000	26,300	45,000	4
14,007	M14 X1,5	11,200	16,000	15,500	12,50	102,000	30,800	48,000	4
16,007	M16 X1,5	12,800	18,000	17,500	14,50	102,000	33,800	48,000	4

Fraises à fileter

Fraises à fileter avec chanfrein p. filetage métrique ISO fin



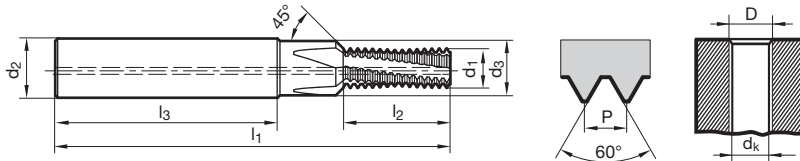
Référence **73820**



P	M	K	N	S	H
•	•	•	•	•	

Conseils d'util.,
page 348

- fraise à fileter avec chanfrein à 45°, à goujures hélicoïdales et adduction intérieure du produit de lubrification / refroidissement, avec sortie axiale
- utilisation universelle



N° de code	D	d1 mm	d2 mm	d3 mm	dk mm	l1 mm	l2 mm	l3 mm	Z
4,003	M 4 X0,5	3,000	6,000	4,500	3,50	48,000	8,800	36,000	3
5,003	M 5 X0,5	4,000	6,000	5,500	4,50	54,000	10,800	36,000	3
6,003	M 6 X0,5	4,800	8,000	6,600	5,50	62,000	12,800	36,000	3
6,004	M 6 X0,75	4,800	8,000	6,600	5,20	62,000	13,100	36,000	3
8,004	M 8 X0,75	6,400	10,000	9,000	7,20	74,000	16,900	40,000	3
8,005	M 8 X1	6,400	10,000	9,000	7,00	74,000	17,500	40,000	3
10,005	M10 X1	7,950	12,000	11,000	9,00	80,000	21,500	45,000	4
10,006	M10 X1,25	7,950	12,000	11,000	8,80	80,000	21,900	45,000	4
12,005	M12 X1	9,950	14,000	13,500	11,00	90,000	25,500	45,000	4
12,007	M12 X1,5	9,950	14,000	13,500	10,50	90,000	26,300	45,000	4
14,007	M14 X1,5	11,200	16,000	15,500	12,50	102,000	30,800	48,000	4
16,007	M16 X1,5	12,800	18,000	17,500	14,50	102,000	33,800	48,000	4

Fraises à fileter

Fraises à fileter sans chanfrein p. filetage métrique ISO



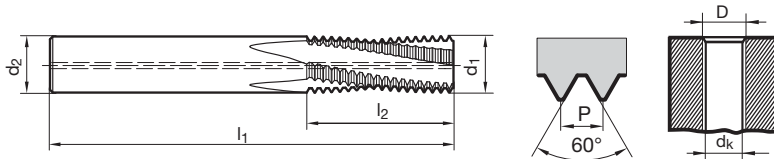
Référence **73830**



P	M	K	N	S	H
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Conseils d'util.,
page 348

- fraise à fileter sans chanfrein, à goujures hélicoïdales et adduction intérieure du produit de lubrification / refroidissement, avec sortie axiale
- utilisation universelle



N° de code	d1	P	d1	d2	dk	l1	l2	Z
		mm	mm	mm	mm	mm	mm	
6,000	M 6	1,000	4,800	6,000	5,00	54,000	13,500	3
8,000	M 8	1,250	6,400	8,000	6,80	62,000	18,100	3
8,005	M 8 X1	1,000	6,400	8,000	7,00	62,000	14,500	3
10,000	M10	1,500	7,950	10,000	8,50	74,000	21,800	3
10,005	M10 X1	1,000	7,950	10,000	9,00	74,000	14,500	3
10,006	M10 X1,25	1,250	7,950	10,000	8,80	74,000	18,100	3
12,000	M12	1,750	9,950	10,000	10,20	74,000	25,400	4
14,000	M14	2,000	11,200	12,000	12,00	90,000	31,000	4
14,007	M14 X1,5	1,500	11,200	12,000	12,50	90,000	23,300	4
16,000	M16	2,000	12,800	14,000	14,00	90,000	35,000	4
16,007	M16 X1,5	1,500	12,800	14,000	14,50	90,000	26,300	4
20,000	M20	2,500	14,950	16,000	17,50	102,000	41,300	4
20,007	M20 X1,5	1,500	14,950	16,000	18,50	102,000	24,800	4

Fraises à fileter

Fraises à fileter sans chanfrein p. filetage métrique ISO



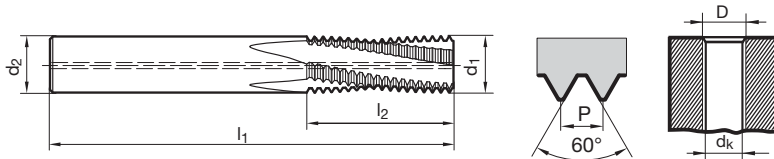
Référence **53830**



P	M	K	N	S	H
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Conseils d'util.,
page 348

- fraise à fileter sans chanfrein, à goujures hélicoïdales et adduction intérieure du produit de lubrification / refroidissement, avec sortie axiale
- utilisation universelle



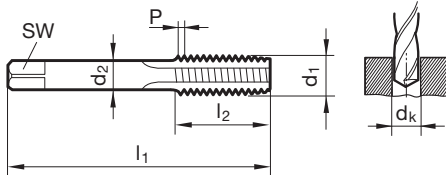
N° de code	d1	P	d1	d2	dk	l1	l2	Z
		mm	mm	mm	mm	mm	mm	
6,000	M 6	1,000	4,800	6,000	5,00	54,000	13,500	3
8,000	M 8	1,250	6,400	8,000	6,80	62,000	18,100	3
8,005	M 8 X1	1,000	6,400	8,000	7,00	62,000	14,500	3
10,000	M10	1,500	7,950	10,000	8,50	74,000	21,800	3
10,005	M10 X1	1,000	7,950	10,000	9,00	74,000	14,500	3
10,006	M10 X1,25	1,250	7,950	10,000	8,80	74,000	18,100	3
12,000	M12	1,750	9,950	10,000	10,20	74,000	25,400	4
14,000	M14	2,000	11,200	12,000	12,00	90,000	31,000	4
14,007	M14 X1,5	1,500	11,200	12,000	12,50	90,000	23,300	4
16,000	M16	2,000	12,800	14,000	14,00	90,000	35,000	4
16,007	M16 X1,5	1,500	12,800	14,000	14,50	90,000	26,300	4
20,000	M20	2,500	14,950	16,000	17,50	102,000	41,300	4
20,007	M20 X1,5	1,500	14,950	16,000	18,50	102,000	24,800	4

Tarauts à main

Tarauts à main pour filetages métriques ISO, jeu(x), coupe à droite



Référence **73531**



P	M	K	N	S	H
●	○	●	●		

Conseils d'util.,
page 358

- Pour trous débouchant et borgnes
- Jeu de tarauds, goujures droites, spécialement pour utilisation manuelle, mais également utilisables sur machines
- Le taraud d'ébauche et le taraud intermédiaire sont échelonnés en Ø extérieur et diamètre sur flanc.
- Le taraud de finition peut également être utilisé comme taraud machine court.
- Taraud d'ébauche 73101
- Taraud intermédiaire 73102
- Taraud de finition 73103

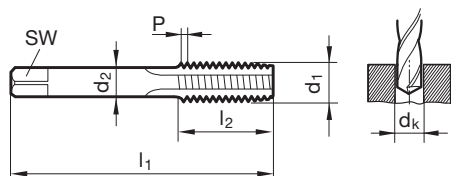
d1	P	d2	SW	dk	l1	l2
	mm	mm	mm	mm	mm	mm
M 1	0,250	2,500	2,100	0,75	32,000	5,500
M 1,2	0,250	2,500	2,100	0,95	32,000	5,500
M 1,4	0,300	2,500	2,100	1,10	32,000	7,000
M 1,6	0,350	2,500	2,100	1,25	32,000	8,000
M 1,7	0,350	2,500	2,100	1,35	32,000	8,000
M 2	0,400	2,800	2,100	1,60	36,000	8,000
M 2,3	0,400	2,800	2,100	1,90	36,000	9,000
M 2,5	0,450	2,800	2,100	2,05	40,000	9,000
M 2,6	0,450	2,800	2,100	2,15	40,000	9,000
M 3	0,500	3,500	2,700	2,50	40,000	10,000
M 3,5	0,600	4,000	3,000	2,90	45,000	12,000
M 4	0,700	4,500	3,400	3,30	45,000	12,000
M 4,5	0,750	6,000	4,900	3,70	50,000	14,000
M 5	0,800	6,000	4,900	4,20	50,000	14,000
M 6	1,000	6,000	4,900	5,00	56,000	16,000
M 7	1,000	6,000	4,900	6,00	56,000	16,000
M 8	1,250	6,000	4,900	6,80	63,000	17,000
M10	1,500	7,000	5,500	8,50	70,000	20,000
M12	1,750	9,000	7,000	10,20	75,000	24,000
M14	2,000	11,000	9,000	12,00	80,000	26,000
M16	2,000	12,000	9,000	14,00	80,000	26,000
M18	2,500	14,000	11,000	15,50	95,000	30,000
M20	2,500	16,000	12,000	17,50	95,000	32,000
M24	3,000	18,000	14,500	21,00	110,000	36,000

Tarauts à main

Tarauts à main pour filetages métriques ISO, jeu(x), coupe à gauche



Référence **73532**



P	M	K	N	S	H
●	○	●	●		

Conseils d'util.,
page 358

- Pour trous débouchant et borgnes
- Jeu de tarauds, goujures droites, spécialement pour utilisation manuelle, mais également utilisables sur machines
- Le taraud d'ébauche et le taraud intermédiaire sont échelonnés en Ø extérieur et diamètre sur flanc.
- Le taraud de finition peut également être utilisé comme taraud machine court.
- Taraud d'ébauche 73105
- Taraud intermédiaire 73106
- Taraud de finition 73107

d1	P	d2	SW	dk	l1	l2
	mm	mm	mm	mm	mm	mm
M 4	0,700	4,500	3,400	3,30	45,000	12,000
M 5	0,800	6,000	4,900	4,20	50,000	14,000
M 6	1,000	6,000	4,900	5,00	56,000	16,000
M 8	1,250	6,000	4,900	6,80	63,000	17,000
M10	1,500	7,000	5,500	8,50	70,000	20,000
M12	1,750	9,000	7,000	10,20	75,000	24,000
M14	2,000	11,000	9,000	12,00	80,000	26,000
M16	2,000	12,000	9,000	14,00	80,000	26,000

Tarauts à main

Jeux de tarauds à main pour filetages métriques ISO fins

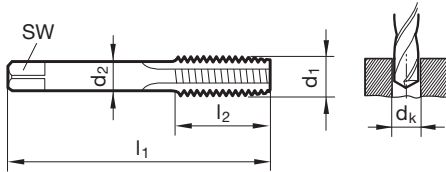


P	M	K	N	S	H
●	○	●	●		

Conseils d'util.,
page 358

Référence **73521**

- Pour trous débouchant et borgnes
- Jeu de tarauds, goujures droites, spécialement pour utilisation manuelle, mais également utilisables sur machines
- Le taraud de finition peut également être utilisé comme taraud machine court.
- Taraud d'ébauche 73110
- Taraud de finition 73111



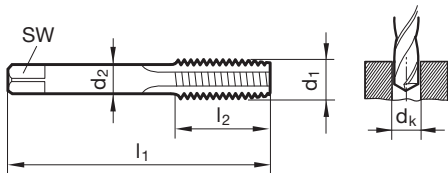
N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm
5,003	M 5 X0,5	6,000	4,900	4,50	50,000	11,000
6,003	M 6 X0,5	6,000	4,900	5,50	56,000	12,000
6,004	M 6 X0,75	6,000	4,900	5,20	56,000	12,000
8,004	M 8 X0,75	6,000	4,900	7,20	56,000	14,000
8,005	M 8 X1	6,000	4,900	7,00	63,000	17,000
10,005	M10 X1	7,000	5,500	9,00	63,000	16,000
10,006	M10 X1,25	7,000	5,500	8,80	63,000	20,000
11,005	M11 X1	8,000	6,200	10,00	63,000	18,000
12,005	M12 X1	9,000	7,000	11,00	70,000	20,000
16,007	M16 X1,5	12,000	9,000	14,50	70,000	20,000
18,007	M18 X1,5	14,000	11,000	16,50	80,000	22,000

Tarauts à main

Jeux de tarauds à main pour filetages UNC



Référence **73535**



P	M	K	N	S	H
•	○	•	•		

Conseils d'util.,
page 358

- Pour trous débouchant et borgnes
- Jeu de tarauds, goujures droites, spécialement pour utilisation manuelle, mais également utilisables sur machines
- Le taraud d'ébauche et le taraud intermédiaire sont échelonnés en Ø extérieur et diamètre sur flanc.
- Le taraud de finition peut également être utilisé comme taraud machine court.
- Taraud d'ébauche 73301
- Taraud intermédiaire 73302
- Taraud de finition 73303

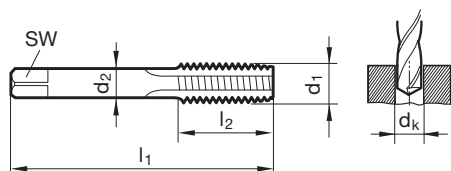
N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm
2,845	4 -40	3,500	2,700	2,35	40,000	11,000
3,175	5 -40	4,000	2,700	2,65	40,000	11,000
3,505	6 -32	4,000	3,000	2,85	45,000	12,000
4,166	8 -32	4,500	3,400	3,50	45,000	12,000
4,826	10 -24	6,000	4,900	3,90	50,000	14,000
6,350	1/4 -20	6,000	4,900	5,10	56,000	16,000
7,938	5/16 -18	6,000	4,900	6,60	63,000	18,000
9,525	3/8 -16	7,000	5,500	8,00	70,000	20,000
11,113	7/16 -14	8,000	6,200	9,40	70,000	22,000
12,700	1/2 -13	9,000	7,000	10,80	75,000	25,000
15,875	5/8 -11	12,000	9,000	13,50	80,000	30,000
19,050	3/4 -10	16,000	11,000	16,50	95,000	33,000

Tarauts à main

Jeux de tarauds à main pour filetages BSW



Référence **73534**



P	M	K	N	S	H
•	○	•	•		

Conseils d'util.,
page 358

- Pour trous débouchant et borgnes
- Jeu de tarauds, goujures droites, spécialement pour utilisation manuelle, mais également utilisables sur machines
- Le taraud d'ébauche et le taraud intermédiaire sont échelonnés en Ø extérieur et diamètre sur flanc.
- Le taraud de finition peut également être utilisé comme taraud machine court.
- Taraud d'ébauche 73311
- Taraud intermédiaire 73312
- Taraud de finition 73313

N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm
3,175	W 1/8	4,000	2,700	2,50	40,000	11,000
3,969	W 5/32	4,500	3,400	3,20	45,000	12,000
4,762	W 3/16	6,000	4,900	3,60	50,000	14,000
6,350	W 1/4	6,000	4,900	5,10	56,000	16,000
7,938	W 5/16	6,000	4,900	6,50	63,000	18,000
9,525	W 3/8	7,000	5,500	7,90	70,000	20,000
11,113	W 7/16	8,000	6,200	9,20	70,000	22,000
12,700	W 1/2	9,000	7,000	10,50	75,000	25,000
14,287	W 9/16	11,000	9,000	12,00	80,000	28,000
15,876	W 5/8	12,000	9,000	13,50	80,000	30,000
19,051	W 3/4	16,000	11,000	16,25	95,000	33,000

Tarauds à main

Jeux de tarauds à main pour filetages BSP

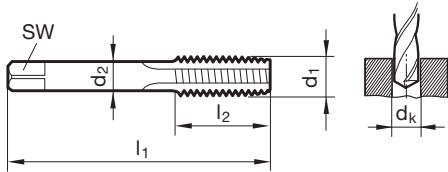


P	M	K	N	S	H
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Conseils d'util.,
page 358

Référence **73522**

- Pour trous débouchant et borgnes
- Jeu de tarauds, goujures droites, spécialement pour utilisation manuelle, mais également utilisables sur machines
- Le taraud de finition peut également être utilisé comme taraud machine court.
- Taraud d'ébauche 73315
- Taraud de finition 73316



N° de code	d1	d2 mm	SW mm	dk mm	l1 mm	l2 mm
9,728	G 1/8	7,000	5,500	8,80	63,000	18,000
13,157	G 1/4	11,000	9,000	11,80	70,000	20,000
16,662	G 3/8	12,000	9,000	15,25	70,000	20,000
20,955	G 1/2	16,000	12,000	19,00	80,000	22,000

Forets taraudeur machine

Forets taraudeur machine p.filetage métr. ISO

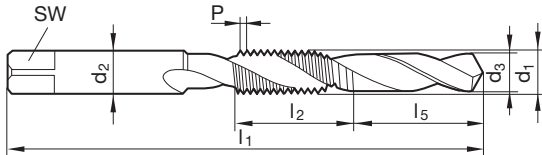


Référence 73248



P	M	K	N	S	H
●	○	●	●		

- pour trous débouchant
- aciers jusqu'à 800 N/mm²



d1	P	N° de code	d2	d3	SW	l1	l5	l2
	mm		mm	mm	mm	mm	mm	mm
M 3	0,500	3,000	3,500	2,500	2,700	62,000	11,000	12,000
M 4	0,700	4,000	4,500	3,300	3,400	66,000	10,000	16,000
M 5	0,800	5,000	6,000	4,200	4,900	75,000	12,000	18,000
M 6	1,000	6,000	6,000	5,000	4,900	81,000	14,000	20,000
M 8	1,250	8,000	6,000	6,800	4,900	93,000	20,000	12,000
M10	1,500	10,000	7,000	8,500	5,500	99,000	22,000	14,000
M12	1,750	12,000	9,000	10,200	7,000	106,000	25,000	16,000

Tarauts machine à l'enfilade

Tarauts machine à l'enfilade pour filetages métriques ISO

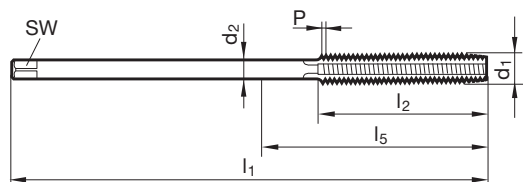


Référence **73243**



P	M	K	N	S	H
●	○	●	●		

- pour trous débouchant
- pour écrous avec une longueur de filetage jusqu'à 1 x D
- longueur de l'entrée environ 20 filets



d1	P mm	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l5 mm
M 3	0,500	2,200		2,50	70,000	22,000	30,000
M 3,5	0,600	2,500	2,100	2,90	80,000	25,000	31,000
M 4	0,700	2,800	2,100	3,30	90,000	25,000	33,000
M 5	0,800	3,500	2,700	4,20	100,000	28,000	38,000
M 6	1,000	4,500	3,400	5,00	110,000	32,000	44,000
M 8	1,250	6,000	4,900	6,80	125,000	40,000	61,000
M10	1,500	7,000	5,500	8,50	140,000	45,000	85,000
M12	1,750	9,000	7,000	10,20	180,000	50,000	120,000
M14	2,000	11,000	9,000	12,00	200,000	56,000	130,000
M16	2,000	12,000	9,000	14,00	200,000	63,000	145,000
M18	2,500	14,000	11,000	15,50	220,000	63,000	155,000

Filières

Filières pour filetage métrique ISO

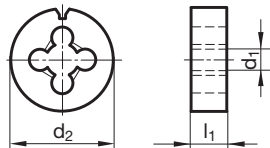


Référence 73400



P	M	K	N	S	H
•	○		•		

• usinage en général



d1	P mm	d2 mm	l1 mm	Ø pièce à usiner mm	N° de code
M 1	0,250	16,000	5,000	0,970	1,000
M 1,2	0,250	16,000	5,000	1,170	1,200
M 2,2	0,450	16,000	5,000	2,130	2,200
M 2,3	0,400	16,000	5,000	2,250	2,300
M 3	0,500	20,000	5,000	2,920	3,000
M 3,5	0,600	20,000	5,000	3,410	3,500
M 4	0,700	20,000	5,000	3,910	4,000
M 5	0,800	20,000	7,000	4,900	5,000
M 6	1,000	20,000	7,000	5,880	6,000
M 7	1,000	25,000	9,000	6,880	7,000
M 8	1,250	25,000	9,000	7,870	8,000
M10	1,500	30,000	11,000	9,850	10,000
M12	1,750	38,000	14,000	11,830	12,000
M14	2,000	38,000	14,000	13,820	14,000
M16	2,000	45,000	18,000	15,820	16,000
M18	2,500	45,000	18,000	17,790	18,000
M20	2,500	45,000	18,000	19,790	20,000
M24	3,000	55,000	22,000	23,770	24,000
M30	3,500	65,000	25,000	29,730	30,000

Filières

Filières pour filetage métrique ISO

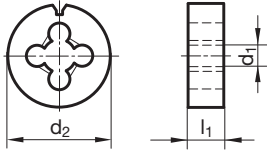


Référence **73410**



P	M	K	N	S	H
•		○	•		

- version rodée pour les non - ferreux
- usinage en général



d1	P	d2	l1	Ø pièce à usiner	N° de code
	mm	mm	mm	mm	
M 3	0,500	20,000	5,000	2,920	3,000
M 4	0,700	20,000	5,000	3,910	4,000
M 6	1,000	20,000	7,000	5,880	6,000
M 8	1,250	25,000	9,000	7,870	8,000
M10	1,500	30,000	11,000	9,850	10,000
M12	1,750	38,000	14,000	11,830	12,000
M14	2,000	38,000	14,000	13,820	14,000
M18	2,500	45,000	18,000	17,790	18,000

Filières

Filières pour filetage métrique ISO

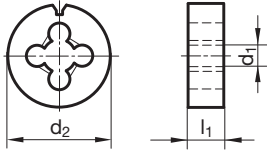


Référence **73413**



P	M	K	N	S	H
•	•		•		

- version rodée pour les non - ferreux
- usinage en général



d1	P mm	d2 mm	l1 mm	Ø pièce à usiner mm	N° de code
M 2,5	0,450	16,000	5,000	2,430	2,500
M 3	0,500	20,000	5,000	2,920	3,020
M 4	0,700	20,000	5,000	3,910	4,020
M 5	0,800	20,000	7,000	4,900	5,000
M 6	1,000	20,000	7,000	5,880	6,000
M 8	1,250	25,000	9,000	7,870	8,000
M10	1,500	30,000	11,000	9,850	10,000
M12	1,750	38,000	14,000	11,830	12,000
M14	2,000	38,000	14,000	13,820	14,000
M16	2,000	45,000	18,000	15,820	16,000
M20	2,500	45,000	18,000	19,790	20,000





OUTILS DE FRAISAGE

SUPER F-UT



ISO-CODES

P	Aciers communs, aciers hautement alliés
M	Aciers inoxydables
K	Fontes grises, fontes à graphite sphéroïdal et fontes malléables
N	Aluminium et ses alliages ainsi que d'autres métaux non ferreux
S	Alliages de titane, spéciaux et superalliages
H	Aciers trempés et fontes dures

Sur les pages suivantes prix et programmes, sont mentionnées pour chacune des fraises, les recommandations d'utilisation pour chacun des groupes d'usinage par enlèvement de copeaux :

- particulièrement recommandé
- sous réserve



PICTOGRAMMES

MATIERE DE COUPE	VHM									
	CW monobloc									
REVETEMENT	poli	AlTiN nano	TiAl-SiN	TiAlN	Al-TiN+					
TOLERANCE	h10	e8								
CONDITIONS DE FRAISAGE										
SENS DE COUPE										
	à droite									
FORME D'ATTACHEMENT										
ANGLE D'HELICE										
NORME										
	Norme usine									
TYPE										

P	M	K	N	S	H	Type	Forme d'attachement	Angle d'hélice °	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Fraises SuperF-UT NX

	•	•	•	•	•	SuperF-UT NX	HA	36/38/37	CW monobloc	TiAlSiN	DIN 6527L	4,000 - 20,000	54590	518
	•	•	•	•	•	SuperF-UT NX	HB	36/38/37	CW monobloc	TiAlSiN	DIN 6527L	4,000 - 20,000	54591	519

Fraises N SuperF-UT

	•	•	•	•	•	SuperF-UT N	HB	35/38	CW monobloc	TiAlN	DIN 6527K	6,000 - 20,000	64550	520
	•	•	•	•	•	SuperF-UT N	HA	35/38	CW monobloc	TiAlN	DIN 6527L	4,000 - 20,000	54551	521
	•	•	•	•	•	SuperF-UT N	HB	35/38	CW monobloc	TiAlN	DIN 6527L	4,000 - 25,000	64551	522
	•	•	•	•	•	SuperF-UT N	HA	35/38	CW monobloc	TiAlN	Norme usine	6,000 - 20,000	54562	523
	•	•	•	•	•	SuperF-UT N	HB	35/38	CW monobloc	TiAlN	Norme usine	6,000 - 20,000	54563	524
	•	•	•	•	•	SuperF-UT N	HA	35/38	CW monobloc	TiAlN	Norme usine	10,000 - 25,000	54552	525
	•	•	•	•	•	SuperF-UT N-F	HA	30/32	CW monobloc	TiAlN	DIN 6527L	6,000 - 25,000	54566	526
	•	•	•	•	•	SuperF-UT N-F	HB	30/32	CW monobloc	TiAlN	DIN 6527L	6,000 - 25,000	54567	527
	•	•	•	•	•	SuperF-UT N-3	HA	41/43/45	CW monobloc	TiAlN	Norme usine	3,000 - 20,000	54564	528
	•	•	•	•	•	SuperF-UT N-3	HB	41/43/45	CW monobloc	TiAlN	Norme usine	3,000 - 20,000	54565	529
	•	•	•	•	•	SuperF-UT N-5	HA	45	CW monobloc	TiAlN	Norme usine	4,000 - 20,000	54579	530
	•	•	•	•	•	SuperF-UT N-5	HB	45	CW monobloc	TiAlN	Norme usine	4,000 - 20,000	54580	531

P	M	K	N	S	H	Type	Forme d'attachement	Angle d'hélice °	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Fraises FS SuperF-UT

		SuperF-UT FS	HA	44/45/46	CW monobloc	TiAlN	Norme usine	8,000 - 25,000	64558	552
		SuperF-UT FS	HB	44/45/46	CW monobloc	TiAlN	Norme usine	8,000 - 25,000	64559	553

Fraises Ti SuperF-UT

		SuperF-UT Ti	HA	35/38	CW monobloc	AlTiN+	DIN 6527L	6,000 - 20,000	54560	532
		SuperF-UT Ti	HB	35/38	CW monobloc	AlTiN+	DIN 6527L	6,000 - 20,000	54561	533

Fraises H SuperF-UT

		SuperF-UT H	HA	40/42	CW monobloc	TiAlSiN	DIN 6527L	6,000 - 20,000	54572	550
		SuperF-UT H	HB	40/42	CW monobloc	TiAlSiN	DIN 6527L	6,000 - 20,000	54573	551

Fraises VA-X SuperF-UT

		SuperF-UT VA-X	HB	36/38	CW monobloc	AlTiN nano	DIN 6527K	4,000 - 20,000	54576	534
		SuperF-UT VA-X	HA	36/38	CW monobloc	AlTiN nano	DIN 6527L	3,000 - 25,000	54558	535
		SuperF-UT VA-X	HB	36/38	CW monobloc	AlTiN nano	DIN 6527L	3,000 - 25,000	54559	536
		SuperF-UT VA-X IK	HA	36/38	CW monobloc	AlTiN nano	DIN 6527L	6,000 - 25,000	54574	537
		SuperF-UT VA-X IK	HB	36/38	CW monobloc	AlTiN nano	DIN 6527L	6,000 - 25,000	54575	538
		SuperF-UT VA-XF	HA	36/38	CW monobloc	AlTiN nano	DIN 6527L	6,000 - 25,000	54568	539

P	M	K	N	S	H	Type	Forme d'attachement	Angle d'hélice °	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Fraises VA-X SuperF-UT

	•			•		SuperF-UT VA-XF	HB	36/38	CW monobloc	AlTiN nano	DIN 6527L	6,000 - 25,000	54569	540
	•	○		○		SuperF-UT S	HA	40/42	CW monobloc	AlTiN nano	DIN 6527L	4,000 - 20,000	54556	541
	•	○		○		SuperF-UT VA	HB	40/42	CW monobloc	TiAlN	DIN 6527L	4,000 - 20,000	64557	542
	•	○		○		SuperF-UT VA-1K	HB	40/42	CW monobloc	TiAlN	DIN 6527L	6,000 - 20,000	64567	543

Fraises SuperF-UT Al

			•			SuperF-UT Al	HA	40/42	CW monobloc	poli	DIN 6527L	4,000 - 20,000	74554	544
			•			SuperF-UT Al	HB	40/42	CW monobloc	poli	DIN 6527L	4,000 - 20,000	74555	545
			•			SuperF-UT Al-F	HA	29/30/31	CW monobloc	poli	Norme usine	6,000 - 25,000	54570	546
			•			SuperF-UT Al-F	HB	29/30/31	CW monobloc	poli	Norme usine	6,000 - 25,000	54571	547
			•			SuperF-UT Al-3	HA	39/40/41	CW monobloc	poli	Norme usine	3,000 - 20,000	74552	548
			•			SuperF-UT Al-3	HB	39/40/41	CW monobloc	poli	Norme usine	3,000 - 20,000	74553	549

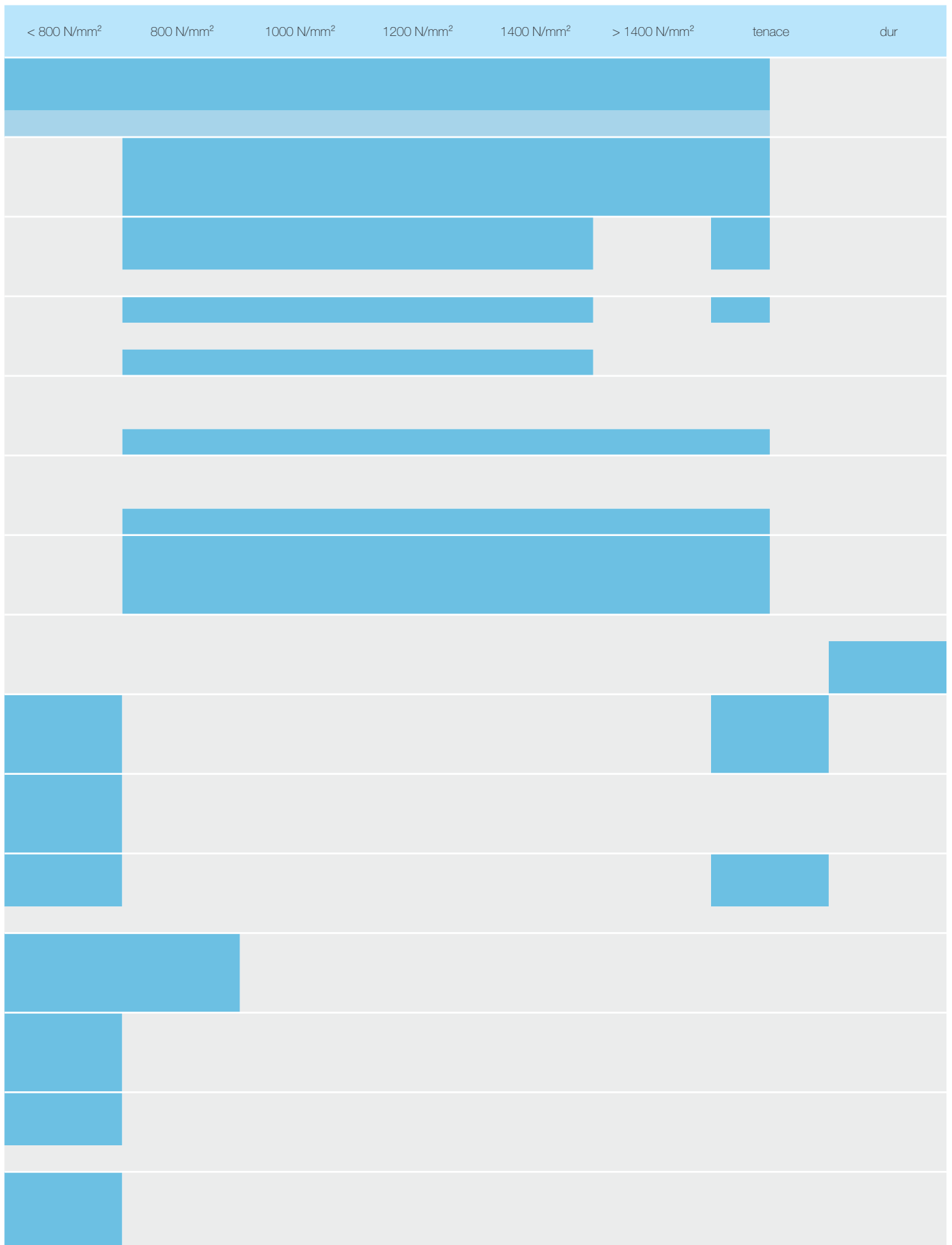
Application

Classement selon les matières

Type	Référence	Application	Métaux non ferreux, Aluminium	Aciers	GG, GGG	Aciers inoxydables/ résistants à l'acide	Nickel, alliages de Ti	Aciers trempés
SuperF-UT NX	54590 54591	Rainurage		optimale				
		Ebauche		optimale				
		Finition		bien adapté				
SuperF-UT N	64550 54551 54562 54563 54552	Rainurage		bien adapté			bien adapté	
		Ebauche		optimale			bien adapté	
		Finition		optimale			bien adapté	
				optimale			bien adapté	
SuperF-UT N-F	54566 54567	Rainurage		optimale			bien adapté	
		Ebauche		optimale			bien adapté	
		Finition		bien adapté			bien adapté	
SuperF-UT N-3	54564 54565	Rainurage	optimale					
		Ebauche	optimale					
		Finition	bien adapté					
SuperF-UT N-5	54579 54580	Rainurage		optimale				
		Ebauche		optimale				
		Finition		optimale				
SuperF-UT FS	64558 64559	Rainurage		optimale				
		Ebauche		optimale				
		Finition		optimale				
SuperF-UT Ti	54560 54561	Rainurage		bien adapté			optimale	
		Ebauche		bien adapté			optimale	
		Finition		bien adapté			optimale	
SuperF-UT H	54572 54573	Rainurage		optimale				
		Ebauche		optimale				
		Finition		optimale				
SuperF-UT VA-X	54576 54558 54559	Rainurage		bien adapté		bien adapté		
		Ebauche		bien adapté		bien adapté		
		Finition		bien adapté		bien adapté		
SuperF-UT VA-X IK	54574 54575	Rainurage		bien adapté		bien adapté		
		Ebauche		bien adapté		bien adapté		
		Finition		bien adapté		bien adapté		
SuperF-UT VA-XF	54568 54569	Rainurage		optimale		bien adapté		
		Ebauche		optimale		bien adapté		
		Finition		bien adapté		bien adapté		
SuperF-UT VA	54556 64557 64567	Rainurage		bien adapté		bien adapté		
		Ebauche		bien adapté		bien adapté		
		Finition		bien adapté		bien adapté		
SuperF-UT AI-3	74552 74553	Rainurage	optimale					
		Ebauche	optimale					
		Finition	optimale					
SuperF-UT AI-F	54570 54571	Rainurage	optimale					
		Ebauche	optimale					
		Finition	optimale					
SuperF-UT AI	74554 74555	Rainurage	bien adapté					
		Ebauche	bien adapté					
		Finition	optimale					

■ optimale ■ bien adapté

Classement selon la résistance



Conseils généraux d'utilisation

Les fraises Stock SuperF-UT sont conçues pour l'utilisation sous des conditions d'usinage optimales, c'est-à-dire

- haut débit de la machine
- bon refroidissement
- serrage stable de la pièce à usiner et de l'outil

Si ces conditions ne sont pas acquises, nous conseillons l'utilisation des fraises SuperF-UT avec le nouveau profil d'ébauche.

Pour l'usinage de matières d'acier (normalement SuperF-UT N) avec une fraise à bec rayonné, nous conseillons le SuperF-UT Ti, référence 54560 ou 54561.

Nous conseillons le fraisage en sens direct.

Fraisage axial :

- Réduire l'avance Vf (mm / mn)
- Pour les profondeurs > 0,5 x D ou lors du déplacement radial, prévoir des déburrages

Attention: Risque de casse lorsqu'il s'agit d'une augmentation brusque des efforts !

Fraisage en plan incliné à 15°, recommandé :

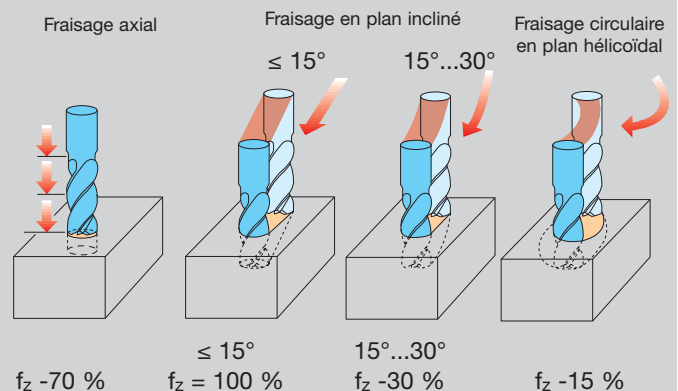
- Il n'est pas nécessaire de réduire l'avance

Fraisage en plan incliné de 15° à 30° :

- Réduire l'avance Vf (mm / mn) en fonction du graphique ci – joint

Plan incliné hélicoïdal :

- Lorsque le fraisage en profondeur est réalisé en plan incliné circulaire, nous recommandons d'augmenter la valeur axiale de 0,1 à 0,2 x D par tour
- Réduire l'avance Vf (mm / mn) en fonction du graphique ci – joint
- Choisir un diamètre de fraisage d'environ 1,8 x D de la fraise



Formules:

Tours par minute n [min⁻¹]

$$n = \frac{v_c \cdot 1000}{\pi \cdot D}$$

Avance par minute v_f [mm/min]

$$v_f = f_z \cdot n \cdot Z_c$$

f_z = Avance par dent [mm/Z]

Z_c = Nombre de dents

D = Diamètre d'outil [mm]

Volume de copeaux Q [mm³/min]

$$Q = \frac{a_p \cdot a_e \cdot v_f}{1000}$$

Couple M_c [Nm]

$$M_c = \frac{P_c \cdot 30 \cdot 10^3}{\pi \cdot n}$$

P_c = Schnittleistung (kW)

v_c = Vitesse de coupe [m/min]

a_p = Profondeur de passe [mm]

a_e = Largeur de passe [mm]

π = Pi



SUPER F-UT NX



RAMPE

Angle de plongée jusqu'à 45°
Evacuation optimale des copeaux

PERÇAGE

Excellentes propriétés de perçage jusqu'à 2xD
Supprime l'opération d'avant-trous
Outil idéal pour le perçage des avant-trous
d'alésage

RAINURAGE

Avances élevées en plongée et en rainurage
Taux d'enlèvement de copeaux élevé, les dimensions
des fraises permettent d'ajuster les largeurs des
rainures
Fraisage très stable assurant fiabilité du processus

EBAUCHER

Efforts de coupe amoindris, donc moins de puissance
absorbée
Jusqu'à 100% d'augmentation des vitesses de coupe
sur les aciers
Taux d'enlèvement de copeaux élevé

FINITION

Contournage avec d'excellents états de surface
Jusqu'à 100% d'augmentation des durée de vie
Paramètres de coupe plus élevés, aussi sur les aciers
alliés

Stratégie de fraisage HPC

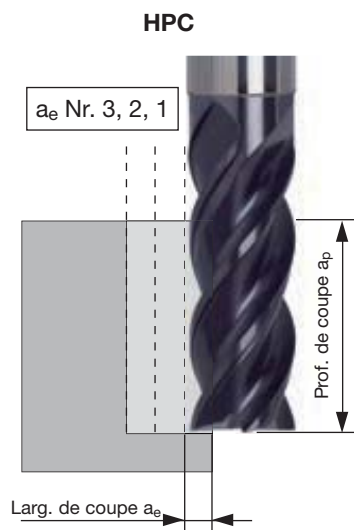
En fraisage, les « **Rendements de coupe Haute Performance** », (**High Performance Cutting / HPC**), permettent de réaliser un usinage avec des vitesses de coupe, des vitesses d'avance et des profondeurs de passes beaucoup plus importantes que celles prévues en usinage conventionnel.

Avantages:

- Grâce à une largeur de prise réduite, efforts de coupe amoindris ménageant outils et machines
- Températures de coupe du procédé d'usinage considérablement réduites
- Possibilité d'utiliser l'outil sur toute sa longueur de coupe
- Ce qui signifie, comme résultat, un énorme gain sur les temps d'usinages

Inconvénients:

- Lorsqu'il s'agit d'usiner des pièces pourvues de contours très complexes, il est nécessaire de réaliser l'usinage sur des machines dynamiques



Adaptation des paramètres de coupe au Fraisage HPC

ae	Facteur fz	Facteur v _c	Q in %
100%	1,00	1,00	100
50%	1,00	1,20	59
40%	1,08	1,25	54
30%	1,20	1,30	45
20%	1,48	1,35	39
10%	2,00	1,50	27

Remarque:

Comme valeurs de base, se servir des paramètres de coupe des SuperF-UT pour le rainurage !

Par exemple :

Outil: SuperF-UT N Ø12, N° d'article 54551

Matière: Acier 42CrMo4

Valeurs de coupe: « Paramètres de coupe de base HPC »

$v_c = 135 \text{ m/min}$

$fz = 0,065 \text{ mm/Z}$

Calcul:

Valeurs de coupe HPC pour 10 % ae:

$v_c = 135 \text{ m/min} \times 1,5 = 203 \text{ m/min}$

$fz = 0,065 \text{ mm/Z} \times 2 = 0,13 \text{ mm/Z}$



F-UT Paramètres de base Fraisage HPC



Propriétés de stabilité :

- Très bonne lubrification
- Puissance suffisante
- Sans porte-à-faux

Propriétés d'instabilité :

- Lubrification standard
- Puissance moyenne
- Porte-à-faux moyen / important

Adaptation des paramètres de coupe au Fraisage HPC

ae	Facteur fz	Facteur Vc	Q in %
100%	1,00	1,00	100
50%	1,00	1,20	59
40%	1,08	1,25	54
30%	1,20	1,30	45
20%	1,48	1,35	39
10%	2,00	1,50	27

Matière	Dureté/ Résistance	Type RF 100 conseillé	Type d'application	Coupe v _c [m/min]	fz [mm/z] pour Ø nom.							
					3	6	8	10	12	16	20	25
P Aciers de constr./décolletage, aciers d'améliorat./cément. non alliés 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E, 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E, 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	jusqu'à 850 N/mm ²	N	propriétés de stabilité	180	0,018	0,035	0,045	0,060	0,070	0,090	0,100	0,150
			propriétés d'instabilité	180	0,013	0,025	0,032	0,042	0,049	0,063	0,070	0,105
P Aciers de décolletage/aciers de cément. alliés/aciers de nitruration 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E, 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6, 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850- 1.200 N/mm ²	N	propriétés de stabilité	160	0,018	0,035	0,045	0,060	0,070	0,090	0,100	0,150
			propriétés d'instabilité	160	0,013	0,025	0,032	0,042	0,049	0,063	0,070	0,105
P Aciers d'amélioration alliés/aciers à outils/aciers rapides 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4, 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4, 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1, 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 aciers à ressort = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850- 1.400 N/mm ²	N	propriétés de stabilité	135	0,016	0,030	0,040	0,055	0,065	0,080	0,095	0,140
			propriétés d'instabilité	135	0,011	0,021	0,028	0,039	0,046	0,056	0,067	0,098
H Aciers trempés Aciers à outils, aciers d'amélioration, aciers à ressort, aciers rapides, aciers de cémentation, etc. Z.B.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1; 1.2080 X210Cr12 1.3343 S 6-5-2	jusqu'à 54 HRC	N	propriétés de stabilité	70	0,012	0,025	0,030	0,040	0,045	0,060	0,070	0,100
			propriétés d'instabilité	70	0,008	0,018	0,021	0,028	0,032	0,042	0,049	0,070
M Aciers inoxydables 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	jusqu'à 750 N/mm ²	VA-X	propriétés de stabilité	120	0,015	0,030	0,040	0,050	0,060	0,070	0,090	0,130
			propriétés d'instabilité	120	0,011	0,021	0,028	0,035	0,042	0,049	0,063	0,091
M Aciers inoxydables 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm ²	VA-X	propriétés de stabilité	80	0,015	0,025	0,035	0,045	0,050	0,065	0,080	0,120
			propriétés d'instabilité	80	0,011	0,018	0,025	0,032	0,035	0,046	0,056	0,084
M Aciers inoxydables 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	über 850 N/mm ²	VA-X	propriétés de stabilité	70	0,012	0,025	0,030	0,040	0,045	0,060	0,070	0,100
			propriétés d'instabilité	70	0,008	0,018	0,021	0,028	0,032	0,042	0,049	0,070
S Alliages spéciaux (Base de Nickel "Ni") Nimonic, Inconel, Monel, Hastelloy	jusqu'à 1.300 N/mm ²	Ti	propriétés de stabilité	30	0,010	0,015	0,020	0,025	0,030	0,040	0,050	0,060
			propriétés d'instabilité	30	0,007	0,011	0,014	0,018	0,021	0,028	0,035	0,042
Ti Alliages de titane ("Ti") 3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5	jusqu'à 1.300 N/mm ²	Ti	propriétés de stabilité	60	0,015	0,025	0,035	0,045	0,050	0,065	0,080	0,120
			propriétés d'instabilité	60	0,011	0,018	0,025	0,032	0,035	0,046	0,056	0,084
K Fontes/fontes grises/fontes à graphite sphéroïdal et malléables 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	jusqu'à 240 HB 30	N	propriétés de stabilité	160	0,020	0,040	0,050	0,065	0,080	0,095	0,110	0,160
			propriétés d'instabilité	160	0,014	0,028	0,035	0,046	0,056	0,067	0,077	0,112
K Fontes/fontes grises/fontes à graphite sphéroïdal et malléables 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	über 240 HB 30	N	propriétés de stabilité	140	0,016	0,030	0,040	0,055	0,065	0,080	0,095	0,140
			propriétés d'instabilité	140	0,011	0,021	0,028	0,039	0,046	0,056	0,067	0,098
N Aluminium/alliages malléables d'Al/alliages d'Al 3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	jusqu'à 3% Si	Al	propriétés de stabilité	500	0,020	0,040	0,050	0,065	0,080	0,095	0,110	0,160
			propriétés d'instabilité	500	0,014	0,028	0,035	0,046	0,056	0,067	0,077	0,112
N Alliages d'Al d'injection 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	über 3% Si	Al	propriétés de stabilité	230	0,016	0,030	0,040	0,055	0,065	0,080	0,095	0,140
			propriétés d'instabilité	230	0,011	0,021	0,028	0,039	0,046	0,056	0,067	0,098
N Alliages de Magnésium MgMn2, G-MgAl8Zn1, G-MgAl6Zn3		Al	propriétés de stabilité	180	0,016	0,030	0,040	0,055	0,065	0,080	0,095	0,140
			propriétés d'instabilité	180	0,011	0,021	0,028	0,039	0,046	0,056	0,067	0,098
N Métaux non-ferreux (cuivre, laiton ou bronze à copeaux longs/courts) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb, 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2, 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5, 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn, 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	jusqu'à 850 N/mm ²	Al	propriétés de stabilité	250	0,015	0,025	0,035	0,045	0,050	0,065	0,080	0,120
			propriétés d'instabilité	250	0,011	0,018	0,025	0,032	0,035	0,046	0,056	0,084



$$a_p = 1 \times D - 3 \times D$$

$$a_e = 0,1 \times D - 0,5 \times D$$

F-UT Type NX pour le fraisage universel



Afin d'assurer l'évacuation optimale des copeaux et la meilleure longévité de la durée de vie, il est

recommandé d'utiliser l'adduction périphérique de la lubrification.

PERÇAGE ET FRAISAGE EN PLONGÉE

Matière	Dureté/ Résistance	Profondeur (ap max.)	Angle de plongée	v _c [m/min]	fz [mm/z] pour Ø nom.							
					4	6	8	10	12	14	16	20
P Aciers de décoll./constr., d'amélior./cément. non alliés 1.0345 P235GH, 1.0050, 1.0503 C45, 1.2076 102Cr6	jusqu'à 850 N/mm ²	1xD	45°	270	0,015	0,020	0,030	0,040	0,045	0,050	0,055	0,060
P Aciers de décolletage, de ciment. non alliés, de nitr. 1.1221 C60E, 1.7043 38Cr4, 1.7131 16MnCr5, 1.8550 34CrAlNi7	850-1.200 N/mm ²	1xD	45°	240	0,010	0,015	0,020	0,030	0,035	0,040	0,045	0,050
P Aciers d'amélior. alliés, aciers p. outils, aciers rapides 1.7003 38Cr2, 1.5710 36NiCr6, 1.7225 42CrMo4, 1.2419 105WCr6	850-1.400 N/mm ²	1xD	30°	200	0,007	0,010	0,015	0,020	0,025	0,030	0,035	0,040
M Aciers inoxydables 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9	jusqu'à 750 N/mm ²	1xD	10°	60	0,007	0,010	0,015	0,020	0,025	0,030	0,035	0,040
M Aciers inoxydables 1.4301X5CrNi18-10, 1.4571 X6CrNi18-10, 1.4404 X2CrNiMo17-12-2	750-950 N/mm ²	0,5xD	5°	50	0,005	0,008	0,012	0,018	0,023	0,026	0,030	0,035
Ti alliages de titane ("Ti") 3.7114 TiAl5Sn2,5, 3.7124 TiCu2, 3.7154 TiAl6Zr5, 3.7164 TiAl6V4	bis 1.300 N/mm ²	0,5xD	10°	45	0,005	0,008	0,012	0,018	0,023	0,026	0,030	0,035
K Fontes aciérées, grises, mall., à graphite sphéroïdal 0.6025 EN-GL250 (GG25), 0.7070 EN-GJS-700-2 (GGG70)	au-dessus 240 HB	1xD	45°	150	0,015	0,020	0,030	0,040	0,045	0,050	0,055	0,060
N Aluminium et ses alliages, alliages d'alu de corroyage 3.0255 Al99,5, 3.2315 AlMgSi1, 3.1325 AlCuMg1, 3.3245 AlMg3Si	jusqu'à 3% Si	1xD	30°	180	0,010	0,015	0,020	0,030	0,035	0,040	0,045	0,050
N Alliages d'aluminium de fonderie 3.2131 G-AISI5Cu1, 3.2153 G-AISI7Cu3, 3.2573 G-AISI9	au-dessus 3% Si	1xD	45°	140	0,015	0,020	0,030	0,040	0,045	0,050	0,055	0,060

RAINURAGE

Matière	Dureté/ Résistance	Prof. de coupe (ap max.)	Larg. de coup (ae max.)	v _c [m/min]	fz [mm/z] pour Ø nom.							
					4	6	8	10	12	14	16	20
P Aciers de décoll./constr., d'amélior./cément. non alliés 1.0345 P235GH, 1.0050, 1.0503 C45, 1.2076 102Cr6	jusqu'à 850 N/mm ²	1xD	1xD	270	0,015	0,025	0,035	0,050	0,055	0,060	0,080	0,100
P Aciers de décolletage, de ciment. non alliés, de nitr. 1.1221 C60E, 1.7043 38Cr4, 1.7131 16MnCr5, 1.8550 34CrAlNi7	850-1.200 N/mm ²	1xD	1xD	240	0,015	0,025	0,035	0,050	0,055	0,060	0,080	0,100
P Aciers d'amélior. alliés, aciers p. outils, aciers rapides 1.7003 38Cr2, 1.5710 36NiCr6, 1.7225 42CrMo4, 1.2419 105WCr6	850-1.400 N/mm ²	1xD	1xD	200	0,015	0,025	0,030	0,045	0,050	0,055	0,070	0,085
M Aciers inoxydables 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9	jusqu'à 750 N/mm ²	1xD	1xD	120	0,015	0,020	0,030	0,045	0,055	0,060	0,065	0,075
M Aciers inoxydables 1.4301X5CrNi18-10, 1.4571 X6CrNi18-10, 1.4404 X2CrNiMo17-12-2	750-950 N/mm ²	1xD	1xD	80	0,015	0,020	0,025	0,030	0,040	0,050	0,060	0,070
Ti alliages de titane ("Ti") 3.7114 TiAl5Sn2,5, 3.7124 TiCu2, 3.7154 TiAl6Zr5, 3.7164 TiAl6V4	bis 1.300 N/mm ²	1xD	1xD	60	0,015	0,020	0,025	0,030	0,040	0,050	0,060	0,070
K Fontes aciérées, grises, mall., à graphite sphéroïdal 0.6025 EN-GL250 (GG25), 0.7070 EN-GJS-700-2 (GGG70)	au-dessus 240 HB	1xD	1xD	160	0,015	0,025	0,035	0,050	0,055	0,060	0,080	0,100
N Aluminium et ses alliages, alliages d'alu de corroyage 3.0255 Al99,5, 3.2315 AlMgSi1, 3.1325 AlCuMg1, 3.3245 AlMg3Si	jusqu'à 3% Si	1xD	1xD	500	0,025	0,030	0,040	0,065	0,080	0,085	0,095	0,110
N Alliages d'aluminium de fonderie 3.2131 G-AISI5Cu1, 3.2153 G-AISI7Cu3, 3.2573 G-AISI9	au-dessus 3% Si	1xD	1xD	340	0,015	0,020	0,030	0,055	0,065	0,070	0,080	0,100

* Lors du fraisage de finition HSC, la vitesse de coupe peut être augmentée de 50 % ; en fonction de l'état de surface prescrit, il faut éventuellement réduire la valeur de l'avance fz. ** Lors du fraisage trochoïdal avec ae = 0,1 - 0,2 x d, il est possible d'augmenter les valeurs de la vitesse de coupe Vc et de l'avance jusqu'à 50 %.

FRAISAGE D'EBAUCHE HPC ET FRAISAGE DE FINITION HSC

Matière	Dureté/ Résistance	Prof. de coupe (ap max.)	Larg. de coup (ae max.)	v _c [m/min]	fz [mm/z] pour Ø nom.							
					4	6	8	10	12	14	16	20
P Aciers de décoll./constr., d'amélior./cément. non alliés 1.0345 P235GH, 1.0050, 1.0503 C45, 1.2076 102Cr6	jusqu'à 850 N/mm ²	2xD	0,4xD	350	0,020	0,030	0,045	0,060	0,075	0,080	0,090	0,110
P Aciers de décolletage, de ciment. non alliés, de nitr. 1.1221 C60E, 1.7043 38Cr4, 1.7131 16MnCr5, 1.8550 34CrAlNi7	850-1.200 N/mm ²	2xD	0,4xD	290	0,020	0,030	0,045	0,060	0,075	0,080	0,090	0,110
P Aciers d'amélior. alliés, aciers p. outils, aciers rapides 1.7003 38Cr2, 1.5710 36NiCr6, 1.7225 42CrMo4, 1.2419 105WCr6	850-1.400 N/mm ²	2xD	0,3xD	240	0,015	0,025	0,030	0,050	0,065	0,075	0,085	0,100
M Aciers inoxydables 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9	jusqu'à 750 N/mm ²	2xD	0,3xD	140	0,020	0,025	0,035	0,055	0,065	0,070	0,080	0,090
M Aciers inoxydables 1.4301X5CrNi18-10, 1.4571 X6CrNi18-10, 1.4404 X2CrNiMo17-12-2	750-950 N/mm ²	2xD	0,25xD	120	0,015	0,020	0,030	0,040	0,050	0,060	0,065	0,075
Ti alliages de titane ("Ti") 3.7114 TiAl5Sn2,5, 3.7124 TiCu2, 3.7154 TiAl6Zr5, 3.7164 TiAl6V4	jusqu'à 1.300 N/mm ²	2xD	0,4xD	120	0,015	0,020	0,030	0,040	0,050	0,060	0,065	0,075
K Fontes aciérées, grises, mall., à graphite sphéroïdal 0.6025 EN-GL250 (GG25), 0.7070 EN-GJS-700-2 (GGG70)	au-dessus 240 HB	2xD	0,4xD	180	0,020	0,030	0,045	0,060	0,075	0,080	0,090	0,110
N Aluminium et ses alliages, alliages d'alu de corroyage 3.0255 Al99,5, 3.2315 AlMgSi1, 3.1325 AlCuMg1, 3.3245 AlMg3Si	jusqu'à 3% Si	2xD	0,5xD	600	0,025	0,040	0,060	0,080	0,100	0,110	0,120	0,150
N Alliages d'aluminium de fonderie 3.2131 G-AISI5Cu1, 3.2153 G-AISI7Cu3, 3.2573 G-AISI9	au-dessus 3% Si	2xD	0,4xD	420	0,020	0,030	0,045	0,060	0,075	0,080	0,090	0,110

PERÇAGE

Matière	Dureté/ Résistance	Prof. de coupe (ap max.)	entspänen ab 1xD	v _c [m/min]	fz [mm/z] pour Ø nom.							
					4	6	8	10	12	14	16	20
P Aciers de décoll./constr., d'amélior./cément. non alliés 1.0345 P235GH, 1.0050, 1.0503 C45, 1.2076 102Cr6	jusqu'à 850 N/mm ²	2xD	Ja	270	0,015	0,020	0,030	0,040	0,045	0,045	0,050	0,060
P Aciers de décolletage, de ciment. non alliés, de nitr. 1.1221 C60E, 1.7043 38Cr4, 1.7131 16MnCr5, 1.8550 34CrAlNi7	850-1.200 N/mm ²	2xD	Ja	240	0,010	0,015	0,020	0,035	0,040	0,040	0,045	0,050
P Aciers d'amélior. alliés, aciers p. outils, aciers rapides 1.7003 38Cr2, 1.5710 36NiCr6, 1.7225 42CrMo4, 1.2419 105WCr6	850-1.400 N/mm ²	1xD	-	200	0,005	0,010	0,015	0,025	0,030	0,030	0,035	0,040
K Fontes aciérées, grises, mall., à graphite sphéroïdal 0.6025 EN-GL250 (GG25), 0.7070 EN-GJS-700-2 (GGG70)	au-dessus 240 HB	2xD	Ja	150	0,015	0,020	0,030	0,040	0,045	0,045	0,050	0,060
N Aluminium et ses alliages, alliages d'alu de corroyage 3.0255 Al99,5, 3.2315 AlMgSi1, 3.1325 AlCuMg1, 3.3245 AlMg3Si	jusqu'à 3% Si	1xD	-	180	0,010	0,015	0,020	0,035	0,040	0,040	0,045	0,050
N Alliages d'aluminium de fonderie 3.2131 G-AISI5Cu1, 3.2153 G-AISI7Cu3, 3.2573 G-AISI9	au-dessus 3% Si	1xD	-	140	0,015	0,020	0,030	0,040	0,045	0,045	0,050	0,060

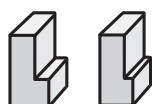
F-UT Finition / Finition de qual. supérieure



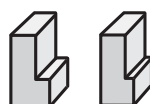
Propriétés de stabilité :
 - Très bonne lubrification
 - Puissance suffisante
 - Sans porte-à-faux

* Outil de fraisage #54207, # 54227 pour le fraisage de superfinition des aciers trempés avec une dureté > 54 HRC

Matériau	Dureté/ Résistance	Type RF 100 conseillé	Type d'application	Coupe v _c [m/min]	fz [mm/z] pour Ø nom.							
					3	6	8	10	12	16	20	25
P Aciers de constr./décolletage, aciers d'améliorat./cément. non alliés 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E, 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E, 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	jusqu'à 850 N/mm ²	N / FS	propriétés de stabilité	280	0,016	0,030	0,040	0,055	0,065	0,080	0,095	0,140
			propriétés d'instabilité	-								
P Aciers de décolletage/aciers de ciment. alliés/aciers de nitruration 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E, 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6, 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850- 1.200 N/mm ²	N / FS	propriétés de stabilité	220	0,016	0,030	0,040	0,055	0,065	0,080	0,095	0,140
			propriétés d'instabilité	-								
P Aciers d'amélioration alliés/aciers à outils/aciers rapides 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4, 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4, 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1, 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 aciers à ressort = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850- 1.400 N/mm ²	N / FS	propriétés de stabilité	200	0,015	0,030	0,040	0,050	0,060	0,070	0,090	0,130
			propriétés d'instabilité	-								
H Aciers trempés Aciers à outils, aciers d'amélioration, aciers à ressort, aciers rapides, aciers de cémentation, etc. Z.B.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1; 1.2080 X210Cr12 1.3343 S 6-5-2	jusqu'à 54 HRC	N / FS	propriétés de stabilité	150	0,015	0,030	0,040	0,050	0,060	0,070	0,090	0,130
			propriétés d'instabilité	-	110	0,007	0,017	0,024	0,030	0,036	0,045	0,057
M Aciers inoxydables 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	jusqu'à 750 N/mm ²	VA-X / FS	propriétés de stabilité	180	0,016	0,030	0,040	0,055	0,065	0,080	0,095	0,140
			propriétés d'instabilité	-								
M Aciers inoxydables 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm ²	VA-X / FS	propriétés de stabilité	140	0,015	0,030	0,040	0,050	0,060	0,070	0,090	0,130
			propriétés d'instabilité	-								
M Aciers inoxydables 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	au-dessus 850 N/mm ²	VA-X / FS	propriétés de stabilité	120	0,015	0,025	0,035	0,045	0,050	0,065	0,080	0,120
			propriétés d'instabilité	-								
S Alliages spéciaux (Base de Nickel "Ni") Nimonic, Inconel, Monel, Hastelloy	jusqu'à 1.300 N/mm ²	N / FS	propriétés de stabilité	45	0,015	0,025	0,035	0,045	0,050	0,065	0,080	0,120
			propriétés d'instabilité	-								
Ti Alliages de titane ("Ti") 3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5	jusqu'à 1.300 N/mm ²	N / FS	propriétés de stabilité	130	0,016	0,030	0,040	0,055	0,065	0,080	0,095	0,140
			propriétés d'instabilité	-								
K Fontes/fontes grises/fontes à graphite sphéroïdal et malléables 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	jusqu'à 240 HB 30	N / FS	propriétés de stabilité	220	0,018	0,035	0,045	0,060	0,070	0,090	0,100	0,150
			propriétés d'instabilité	-								
K Fontes/fontes grises/fontes à graphite sphéroïdal et malléables 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	au-dessus 240 HB 30	N / FS	propriétés de stabilité	200	0,018	0,035	0,045	0,060	0,070	0,090	0,100	0,150
			propriétés d'instabilité	-								
N Aluminium/alliages malléables d'Al/alliages d'Al 3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	jusqu'à 3% Si	Al / FS	propriétés de stabilité	1000	0,018	0,035	0,045	0,060	0,070	0,090	0,100	0,150
			propriétés d'instabilité	-								
N Alliages d'Al d'injection 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	au-dessus 3% Si	Al / FS	propriétés de stabilité	350	0,018	0,035	0,045	0,060	0,070	0,090	0,100	0,150
			propriétés d'instabilité	-								
N Alliages de Magnésium MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	Al / FS	propriétés de stabilité	280	0,018	0,035	0,045	0,060	0,070	0,090	0,100	0,150
			propriétés d'instabilité	-								
N Métaux non-ferreux (cuivre, laiton ou bronze à copeaux longs/courts) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb, 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2, 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5, 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn, 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	jusqu'à 850 N/mm ²	N / FS	propriétés de stabilité	400	0,016	0,030	0,040	0,055	0,065	0,080	0,095	0,140
			propriétés d'instabilité	-								



Finition:
 $a_p = 1 \times D - 2 \times D$
 $a_e = 0,1 \times D - 0,3 \times D$



Finition de qual. supérieure:
 $a_p = 1 \times D - 3 \times D$
 $a_e = 0,05 \times D - 0,1 \times D$

F-UT Ebauche



Propriétés de stabilité :
 - Très bonne lubrification
 - Puissance suffisante
 - Sans porte-à-faux

Propriétés d'instabilité :
 - Lubrification standard
 - Puissance moyenne
 - Porte-à-faux moyen / important

Matière	Dureté/ Résistance	Type RF 100 conseillé	Type d'application	Coupe v _c [m/min]	fz [mm/z] pour Ø nom.							
					3	6	8	10	12	16	20	25
P Aciers de constr./décolletage, aciers d'améliorat./cément. non alliés 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E, 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E, 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	jusqu'à 850 N/mm ²	N	propriétés de stabilité	200	0,020	0,040	0,055	0,070	0,085	0,100	0,120	0,170
			propriétés d'instabilité	200	0,014	0,028	0,039	0,049	0,060	0,070	0,084	0,119
P Aciers de décolletage/aciers de ciment. alliés/aciers de nitruration 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E, 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6, 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850- 1.200 N/mm ²	N	propriétés de stabilité	180	0,020	0,040	0,055	0,070	0,085	0,100	0,120	0,170
			propriétés d'instabilité	180	0,014	0,028	0,039	0,049	0,060	0,070	0,084	0,119
P Aciers d'amélioration alliés/aciers à outils/aciers rapides 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4, 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4, 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1, 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 aciers à ressort = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850- 1.400 N/mm ²	N	propriétés de stabilité	160	0,020	0,040	0,050	0,065	0,080	0,095	0,110	0,160
			propriétés d'instabilité	160	0,014	0,028	0,035	0,046	0,056	0,067	0,077	0,112
H Aciers trempés Aciers à outils, aciers d'amélioration, aciers à ressort, aciers rapides, aciers de cémentation, etc. Z.B.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1; 1.2080 X210Cr12 1.3343 S 6-5-2	jusqu'à 54 HRC	N	propriétés de stabilité	110	0,015	0,025	0,035	0,045	0,050	0,065	0,080	0,120
			propriétés d'instabilité	110	0,011	0,018	0,025	0,032	0,035	0,046	0,056	0,084
M Aciers inoxydables 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	jusqu'à 750 N/mm ²	VA-X	propriétés de stabilité	140	0,018	0,035	0,045	0,060	0,070	0,090	0,100	0,150
			propriétés d'instabilité	140	0,013	0,025	0,032	0,042	0,049	0,063	0,070	0,105
M Aciers inoxydables 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm ²	VA-X	propriétés de stabilité	120	0,016	0,030	0,040	0,055	0,065	0,080	0,095	0,140
			propriétés d'instabilité	120	0,011	0,021	0,028	0,039	0,046	0,056	0,067	0,098
M Aciers inoxydables 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	au-dessus 850 N/mm ²	VA-X	propriétés de stabilité	100	0,015	0,025	0,035	0,045	0,050	0,065	0,080	0,120
			propriétés d'instabilité	100	0,011	0,018	0,025	0,032	0,035	0,046	0,056	0,084
S Alliages spéciaux (Base de Nickel "Ni") Nimonic, Inconel, Monel, Hastelloy	jusqu'à 1.300 N/mm ²	Ti	propriétés de stabilité	35	0,010	0,020	0,030	0,035	0,040	0,055	0,065	0,080
			propriétés d'instabilité	35	0,007	0,014	0,021	0,025	0,028	0,039	0,046	0,056
Ti Alliages de titane ("Ti") 3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5	jusqu'à 1.300 N/mm ²	Ti	propriétés de stabilité	90	0,016	0,030	0,040	0,055	0,065	0,080	0,095	0,140
			propriétés d'instabilité	90	0,011	0,021	0,028	0,039	0,046	0,056	0,067	0,098
K Fontes/fontes grises/fontes à graphite sphéroïdal et malléables 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	jusqu'à 240 HB 30	N	propriétés de stabilité	180	0,020	0,040	0,055	0,070	0,085	0,100	0,120	0,170
			propriétés d'instabilité	180	0,014	0,028	0,039	0,049	0,060	0,070	0,084	0,119
K Fontes/fontes grises/fontes à graphite sphéroïdal et malléables 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	au-dessus 240 HB 30	N	propriétés de stabilité	160	0,020	0,040	0,050	0,065	0,080	0,095	0,110	0,160
			propriétés d'instabilité	160	0,014	0,028	0,035	0,046	0,056	0,067	0,077	0,112
N Aluminium/alliages malléables d'Al/alliages d'Al 3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	jusqu'à 3% Si	Al	propriétés de stabilité	600	0,020	0,040	0,055	0,070	0,085	0,100	0,120	0,170
			propriétés d'instabilité	600	0,014	0,028	0,039	0,049	0,060	0,070	0,084	0,119
N Alliages d'Al d'injection 3.2131 G-AISI5Cu1, 3.2153 G-AISI7Cu3, 3.2573 G-AISI9 3.2581 G-AISI12, 3.2583 G-AISI12Cu, - G-AISI12CuNiMg	au-dessus 3% Si	Al	propriétés de stabilité	280	0,020	0,040	0,050	0,065	0,080	0,095	0,110	0,160
			propriétés d'instabilité	280	0,014	0,028	0,035	0,046	0,056	0,067	0,077	0,112
N Alliages de Magnésium MgMn2, G-MgAl8Zn1, G-MgAl6Zn3		Al	propriétés de stabilité	220	0,020	0,040	0,050	0,065	0,080	0,095	0,110	0,160
			propriétés d'instabilité	220	0,014	0,028	0,035	0,046	0,056	0,067	0,077	0,112
N Métaux non-ferreux (cuivre, laiton ou bronze à copeaux longs/courts) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb, 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2, 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5, 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn, 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	jusqu'à 850 N/mm ²	Al	propriétés de stabilité	300	0,016	0,030	0,040	0,055	0,065	0,080	0,095	0,140
			propriétés d'instabilité	300	0,011	0,021	0,028	0,039	0,046	0,056	0,067	0,098



$$a_p = \leq 1 \times D \quad a_p = 1 \times D - 2 \times D$$

$$a_e = 0,5 - 0,9 \times D \quad f_z = 70\%$$

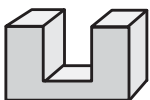
F-UT Rainurage



Propriétés de stabilité :
 - Très bonne lubrification
 - Puissance suffisante
 - Sans porte-à-faux

Propriétés d'instabilité :
 - Lubrification standard
 - Puissance moyenne
 - Porte-à-faux moyen / important

Matière	Dureté/ Résistance	Type RF 100 conseillé	Type d'application	Coupe v _c [m/min]	fz [mm/z] pour Ø nom.							
					3	6	8	10	12	16	20	25
P Aciers de constr./décolletage, aciers d'améliorat./cément. non alliés 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E, 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E, 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	jusqu'à 850 N/mm ²	N-3	propriétés de stabilité	180	0,018	0,035	0,045	0,060	0,070	0,090	0,100	0,150
			propriétés d'instabilité	180	0,013	0,025	0,032	0,042	0,049	0,063	0,070	0,105
P Aciers de décolletage/aciers de ciment. alliés/aciers de nitruration 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E, 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6, 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850- 1.200 N/mm ²	N-3	propriétés de stabilité	160	0,018	0,035	0,045	0,060	0,070	0,090	0,100	0,150
			propriétés d'instabilité	160	0,013	0,025	0,032	0,042	0,049	0,063	0,070	0,105
P Aciers d'amélioration alliés/aciers à outils/aciers rapides 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4, 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4, 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1, 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 aciers à ressort = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850- 1.400 N/mm ²	N-3	propriétés de stabilité	135	0,016	0,030	0,040	0,055	0,065	0,080	0,095	0,140
			propriétés d'instabilité	135	0,011	0,021	0,028	0,039	0,046	0,056	0,067	0,098
H Aciers trempés Aciers à outils, aciers d'amélioration, aciers à ressort, aciers rapides, aciers de cémentation, etc. Z.B.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1; 1.2080 X210Cr12 1.3343 S 6-5-2	jusqu'à 54 HRC	N-3	propriétés de stabilité	70	0,012	0,025	0,030	0,040	0,045	0,060	0,070	0,100
			propriétés d'instabilité	70	0,008	0,018	0,021	0,028	0,032	0,042	0,049	0,070
M Aciers inoxydables 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	jusqu'à 750 N/mm ²	VA-X	propriétés de stabilité	120	0,015	0,030	0,040	0,050	0,060	0,070	0,090	0,130
			propriétés d'instabilité	120	0,011	0,021	0,028	0,035	0,042	0,049	0,063	0,091
M Aciers inoxydables 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm ²	VA-X	propriétés de stabilité	80	0,015	0,025	0,035	0,045	0,050	0,065	0,080	0,120
			propriétés d'instabilité	80	0,011	0,018	0,025	0,032	0,035	0,046	0,056	0,084
M Aciers inoxydables 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	au-dessus 850 N/mm ²	VA-X	propriétés de stabilité	70	0,012	0,025	0,030	0,040	0,045	0,060	0,070	0,100
			propriétés d'instabilité	70	0,008	0,018	0,021	0,028	0,032	0,042	0,049	0,070
S Alliages spéciaux (Base de Nickel "Ni") Nimonic, Inconel, Monel, Hastelloy	jusqu'à 1.300 N/mm ²	Ti	propriétés de stabilité	30	0,010	0,015	0,020	0,025	0,030	0,040	0,050	0,060
			propriétés d'instabilité	30	0,007	0,011	0,014	0,018	0,021	0,028	0,035	0,042
Ti Alliages de titane ("Ti") 3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5	jusqu'à 1.300 N/mm ²	Ti	propriétés de stabilité	60	0,015	0,025	0,035	0,045	0,050	0,065	0,080	0,120
			propriétés d'instabilité	60	0,011	0,018	0,025	0,032	0,035	0,046	0,056	0,084
K Fontes/fontes grises/fontes à graphite sphéroïdal et malléables 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	jusqu'à 240 HB 30	N	propriétés de stabilité	160	0,020	0,040	0,050	0,065	0,080	0,095	0,110	0,160
			propriétés d'instabilité	160	0,014	0,028	0,035	0,046	0,056	0,067	0,077	0,112
K Fontes/fontes grises/fontes à graphite sphéroïdal et malléables 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	au-dessus 240 HB 30	N	propriétés de stabilité	140	0,016	0,030	0,040	0,055	0,065	0,080	0,095	0,140
			propriétés d'instabilité	140	0,011	0,021	0,028	0,039	0,046	0,056	0,067	0,098
N Aluminium/alliages malléables d'Al/alliages d'Al 3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	jusqu'à 3% Si	Al-3	propriétés de stabilité	500	0,020	0,040	0,050	0,065	0,080	0,095	0,110	0,160
			propriétés d'instabilité	500	0,014	0,028	0,035	0,046	0,056	0,067	0,077	0,112
N Alliages d'Al d'injection 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	au-dessus 3% Si	Al-3	propriétés de stabilité	230	0,016	0,030	0,040	0,055	0,065	0,080	0,095	0,140
			propriétés d'instabilité	230	0,011	0,021	0,028	0,039	0,046	0,056	0,067	0,098
N Alliages de Magnésium MgMn2, G-MgAl8Zn1, G-MgAl6Zn3		Al-3	propriétés de stabilité	180	0,016	0,030	0,040	0,055	0,065	0,080	0,095	0,140
			propriétés d'instabilité	180	0,011	0,021	0,028	0,039	0,046	0,056	0,067	0,098
N Métaux non-ferreux (cuivre, laiton ou bronze à copeaux longs/courts) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb, 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2, 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5, 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn, 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	jusqu'à 850 N/mm ²	Al-3	propriétés de stabilité	250	0,015	0,025	0,035	0,045	0,050	0,065	0,080	0,120
			propriétés d'instabilité	250	0,011	0,018	0,025	0,032	0,035	0,046	0,056	0,084



$$a_p = 0,5 \times D - 1 \times D \quad a_p = 1 \times D - 2 \times D$$

$$a_e = 1 \times D \quad f_z = 70\%$$

Fraises SuperF-UT

Fraises SuperF-UT NX



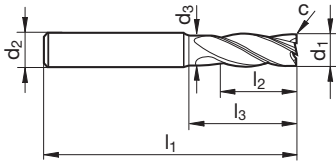
Référence **54590**



P	M	K	N	S	H
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Conseils d'util.,
page 513-517

- géométrie de la coupe frontale et des goujures appropriée afin d'obtenir des paramètres de coupe très élevés et l'évacuation optimale des copeaux
- angle de plongée en biais, extrême, possible jusqu'à 45°
- tenue de coupe des outils augmentée grâce au revêtement ultradur
- garantit la réduction des temps d'usinages et la plus haute fiabilité des procédés d'usinage
- jusqu'à 1400 N/mm²
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
4,000	6,000	3,700	57,000	11,000	18,000	0,040	4	4,000
5,000	6,000	4,700	57,000	13,000	18,000	0,050	4	5,000
5,700	6,000	5,400	57,000	13,000	20,000	0,060	4	5,700
6,000	6,000	5,500	57,000	13,000	20,000	0,060	4	6,000
7,700	8,000	7,200	63,000	19,000	26,000	0,080	4	7,700
8,000	8,000	7,500	63,000	19,000	26,000	0,080	4	8,000
9,700	10,000	9,200	72,000	22,000	31,000	0,100	4	9,700
10,000	10,000	9,200	72,000	22,000	30,000	0,100	4	10,000
11,700	12,000	10,900	83,000	26,000	35,500	0,120	4	11,700
12,000	12,000	11,200	83,000	26,000	36,000	0,120	4	12,000
13,700	14,000	12,900	83,000	26,000	35,500	0,140	4	13,700
14,000	14,000	13,200	83,000	26,000	36,000	0,140	4	14,000
15,600	16,000	14,800	92,000	32,000	41,400	0,160	4	15,600
16,000	16,000	15,000	92,000	32,000	42,000	0,160	4	16,000
19,500	20,000	18,500	104,000	38,000	51,300	0,200	4	19,500
20,000	20,000	19,000	104,000	38,000	52,000	0,200	4	20,000

Fraises SuperF-UT

Fraises SuperF-UT NX



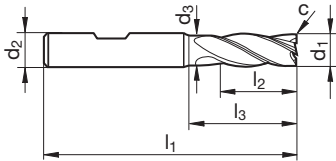
Référence **54591**



P	M	K	N	S	H
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Conseils d'util.,
page 513-517

- géométrie de la coupe frontale et des goujures appropriée afin d'obtenir des paramètres de coupe très élevés et l'évacuation optimale des copeaux
- angle de plongée en biais, extrême, possible jusqu'à 45°
- tenue de coupe des outils augmentée grâce au revêtement ultradrur
- garantit la réduction des temps d'usinages et la plus haute fiabilité des procédés d'usinage
- jusqu'à 1400 N/mm²
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
4,000	6,000	3,700	57,000	11,000	18,000	0,040	4	4,000
5,000	6,000	4,700	57,000	13,000	18,000	0,050	4	5,000
5,700	6,000	5,400	57,000	13,000	20,000	0,060	4	5,700
6,000	6,000	5,500	57,000	13,000	20,000	0,060	4	6,000
7,700	8,000	7,200	63,000	19,000	26,000	0,080	4	7,700
8,000	8,000	7,500	63,000	19,000	26,000	0,080	4	8,000
9,700	10,000	9,200	72,000	22,000	31,000	0,100	4	9,700
10,000	10,000	9,200	72,000	22,000	30,000	0,100	4	10,000
11,700	12,000	10,900	83,000	26,000	35,500	0,120	4	11,700
12,000	12,000	11,200	83,000	26,000	36,000	0,120	4	12,000
13,700	14,000	12,900	83,000	26,000	35,500	0,140	4	13,700
14,000	14,000	13,200	83,000	26,000	36,000	0,140	4	14,000
15,600	16,000	14,800	92,000	32,000	41,400	0,160	4	15,600
16,000	16,000	15,000	92,000	32,000	42,000	0,160	4	16,000
19,500	20,000	18,500	104,000	38,000	51,300	0,200	4	19,500
20,000	20,000	19,000	104,000	38,000	52,000	0,200	4	20,000

Fraises SuperF-UT

Fraises N SuperF-UT



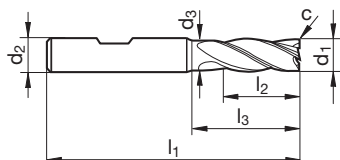
Référence **64550**



P	M	K	N	S	H
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Conseils d'util.,
page 513-517

- pour applications universelles
- version courte et rigide
- jusqu'à 1600 N/mm²
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
6,000	6,000	5,500	54,000	10,000	17,000	0,150	4	6,000
8,000	8,000	7,500	58,000	12,000	21,000	0,150	4	8,000
10,000	10,000	9,200	66,000	14,000	24,000	0,200	4	10,000
12,000	12,000	11,200	73,000	16,000	26,000	0,200	4	12,000
14,000	14,000	13,200	75,000	18,000	28,000	0,250	4	14,000
16,000	16,000	15,000	82,000	22,000	32,000	0,350	4	16,000
18,000	18,000	17,000	84,000	24,000	34,000	0,400	4	18,000
20,000	20,000	19,000	92,000	26,000	40,000	0,450	4	20,000

Fraises SuperF-UT

Fraises N SuperF-UT



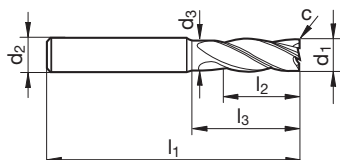
Référence **54551**



P	M	K	N	S	H
•		•			

Conseils d'util.,
page 513-517

- pour applications universelles
- jusqu'à 1600 N/mm²
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
4,000	6,000	3,700	57,000	11,000	18,000	0,100	4	4,000
5,000	6,000	4,700	57,000	13,000	18,000	0,100	4	5,000
6,000	6,000	5,500	57,000	13,000	20,000	0,150	4	6,000
8,000	8,000	7,500	63,000	19,000	26,000	0,150	4	8,000
10,000	10,000	9,200	72,000	22,000	30,000	0,200	4	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,200	4	12,000
14,000	14,000	13,200	83,000	26,000	36,000	0,250	4	14,000
16,000	16,000	15,000	92,000	32,000	42,000	0,350	4	16,000
18,000	18,000	17,000	92,000	32,000	42,000	0,400	4	18,000
20,000	20,000	19,000	104,000	38,000	52,000	0,450	4	20,000

Fraises SuperF-UT

Fraises N SuperF-UT



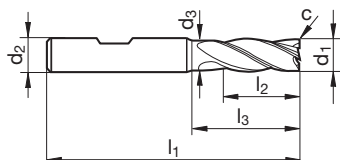
Référence **64551**



P	M	K	N	S	H
•		•			

Conseils d'util.,
page 513-517

- pour applications universelles
- jusqu'à 1600 N/mm²
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



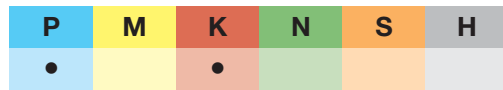
d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
4,000	6,000	3,700	57,000	11,000	18,000	0,100	4	4,000
5,000	6,000	4,700	57,000	13,000	18,000	0,100	4	5,000
6,000	6,000	5,500	57,000	13,000	20,000	0,150	4	6,000
8,000	8,000	7,500	63,000	19,000	26,000	0,150	4	8,000
10,000	10,000	9,200	72,000	22,000	30,000	0,200	4	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,200	4	12,000
14,000	14,000	13,200	83,000	26,000	36,000	0,250	4	14,000
16,000	16,000	15,000	92,000	32,000	42,000	0,350	4	16,000
18,000	18,000	17,000	92,000	32,000	42,000	0,400	4	18,000
20,000	20,000	19,000	104,000	38,000	52,000	0,450	4	20,000
25,000	25,000	23,500	121,000	45,000	63,000	0,600	4	25,000

Fraises SuperF-UT

Fraises N SuperF-UT

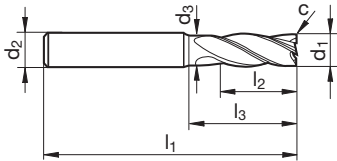


Référence **54562**



Conseils d'util.,
page 513-517

- pour applications universelles
- jusqu'à 1600 N/mm²
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



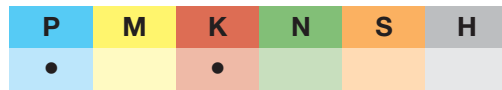
d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
6,000	6,000	5,500	65,000	18,000	28,000	0,150	4	6,000
8,000	8,000	7,500	75,000	24,000	38,000	0,150	4	8,000
10,000	10,000	9,200	80,000	30,000	38,000	0,200	4	10,000
12,000	12,000	11,200	93,000	36,000	46,000	0,200	4	12,000
16,000	16,000	15,000	108,000	48,000	58,000	0,350	4	16,000
20,000	20,000	19,000	126,000	60,000	74,000	0,450	4	20,000

Fraises SuperF-UT

Fraises N SuperF-UT

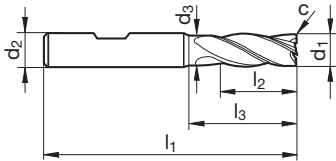


Référence **54563**



Conseils d'util.,
page 513-517

- pour applications universelles
- jusqu'à 1600 N/mm²
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
6,000	6,000	5,500	65,000	18,000	28,000	0,150	4	6,000
8,000	8,000	7,500	75,000	24,000	38,000	0,150	4	8,000
10,000	10,000	9,200	80,000	30,000	38,000	0,200	4	10,000
12,000	12,000	11,200	93,000	36,000	46,000	0,200	4	12,000
16,000	16,000	15,000	108,000	48,000	58,000	0,350	4	16,000
20,000	20,000	19,000	126,000	60,000	74,000	0,450	4	20,000

Fraises SuperF-UT

Fraises N SuperF-UT



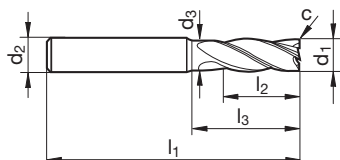
Référence **54552**



P	M	K	N	S	H
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Conseils d'util.,
page 513-517

- pour applications universelles
- jusqu'à 1600 N/mm²
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
10,000	10,000	9,200	100,000	40,000	48,000	0,200	4	10,000
12,000	12,000	11,200	150,000	45,000	58,000	0,200	4	12,000
14,000	14,000	13,200	150,000	45,000	58,000	0,250	4	14,000
16,000	16,000	15,000	150,000	65,000	78,000	0,350	4	16,000
18,000	18,000	17,000	150,000	65,000	78,000	0,400	4	18,000
20,000	20,000	19,000	150,000	65,000	78,000	0,450	4	20,000
25,000	25,000	23,500	150,000	75,000	92,000	0,600	4	25,000

Fraises SuperF-UT

Fraises N-F SuperF-UT



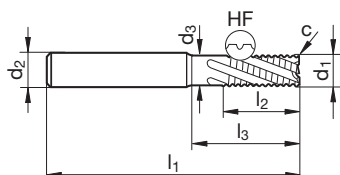
Référence **54566**



P	M	K	N	S	H
●		○		○	

Conseils d'util.,
page 513-517

- jusqu'à une dureté de 48 HRC ainsi que les alliages de titane et alliages de nickel
- encore bien approprié lors de conditions d'usinages sur des machines instables
- afin d'obtenir une qualité de l'état de surface $R_a = 2$ à $3 \mu\text{m}$
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



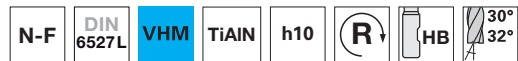
d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	N° de code
6,000	6,000	5,500	57,000	13,000	20,000	0,300	4	6,000
8,000	8,000	7,500	63,000	19,000	26,000	0,300	4	8,000
10,000	10,000	9,200	72,000	22,000	30,000	0,300	4	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,500	4	12,000
16,000	16,000	15,000	92,000	32,000	42,000	0,500	4	16,000
20,000	20,000	19,000	104,000	38,000	52,000	0,500	4	20,000
25,000	25,000	23,500	121,000	45,000	63,000	0,600	4	25,000

Fraises SuperF-UT

Fraises N-F SuperF-UT



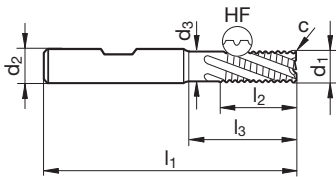
Référence **54567**



P	M	K	N	S	H
●		○		○	

Conseils d'util.,
page 513-517

- jusqu'à une dureté de 48 HRC ainsi que les alliages de titane et alliages de nickel
- encore bien approprié lors de conditions d'usinages sur des machines instables
- afin d'obtenir une qualité de l'état de surface $Ra = 2$ à $3 \mu m$
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	N° de code
6,000	6,000	5,500	57,000	13,000	20,000	0,300	4	6,000
8,000	8,000	7,500	63,000	19,000	26,000	0,300	4	8,000
10,000	10,000	9,200	72,000	22,000	30,000	0,300	4	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,500	4	12,000
16,000	16,000	15,000	92,000	32,000	42,000	0,500	4	16,000
20,000	20,000	19,000	104,000	38,000	52,000	0,500	4	20,000
25,000	25,000	23,500	121,000	45,000	63,000	0,600	4	25,000

Fraises SuperF-UT

Fraises N-3 SuperF-UT



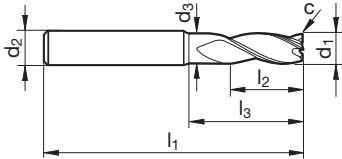
Référence **54564**



P	M	K	N	S	H
●	○	●	○		

Conseils d'util.,
page 513-517

- outil alésoir à trois coupes avec un volume de goujures augmenté
- pour la réalisation des logements de clavettes
- jusqu'à 1400 N/mm²
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	N° de code
3,000	6,000	2,700	57,000	8,000	15,000	0,050	3	3,000
3,500	6,000	3,200	57,000	10,000	15,000	0,050	3	3,500
3,700	6,000	3,400	57,000	11,000	15,000	0,050	3	3,700
4,000	6,000	3,700	57,000	11,000	18,000	0,050	3	4,000
4,500	6,000	4,200	57,000	11,000	18,000	0,050	3	4,500
4,700	6,000	4,400	57,000	13,000	18,000	0,050	3	4,700
5,000	6,000	4,700	57,000	13,000	18,000	0,050	3	5,000
5,500	6,000	5,200	57,000	13,000	19,300	0,050	3	5,500
5,700	6,000	5,400	57,000	13,000	19,500	0,050	3	5,700
6,000	6,000	5,500	57,000	13,000	20,000	0,050	3	6,000
6,500	8,000	6,000	63,000	16,000	24,300	0,100	3	6,500
7,000	8,000	6,500	63,000	16,000	24,700	0,100	3	7,000
7,500	8,000	7,000	63,000	19,000	25,100	0,100	3	7,500
8,000	8,000	7,500	63,000	19,000	26,000	0,100	3	8,000
8,500	10,000	8,000	72,000	19,000	29,300	0,100	3	8,500
9,000	10,000	8,500	72,000	19,000	29,700	0,100	3	9,000
9,500	10,000	9,000	72,000	22,000	30,100	0,100	3	9,500
10,000	10,000	9,200	72,000	22,000	30,000	0,100	3	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,100	3	12,000
16,000	16,000	15,000	92,000	32,000	42,000	0,150	3	16,000
20,000	20,000	19,000	104,000	38,000	52,000	0,150	3	20,000

Fraises SuperF-UT

Fraises N-3 SuperF-UT



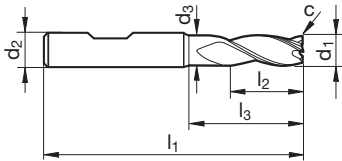
Référence **54565**



P	M	K	N	S	H
●	○	●	○		

Conseils d'util.,
page 513-517

- outil alésoir à trois coupes avec un volume de goujures augmenté
- pour la réalisation des logements de clavettes
- jusqu'à 1400 N/mm²
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	N° de code
3,000	6,000	2,700	57,000	8,000	15,000	0,050	3	3,000
3,500	6,000	3,200	57,000	10,000	15,000	0,050	3	3,500
3,700	6,000	3,400	57,000	11,000	15,000	0,060	3	3,700
4,000	6,000	3,700	57,000	11,000	18,000	0,060	3	4,000
4,500	6,000	4,200	57,000	11,000	18,000	0,070	3	4,500
4,700	6,000	4,400	57,000	13,000	18,000	0,070	3	4,700
5,000	6,000	4,700	57,000	13,000	18,000	0,080	3	5,000
5,500	6,000	5,200	57,000	13,000	20,000	0,080	3	5,500
5,700	6,000	5,400	57,000	13,000	20,000	0,090	3	5,700
6,000	6,000	5,500	57,000	13,000	20,000	0,090	3	6,000
6,500	8,000	6,000	63,000	16,000	26,000	0,100	3	6,500
7,000	8,000	6,500	63,000	16,000	26,000	0,110	3	7,000
7,500	8,000	7,000	63,000	19,000	26,000	0,110	3	7,500
8,000	8,000	7,500	63,000	19,000	26,000	0,120	3	8,000
8,500	10,000	8,000	72,000	19,000	31,000	0,130	3	8,500
9,000	10,000	8,500	72,000	19,000	31,000	0,140	3	9,000
9,500	10,000	9,000	72,000	22,000	31,000	0,140	3	9,500
10,000	10,000	9,200	72,000	22,000	30,000	0,150	3	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,180	3	12,000
16,000	16,000	15,000	92,000	32,000	42,000	0,190	3	16,000
20,000	20,000	19,000	104,000	38,000	52,000	0,240	3	20,000

Fraises SuperF-UT

Fraises N-5 SuperF-UT



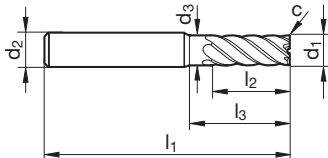
Référence **54579**



P	M	K	N	S	H
•	•	•	•	•	

Conseils d'util.,
page 513-517

- obtention des plus hauts avantages et résultats lors des opérations de finition et semi - ébauche spécialement sous conditions d'usinage HPC
- Division décalée, non équidistante
- Dimensions plus courtes voir F-UT FS avec 6 dents
- jusqu'à 1600 N/mm²
- protection microscopique des becs
- avec dégagement
- coupe au centre



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
4,000	6,000	3,700	65,000	12,000	26,000	0,050	5	4,000
5,000	6,000	4,700	65,000	15,000	26,000	0,050	5	5,000
6,000	6,000	5,500	65,000	18,000	28,000	0,050	5	6,000
8,000	8,000	7,500	75,000	24,000	38,000	0,100	5	8,000
10,000	10,000	9,200	80,000	30,000	38,000	0,100	5	10,000
12,000	12,000	11,200	93,000	36,000	46,000	0,100	5	12,000
16,000	16,000	15,000	108,000	48,000	58,000	0,150	5	16,000
20,000	20,000	19,000	126,000	60,000	74,000	0,150	5	20,000

Fraises SuperF-UT

Fraises N-5 SuperF-UT



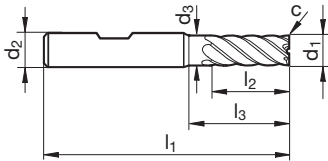
Référence **54580**



P	M	K	N	S	H
•	•	•	•	•	

Conseils d'util.,
page 513-517

- obtention des plus hauts avantages et résultats lors des opérations de finition et semi - ébauche spécialement sous conditions d'usinage HPC
- Division décalée, non équidistante
- Dimensions plus courtes voir F-UT FS avec 6 dents
- jusqu'à 1600 N/mm²
- protection microscopique des becs
- avec dégagement
- coupe au centre



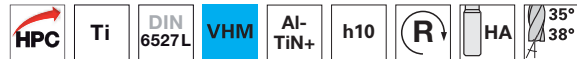
d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
4,000	6,000	3,700	65,000	12,000	26,000	0,050	5	4,000
5,000	6,000	4,700	65,000	15,000	26,000	0,050	5	5,000
6,000	6,000	5,500	65,000	18,000	28,000	0,050	5	6,000
8,000	8,000	7,500	75,000	24,000	38,000	0,100	5	8,000
10,000	10,000	9,200	80,000	30,000	38,000	0,100	5	10,000
12,000	12,000	11,200	93,000	36,000	46,000	0,100	5	12,000
16,000	16,000	15,000	108,000	48,000	58,000	0,150	5	16,000
20,000	20,000	19,000	126,000	60,000	74,000	0,150	5	20,000

Fraises SuperF-UT

Fraises Ti SuperF-UT



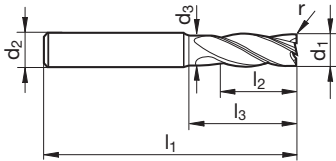
Référence **54560**



P	M	K	N	S	H
●		○		●	

Conseils d'util.,
page 513-517

- version optimisée des arêtes de coupe pour l'usinage des alliages de titane et des matériaux spéciaux de très haute résistance
- aussi utilisable en tant que SuperF-UT Type N avec becs rayonnés
- avec des rayons de becs définis
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



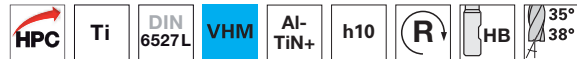
d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	r	Z	N° de code
6,000	6,000	5,500	57,000	13,000	20,000	0,500	4	6,005
6,000	6,000	5,500	57,000	13,000	20,000	0,800	4	6,008
6,000	6,000	5,500	57,000	13,000	20,000	1,000	4	6,010
6,000	6,000	5,500	57,000	13,000	20,000	1,500	4	6,015
6,000	6,000	5,500	57,000	13,000	20,000	2,000	4	6,020
8,000	8,000	7,500	63,000	19,000	26,000	0,500	4	8,005
8,000	8,000	7,500	63,000	19,000	26,000	0,800	4	8,008
8,000	8,000	7,500	63,000	19,000	26,000	1,000	4	8,010
8,000	8,000	7,500	63,000	19,000	26,000	1,500	4	8,015
8,000	8,000	7,500	63,000	19,000	26,000	2,000	4	8,020
10,000	10,000	9,200	72,000	22,000	30,000	0,500	4	10,005
10,000	10,000	9,200	72,000	22,000	30,000	0,800	4	10,008
10,000	10,000	9,200	72,000	22,000	30,000	1,000	4	10,010
10,000	10,000	9,200	72,000	22,000	30,000	1,500	4	10,015
10,000	10,000	9,200	72,000	22,000	30,000	2,000	4	10,020
12,000	12,000	11,200	83,000	26,000	36,000	0,500	4	12,005
12,000	12,000	11,200	83,000	26,000	36,000	0,800	4	12,008
12,000	12,000	11,200	83,000	26,000	36,000	1,000	4	12,010
12,000	12,000	11,200	83,000	26,000	36,000	1,500	4	12,015
12,000	12,000	11,200	83,000	26,000	36,000	2,000	4	12,020
12,000	12,000	11,200	83,000	26,000	36,000	2,500	4	12,025
12,000	12,000	11,200	83,000	26,000	36,000	3,000	4	12,030
12,000	12,000	11,200	83,000	26,000	36,000	4,000	4	12,040
16,000	16,000	15,000	92,000	32,000	42,000	0,500	4	16,005
16,000	16,000	15,000	92,000	32,000	42,000	0,800	4	16,008
16,000	16,000	15,000	92,000	32,000	42,000	1,000	4	16,010
16,000	16,000	15,000	92,000	32,000	42,000	1,500	4	16,015
16,000	16,000	15,000	92,000	32,000	42,000	2,000	4	16,020
16,000	16,000	15,000	92,000	32,000	42,000	2,500	4	16,025
16,000	16,000	15,000	92,000	32,000	42,000	3,000	4	16,030
16,000	16,000	15,000	92,000	32,000	42,000	4,000	4	16,040
20,000	20,000	19,000	104,000	38,000	52,000	1,000	4	20,010
20,000	20,000	19,000	104,000	38,000	52,000	2,000	4	20,020
20,000	20,000	19,000	104,000	38,000	52,000	4,000	4	20,040

Fraises SuperF-UT

Fraises Ti SuperF-UT



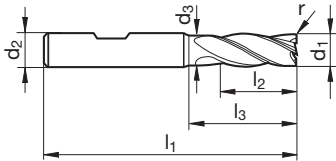
Référence **54561**



P	M	K	N	S	H
●		○		●	

Conseils d'util.,
page 513-517

- version optimisée des arêtes de coupe pour l'usinage des alliages de titane et des matériaux spéciaux de très haute résistance
- aussi utilisable en tant que SuperF-UT Type N avec becs rayonnés
- avec des rayons de becs définis
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	r	Z	N° de code
6,000	6,000	5,500	57,000	13,000	20,000	0,500	4	6,005
6,000	6,000	5,500	57,000	13,000	20,000	0,800	4	6,008
6,000	6,000	5,500	57,000	13,000	20,000	1,000	4	6,010
6,000	6,000	5,500	57,000	13,000	20,000	1,500	4	6,015
6,000	6,000	5,500	57,000	13,000	20,000	2,000	4	6,020
8,000	8,000	7,500	63,000	19,000	26,000	0,500	4	8,005
8,000	8,000	7,500	63,000	19,000	26,000	0,800	4	8,008
8,000	8,000	7,500	63,000	19,000	26,000	1,000	4	8,010
8,000	8,000	7,500	63,000	19,000	26,000	1,500	4	8,015
8,000	8,000	7,500	63,000	19,000	26,000	2,000	4	8,020
10,000	10,000	9,200	72,000	22,000	30,000	0,500	4	10,005
10,000	10,000	9,200	72,000	22,000	30,000	0,800	4	10,008
10,000	10,000	9,200	72,000	22,000	30,000	1,000	4	10,010
10,000	10,000	9,200	72,000	22,000	30,000	1,500	4	10,015
10,000	10,000	9,200	72,000	22,000	30,000	2,000	4	10,020
12,000	12,000	11,200	83,000	26,000	36,000	0,500	4	12,005
12,000	12,000	11,200	83,000	26,000	36,000	0,800	4	12,008
12,000	12,000	11,200	83,000	26,000	36,000	1,000	4	12,010
12,000	12,000	11,200	83,000	26,000	36,000	1,500	4	12,015
12,000	12,000	11,200	83,000	26,000	36,000	2,000	4	12,020
12,000	12,000	11,200	83,000	26,000	36,000	2,500	4	12,025
12,000	12,000	11,200	83,000	26,000	36,000	3,000	4	12,030
12,000	12,000	11,200	83,000	26,000	36,000	4,000	4	12,040
16,000	16,000	15,000	92,000	32,000	42,000	0,500	4	16,005
16,000	16,000	15,000	92,000	32,000	42,000	0,800	4	16,008
16,000	16,000	15,000	92,000	32,000	42,000	1,000	4	16,010
16,000	16,000	15,000	92,000	32,000	42,000	1,500	4	16,015
16,000	16,000	15,000	92,000	32,000	42,000	2,000	4	16,020
16,000	16,000	15,000	92,000	32,000	42,000	2,500	4	16,025
16,000	16,000	15,000	92,000	32,000	42,000	3,000	4	16,030
16,000	16,000	15,000	92,000	32,000	42,000	4,000	4	16,040
20,000	20,000	19,000	104,000	38,000	52,000	1,000	4	20,010
20,000	20,000	19,000	104,000	38,000	52,000	2,000	4	20,020
20,000	20,000	19,000	104,000	38,000	52,000	4,000	4	20,040

Fraises SuperF-UT

Fraises VA-X SuperF-UT



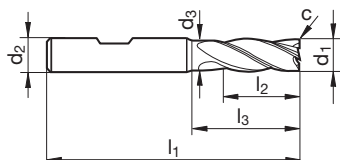
Référence **54576**



P	M	K	N	S	H
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Conseils d'util.,
page 513-517

- géométrie des arêtes de coupe et revêtement appropriés
- pour l'usinage des aciers inoxydables et inaltérables aux acides ainsi que pour les alliages à base de nickel
- version courte et rigide
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
4,000	6,000	3,700	54,000	8,000	15,000	0,150	4	4,000
5,000	6,000	4,700	54,000	9,000	15,000	0,150	4	5,000
6,000	6,000	5,500	54,000	10,000	17,000	0,200	4	6,000
8,000	8,000	7,500	58,000	12,000	21,000	0,250	4	8,000
10,000	10,000	9,200	66,000	14,000	24,000	0,300	4	10,000
12,000	12,000	11,200	73,000	16,000	26,000	0,350	4	12,000
16,000	16,000	15,000	82,000	22,000	32,000	0,500	4	16,000
20,000	20,000	19,000	92,000	26,000	40,000	0,600	4	20,000

Fraises SuperF-UT

Fraises VA-X SuperF-UT



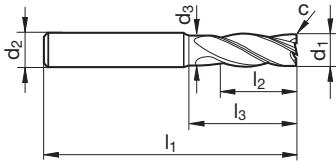
Référence **54558**



P	M	K	N	S	H
	•			•	

Conseils d'util.,
page 513-517

- géométrie des arêtes de coupe et revêtement appropriés
- pour l'usinage des aciers inoxydables et inaltérables aux acides ainsi que pour les alliages à base de nickel
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
3,000	6,000	2,700	57,000	8,000	15,000	0,100	4	3,000
4,000	6,000	3,700	57,000	11,000	18,000	0,150	4	4,000
5,000	6,000	4,700	57,000	13,000	18,000	0,150	4	5,000
6,000	6,000	5,500	57,000	13,000	20,000	0,200	4	6,000
8,000	8,000	7,500	63,000	19,000	26,000	0,250	4	8,000
10,000	10,000	9,200	72,000	22,000	30,000	0,300	4	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,350	4	12,000
14,000	14,000	13,200	83,000	26,000	36,000	0,400	4	14,000
16,000	16,000	15,000	92,000	32,000	42,000	0,500	4	16,000
18,000	18,000	17,000	92,000	32,000	42,000	0,600	4	18,000
20,000	20,000	19,000	104,000	38,000	52,000	0,600	4	20,000
25,000	25,000	23,500	121,000	45,000	63,000	0,750	4	25,000

Fraises SuperF-UT

Fraises VA-X SuperF-UT



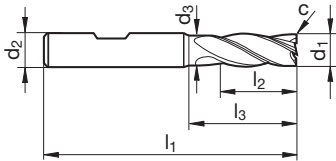
Référence **54559**



P	M	K	N	S	H
	•			•	

Conseils d'util.,
page 513-517

- géométrie des arêtes de coupe et revêtement appropriés
- pour l'usinage des aciers inoxydables et inaltérables aux acides ainsi que pour les alliages à base de nickel
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
3,000	6,000	2,700	57,000	8,000	15,000	0,100	4	3,000
4,000	6,000	3,700	57,000	11,000	18,000	0,150	4	4,000
5,000	6,000	4,700	57,000	13,000	18,000	0,150	4	5,000
6,000	6,000	5,500	57,000	13,000	20,000	0,200	4	6,000
8,000	8,000	7,500	63,000	19,000	26,000	0,250	4	8,000
10,000	10,000	9,200	72,000	22,000	30,000	0,300	4	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,350	4	12,000
14,000	14,000	13,200	83,000	26,000	36,000	0,400	4	14,000
16,000	16,000	15,000	92,000	32,000	42,000	0,500	4	16,000
18,000	18,000	17,000	92,000	32,000	42,000	0,600	4	18,000
20,000	20,000	19,000	104,000	38,000	52,000	0,600	4	20,000
25,000	25,000	23,500	121,000	45,000	63,000	0,750	4	25,000

Fraises SuperF-UT

Fraises VA-X IK SuperF-UT

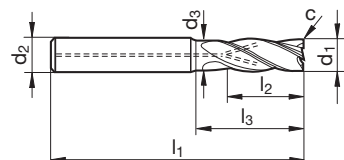


Référence **54574**



P	M	K	N	S	H
	•			•	

Conseils d'util.,
page 513-517



- géométrie des arêtes de coupe et revêtement appropriés
- pour l'usinage des aciers inoxydables et inaltérables aux acides ainsi que pour les alliages à base de nickel
- avec adduction intérieure du produit de lubrification et de refroidissement afin d'obtenir des tenues de coupe plus élevées et l'évacuation optimale des copeaux
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.

d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
6,000	6,000	5,500	57,000	13,000	20,000	0,200	4	6,000
8,000	8,000	7,500	63,000	19,000	26,000	0,250	4	8,000
10,000	10,000	9,200	72,000	22,000	30,000	0,300	4	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,350	4	12,000
16,000	16,000	15,000	92,000	32,000	42,000	0,500	4	16,000
20,000	20,000	19,000	104,000	38,000	52,000	0,600	4	20,000
25,000	25,000	23,500	121,000	45,000	63,000	0,750	4	25,000

Fraises SuperF-UT

Fraises VA-X IK SuperF-UT

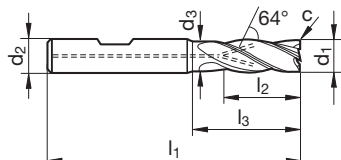


Référence **54575**



P	M	K	N	S	H
	•			•	

Conseils d'util.,
page 513-517



- géométrie des arêtes de coupe et revêtement appropriés
- pour l'usinage des aciers inoxydables et inaltérables aux acides ainsi que pour les alliages à base de nickel
- avec adduction intérieure du produit de lubrification et de refroidissement afin d'obtenir des tenues de coupe plus élevées et l'évacuation optimale des copeaux
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.

d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
6,000	6,000	5,500	57,000	13,000	20,000	0,200	4	6,000
8,000	8,000	7,500	63,000	19,000	26,000	0,250	4	8,000
10,000	10,000	9,200	72,000	22,000	30,000	0,300	4	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,350	4	12,000
16,000	16,000	15,000	92,000	32,000	42,000	0,500	4	16,000
20,000	20,000	19,000	104,000	38,000	52,000	0,600	4	20,000
25,000	25,000	23,500	121,000	45,000	63,000	0,750	4	25,000

Fraises SuperF-UT

Fraises VA-XF SuperF-UT



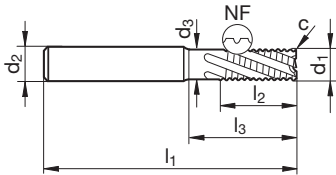
Référence **54568**



P	M	K	N	S	H
	•			•	

Conseils d'util.,
page 513-517

- géométrie des arêtes de coupe et revêtement appropriés
- pour l'usinage des aciers inoxydables et inaltérables aux acides ainsi que pour les alliages à base de nickel
- encore bien approprié lors de conditions d'usinages sur des machines instables
- afin d'obtenir une qualité de l'état de surface $Ra = 2$ à $3 \mu m$
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	N° de code
6,000	6,000	5,500	57,000	13,000	20,000	0,300	4	6,000
8,000	8,000	7,500	63,000	19,000	26,000	0,300	4	8,000
10,000	10,000	9,200	72,000	22,000	30,000	0,300	4	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,500	4	12,000
14,000	14,000	13,200	83,000	26,000	36,000	0,500	4	14,000
16,000	16,000	15,000	92,000	32,000	42,000	0,500	4	16,000
18,000	18,000	17,000	92,000	32,000	42,000	0,500	4	18,000
20,000	20,000	19,000	104,000	38,000	52,000	0,500	4	20,000
25,000	25,000	23,500	121,000	45,000	63,000	0,600	4	25,000

Fraises SuperF-UT

Fraises VA-XF SuperF-UT



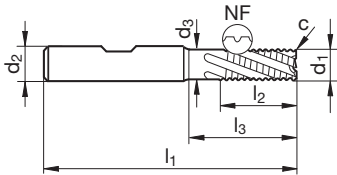
Référence **54569**



P	M	K	N	S	H
	•			•	

Conseils d'util.,
page 513-517

- géométrie des arêtes de coupe et revêtement appropriés
- pour l'usinage des aciers inoxydables et inaltérables aux acides ainsi que pour les alliages à base de nickel
- encore bien approprié lors de conditions d'usinages sur des machines instables
- afin d'obtenir une qualité de l'état de surface $Ra = 2$ à $3 \mu m$
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	N° de code
6,000	6,000	5,500	57,000	13,000	20,000	0,300	4	6,000
8,000	8,000	7,500	63,000	19,000	26,000	0,300	4	8,000
10,000	10,000	9,200	72,000	22,000	30,000	0,300	4	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,500	4	12,000
14,000	14,000	13,200	83,000	26,000	36,000	0,500	4	14,000
16,000	16,000	15,000	92,000	32,000	42,000	0,500	4	16,000
18,000	20,000	17,000	92,000	32,000	42,000	0,500	4	18,000
20,000	20,000	19,000	104,000	38,000	52,000	0,500	4	20,000
25,000	25,000	23,500	121,000	45,000	63,000	0,600	4	25,000

Fraises SuperF-UT

Fraises VA SuperF-UT



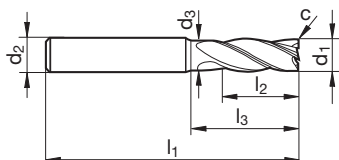
Référence **54556**



P	M	K	N	S	H
●	○		○		

Conseils d'util.,
page 513-517

- géométrie des arêtes de coupe et revêtement appropriés
- matières tendres et à copeaux longs < 850 N/mm²
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
4,000	6,000	3,700	57,000	11,000	18,000	0,100	4	4,000
5,000	6,000	4,700	57,000	13,000	18,000	0,100	4	5,000
6,000	6,000	5,500	57,000	13,000	20,000	0,150	4	6,000
8,000	8,000	7,500	63,000	19,000	26,000	0,150	4	8,000
10,000	10,000	9,200	72,000	22,000	30,000	0,200	4	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,200	4	12,000
16,000	16,000	15,000	92,000	32,000	42,000	0,350	4	16,000
20,000	20,000	19,000	104,000	38,000	52,000	0,450	4	20,000

Fraises SuperF-UT

Fraises VA SuperF-UT



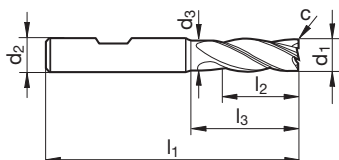
Référence **64557**



P	M	K	N	S	H
●	○		○		

Conseils d'util.,
page 513-517

- géométrie des arêtes de coupe et revêtement appropriés
- matières tendres et à copeaux longs < 850 N/mm²
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
4,000	6,000	3,700	57,000	11,000	18,000	0,100	4	4,000
5,000	6,000	4,700	57,000	13,000	18,000	0,100	4	5,000
6,000	6,000	5,500	57,000	13,000	20,000	0,150	4	6,000
8,000	8,000	7,500	63,000	19,000	26,000	0,150	4	8,000
10,000	10,000	9,200	72,000	22,000	30,000	0,200	4	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,200	4	12,000
16,000	16,000	15,000	92,000	32,000	42,000	0,350	4	16,000
20,000	20,000	19,000	104,000	38,000	52,000	0,450	4	20,000

Fraises SuperF-UT

Fraise VA-IK SuperF-UT



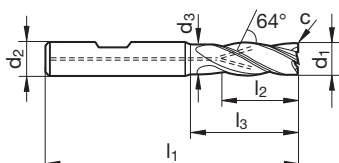
Référence **64567**



P	M	K	N	S	H
●	○		○		

Conseils d'util.,
page 513-517

- géométrie des arêtes de coupe et revêtement appropriés
- matières tendres et à copeaux longs < 850 N/mm²
- avec adduction intérieure du produit de lubrification et de refroidissement afin d'obtenir des tenues de coupe plus élevées et l'évacuation optimale des copeaux
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



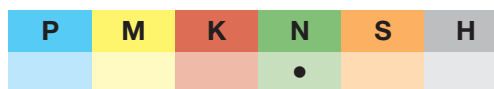
d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
6,000	6,000	5,500	57,000	13,000	20,000	0,150	4	6,000
8,000	8,000	7,500	63,000	19,000	26,000	0,150	4	8,000
10,000	10,000	9,200	72,000	22,000	30,000	0,200	4	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,200	4	12,000
16,000	16,000	15,000	92,000	32,000	42,000	0,350	4	16,000
20,000	20,000	19,000	104,000	38,000	52,000	0,450	4	20,000

Fraises SuperF-UT

Fraises SuperF-UT AI

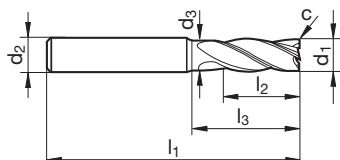


Référence **74554**



Conseils d'util.,
page 513-517

- aluminiums et alliages d'aluminiums, mais aussi pour les non - ferreux
- qualité optimale de l'état de surface lors des opérations d'usinages de finition
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



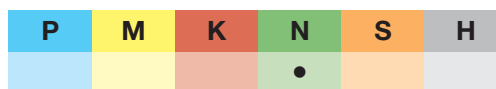
d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	N° de code
4,000	6,000	3,700	57,000	11,000	18,000	0,100	4	4,000
5,000	6,000	4,700	57,000	13,000	18,000	0,100	4	5,000
6,000	6,000	5,500	57,000	13,000	20,000	0,150	4	6,000
8,000	8,000	7,500	63,000	19,000	26,000	0,150	4	8,000
10,000	10,000	9,200	72,000	22,000	30,000	0,200	4	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,200	4	12,000
16,000	16,000	15,000	92,000	32,000	42,000	0,350	4	16,000
20,000	20,000	19,000	104,000	38,000	52,000	0,450	4	20,000

Fraises SuperF-UT

Fraises SuperF-UT AI

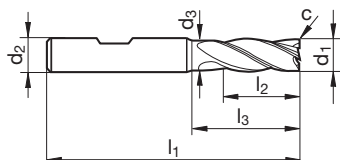


Référence **74555**



Conseils d'util.,
page 513-517

- aluminiums et alliages d'aluminiums, mais aussi pour les non - ferreux
- qualité optimale de l'état de surface lors des opérations d'usinages de finition
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



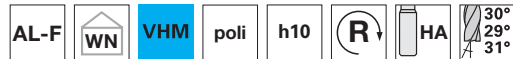
d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	N° de code
4,000	6,000	3,700	57,000	11,000	18,000	0,100	4	4,000
5,000	6,000	4,700	57,000	13,000	18,000	0,100	4	5,000
6,000	6,000	5,500	57,000	13,000	20,000	0,150	4	6,000
8,000	8,000	7,500	63,000	19,000	26,000	0,150	4	8,000
10,000	10,000	9,200	72,000	22,000	30,000	0,200	4	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,200	4	12,000
16,000	16,000	15,000	92,000	32,000	42,000	0,350	4	16,000
20,000	20,000	19,000	104,000	38,000	52,000	0,450	4	20,000

Fraises SuperF-UT

Fraises Al-F SuperF-UT

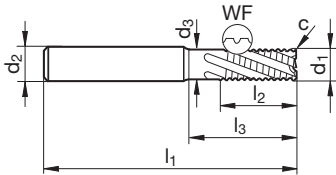


Référence **54570**



Conseils d'util.,
page 513-517

- outil alésoir à trois coupes avec un volume de goujures augmenté
- encore bien approprié lors de conditions d'usinages sur des machines instables
- afin d'obtenir une qualité de l'état de surface $Ra = 2$ à $3 \mu m$
- aluminiums et alliages d'aluminiums, mais aussi pour autres non - ferreux à copeaux longs
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



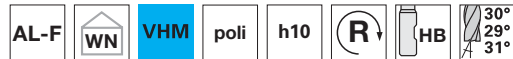
d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	N° de code
6,000	6,000	5,500	57,000	13,000	20,000	0,300	3	6,000
8,000	8,000	7,500	63,000	19,000	26,000	0,300	3	8,000
10,000	10,000	9,200	72,000	22,000	30,000	0,300	3	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,500	3	12,000
16,000	16,000	15,000	92,000	32,000	42,000	0,500	3	16,000
20,000	20,000	19,000	104,000	38,000	52,000	0,500	3	20,000
25,000	25,000	23,500	121,000	45,000	63,000	0,600	3	25,000

Fraises SuperF-UT

Fraises Al-F SuperF-UT

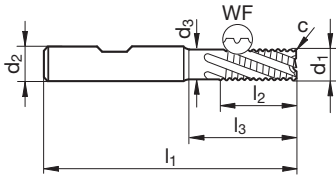


Référence **54571**



Conseils d'util.,
page 513-517

- outil alésoir à trois coupes avec un volume de goujures augmenté
- encore bien approprié lors de conditions d'usinages sur des machines instables
- afin d'obtenir une qualité de l'état de surface $Ra = 2$ à $3 \mu m$
- aluminiums et alliages d'aluminiums, mais aussi pour autres non - ferreux à copeaux longs
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



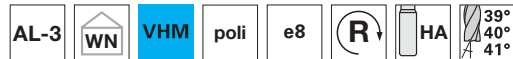
d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	N° de code
6,000	6,000	5,500	57,000	13,000	20,000	0,300	3	6,000
8,000	8,000	7,500	63,000	19,000	26,000	0,300	3	8,000
10,000	10,000	9,200	72,000	22,000	30,000	0,300	3	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,500	3	12,000
16,000	16,000	15,000	92,000	32,000	42,000	0,500	3	16,000
20,000	20,000	19,000	104,000	38,000	52,000	0,500	3	20,000
25,000	25,000	23,500	121,000	45,000	63,000	0,600	3	25,000

Fraises SuperF-UT

Fraises Al-3 SuperF-UT

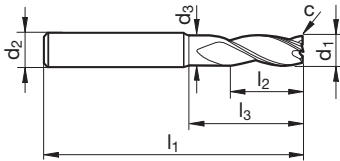


Référence **74552**



Conseils d'util.,
page 513-517

- outil alésoir à trois coupes avec un volume de goujures augmenté
- rectification poli-miroir assurant l'évacuation optimale des copeaux
- aluminiums et alliages d'aluminiums, mais aussi pour autres non - ferreux à copeaux longs
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



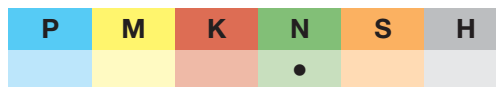
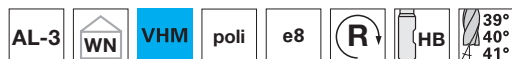
d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	N° de code
3,000	6,000	2,700	57,000	8,000	15,000	0,030	3	3,000
4,000	6,000	3,700	57,000	11,000	18,000	0,040	3	4,000
5,000	6,000	4,700	57,000	13,000	18,000	0,050	3	5,000
6,000	6,000	5,500	57,000	13,000	20,000	0,060	3	6,000
8,000	8,000	7,500	63,000	19,000	26,000	0,080	3	8,000
10,000	10,000	9,200	72,000	22,000	30,000	0,100	3	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,120	3	12,000
16,000	16,000	15,000	92,000	32,000	42,000	0,160	3	16,000
20,000	20,000	19,000	104,000	38,000	52,000	0,200	3	20,000

Fraises SuperF-UT

Fraises Al-3 SuperF-UT

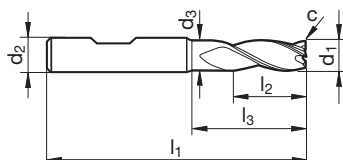


Référence **74553**



Conseils d'util.,
page 513-517

- outil alésoir à trois coupes avec un volume de goujures augmenté
- rectification poli-miroir assurant l'évacuation optimale des copeaux
- aluminiums et alliages d'aluminiums, mais aussi pour autres non - ferreux à copeaux longs
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	N° de code
3,000	6,000	2,700	57,000	8,000	15,000	0,030	3	3,000
4,000	6,000	3,700	57,000	11,000	18,000	0,040	3	4,000
5,000	6,000	4,700	57,000	13,000	18,000	0,050	3	5,000
6,000	6,000	5,500	57,000	13,000	20,000	0,060	3	6,000
8,000	8,000	7,500	63,000	19,000	26,000	0,080	3	8,000
10,000	10,000	9,200	72,000	22,000	30,000	0,100	3	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,120	3	12,000
16,000	16,000	15,000	92,000	32,000	42,000	0,160	3	16,000
20,000	20,000	19,000	104,000	38,000	52,000	0,200	3	20,000

Fraises SuperF-UT

Fraises H SuperF-UT



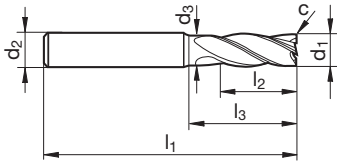
Référence **54572**



P	M	K	N	S	H
•		•			•

Conseils d'util.,
page 513-517

- ébauche jusqu'à 1 x D des matériaux avec une dureté jusqu'à 54 HRC
- finition jusqu'à 2,5 x D des matériaux avec une dureté jusqu'à 63 HRC
- tenue de coupe des outils augmentée grâce au revêtement ultradur
- particulièrement rigide grâce à l'âme étagée
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	N° de code
6,000	6,000	5,500	57,000	13,000	20,000	0,150	4	6,000
8,000	8,000	7,500	63,000	19,000	26,000	0,150	4	8,000
10,000	10,000	9,200	72,000	22,000	30,000	0,200	4	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,200	4	12,000
16,000	16,000	15,000	92,000	32,000	42,000	0,350	4	16,000
20,000	20,000	19,000	104,000	38,000	52,000	0,450	4	20,000

Fraises SuperF-UT

Fraises H SuperF-UT



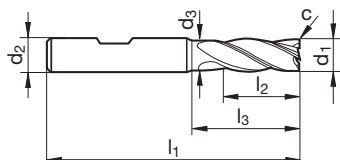
Référence **54573**



P	M	K	N	S	H
•		•			•

Conseils d'util.,
page 513-517

- ébauche jusqu'à 1 x D des matériaux avec une dureté jusqu'à 54 HRC
- finition jusqu'à 2,5 x D des matériaux avec une dureté jusqu'à 63 HRC
- tenue de coupe des outils augmentée grâce au revêtement ultradur
- particulièrement rigide grâce à l'âme étagée
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	N° de code
6,000	6,000	5,500	57,000	13,000	20,000	0,150	4	6,000
8,000	8,000	7,500	63,000	19,000	26,000	0,150	4	8,000
10,000	10,000	9,200	72,000	22,000	30,000	0,200	4	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,200	4	12,000
16,000	16,000	15,000	92,000	32,000	42,000	0,350	4	16,000
20,000	20,000	19,000	104,000	38,000	52,000	0,450	4	20,000

Fraises SuperF-UT

Fraises FS SuperF-UT



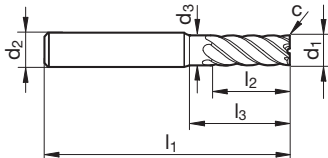
Référence **64558**



P	M	K	N	S	H
•	•	•	•	•	•

Conseils d'util.,
page 513-517

- obtention des plus hauts avantages et résultats lors des opérations de finition et semi - ébauche spécialement sous conditions d'usinage HPC
- pour l'usinage de superfinition, avec une qualité extrême de l'état de surface, sur les matériaux avec une dureté de jusqu'à 50 HRC
- dimensions plus longues voir F-UT N-5 avec 5 dents
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
8,000	8,000	7,500	63,000	19,000	26,000	0,100	6	8,000
10,000	10,000	9,200	72,000	22,000	30,000	0,100	6	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,100	6	12,000
16,000	16,000	15,000	92,000	32,000	42,000	0,150	6	16,000
20,000	20,000	19,000	104,000	38,000	52,000	0,150	6	20,000
25,000	25,000	23,500	121,000	45,000	63,000	0,200	6	25,000

Fraises SuperF-UT

Fraises FS SuperF-UT



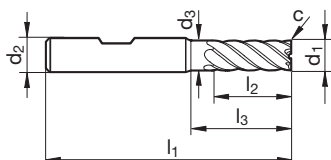
Référence **64559**



P	M	K	N	S	H
•	•	•	•	•	•

Conseils d'util.,
page 513-517

- obtention des plus hauts avantages et résultats lors des opérations de finition et semi - ébauche spécialement sous conditions d'usinage HPC
- pour l'usinage de superfinition, avec une qualité extrême de l'état de surface, sur les matériaux avec une dureté de jusqu'à 50 HRC
- dimensions plus longues voir F-UT N-5 avec 5 dents
- protection microscopique des becs
- avec dégagement
- coupe au centre
- fonctionnement stable et sans vibrations grâce à l'hélice décalée.



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
8,000	8,000	7,500	63,000	19,000	26,000	0,300	6	8,000
10,000	10,000	9,200	72,000	22,000	30,000	0,300	6	10,000
12,000	12,000	11,200	83,000	26,000	36,000	0,500	6	12,000
16,000	16,000	15,000	92,000	32,000	42,000	0,500	6	16,000
20,000	20,000	19,000	104,000	38,000	52,000	0,500	6	20,000
25,000	25,000	23,500	121,000	45,000	63,000	0,600	6	25,000





OUTILS DE FRAISAGE



ISO-CODES

P	Aciers communs, aciers hautement alliés
M	Aciers inoxydables
K	Fontes grises, fontes à graphite sphéroïdal et fontes malléables
N	Aluminium et ses alliages ainsi que d'autres métaux non ferreux
S	Alliages de titane, spéciaux et superalliages
H	Aciers trempés et fontes dures

Sur les pages suivantes prix et programmes, sont mentionnées pour chacune des fraises, les recommandations d'utilisation pour chacun des groupes d'usinage par enlèvement de copeaux :

- particulièrement recommandé
- sous réserve



PICTOGRAMMES

MATIERE DE COUPE	VHM	M42	HSS-E-PM								
	CW monobloc										
REVETEMENT	poli	TiAlN	TiAl-SiN	Al-TiN	AlTiN nano	Al-TiN+					
TOLERANCE	e8	e8/h10	h8	h10	m8	js9	k10	js12	k12		
SENS DE COUPE	 à droite										
FORME D'ATTACHEMENT	HA	HB	B								
ANGLE D'HELICE	20°	30°	45°	55°							
NORME	DIN 6527K	DIN 6527L	DIN 6528	DIN 327	DIN 844K	DIN 844L	WN				
	Norme usine										
TYPE	W	N	NH	H	NF	WR	NRf	HR	NR		
	Super AF-60	Super AF-90	Super AF-120	Super AD-90							

P	M	K	N	S	H	Type	Forme d'attachement	Angle d'hélice °	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Fraises à rainurer Alu (3 dents)

						W	HB	45	CW monobloc	poli	DIN 6527K	3,000 - 20,000	74204	584
						W	HB	45	CW monobloc	poli	DIN 6527L	3,000 - 20,000	74202	585
						W	HA	45	CW monobloc	poli	Norme usine	5,000 - 16,000	74206	586
						W	HA	45	CW monobloc	poli	Norme usine	6,000 - 20,000	74479	587

Fraises pour clavettes (2 dents)

						N	HB	30	CW monobloc	poli	DIN 6527K	2,000 - 20,000	74520	588
						N	HB	30	CW monobloc	TiAIN	DIN 6527K	2,000 - 20,000	54520	589
						N	HA	30	CW monobloc	TiAIN	DIN 6527L	2,000 - 20,000	54519	590
						N	HB	30	CW monobloc	poli	DIN 6527L	2,000 - 20,000	74521	591
						N	HB	30	CW monobloc	TiAIN	DIN 6527L	2,000 - 20,000	54521	592
						N	HA	30	CW monobloc	poli	Norme usine	3,000 - 20,000	74404	593
						N	HA	30	CW monobloc	TiAIN	Norme usine	5,000 - 20,000	54404	594

Minifraises à rainurer (3 dents)

						N	HA/HB	30	CW monobloc	TiAIN	Norme usine	0,300 - 20,000	64080	595
						NH	HA/HB	45	CW monobloc	TiAIN	Norme usine	1,000 - 10,000	64180	596

P	M	K	N	S	H	Type	Forme d'attachement	Angle d'hélice °	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Fraises à rainurer (3 dents)

	•	•	•	•	•	N	HB	30	CW monobloc	poli	DIN 6527K	2,000 - 20,000	74522	597
	•	•	•	○	•	N	HB	30	CW monobloc	TiAIN	DIN 6527K	2,000 - 20,000	64522	598
	•	•	•	○	•	N	HA	30	CW monobloc	TiAIN	DIN 6527L	2,000 - 20,000	54523	599
	•	•	•	•	•	N	HB	30	CW monobloc	poli	DIN 6527L	2,000 - 20,000	74523	600
	•	•	•	○	•	N	HB	30	CW monobloc	TiAIN	DIN 6527L	2,000 - 20,000	64523	601
	•	•	○	○	•	N	HA	30	CW monobloc	poli	Norme usine	3,000 - 20,000	74424	602
	•	•	•	○	•	N	HA	30	CW monobloc	TiAIN	Norme usine	3,000 - 20,000	54424	603

Fraises à rainurer (3 dents)

	•	•	•	○	•	NH	HB	45	CW monobloc	TiAIN	DIN 6527K	3,000 - 20,000	64570	604
	•	•	•	•	•	NH	HA	45	CW monobloc	poli	DIN 6527L	3,000 - 20,000	74478	605
	•	•	•	○	•	NH	HA	45	CW monobloc	TiAIN	DIN 6527L	1,000 - 20,000	64478	606
	•	•	•	○	•	NH	HB	45	CW monobloc	TiAIN	DIN 6527L	3,000 - 20,000	64571	607

Fraises deux tailles (4 dents)

	•	•	•	○	•	N	HA	30	CW monobloc	TiAIN	DIN 6527L	2,000 - 20,000	54524	608
	•	•	•	•	•	N	HB	30	CW monobloc	poli	DIN 6527L	3,000 - 20,000	74525	609

P	M	K	N	S	H	Type	Forme d'attachement	Angle d'hélice °	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Fraises deux tailles (4 dents)



•	○	•	○	○		N	HB	30	CW monobloc	TiAIN	DIN 6527L	2,000 - 20,000	64525	610
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•	○	•	○	○		N	HA	30	CW monobloc	TiAIN	Norme usine	3,000 - 20,000	54444	611
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Fraises deux tailles à becs rayonnés



•	○	•	○	○		N	HA	30	CW monobloc	TiAIN	DIN 6527L	6,000 - 16,000	54522	612
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•	○	•	○	○		N	HA	30	CW monobloc	TiAIN	DIN 6527L	6,000 - 20,000	54526	613
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•	○	•	○	○	○	NH	HA	45	CW monobloc	TiAIN	DIN 6527L	6,000 - 20,000	54206	614
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Fraises de pré-finition, multicoupe



•	○	•	○	○	○	NH	HA	45	CW monobloc	TiAIN	Norme usine	3,000 - 20,000	54205	615
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•	○	•	○	○	○	NH	HB	45	CW monobloc	TiAIN	Norme usine	6,000 - 20,000	54201	616
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•	○	•	○	○	○	NH	HA	45	CW monobloc	TiAIN	Norme usine	6,000 - 20,000	54225	617
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•	○	•	○	○	○	NH	HB	45	CW monobloc	TiAIN	Norme usine	6,000 - 20,000	54221	618
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Fraises pour matériaux durs, multicoupe



•	○	•	○	○	•	H	HA	55	CW monobloc	TiAlSiN	Norme usine	3,000 - 20,000	54207	619
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•	○	•	○	○	•	H	HA	55	CW monobloc	TiAlSiN	Norme usine	6,000 - 20,000	54227	620
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P	M	K	N	S	H	Type	Forme d'attachement	Angle d'hélice °	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Fraises d'ébauche

						NF	HB	30	CW monobloc	TiAIN	DIN 6527L	6,000 - 25,000	54496	621
						NF	HB	45	CW monobloc	TiAIN	DIN 6527L	6,000 - 25,000	54497	622
						WR	HB	30	CW monobloc	poli	DIN 6527L	6,000 - 20,000	74203	623
						WR	HB	30	CW monobloc	poli	DIN 6527L	6,000 - 20,000	74303	624
						NRf	HB	30	CW monobloc	TiAIN	DIN 6527L	6,000 - 20,000	64495	625
						HR	HB	20	CW monobloc	TiAlSiN	DIN 6527L	6,000 - 20,000	64497	626

Fraises à bout hémisphérique

						N	HA	30	CW monobloc	poli	DIN 6527L	3,000 - 20,000	74543	627
						N	HA	30	CW monobloc	TiAIN	DIN 6527L	0,500 - 20,000	54541	628
						N	HB	30	CW monobloc	TiAIN	DIN 6527L	1,000 - 20,000	64542	629
						N	HA	30	CW monobloc	poli	Norme usine	3,000 - 12,000	74545	630
						N	HA	30	CW monobloc	TiAIN	Norme usine	3,000 - 12,000	64545	631
						N	HA	30	CW monobloc	poli	DIN 6528	4,000 - 16,000	74531	632
						N	HA	30	CW monobloc	TiAIN	DIN 6528	4,000 - 20,000	54531	633
						N	HB	30	CW monobloc	TiAIN	DIN 6527L	3,000 - 20,000	64532	634

P	M	K	N	S	H	Type	Forme d'attachement	Angle d'hélice °	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Fraises à bout hémisphérique



•	•	•	○	○		N	HA	30	CW monobloc	TiAlN	Norme usine	3,000 - 12,000	64535	635
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Fraises à copier, à affûtage torique



•	•	•	○	•		H	HA	30	CW monobloc	TiAlSiN	Norme usine	3,000 - 16,000	54304	636
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•	•	•	○	•	•	H	HA	30	CW monobloc	TiAlSiN	Norme usine	6,000 - 16,000	54305	637
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•	•	•	○	•		N	HA	30	CW monobloc	TiAlSiN	Norme usine	2,000 - 12,000	54302	638
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•	•	•	○	•		N	HA	30	CW monobloc	TiAlSiN	Norme usine	2,000 - 12,000	54303	639
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Fraises à copier, à bout hémisphérique



•	•	•	○	•	•	H	HA	30	CW monobloc	TiAlSiN	Norme usine	0,500 - 16,000	54306	640
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•	•	•	○	•	•	H	HA	30	CW monobloc	TiAlSiN	Norme usine	3,000 - 16,000	54307	641
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•	•	•	○	•		N	HA	30	CW monobloc	TiAlSiN	Norme usine	2,000 - 12,000	54300	642
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•	•	•	○	•		N	HA	30	CW monobloc	TiAlSiN	Norme usine	2,000 - 12,000	54301	643
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Fraises à pilote



•	•	•	○	•	•	N	HA	30	CW monobloc	AlTiN+	DIN 6527L	1,400 - 12,000	54700	644
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Fraises à ébavurer 60°



•	•	•	○	•		SuperAF-60	HA	0	CW monobloc	AlTiN	Norme usine	4,000 - 12,000	53393	645
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P	M	K	N	S	H	Type	Forme d'attachement	Angle d'hélice °	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Fraises à ébavurer 60°



•	•	•	•	•		SuperAF-60	HB	0	CW monobloc	AITiN	Norme usine	6,000 - 12,000	53394	646
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Fraises à ébavurer 90°



•	•	•	•	•		SuperAF-90	HA	0	CW monobloc	AITiN	Norme usine	4,000 - 12,000	53395	647
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•	•	•	•	•		SuperAF-90	HB	0	CW monobloc	AITiN	Norme usine	4,000 - 12,000	53396	648
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Fraises à ébavurer 120°



•	•	•	•	•		Super-AF-120	HA	0	CW monobloc	AITiN	Norme usine	4,000 - 12,000	53397	649
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•	•	•	•	•		Super-AF-120	HB	0	CW monobloc	AITiN	Norme usine	6,000 - 12,000	53398	650
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Ebavureur avant et arrière 90°



•	•	•	•	•		SuperAD-90	HA	0	CW monobloc	AITiN nano	Norme usine	3,000 - 12,000	52365	651
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P	M	K	N	S	H	Type	Forme d'attachement	Angle d'hélice °	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Fraises pour clavettes (2 dents)

		N	B	30	M42	poli	DIN 327	1,000 - 25,000	74231	652
		N	B	30	M42	TiAIN	DIN 327	1,000 - 20,000	64640	653
		N	B	30	M42	poli	DIN 844K	3,000 - 20,000	74243	654
		N	B	30	M42	TiAIN	DIN 844K	3,000 - 20,000	64670	655
		N	B	30	M42	poli	DIN 844L	3,000 - 20,000	74244	656
		N	B	30	M42	TiAIN	DIN 844L	4,000 - 20,000	64671	657

Fraises à rainurer (3 dents)

		N	B	30	M42	poli	DIN 327	2,800 - 25,000	74280	658
		N	B	30	M42	TiAIN	DIN 327	2,800 - 25,000	64604	659
		N	B	30	M42	poli	DIN 844K	3,000 - 20,000	74282	660
		N	B	30	M42	TiAIN	DIN 844K	3,000 - 20,000	64641	661
		N	B	30	M42	poli	DIN 844L	3,000 - 20,000	74294	663
		N	B	30	M42	TiAIN	DIN 844L	4,000 - 18,000	54294	662

Minifraises à rainurer (3 dents)

		N		30	M42	TiAIN	Norme usine	3,000 - 10,000	54080	664
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P	M	K	N	S	H	Type	Forme d'attachement	Angle d'hélice °	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Minifraises à rainurer (3 dents)



○	●	●	●	○		N		30	M42	TiAIN	Norme usine	3,000 - 10,000	54180	665
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Fraises deux tailles à arêtes de coupe multiples



●	●	○	○			N	B	30	M42	poli	DIN 844K	2,000 - 25,000	74617	666
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●	●	●	○			N	B	30	M42	TiAIN	DIN 844K	3,000 - 25,000	64667	667
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●	○	●	○			N	B	30	M42	poli	DIN 844L	3,000 - 25,000	74847	668
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●	●	●	○			N	B	30	M42	TiAIN	DIN 844L	3,000 - 32,000	54847	669
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●	○					N	B	30	M42	poli	Norme usine	6,000 - 20,000	74800	670
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Fraises d'ébauche et de finition



●	●	●				NF	B	30	M42	TiAIN	DIN 844K	6,000 - 25,000	54815	671
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Fraises d'ébauche (3 arêtes de coupe frontale)



●	●	●				NRf	B	30	HSS-E-PM	poli	DIN 844K	6,000 - 20,000	74825	672
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●	●	●				NRf	B	30	HSS-E-PM	TiAIN	DIN 844K	6,000 - 20,000	54825	673
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Fraises d'ébauche (4 arêtes de coupe frontale)



●	●	●				NR	B	30	M42	poli	DIN 844K	6,000 - 30,000	74816	674
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●	●	●				NR	B	30	M42	TiAIN	DIN 844K	6,000 - 32,000	54816	675
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P	M	K	N	S	H	Type	Forme d'attachement	Angle d'hélice °	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Fraises d'ébauche (4 arêtes de coupe frontale)



•	•	•	•	•	•	NRf	B	30	HSS-E-PM	poli	DIN 844K	6,000 - 25,000	74845	676
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•	•	•	•	•	•	NRf	B	30	HSS-E-PM	TiAIN	DIN 844K	6,000 - 25,000	54845	677
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•	•	•	•	•	•	NR	B	30	M42	poli	DIN 844L	6,000 - 25,000	74836	678
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•	•	•	•	•	•	NR	B	30	M42	TiAIN	DIN 844L	6,000 - 25,000	54836	679
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Fraises à bout hémisphérique



•	•	•	•	•	•	N	B	30	M42	TiAIN	DIN 327	2,000 - 20,000	54275	680
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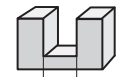


•	•	•	•	•	•	N	B	30	M42	TiAIN	Norme usine	3,000 - 20,000	54276	681
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Conseils d'utilisation p. fraises p. trou longitudinal et fraises à rainurer, CW

Gamme d'avances																	
Lettre-Code	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	
Ø outil mm	2,00	0,001	0,001	0,001	0,002	0,002	0,004	0,005	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,018	0,020
	3,00	0,002	0,002	0,003	0,003	0,004	0,007	0,010	0,010	0,010	0,015	0,016	0,013	0,019	0,022	0,024	0,030
	5,00	0,005	0,006	0,007	0,009	0,010	0,014	0,020	0,020	0,022	0,025	0,026	0,026	0,028	0,030	0,032	0,038
	6,00	0,006	0,008	0,009	0,011	0,013	0,017	0,024	0,025	0,027	0,031	0,029	0,033	0,039	0,036	0,041	0,047
	8,00	0,010	0,012	0,014	0,016	0,019	0,024	0,032	0,032	0,035	0,042	0,042	0,047	0,053	0,052	0,058	0,064
	10,00	0,013	0,015	0,018	0,021	0,025	0,030	0,038	0,039	0,044	0,050	0,053	0,059	0,065	0,066	0,073	0,080
	12,00	0,010	0,018	0,022	0,026	0,030	0,036	0,046	0,048	0,052	0,059	0,063	0,072	0,079	0,085	0,090	0,100
	16,00	0,020	0,023	0,027	0,032	0,038	0,045	0,054	0,058	0,063	0,071	0,079	0,088	0,095	0,100	0,110	0,120
	20,00	0,023	0,028	0,033	0,038	0,045	0,057	0,066	0,073	0,080	0,090	0,097	0,100	0,110	0,120	0,130	0,140
	25,00	0,030	0,035	0,040	0,045	0,055	0,065	0,075	0,100	0,120	0,130	0,140	0,150	0,165	0,170	0,180	0,190

a_e = Largeur de coupe
 a_p = prof. de coupe



$a_e = 1,0 \times D$

Les codes d'avance dont les lettres sont en caractères gras, doivent être utilisés de préférence, tant que le dégagement de la fraise le permet.

Fraisage en plongée inclinée et rainurage:

Lors du fraisage en plongée l'avance (v_f = mm/min) devrait être réduite comme expliqué ci-après. Lors de profondeurs de fraisage plus importantes $> 1 \times D$, il faut en plus évacuer les copeaux. La même chose est valable lors du passage au fraisage radial.

Rainurage

a_p = prof. de coupe $0,5 \times D = f_z$ 100%
 a_p = prof. de coupe $1,0 \times D = f_z$ 75%

Fraisage

Lors du perçage l'avance (v_f = mm/min) doit être réduite comme montré ci-après. Lors de profondeurs de fraisage plus importantes $> 0,5 \times D$, il faut en plus évacuer les copeaux.



Produits de réfrigération:

- Huile de coupe ■
- Emulsion d'huile à forer ■
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		■
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		■
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		■
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		■
Aciers de ciment, non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		■
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		■ ■
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	>850-≤1000 ≥1000-1200		■ ■
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		■ ■
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		■
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	■ ■
Aciers trempés	-		≤40-48 HRC >48-60 HRC	■ ■
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		■ ■
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		■ ■
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		■ ■
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		■ □
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	■ ■
Fontes dures	-		≤350 HB	■ ■
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			■ □
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		■ □
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		■ ■
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		■ ■
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		■ ■
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		■ ■
Alliages d'Al d'inject. ≤10% Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		■ ■
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		■ ■
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		□
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		■ ■
Laiton à copeaux courts à copeaux longs	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		■ ■
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		■ ■
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		■ ■
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			- □
Thermoplastiques	Plexiglas, Hostalen, Novodur, Makralon			- ■ □
Kevlar - plast. renf. de fibres	Kevlar			- □
d'aramide, de verre ou de carb.	GFK/CFK			- □

Rainurage

Référence	74204	74202	74479	74520	74522	54520 54522	64522	74521	74523	74478
Matière	CW		CW	CW		CW		CW		CW
DIN	6527 K	6527 L	N. usine	6527 K		6527 K		6527 L		6527 L
Type	W		W	N		N		N		NH
Page	584	585	587	588	597	589/612	598	591	600	605

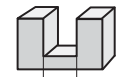


Vc m/min	Code avance	Vc m/min	Code avance	Vc m/min	Code avance	Vc m/min	Code avance	Vc m/min	Code avance	Vc m/min	Code avance
				73	O	120	O	63	N	63	N
				69	M	115	N	60	L	60	L
				73	M	120	N	63	L	63	L
				53	N	90	O	47	M	47	M
				73	M	120	N	63	L	63	L
				65	M	108	N	57	L	57	L
				53	N	90	O	47	M	47	M
				65	N	108	O	57	M	57	M
				53	N	90	O	47	M	47	M
				76	M	127	N	66	L	66	L
				65	M	108	N	57	L	57	L
				46	N	76	O	40	M	40	M
				73	M	120	N	63	L	63	L
				65	L	108	M	57	L	57	L
				65	M	108	N	57	L	57	L
				53	L	90	M	47	L	47	L
				39	N	64	O	33	M	33	M
						64	M				
						64	M				
				39	N	64	O	33	M	33	M
				35	L	58	M	30	L	30	L
				31	M	51	N	27	L	27	L
				92	M	152	N	80	L	80	L
				84	L	140	M	73	L	73	L
				76	M	127	N	66	L	66	L
				69	L	115	M	60	L	60	L
				46	L	76	M	40	L	40	L
						39	M				
				39	L	64	M	33	L	33	L
				31	L	51	M	27	L	27	L
363	R	436	T	343	O	570	P	297	N	297	N
440	R	528	T	418	O	697	P	363	N	363	N
176	Q	212	S	168	N	279	O	146	M	146	M
143	R	172	T	137	O	228	P	119	N	119	N
209	S	251	T	191	P	317	Q	165	O	165	O
99	R	119	T	92	O	152	P	80	N	80	N
88	R	106	T	76	O	127	P	66	N	66	N
83	Q	99	S	69	N	115	O	60	M	60	M
88	Q	106	S	76	N	127	O	66	M	66	M
77	P	93	S	61	M	102	N	53	L	53	L
77	Q	93	S	61	N	102	O	53	M	53	M
66	O	80	R	53	L	90	M	47	L	47	L
99	O	119	R	92	L	152	M	80	L	80	L
88	O	106	R	84	L	140	M	73	L	73	L

Conseils d'utilisation p. fraises p. trou longitudinal et fraises à rainurer, CW

Gamme d'avances																	
Lettre-Code	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	
Ø outil mm	2,00	0,001	0,001	0,001	0,002	0,002	0,004	0,005	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,018	0,020
	3,00	0,002	0,002	0,003	0,003	0,004	0,007	0,010	0,010	0,010	0,015	0,016	0,013	0,019	0,022	0,024	0,030
	5,00	0,005	0,006	0,007	0,009	0,010	0,014	0,020	0,020	0,022	0,025	0,026	0,026	0,028	0,030	0,032	0,038
	6,00	0,006	0,008	0,009	0,011	0,013	0,017	0,024	0,025	0,027	0,031	0,029	0,033	0,039	0,036	0,041	0,047
	8,00	0,010	0,012	0,014	0,016	0,019	0,024	0,032	0,032	0,035	0,042	0,042	0,047	0,053	0,052	0,058	0,064
	10,00	0,013	0,015	0,018	0,021	0,025	0,030	0,038	0,039	0,044	0,050	0,053	0,059	0,065	0,066	0,073	0,080
	12,00	0,010	0,018	0,022	0,026	0,030	0,036	0,046	0,048	0,052	0,059	0,063	0,072	0,079	0,085	0,090	0,100
	16,00	0,020	0,023	0,027	0,032	0,038	0,045	0,054	0,058	0,063	0,071	0,079	0,088	0,095	0,100	0,110	0,120
	20,00	0,023	0,028	0,033	0,038	0,045	0,057	0,066	0,073	0,080	0,090	0,097	0,100	0,110	0,120	0,130	0,140
	25,00	0,030	0,035	0,040	0,045	0,055	0,065	0,075	0,100	0,120	0,130	0,140	0,150	0,165	0,170	0,180	0,190

a_e = Largeur de coupe
a_p = prof. de coupe



a_e = 1,0 x D

Les codes d'avance dont les lettres sont en caractères gras, doivent être utilisés de préférence, tant que le dégagement de la fraise le permet.

Fraisage en plongée inclinée et rainurage:

Lors du fraisage en plongée l'avance (v_f = mm/min) devrait être réduite comme expliqué ci-après. Lors de profondeurs de fraisage plus importantes > 1 x D, il faut en plus évacuer les copeaux. La même chose est valable lors du passage au fraisage radial.

Rainurage

a_p = prof. de coupe 0,5 x D = f_z 100%
a_p = prof. de coupe 1,0 x D = f_z 75%

Fraisage

Lors du perçage l'avance (v_f = mm/min) doit être réduite comme montré ci-après. Lors de profondeurs de fraisage plus importantes > 0,5 x D, il faut en plus évacuer les copeaux.



Produits de réfrigération:

- Huile de coupe
- Emulsion d'huile à forer
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de ciment, non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers trempés	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		<input checked="" type="checkbox"/>
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		<input checked="" type="checkbox"/>
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		<input checked="" type="checkbox"/>
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes dures	-		≤350 HB	<input checked="" type="checkbox"/>
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Alliages d'Al d'inject. ≤10% Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input checked="" type="checkbox"/>
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input checked="" type="checkbox"/>
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Laiton à copeaux courts à copeaux longs	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			<input type="checkbox"/>
Thermoplastiques	Plexiglas, Hostalen, Novodur, Makralon			<input checked="" type="checkbox"/>
Kevlar - plast. renf. de fibres	Kevlar			<input type="checkbox"/>
d'aramide, de verre ou de carb.	GFK/CFK			<input type="checkbox"/>

Rainurage

Référence	54521 54519	54523 64523	64478	64570 64571	74404	74424	54404	54424	64080	64180
Matière	CW		CW		CW		CW		CW	CW
DIN	6527 L		6527 L	6527 K/L	N. usine		N. usine		N. usine	N. usine
Type	N		NH		N		N		N	NH
Page	592/590	599/601	606	604/607	593	602	594	603	595	596

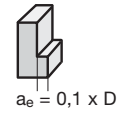


V _c m/min	Code avance	V _c m/min	Code avance	V _c m/min	Code avance	V _c m/min	Code avance	V _c m/min	Code avance	V _c m/min	Code avance
105	N	105	N	50	J	80	J	95	M	105	N
99	M	99	M	45	H	75	I	90	L	100	M
105	M	105	M	50	H	80	I	95	L	105	M
77	N	77	N	35	I	60	J	70	M	75	N
105	M	105	M	50	H	80	I	95	L	105	M
94	M	94	M	40	H	70	I	85	L	95	M
77	N	77	N	35	I	60	J	70	M	75	N
94	N	94	N	40	I	70	J	85	M	95	N
77	N	77	N	35	I	60	J				
110	M	110	M	45	H	75	I	100	L	110	M
94	M	94	M	40	H	70	I	85	L	95	M
66	N	66	N	30	I	50	J				
105	M	105	M	50	H	80	I	95	L	105	M
94	L	94	L	40	H	70	H				
94	M	94	M	40	H	70	I	85	L	95	M
77	L	77	L	35	H	60	H	70	K	75	L
55	N	55	N	38	I	45	J	50	M	55	N
55	L	55	L								
55	L	55	L								
55	N	55	N					50	M	55	N
50	L	50	L					45	K	50	L
44	M	44	M					40	L	45	M
132	M	132	M	60	H	105	I	120	L	130	M
121	L	121	L	55	H	95	H	110	K	120	L
110	M	110	M	55	H	90	I	100	L	110	M
99	L	99	L	45	H	75	H	90	K	100	L
66	L	66	L					60	K	65	L
33	L	33	L							35	L
55	L	55	L	40	H	65	H	50	K	55	L
44	L	44	L	20	H	35	H	40	K	45	L
495	O	495	O					330	Q	330	Q
605	O	605	O					400	Q	400	Q
242	N	242	N					160	P	245	N
198	O	198	O					130	Q	200	O
275	P	275	P					185	R	185	R
132	O	132	O					90	Q	130	O
110	O	110	O					80	Q	110	O
99	N	99	N					70	P	75	P
110	N	110	N					80	P	110	N
88	M	88	M					70	O	90	M
88	N	88	N					70	P	70	P
77	L	77	L					60	N	60	N
132	L	132	L					90	N	90	N
121	L	121	L					80	N	80	N

Conseils d'utilisation pour fraises à rainurer et fraises deux tailles, CW

Gamme d'avances																	
Lettre-Code	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	
Ø outil mm	2,00	0,001	0,001	0,001	0,002	0,002	0,004	0,005	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,018	0,020
	3,00	0,002	0,002	0,003	0,003	0,004	0,007	0,010	0,010	0,010	0,015	0,016	0,013	0,019	0,022	0,024	0,030
	5,00	0,005	0,006	0,007	0,009	0,010	0,014	0,020	0,020	0,022	0,025	0,026	0,026	0,028	0,030	0,032	0,038
	6,00	0,006	0,008	0,009	0,011	0,013	0,017	0,024	0,025	0,027	0,031	0,029	0,033	0,039	0,036	0,041	0,047
	8,00	0,010	0,012	0,014	0,016	0,019	0,024	0,032	0,032	0,035	0,042	0,042	0,047	0,053	0,052	0,058	0,064
	10,00	0,013	0,015	0,018	0,021	0,025	0,030	0,038	0,039	0,044	0,050	0,053	0,059	0,065	0,066	0,073	0,080
	12,00	0,010	0,018	0,022	0,026	0,030	0,036	0,046	0,048	0,052	0,059	0,063	0,072	0,079	0,085	0,090	0,100
	16,00	0,020	0,023	0,027	0,032	0,038	0,045	0,054	0,058	0,063	0,071	0,079	0,088	0,095	0,100	0,110	0,120
	20,00	0,023	0,028	0,033	0,038	0,045	0,057	0,066	0,073	0,080	0,090	0,097	0,100	0,110	0,120	0,130	0,140
	25,00	0,030	0,035	0,040	0,045	0,055	0,065	0,075	0,100	0,120	0,130	0,140	0,150	0,165	0,170	0,180	0,190

a_e = Largeur de coupe
a_p = prof. de coupe



Les codes d'avance dont les lettres sont en caractères gras, doivent être utilisés de préférence, tant que le dégagement de la fraise le permet.

Fraisage en plongée inclinée et rainurage:

Lors du fraisage en plongée l'avance (v_f = mm/min) devrait être réduite comme expliqué ci-après. Lors de profondeurs de fraisage plus importantes > 1 x D, il faut en plus évacuer les copeaux. La même chose est valable lors du passage au fraisage radial.

Rainurage

a_p = prof. de coupe 0,5 x D = f_z 100%
a_p = prof. de coupe 1,0 x D = f_z 75%

Fraisage

Lors du perçage l'avance (v_f = mm/min) doit être réduite comme montré ci-après. Lors de profondeurs de fraisage plus importantes > 0,5 x D, il faut en plus évacuer les copeaux.



Produits de réfrigération:

- Huile de coupe ■
- Emulsion d'huile à forer ■
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		■
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		■
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		■
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		■
Aciers de ciment, non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		■
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		■ ■
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		■ ■
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		■ ■
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		■
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	■ ■
Aciers trempés	-		≤40-48 HRC >48-60 HRC	■ ■
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		■ ■
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		■ ■
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		■ ■
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		■ □
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	■ ■
Fontes dures	-		≤350 HB	■ ■
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			■ □
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		■ □
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		■ ■
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		■ ■
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.2315 AlMg1	≤400		■ ■
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		■ ■
Alliages d'Al d'inject. ≤10% Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		■ ■
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		■ ■
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		□
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		■ ■
Laiton à copeaux courts à copeaux longs	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		■ ■
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		■ ■
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		■ ■
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			- □
Thermoplastiques	Plexiglas, Hostalen, Novodur, Makralon			- ■ □
Kevlar - plast. renf. de fibres	Kevlar			- □
d'aramide, de verre ou de carb.	GFK/CFK			- □

Fraisage de finition

Référence	74525	54526	64525 54524	74424	54444	74204	74202	74206	74479
Matière	CW	CW	CW	CW	CW	CW		CW	CW
DIN	6527 L	6527 L		N. usine	N. usine	6527 K	6527 L	N. usine	N. usine
Type	N	N		N	N	W		W	W
Page	609	613	610/608	602	611	584	585	586	587



V _c m/min	Code avance	V _c m/min	Code avance	V _c m/min	Code avance	V _c m/min	Code avance	V _c m/min	Code avance	V _c m/min	Code avance	V _c m/min	Code avance
116	S	193	S	76	N	127	O						
106	R	176	S	70	M	116	N						
116	R	193	S	76	M	127	N						
86	Q	143	R	60	L	99	M						
116	R	193	S	76	M	127	N						
106	R	176	S	66	M	110	N						
86	Q	143	R	57	L	94	M						
103	Q	171	R	66	L	110	M						
86	P	143	Q	57	L	94	L						
129	R	215	S	73	M	121	N						
103	R	171	S	66	M	110	N						
76	Q	127	R	50	L	83	M						
116	R	193	S	76	M	127	N						
106	P	176	Q	66	L	110	L						
103	R	171	S	66	M	110	N						
86	P	143	Q	57	L	94	L						
66	Q	110	R	43	L	72	M						
66	P	110	Q										
39	N	55	O										
66	Q	110	R										
57	P	94	Q										
53	Q	88	R										
139	R	231	S	99	M	165	N						
139	Q	231	R	90	L	149	M						
126	R	209	S	83	M	138	N						
106	Q	176	R	70	L	116	M						
73	O	121	P										
40	P	66	Q										
66	P	110	Q	43	L	72	L						
53	O	88	P	33	K	55	L						
561	T	935	T	330	P	550	Q	418	U	330	P	523	U
528	S	880	T	396	O	660	P	506	T	396	O	633	T
274	S	457	S	165	N	275	O	203	T	165	N	253	T
225	S	374	T	132	O	220	P	165	T	132	P	207	T
317	T	528	T	198	P	330	Q	241	U	198	U	302	U
146	S	242	T	99	O	165	P	115	T	99	P	143	T
132	S	220	S	80	N	132	O	102	T	80	N	127	T
106	S	176	S	66	N	110	O	95	T	66	N	119	T
132	S	220	S	80	N	132	O	102	T	80	N	127	T
99	R	165	S					90	S			112	S
99	R	165	S					90	S			112	S
86	Q	143	R					76	S			95	S
146	Q	242	R					115	S			143	S
132	Q	220	R					102	S			127	S

Conseils d'utilisation pour fraises à rainurer et fraises deux tailles, CW

Gamme d'avances														Avance f (mm/dent)			
Lettre-Code	H	I	J	K	L	M	N	O	P	Q	R	S	T		U	V	W
Ø outil mm	2,00	0,001	0,001	0,001	0,002	0,002	0,004	0,005	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,018	0,020
	3,00	0,002	0,002	0,003	0,003	0,004	0,007	0,010	0,010	0,010	0,015	0,016	0,013	0,019	0,022	0,024	0,030
	5,00	0,005	0,006	0,007	0,009	0,010	0,014	0,020	0,020	0,022	0,025	0,026	0,026	0,028	0,030	0,032	0,038
	6,00	0,006	0,008	0,009	0,011	0,013	0,017	0,024	0,025	0,027	0,031	0,029	0,033	0,039	0,036	0,041	0,047
	8,00	0,010	0,012	0,014	0,016	0,019	0,024	0,032	0,032	0,035	0,042	0,042	0,047	0,053	0,052	0,058	0,064
	10,00	0,013	0,015	0,018	0,021	0,025	0,030	0,038	0,039	0,044	0,050	0,053	0,059	0,065	0,066	0,073	0,080
	12,00	0,010	0,018	0,022	0,026	0,030	0,036	0,046	0,048	0,052	0,059	0,063	0,072	0,079	0,085	0,090	0,100
	16,00	0,020	0,023	0,027	0,032	0,038	0,045	0,054	0,058	0,063	0,071	0,079	0,088	0,095	0,100	0,110	0,120
	20,00	0,023	0,028	0,033	0,038	0,045	0,057	0,066	0,073	0,080	0,090	0,097	0,100	0,110	0,120	0,130	0,140
	25,00	0,030	0,035	0,040	0,045	0,055	0,065	0,075	0,100	0,120	0,130	0,140	0,150	0,165	0,170	0,180	0,190

a_e = Largeur de coupe
a_p = prof. de coupe



a_e = 0,5 x D

Les codes d'avance dont les lettres sont en caractères gras, doivent être utilisés de préférence, tant que le dégagement de la fraise le permet.

Fraisage en plongée inclinée et rainurage:

Lors du fraisage en plongée l'avance (v_f = mm/min) devrait être réduite comme expliqué ci-après. Lors de profondeurs de fraisage plus importantes > 1 x D, il faut en plus évacuer les copeaux. La même chose est valable lors du passage au fraisage radial.

Rainurage

a_p = prof. de coupe 0,5 x D = f_z 100%
a_p = prof. de coupe 1,0 x D = f_z 75%

Fraisage

Lors du perçage l'avance (v_f = mm/min) doit être réduite comme montré ci-après. Lors de profondeurs de fraisage plus importantes > 0,5 x D, il faut en plus évacuer les copeaux.



Produits de réfrigération:

- Huile de coupe ■
- Emulsion d'huile à forer ■
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		■
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		■
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		■
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		■
Aciers de ciment, non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		■
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		■ ■
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		■ ■
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		■ ■
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		■
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	■ ■
Aciers trempés	-		≤40-48 HRC >48-60 HRC	■ ■
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		■ ■
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		■ ■
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		■ ■
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		■ □
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	■ ■
Fontes dures	-		≤350 HB	■ ■
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			■ □
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		■ □
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		■ ■
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		■ ■
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.2315 AlMg1	≤400		■ ■
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		■ ■
Alliages d'Al d'inject. ≤10% Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		■ ■
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		■ ■
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		□
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		■ ■
Laiton à copeaux courts à copeaux longs	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		■ ■
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		■ ■
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		■ ■
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			- □
Thermoplastiques	Plexiglas, Hostalen, Novodur, Makralon			- ■ □
Kevlar - plast. renf. de fibres	Kevlar			- □
d'aramide, de verre ou de carb.	GFK/CFK			- □

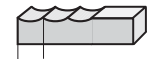
Conseils d'utilisation p. fraises à rain., fraises 2 tailles, fraises à bout hém. CW

Gamme d'avances														Avance f (mm/dent)			
Lettre-Code	H	I	J	K	L	M	N	O	P	Q	R	S	T		U	V	W
Ø outil mm	2,00	0,001	0,001	0,001	0,002	0,002	0,004	0,005	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,018	0,020
	3,00	0,002	0,002	0,003	0,003	0,004	0,007	0,010	0,010	0,010	0,015	0,016	0,013	0,019	0,022	0,024	0,030
	5,00	0,005	0,006	0,007	0,009	0,010	0,014	0,020	0,020	0,022	0,025	0,026	0,026	0,028	0,030	0,032	0,038
	6,00	0,006	0,008	0,009	0,011	0,013	0,017	0,024	0,025	0,027	0,031	0,029	0,033	0,039	0,036	0,041	0,047
	8,00	0,010	0,012	0,014	0,016	0,019	0,024	0,032	0,032	0,035	0,042	0,042	0,047	0,053	0,052	0,058	0,064
	10,00	0,013	0,015	0,018	0,021	0,025	0,030	0,038	0,039	0,044	0,050	0,053	0,059	0,065	0,066	0,073	0,080
	12,00	0,010	0,018	0,022	0,026	0,030	0,036	0,046	0,048	0,052	0,059	0,063	0,072	0,079	0,085	0,090	0,100
	16,00	0,020	0,023	0,027	0,032	0,038	0,045	0,054	0,058	0,063	0,071	0,079	0,088	0,095	0,100	0,110	0,120
	20,00	0,023	0,028	0,033	0,038	0,045	0,057	0,066	0,073	0,080	0,090	0,097	0,100	0,110	0,120	0,130	0,140
	25,00	0,030	0,035	0,040	0,045	0,055	0,065	0,075	0,100	0,120	0,130	0,140	0,150	0,165	0,170	0,180	0,190

a_e = Largeur de coupe
a_p = prof. de coupe



$$a_e = 0,02 - 0,05 \times D$$



$$a_e = 0,02 - 0,05 \times D$$

Les codes d'avance dont les lettres sont en caractères gras, doivent être utilisés de préférence, tant que le dégagement de la fraise le permet.

Fraisage en plongée inclinée et rainurage:

Lors du fraisage en plongée l'avance (v_f = mm/min) devrait être réduite comme expliqué ci-après. Lors de profondeurs de fraisage plus importantes > 1 x D, il faut en plus évacuer les copeaux. La même chose est valable lors du passage au fraisage radial.

Rainurage

a_p = prof. de coupe 0,5 x D = f_z 100%
a_p = prof. de coupe 1,0 x D = f_z 75%

Fraisage

Lors du perçage l'avance (v_f = mm/min) doit être réduite comme montré ci-après. Lors de profondeurs de fraisage plus importantes > 0,5 x D, il faut en plus évacuer les copeaux.



Produits de réfrigération:

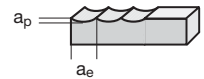
- Huile de coupe ■
- Emulsion d'huile à forer ■
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		■
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		■
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		■
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		■
Aciers de ciment, non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		■
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		■ ■
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	>850-≤1000 ≥1000-1200		■ ■
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		■ ■
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		■
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	■ ■
Aciers trempés	-		≤40-48 HRC >48-60 HRC	■ ■
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		■ ■
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		■ ■
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		■ ■
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		■ □
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	■ ■
Fontes dures	-		≤350 HB	■ ■
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			■ □
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		■ □
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		■
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		■ ■
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		■
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		■ ■
Alliages d'Al d'inject. ≤10% Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		■ ■
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		■ ■
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		□
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		■ ■
Laiton à copeaux courts à copeaux longs	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		■ ■
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		■ ■
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		■ ■
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			- □
Thermoplastiques	Plexiglas, Hostalen, Novodur, Makralon			- ■ □
Kevlar - plast. renf. de fibres	Kevlar			- □
d'aramide, de verre ou de carb.	GFK/CFK			- □

Conseils d'utilisation pour fraises à copier, CW

Gamme d'avances																	
Lettre-Code	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	
Ø outil mm	2,00	0,001	0,001	0,001	0,002	0,002	0,004	0,005	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,018	0,020
	3,00	0,002	0,002	0,003	0,003	0,004	0,007	0,010	0,010	0,010	0,015	0,016	0,013	0,019	0,022	0,024	0,030
	5,00	0,005	0,006	0,007	0,009	0,010	0,014	0,020	0,020	0,022	0,025	0,026	0,026	0,028	0,030	0,032	0,038
	6,00	0,006	0,008	0,009	0,011	0,013	0,017	0,024	0,025	0,027	0,031	0,029	0,033	0,039	0,036	0,041	0,047
	8,00	0,010	0,012	0,014	0,016	0,019	0,024	0,032	0,032	0,035	0,042	0,042	0,047	0,053	0,052	0,058	0,064
	10,00	0,013	0,015	0,018	0,021	0,025	0,030	0,038	0,039	0,044	0,050	0,053	0,059	0,065	0,066	0,073	0,080
	12,00	0,010	0,018	0,022	0,026	0,030	0,036	0,046	0,048	0,052	0,059	0,063	0,072	0,079	0,085	0,090	0,100
	16,00	0,020	0,023	0,027	0,032	0,038	0,045	0,054	0,058	0,063	0,071	0,079	0,088	0,095	0,100	0,110	0,120
	20,00	0,023	0,028	0,033	0,038	0,045	0,057	0,066	0,073	0,080	0,090	0,097	0,100	0,110	0,120	0,130	0,140
	25,00	0,030	0,035	0,040	0,045	0,055	0,065	0,075	0,100	0,120	0,130	0,140	0,150	0,165	0,170	0,180	0,190

a_e = Largeur de coupe
a_p = prof. de coupe



Lors de notre choix des exemples de matières, nous nous basons sur les nouvelles désignations standardisées dans toute l'Europe pour les aciers et les matériaux en fonte selon DIN EN.

Produits de réfrigération:

- Huile de coupe ■
- Emulsion d'huile à forer ■
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		■ ■
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		■ ■
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		■ ■ ■
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		■ ■
Aciers de ciment, non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		■
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		■ ■
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		■ ■
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		■ ■
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		■
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	■
Aciers trempés	-		≤40-48 HRC >48-60 HRC	■ ■
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		■
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		■
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		■
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		■ ■
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	■ ■
Fontes dures	-		≤350 HB	■
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			■ ■
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		■ ■
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		■
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		■ ■
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		■
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		■
Alliages d'Al d'inject. ≤10%Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		■
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		■
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		■
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		■
Laiton à copeaux courts à copeaux longs	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		■ ■
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		■ ■
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		■ ■
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			■
Thermoplastiques	Plexiglas, Hostalen, Novodur, Makralon			■
Kevlar - plast. renf. de fibres	Kevlar			■
d'aramide, de verre ou de carb.	GFK/CFK			■

Usinage UGV

Référence

54300
54301

Matière

Carbure monobloc

DIN

N. usine

Type

N

Page

642/643



54302
54303

Carbure monobloc

N. usine

N

638/639

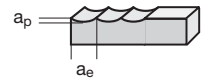


54300 / 54301								54302 / 54303							
Ebauche								Ebauche							
Ø	2/3	4	6	8	10	12		Ø	4	6	8	10	12		
eff. Ø *	-	1,74	2,99	4,21	5,27	6,63		eff. Ø *	-	-	-	-	-		
a _p mm	0,10	0,20	0,40	0,60	0,75	1,00		a _p mm	0,20	0,40	0,60	0,75	1,00		
a _e mm	0,15	0,30	0,50	0,75	1,00	1,50		a _e mm	0,30	0,50	0,75	1,00	1,50		
Finition								Finition							
eff. Ø *	-	1,25	1,81	2,24	2,66	3,07		eff. Ø *	-	-	-	-	-		
a _p mm	0,07	0,10	0,14	0,16	0,18	0,20		a _p mm	0,10	0,14	0,16	0,18	0,20		
a _e mm	0,05	0,07	0,10	0,15	0,20	0,25		a _e mm	0,07	0,10	0,15	0,20	0,25		
V _c m/min	V _c m/min	fz (mm)	fz (mm)	fz (mm)	fz (mm)	fz (mm)	fz (mm)	V _c m/min	V _c m/min	fz (mm)	fz (mm)	fz (mm)	fz (mm)	fz (mm)	
225	310	0,03	0,03	0,05	0,06	0,08	0,1	225	310	0,03	0,05	0,06	0,08	0,1	
170	240	0,02	0,02	0,04	0,05	0,08	0,1	170	240	0,02	0,04	0,05	0,08	0,1	
170	240	0,02	0,02	0,04	0,05	0,08	0,1	170	240	0,02	0,04	0,05	0,08	0,1	
150	190	0,02	0,02	0,04	0,05	0,08	0,1	150	190	0,02	0,04	0,05	0,08	0,1	
190	240	0,02	0,02	0,04	0,05	0,08	0,1	190	240	0,02	0,04	0,05	0,08	0,1	
190	240	0,02	0,02	0,04	0,05	0,08	0,1	190	240	0,02	0,04	0,05	0,08	0,1	
150	190	0,02	0,02	0,04	0,05	0,08	0,1	150	190	0,02	0,04	0,05	0,08	0,1	
150	190	0,02	0,02	0,04	0,05	0,08	0,1	150	190	0,02	0,04	0,05	0,08	0,1	
105	140	0,02	0,02	0,04	0,05	0,08	0,1	105	140	0,02	0,04	0,05	0,08	0,1	
225	310	0,03	0,03	0,05	0,06	0,08	0,1	225	310	0,03	0,05	0,06	0,08	0,1	
150	190	0,02	0,02	0,04	0,05	0,08	0,1	150	190	0,02	0,04	0,05	0,08	0,1	
105	140	0,02	0,02	0,04	0,05	0,08	0,1	105	140	0,02	0,04	0,05	0,08	0,1	
150	190	0,02	0,02	0,04	0,05	0,08	0,1	150	190	0,02	0,04	0,05	0,08	0,1	
105	140	0,02	0,02	0,04	0,05	0,08	0,1	105	140	0,02	0,04	0,05	0,08	0,1	
150	190	0,02	0,02	0,04	0,05	0,08	0,1	150	190	0,02	0,04	0,05	0,08	0,1	
105	140	0,02	0,02	0,04	0,05	0,08	0,1	105	140	0,02	0,04	0,05	0,08	0,1	
80	125	0,02	0,02	0,04	0,05	0,06	0,08	80	125						
80	125	0,02	0,02	0,04	0,05	0,06	0,08	80	125						
300	450	0,04	0,04	0,06	0,08	0,1	0,13	300	450	0,04	0,06	0,08	0,1	0,13	
225	310	0,03	0,03	0,05	0,06	0,08	0,1	225	310	0,03	0,05	0,06	0,08	0,1	
105	140	0,02	0,02	0,04	0,05	0,08	0,1	105	140	0,02	0,04	0,05	0,08	0,1	
80	125	0,02	0,02	0,04	0,05	0,06	0,08	80	125	0,02	0,04	0,05	0,06	0,08	
300	400	0,06	0,06	0,1	0,15	0,2	0,25	300	400	0,06	0,1	0,15	0,2	0,25	
300	400	0,05	0,05	0,08	0,1	0,15	0,2	300	400	0,05	0,08	0,1	0,15	0,2	
225	325	0,05	0,05	0,08	0,1	0,12	0,15	225	325	0,05	0,08	0,1	0,12	0,15	
225	275	0,04	0,04	0,06	0,08	0,1	0,12	225	275	0,04	0,06	0,08	0,1	0,12	
65	80	0,02	0,02	0,04	0,05	0,06	0,08	65	80	0,02	0,04	0,05	0,06	0,08	
80	125	0,02	0,02	0,04	0,05	0,08	0,1	80	125	0,02	0,04	0,05	0,08	0,1	
75	100	0,02	0,02	0,04	0,05	0,06	0,08	75	100	0,02	0,04	0,05	0,06	0,08	
375	500	0,04	0,04	0,06	0,08	0,1	0,15	375	500	0,04	0,06	0,08	0,1	0,15	
500	900	0,04	0,04	0,06	0,08	0,1	0,15	500	900	0,04	0,06	0,08	0,1	0,15	
300	450	0,04	0,04	0,06	0,08	0,1	0,13	300	450	0,04	0,06	0,08	0,1	0,13	
225	310	0,03	0,03	0,05	0,06	0,08	0,1	225	310	0,03	0,05	0,06	0,08	0,1	
225	310	0,03	0,03	0,05	0,06	0,08	0,1	225	310	0,03	0,05	0,06	0,08	0,1	
300	350	0,05	0,05	0,08	0,12	0,15	0,2	300	350	0,05	0,08	0,12	0,15	0,2	
225	300	0,04	0,04	0,06	0,1	0,12	0,15	225	300	0,04	0,06	0,1	0,12	0,15	
225	325	0,05	0,05	0,08	0,1	0,12	0,15	225	325	0,05	0,08	0,1	0,12	0,15	
225	275	0,04	0,04	0,06	0,08	0,1	0,12	225	275	0,04	0,06	0,08	0,1	0,12	
225	275	0,04	0,04	0,06	0,08	0,1	0,12	225	275	0,04	0,06	0,08	0,1	0,12	
150	225	0,03	0,03	0,05	0,08	0,1	0,12	150	225	0,03	0,05	0,08	0,1	0,12	

Conseils d'utilisation pour fraises à copier, CW

Gamme d'avances																	
Lettre-Code	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	
Ø outil mm	2,00	0,001	0,001	0,001	0,002	0,002	0,004	0,005	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,018	0,020
	3,00	0,002	0,002	0,003	0,003	0,004	0,007	0,010	0,010	0,010	0,015	0,016	0,013	0,019	0,022	0,024	0,030
	5,00	0,005	0,006	0,007	0,009	0,010	0,014	0,020	0,020	0,022	0,025	0,026	0,026	0,028	0,030	0,032	0,038
	6,00	0,006	0,008	0,009	0,011	0,013	0,017	0,024	0,025	0,027	0,031	0,029	0,033	0,039	0,036	0,041	0,047
	8,00	0,010	0,012	0,014	0,016	0,019	0,024	0,032	0,032	0,035	0,042	0,042	0,047	0,053	0,052	0,058	0,064
	10,00	0,013	0,015	0,018	0,021	0,025	0,030	0,038	0,039	0,044	0,050	0,053	0,059	0,065	0,066	0,073	0,080
	12,00	0,010	0,018	0,022	0,026	0,030	0,036	0,046	0,048	0,052	0,059	0,063	0,072	0,079	0,085	0,090	0,100
	16,00	0,020	0,023	0,027	0,032	0,038	0,045	0,054	0,058	0,063	0,071	0,079	0,088	0,095	0,100	0,110	0,120
	20,00	0,023	0,028	0,033	0,038	0,045	0,057	0,066	0,073	0,080	0,090	0,097	0,100	0,110	0,120	0,130	0,140
	25,00	0,030	0,035	0,040	0,045	0,055	0,065	0,075	0,100	0,120	0,130	0,140	0,150	0,165	0,170	0,180	0,190

a_e = Largeur de coupe
a_p = prof. de coupe



Lors de notre choix des exemples de matières, nous nous basons sur les nouvelles désignations standardisées dans toute l'Europe pour les aciers et les matériaux en fonte selon DIN EN.

Produits de réfrigération:

- Huile de coupe ■
- Emulsion d'huile à forer ■
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		■ ■
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		■ ■
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		■ ■ ■
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		■ ■
Aciers de ciment, non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		■
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		■ ■
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		■ ■
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		■ ■
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		■
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	■
Aciers trempés	-		≤40-48 HRC >48-60 HRC	■ ■
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		■
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		■
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		■
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		■ ■
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	■ ■
Fontes dures	-		≤350 HB	■
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			■ ■
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		■ ■
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		■
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		■ ■
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		■
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		■
Alliages d'Al d'inject. ≤10%Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		■
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		■
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		■
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		■
Laiton à copeaux courts à copeaux longs	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		■ ■
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		■ ■
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		■ ■
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			■
Thermoplastiques	Plexiglas, Hostalen, Novodur, Makralon			■
Kevlar - plast. renf. de fibres	Kevlar			■
d'aramide, de verre ou de carb.	GFK/CFK			■

Usinage UGV

Référence

54306
54307

Matière
DIN
Type
Page

Carbure monobloc

N. usine

N

640/641



54304
54305

Carbure monobloc

N. usine

N

636/637

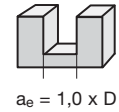


54306 / 54307								54304 / 54305								
Ø	2/3	4	6	8	10	12		Ø	4	6	8	10	12			
Ebauche								Ebauche								
eff. Ø *	1,74	2,99	4,21	5,27	6,63	9,33		eff. Ø *	-	-	-	-	-			
a _p mm	0,20	0,40	0,60	0,75	1,00	1,50		a _p mm	0,40	0,60	0,75	1,00	1,50			
a _e mm	0,30	0,50	0,75	1,00	1,50	2,50		a _e mm	3,50	5,50	6,50	8,50	11,50			
Finition								Finition								
eff. Ø *	1,25	1,81	2,24	2,66	3,07	3,97		eff. Ø *	-	-	-	-	-			
a _p mm	0,10	0,14	0,16	0,18	0,20	0,25		a _p mm	0,15	0,20	0,30	0,40	0,50			
a _e mm	0,07	0,10	0,15	0,20	0,25	0,30		a _e mm	0,20	0,30	0,40	0,60	1,00			
V _c m/min	V _c m/min	fz (mm)	fz (mm)	fz (mm)	fz (mm)	fz (mm)	fz (mm)	V _c m/min	V _c m/min	fz (mm)	fz (mm)	fz (mm)	fz (mm)	fz (mm)		
300	350							200	230	0,05	0,06	0,07	0,08	0,1		
										200	230	0,05	0,06	0,07	0,08	0,1
										200	230	0,05	0,06	0,07	0,08	0,1
		0,04	0,06	0,08	0,1	0,15	0,2			200	230	0,05	0,06	0,07	0,08	0,1
		0,04	0,06	0,08	0,1	0,13	0,15			160	190	0,04	0,05	0,06	0,07	0,08
		0,03	0,05	0,06	0,08	0,1	0,12			105	125	0,02	0,03	0,04	0,05	0,06
		0,04	0,06	0,08	0,1	0,13	0,15			150	175	0,05	0,06	0,07	0,08	0,1
		0,02	0,04	0,05	0,08	0,1	0,12			75	95	0,02	0,03	0,04	0,05	0,06
		0,06	0,1	0,15	0,2	0,25	0,3			300	400	0,06	0,08	0,1	0,12	0,15
		0,05	0,08	0,1	0,15	0,2	0,25			300	400	0,06	0,08	0,1	0,12	0,15
0,05	0,08	0,1	0,12	0,15	0,2	250	325	0,05	0,06	0,07	0,08	0,1				
0,04	0,06	0,08	0,1	0,12	0,15	225	275	0,04	0,05	0,06	0,07	0,08				
0,03	0,05	0,08	0,1	0,12	0,15	150	225	0,02	0,03	0,04	0,05	0,06				
400	475	0,06	0,1	0,15	0,2	0,25	0,3	400	475	0,06	0,08	0,1	0,12	0,15		
		0,05	0,08	0,12	0,15	0,2	0,3	300	350	0,06	0,08	0,1	0,12	0,15		
		0,04	0,06	0,1	0,12	0,15	0,2	275	300	0,05	0,06	0,07	0,08	0,1		

Conseils d'utilisation pour fraises en HSS

Gamme d'avances														Avance f (mm/dent)			
Lettre-Code	H	I	J	K	L	M	N	O	P	Q	R	S	T		U	V	W
Ø outil mm	2,00	0,001	0,001	0,001	0,002	0,002	0,004	0,005	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,018	0,020
	3,00	0,002	0,002	0,003	0,003	0,004	0,007	0,010	0,010	0,010	0,015	0,016	0,013	0,019	0,022	0,024	0,030
	5,00	0,005	0,006	0,007	0,009	0,010	0,014	0,020	0,020	0,022	0,025	0,026	0,026	0,028	0,030	0,032	0,038
	6,00	0,006	0,008	0,009	0,011	0,013	0,017	0,024	0,025	0,027	0,031	0,029	0,033	0,039	0,036	0,041	0,047
	8,00	0,010	0,012	0,014	0,016	0,019	0,024	0,032	0,032	0,035	0,042	0,042	0,047	0,053	0,052	0,058	0,064
	10,00	0,013	0,015	0,018	0,021	0,025	0,030	0,038	0,039	0,044	0,050	0,053	0,059	0,065	0,066	0,073	0,080
	12,00	0,010	0,018	0,022	0,026	0,030	0,036	0,046	0,048	0,052	0,059	0,063	0,072	0,079	0,085	0,090	0,100
	16,00	0,020	0,023	0,027	0,032	0,038	0,045	0,054	0,058	0,063	0,071	0,079	0,088	0,095	0,100	0,110	0,120
	20,00	0,023	0,028	0,033	0,038	0,045	0,057	0,066	0,073	0,080	0,090	0,097	0,100	0,110	0,120	0,130	0,140
	25,00	0,030	0,035	0,040	0,045	0,055	0,065	0,075	0,100	0,120	0,130	0,140	0,150	0,165	0,170	0,180	0,190

a_e = Largeur de coupe
a_p = prof. de coupe



$$a_e = 1,0 \times D$$

Les codes d'avance dont les lettres sont en caractères gras, doivent être utilisés de préférence, tant que le dégagement de la fraise le permet.

Fraisage en plongée inclinée et rainurage:

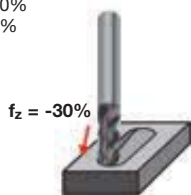
Lors du fraisage en plongée l'avance (v_f = mm/min) devrait être réduite comme expliqué ci-après. Lors de profondeurs de fraisage plus importantes > 1 x D, il faut en plus évacuer les copeaux. La même chose est valable lors du passage au fraisage radial.

Rainurage

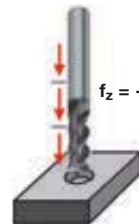
a_p = prof. de coupe 0,5 x D = f_z 100%
a_p = prof. de coupe 1,0 x D = f_z 75%

Fraisage

Lors du perçage l'avance (v_f = mm/min) doit être réduite comme montré ci-après. Lors de profondeurs de fraisage plus importantes > 0,5 x D, il faut en plus évacuer les copeaux.



f_z = -30%



f_z = -70%

Produits de réfrigération:

- Huile de coupe
- Emulsion d'huile à forer
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de ciment, non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers trempés	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		<input checked="" type="checkbox"/>
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		<input checked="" type="checkbox"/>
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		<input checked="" type="checkbox"/>
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes dures	-		≤350 HB	<input checked="" type="checkbox"/>
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Alliages d'Al d'inject. ≤10% Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input checked="" type="checkbox"/>
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input checked="" type="checkbox"/>
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Laiton à copeaux courts à copeaux longs	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Therm durcissables	Résine époxy, Résopal, Pertinax, Moltopren			- <input type="checkbox"/>
Thermoplastiques	Plexiglas, Hostalen, Novodur, Makralon			- <input checked="" type="checkbox"/>
Kevlar - plast. renf. de fibres	Kevlar			- <input type="checkbox"/>
d'aramide, de verre ou de carb.	GFK/CFK			- <input type="checkbox"/>

Rainurage

Référence	74231 74280	74243 74282	54275 64640 64604	64670 64641	54080 54180	74244	74294	64671	54294	54276	54825	54845	74816	54816
Matière	M42		M42			M42	M42			HSS-E-PM		M42	M42	
DIN	327 D	844 K	327 D	844 K	N.usine	844 L		844 L		N.usine	844 K		844 K	844 K
Type	N		N			N		N			NRf		NR	NR
Page	652/658	654/660	680/653/659	655/661	664/665	656	663	657	662	681	673	677	674	675

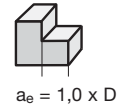
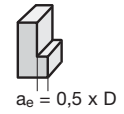


V _c m/min	Code avance	Code avance	V _c m/min	Code avance	Code avance	V _c m/min	Code avance	V _c m/min	Code avance	Code avance	V _c m/min	Code avance	V _c m/min	V _c m/min	Code avance
28	M	61	M	22	K	49	K	90	O	34	M	61	N		
25	L	55	L	20	K	44	K	80	N	30	K	55	L		
25	L	55	L	20	K	44	K	80	N	30	K	55	L		
22	M	50	M	18	K	40	K	75	M	28	J	50	K		
28	L	61	L	22	K	49	K	90	N	34	K	61	L		
26	L	55	L	21	K	44	K	80	N	30	K	55	L		
22	M	50	M	18	K	40	K	75	M	28	J	50	K		
22	M	50	M	18	K	40	K	75	M	28	J	50	K		
17	M	39	M	14	K	31	K	60	L	22	I	39	J		
28	L	61	L	22	K	49	K	90	N	34	K	61	L		
22	L	50	L	18	K	40	K	75	N	28	K	50	L		
17	M	39	M	14	K	31	K	60	M	22	J	39	K		
22	L	50	L	18	K	40	K	75	N	28	K	50	L		
17	L	39	L	14	K	31	K	60	L	22	I	39	J		
28	L	61	L	22	K	49	K	90	N	34	K	61	L		
11	L	28	L	9	K	22	K	40	L	15	I	28	J		
11	M	28	M	9	K	22	K	40	M	15	J	28	K		
11	L	22	L					33	L			22	J		
18	M	42	M					65	M	23	J	42	K		
14	L	39	L					60	L	21	I	39	J		
14	L	39	L					60	M	21	J	39	K		
20	L	50	L	16	K	40	K	75	N	28	K	50	L		
14	L	42	L	11	K	34	K	65	M			42	K		
20	L	50	L	16	K	40	K	75	N	28	K	50	L		
14	L	42	L	11	K	34	K	65	M			42	K		
11	L	31	L					45	K			31	I		
5	L	9	L					14	L			9	J		
11	L	25	L					36	L	13	I	25	J		
7	L	11	L					17	K			11	I		
154	N	220	N												
110	N	198	N												
88	M	132	M												
44	N	121	N												
66	O	143	O												
61	N	99	N												
61	N	99	N												
39	M	94	M												
39	M	94	M												
33	L	72	L												
33	M	72	M												
17	L	44	L												

Conseils d'utilisation pour fraises en acier rapide

Gamme d'avances														Avance f (mm/dent)			
Lettre-Code	H	I	J	K	L	M	N	O	P	Q	R	S	T		U	V	W
Ø outil mm	2,00	0,001	0,001	0,001	0,002	0,002	0,004	0,005	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,018	0,020
	3,00	0,002	0,002	0,003	0,003	0,004	0,007	0,010	0,010	0,010	0,015	0,016	0,013	0,019	0,022	0,024	0,030
	5,00	0,005	0,006	0,007	0,009	0,010	0,014	0,020	0,020	0,022	0,025	0,026	0,026	0,028	0,030	0,032	0,038
	6,00	0,006	0,008	0,009	0,011	0,013	0,017	0,024	0,025	0,027	0,031	0,029	0,033	0,039	0,036	0,041	0,047
	8,00	0,010	0,012	0,014	0,016	0,019	0,024	0,032	0,032	0,035	0,042	0,042	0,047	0,053	0,052	0,058	0,064
	10,00	0,013	0,015	0,018	0,021	0,025	0,030	0,038	0,039	0,044	0,050	0,053	0,059	0,065	0,066	0,073	0,080
	12,00	0,010	0,018	0,022	0,026	0,030	0,036	0,046	0,048	0,052	0,059	0,063	0,072	0,079	0,085	0,090	0,100
	16,00	0,020	0,023	0,027	0,032	0,038	0,045	0,054	0,058	0,063	0,071	0,079	0,088	0,095	0,100	0,110	0,120
	20,00	0,023	0,028	0,033	0,038	0,045	0,057	0,066	0,073	0,080	0,090	0,097	0,100	0,110	0,120	0,130	0,140
	25,00	0,030	0,035	0,040	0,045	0,055	0,065	0,075	0,100	0,120	0,130	0,140	0,150	0,165	0,170	0,180	0,190

a_e = Largeur de coupe
 a_p = prof. de coupe



Les codes d'avance dont les lettres sont en caractères gras, doivent être utilisés de préférence, tant que le dégagement de la fraise le permet.

Fraisage en plongée inclinée et rainurage:

Lors du fraisage en plongée l'avance (v_f = mm/min) devrait être réduite comme expliqué ci-après. Lors de profondeurs de fraisage plus importantes > 1 x D, il faut en plus évacuer les copeaux. La même chose est valable lors du passage au fraisage radial.

Rainurage

a_p = prof. de coupe 0,5 x D = f_z 100%
 a_p = prof. de coupe 1,0 x D = f_z 75%

Fraisage

Lors du perçage l'avance (v_f = mm/min) doit être réduite comme montré ci-après. Lors de profondeurs de fraisage plus importantes > 0,5 x D, il faut en plus évacuer les copeaux.



Produits de réfrigération:

- Huile de coupe ■
- Emulsion d'huile à forer ■
- seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		■ ■
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		■ ■
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		■ ■ ■
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		■ ■
Aciers de ciment, non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		■
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		■ ■
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	>850-≤1000 ≥1000-1200		■ ■
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		■ ■
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		■
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	■
Aciers trempés	-		≤40-48 HRC >48-60 HRC	■ ■
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		■
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		■
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		■
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		■ ■
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	■ ■
Fontes dures	-		≤350 HB	■
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			■ ■
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		■ ■
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		■
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		■ ■
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		■
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		■
Alliages d'Al d'inject. ≤10% Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		■
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		■
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		■
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		■
Laiton à copeaux courts à copeaux longs	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		■ ■
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		■ ■
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		■ ■
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			■
Thermoplastiques	Plexiglas, Hostalen, Novodur, Makralon			■
Kevlar - plast. renf. de fibres	Kevlar			■
d'aramide, de verre ou de carb.	GFK/CFK			■

Fraisage de finition

Fraisage d'ébauche

Référence

Matière
DIN
Type
Page

74617	74847	64667	54847	74800	74825	74845	54825	54845	74816 74836	54816 54836	54815
M42	M42	M42		M42	HSS-E-PM		HSS-E-PM		M42	M42	
844K	844 L	844 K	844 L	N. usine	844 K		844 K		844 K/L	844 K/L	
N	N	N		N	NRf		NRf		NR	NF	
666	668	667	669	670	672	676	673	677	674/678	675/679	671



V _c m/min	Code avance	V _c m/min	Code avance	V _c m/min	Code avance	V _c m/min	Code avance	V _c m/min	Code avance	V _c m/min	Code avance	V _c m/min	Code avance	V _c m/min	Code avance
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24	L	27	M	61	N	16	K	51	N	92	O	33	L	61	M
24	L	27	M	61	N	16	K	51	N	92	O	33	L	61	M
22	K	25	L	55	M	15	K	46	M	83	N	31	L	55	L
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25	L	28	M	61	N	17	K	51	N	92	O	33	L	61	M
22	K	25	L	55	M	15	K	46	M	83	N	31	L	55	L
22	K	25	L	55	M	15	K	46	M	83	N	31	L	55	L
17	J	19	L	43	L	11	K	36	L	65	M	24	K	43	L
28	L	31	M	68	N	19	K	57	N	102	O	38	L	68	M
22	L	25	M	55	N	15	K	46	N	83	O	31	L	55	M
17	K	19	L	43	M	11	K	36	M	65	N	24	L	43	L
22	L	25	M	55	N	15	K	46	N	83	O	31	L	55	M
17	J	19	L	43	L	11	K	36	L	65	M	24	K	43	L
28	L	31	M	68	N	19	K	57	N	102	O	38	L	68	M
11	J	13	L	31	L	8	K	26	L	47	M	17	K	31	L
11	K	13	L	31	M	8	K	26	M	47	N	17	L	31	L
		13	L	25	L			20	L	37	M	14	K	25	L

18	K	20	L	47	M	13	K	39	M	70	N	26	L	47	L
13	J	15	L	43	L	9	K	36	L	65	M	24	K	43	L
13	K	15	L	43	M	9	K	36	M	65	N	24	L	43	L
20	L	22	M	55	N			46	N	83	O	31	L	55	M
		15	L	47	M			39	M	70	N	26	L	47	L
20	L	22	M	55	N			46	N	83	O	31	L	55	M
		15	L	47	M			39	M	70	N	26	L	47	L
11	I	13	K	35	L			29	L	52	L	19	K	35	K

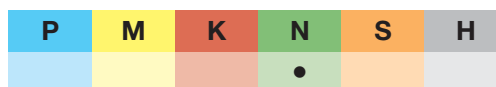
		5	L	10	L			9	L	16	M	6	K	10	L
11	J	13	L	27	L			22	L	40	M	15	K	27	L
		8	K	13	L			10	L	19	L	7	K	13	K
155	O	170	P	242	Q										
110	N	121	O	218	P										
90	M	97	N	146	O										
40	N	49	O	134	P										
65	O	73	P	158	Q										
62	N	68	O	109	P										
62	M	68	N	109	O										
40	M	43	N	104	O										
40	M	43	N	104	O										
33	L	37	M	80	N										
33	L	37	M	80	N										
17	K	19	L	49	M										

Fraises en CW monobloc

Fraises à rainurer Alu (3 dents)

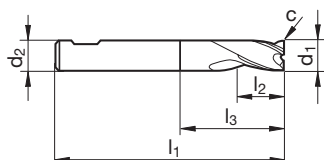


Référence **74204**



Conseils d'util.,
page 570

- extra court
- coupe au centre



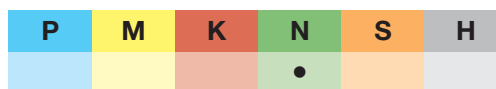
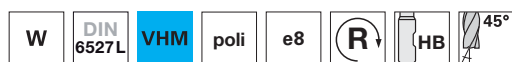
d1 e8 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
3,000	6,000	50,000	4,000	8,400	0,030	2	3,000
4,000	6,000	54,000	5,000	10,400	0,030	2	4,000
5,000	6,000	54,000	6,000	12,400	0,030	2	5,000
6,000	6,000	54,000	7,000	18,000	0,030	2	6,000
8,000	8,000	58,000	9,000	22,000	0,050	2	8,000
10,000	10,000	66,000	11,000	26,000	0,050	2	10,000
12,000	12,000	73,000	12,000	28,000	0,100	2	12,000
14,000	14,000	75,000	14,000	30,000	0,100	2	14,000
16,000	16,000	82,000	16,000	34,000	0,100	2	16,000
18,000	18,000	84,000	18,000	36,000	0,100	2	18,000
20,000	20,000	92,000	20,000	42,000	0,100	2	20,000

Fraises en CW monobloc

Fraises à rainurer Alu (3 dents)

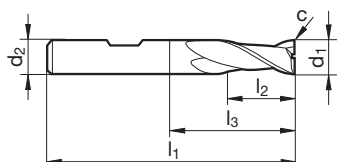


Référence **74202**



Conseils d'util.,
page 570

• coupe au centre



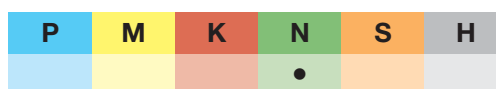
d1 e8 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
3,000	6,000	57,000	7,000	11,400	0,030	2	3,000
4,000	6,000	57,000	8,000	13,900	0,030	2	4,000
5,000	6,000	57,000	10,000	16,900	0,030	2	5,000
6,000	6,000	57,000	10,000	21,000	0,030	2	6,000
8,000	8,000	63,000	16,000	27,000	0,050	2	8,000
10,000	10,000	72,000	19,000	32,000	0,050	2	10,000
12,000	12,000	83,000	22,000	38,000	0,100	2	12,000
14,000	14,000	83,000	22,000	38,000	0,100	2	14,000
16,000	16,000	92,000	26,000	44,000	0,100	2	16,000
18,000	18,000	92,000	26,000	44,000	0,100	2	18,000
20,000	20,000	104,000	32,000	54,000	0,100	2	20,000

Fraises en CW monobloc

Fraises à rainurer Alu (3 dents)

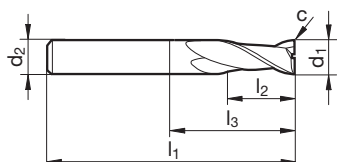


Référence **74206**



Conseils d'util.,
page 570

- extra long
- coupe au centre



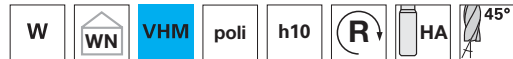
d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
5,000	5,000	75,000	30,000	47,000	0,030	2	5,000
6,000	6,000	75,000	30,000	39,000	0,030	2	6,000
8,000	8,000	100,000	40,000	64,000	0,050	2	8,000
10,000	10,000	100,000	40,000	60,000	0,050	2	10,000
12,000	12,000	150,000	45,000	105,000	0,100	2	12,000
16,000	16,000	150,000	65,000	102,000	0,100	2	16,000

Fraises en CW monobloc

Fraises à rainurer Alu (3 dents)

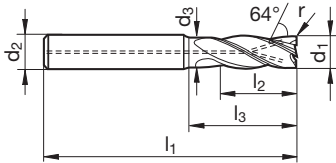


Référence **74479**



Conseils d'util.,
page 570

- avec adduction intérieure du produit de lubrification et de refroidissement afin d'obtenir des tenues de coupe plus élevées et l'évacuation optimale des copeaux
- coupe au centre



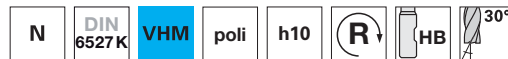
d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	r mm x 45°	Z	N° de code
6,000	6,000	57,000	10,000	21,000	1,000	3	6,000
8,000	8,000	63,000	16,000	27,000	1,000	3	8,000
10,000	10,000	72,000	19,000	32,000	1,500	3	10,000
12,000	12,000	83,000	22,000	38,000	1,500	3	12,000
16,000	16,000	92,000	26,000	44,000	2,000	3	16,000
20,000	20,000	104,000	32,000	54,000	2,500	3	20,000

Fraises en CW monobloc

Fraises pour clavettes (2 dents)



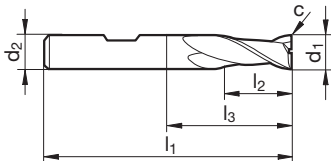
Référence **74520**



P	M	K	N	S	H
•	•	•	•		

Conseils d'util.,
page 566

- extra court
- coupe au centre
- pour applications universelles



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
2,000	6,000	50,000	3,000	6,400	0,025	2	2,000
2,500	6,000	50,000	3,000	6,400	0,050	2	2,500
3,000	6,000	50,000	4,000	8,900	0,050	2	3,000
3,500	6,000	50,000	4,000	9,000	0,050	2	3,500
4,000	6,000	54,000	5,000	10,400	0,050	2	4,000
4,500	6,000	54,000	5,000	11,500	0,050	2	4,500
5,000	6,000	54,000	6,000	12,900	0,050	2	5,000
5,500	6,000	54,000	7,000	14,400	0,050	2	5,500
6,000	6,000	54,000	7,000	18,000	0,050	2	6,000
6,500	8,000	58,000	8,000	17,400	0,100	2	6,500
7,000	8,000	58,000	8,000	17,400	0,100	2	7,000
7,500	8,000	58,000	9,000	18,400	0,100	2	7,500
8,000	8,000	58,000	9,000	22,000	0,100	2	8,000
8,500	10,000	66,000	10,000	21,400	0,100	2	8,500
9,000	10,000	66,000	10,000	21,400	0,100	2	9,000
9,500	10,000	66,000	11,000	22,400	0,100	2	9,500
10,000	10,000	66,000	11,000	26,000	0,100	2	10,000
11,000	12,000	73,000	12,000	25,400	0,100	2	11,000
12,000	12,000	73,000	12,000	28,000	0,100	2	12,000
13,000	14,000	75,000	14,000	29,400	0,150	2	13,000
14,000	14,000	75,000	14,000	30,000	0,150	2	14,000
15,000	16,000	82,000	16,000	33,400	0,150	2	15,000
16,000	16,000	82,000	16,000	34,000	0,150	2	16,000
18,000	18,000	84,000	18,000	36,000	0,150	2	18,000
20,000	20,000	92,000	20,000	42,000	0,150	2	20,000

Fraises en CW monobloc

Fraises pour clavettes (2 dents)



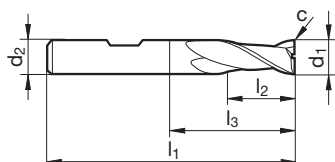
Référence **54520**



P	M	K	N	S	H
•	•	•	○	•	

Conseils d'util.,
page 566

- extra court
- coupe au centre
- pour applications universelles



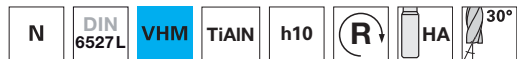
d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
2,000	6,000	50,000	3,000	7,400	0,025	2	2,000
3,000	6,000	50,000	4,000	8,400	0,050	2	3,000
4,000	6,000	54,000	5,000	10,400	0,050	2	4,000
5,000	6,000	54,000	6,000	12,400	0,050	2	5,000
6,000	6,000	54,000	7,000	18,000	0,050	2	6,000
8,000	8,000	58,000	9,000	22,000	0,100	2	8,000
10,000	10,000	66,000	11,000	26,000	0,100	2	10,000
12,000	12,000	73,000	12,000	28,000	0,100	2	12,000
14,000	14,000	75,000	14,000	30,000	0,150	2	14,000
16,000	16,000	82,000	16,000	34,000	0,150	2	16,000
18,000	18,000	84,000	18,000	36,000	0,150	2	18,000
20,000	20,000	92,000	20,000	42,000	0,150	2	20,000

Fraises en CW monobloc

Fraises pour clavettes (2 dents)



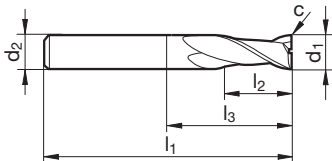
Référence **54519**



P	M	K	N	S	H
•	•	•	○	•	•

Conseils d'util.,
page 568

- coupe au centre
- pour applications universelles



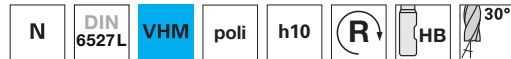
d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
2,000	6,000	57,000	6,000	9,400	0,025	2	2,000
2,800	6,000	57,000	7,000	11,900	0,050	2	2,800
3,000	6,000	57,000	7,000	11,900	0,050	2	3,000
3,800	6,000	57,000	8,000	13,400	0,050	2	3,800
4,000	6,000	57,000	8,000	13,400	0,050	2	4,000
4,800	6,000	57,000	10,000	16,900	0,050	2	4,800
5,000	6,000	57,000	10,000	16,900	0,050	2	5,000
5,750	6,000	57,000	10,000	18,400	0,050	2	5,750
6,000	6,000	57,000	10,000	21,000	0,050	2	6,000
6,750	8,000	63,000	13,000	22,400	0,100	2	6,750
7,000	8,000	63,000	13,000	22,400	0,100	2	7,000
7,750	8,000	63,000	16,000	25,400	0,100	2	7,750
8,000	8,000	63,000	16,000	27,000	0,100	2	8,000
8,700	10,000	72,000	16,000	27,400	0,100	2	8,700
9,000	10,000	72,000	16,000	27,400	0,100	2	9,000
9,700	10,000	72,000	19,000	30,400	0,100	2	9,700
10,000	10,000	72,000	19,000	32,000	0,100	2	10,000
11,700	12,000	83,000	22,000	35,400	0,100	2	11,700
12,000	12,000	83,000	22,000	38,000	0,100	2	12,000
14,000	14,000	83,000	22,000	38,000	0,150	2	14,000
15,700	16,000	92,000	26,000	44,000	0,150	2	15,700
18,000	18,000	92,000	26,000	44,000	0,150	2	18,000
20,000	20,000	104,000	32,000	54,000	0,150	2	20,000

Fraises en CW monobloc

Fraises pour clavettes (2 dents)



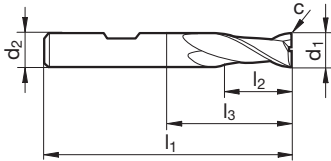
Référence **74521**



P	M	K	N	S	H
•	•	•	•		

Conseils d'util.,
page 566

- coupe au centre
- pour applications universelles



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
2,000	6,000	57,000	6,000	9,400	0,025	2	2,000
2,500	6,000	57,000	7,000	10,400	0,050	2	2,500
3,000	6,000	57,000	7,000	11,900	0,050	2	3,000
3,500	6,000	57,000	7,000	12,400	0,050	2	3,500
3,800	6,000	57,000	8,000	13,400	0,050	2	3,800
4,000	6,000	57,000	8,000	13,400	0,050	2	4,000
4,500	6,000	57,000	8,000	14,900	0,050	2	4,500
4,800	6,000	57,000	10,000	16,900	0,050	2	4,800
5,000	6,000	57,000	10,000	16,900	0,050	2	5,000
5,750	6,000	57,000	10,000	18,400	0,050	2	5,750
6,000	6,000	57,000	10,000	21,000	0,050	2	6,000
6,750	8,000	63,000	13,000	22,400	0,100	2	6,750
7,000	8,000	63,000	13,000	22,400	0,100	2	7,000
7,750	8,000	63,000	16,000	25,400	0,100	2	7,750
8,000	8,000	63,000	16,000	27,000	0,100	2	8,000
8,700	10,000	72,000	16,000	27,400	0,100	2	8,700
9,000	10,000	72,000	16,000	27,400	0,100	2	9,000
9,700	10,000	72,000	19,000	30,400	0,100	2	9,700
10,000	10,000	72,000	19,000	32,000	0,100	2	10,000
11,700	12,000	83,000	22,000	35,400	0,100	2	11,700
12,000	12,000	83,000	22,000	38,000	0,100	2	12,000
14,000	14,000	83,000	22,000	38,000	0,150	2	14,000
15,700	16,000	92,000	26,000	44,000	0,150	2	15,700
16,000	16,000	92,000	26,000	44,000	0,150	2	16,000
18,000	18,000	92,000	26,000	44,000	0,150	2	18,000
20,000	20,000	104,000	32,000	54,000	0,150	2	20,000

Fraises en CW monobloc

Fraises pour clavettes (2 dents)



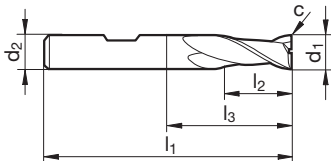
Référence **54521**



P	M	K	N	S	H
•	•	•	○	•	•

Conseils d'util.,
page 568

- coupe au centre
- pour applications universelles



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
2,000	6,000	57,000	6,000	10,400	0,025	2	2,000
2,800	6,000	57,000	7,000	11,400	0,050	2	2,800
3,000	6,000	57,000	7,000	11,400	0,050	2	3,000
3,800	6,000	57,000	8,000	13,900	0,050	2	3,800
4,000	6,000	57,000	8,000	13,900	0,050	2	4,000
4,800	6,000	57,000	10,000	16,900	0,050	2	4,800
5,000	6,000	57,000	10,000	16,900	0,050	2	5,000
5,750	6,000	57,000	10,000	17,900	0,050	2	5,750
6,000	6,000	57,000	10,000	21,000	0,050	2	6,000
6,750	8,000	63,000	13,000	21,900	0,100	2	6,750
7,000	8,000	63,000	13,000	21,900	0,100	2	7,000
7,750	8,000	63,000	16,000	25,900	0,100	2	7,750
8,000	8,000	63,000	16,000	27,000	0,100	2	8,000
8,700	10,000	72,000	16,000	27,400	0,100	2	8,700
9,000	10,000	72,000	16,000	27,400	0,100	2	9,000
9,700	10,000	72,000	19,000	31,400	0,100	2	9,700
10,000	10,000	72,000	19,000	32,000	0,100	2	10,000
11,700	12,000	83,000	22,000	36,400	0,100	2	11,700
12,000	12,000	83,000	22,000	38,000	0,100	2	12,000
14,000	14,000	83,000	22,000	38,000	0,150	2	14,000
15,700	16,000	92,000	26,000	44,000	0,150	2	15,700
16,000	16,000	92,000	26,000	44,000	0,150	2	16,000
18,000	18,000	92,000	26,000	44,000	0,150	2	18,000
20,000	20,000	104,000	32,000	54,000	0,150	2	20,000

Fraises en CW monobloc

Fraises pour clavettes (2 dents)



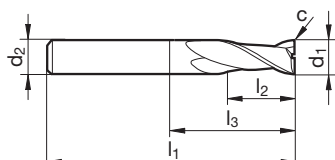
Référence **74404**



P	M	K	N	S	H
●		○	○		

Conseils d'util.,
page 568

- extra long
- coupe au centre
- pour applications universelles



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
3,000	3,000	75,000	20,000	28,000	0,050	2	3,000
4,000	4,000	75,000	25,000	33,000	0,050	2	4,000
5,000	5,000	75,000	30,000	37,000	0,050	2	5,000
6,000	6,000	75,000	30,000	41,000	0,050	2	6,000
8,000	8,000	100,000	40,000	53,000	0,100	2	8,000
10,000	10,000	100,000	40,000	50,000	0,100	2	10,000
12,000	12,000	150,000	45,000	58,000	0,100	2	12,000
14,000	14,000	150,000	45,000	63,000	0,150	2	14,000
16,000	16,000	150,000	65,000	85,000	0,150	2	16,000
18,000	18,000	150,000	65,000	85,000	0,150	2	18,000
20,000	20,000	150,000	65,000	100,000	0,150	2	20,000

Fraises en CW monobloc

Fraises pour clavettes (2 dents)



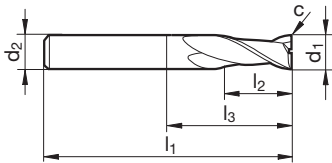
Référence **54404**



P	M	K	N	S	H
•		•	○		

Conseils d'util.,
page 568

- extra long
- coupe au centre
- pour applications universelles



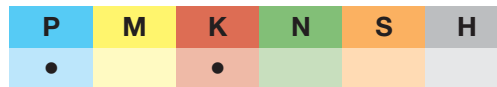
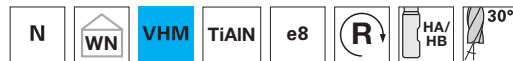
d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
5,000	5,000	75,000	30,000	41,000	0,050	2	5,000
6,000	6,000	75,000	30,000	42,000	0,050	2	6,000
8,000	8,000	100,000	40,000	53,000	0,100	2	8,000
10,000	10,000	100,000	40,000	50,000	0,100	2	10,000
12,000	12,000	150,000	45,000	58,000	0,100	2	12,000
14,000	14,000	150,000	45,000	64,000	0,150	2	14,000
16,000	16,000	150,000	65,000	86,000	0,150	2	16,000
20,000	20,000	150,000	65,000	89,000	0,150	2	20,000

Fraises en CW monobloc

Minifraises à rainurer (3 dents)

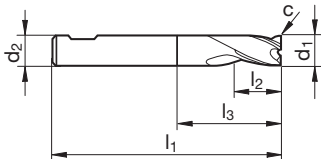


Référence **64080**



Conseils d'util.,
page 568

- extra court
- coupe au centre
- Fraise optimale «One-Way»



d1 e8 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
0,300	3,000	38,000	1,000	3,400		3	0,300
0,400	3,000	38,000	1,000	3,400		3	0,400
0,500	3,000	38,000	1,500	3,400	0,025	3	0,500
0,600	3,000	38,000	1,500	3,400	0,025	3	0,600
0,800	3,000	38,000	2,000	3,900	0,025	3	0,800
1,000	3,000	38,000	2,000	3,900	0,025	3	1,000
1,200	3,000	38,000	2,000	3,900	0,025	3	1,200
1,500	3,000	38,000	2,000	3,900	0,025	3	1,500
1,800	3,000	38,000	2,000	3,900	0,025	3	1,800
2,000	6,000	38,000	4,000	7,400	0,025	3	2,000
2,500	6,000	38,000	5,000	8,400	0,050	3	2,500
3,000	6,000	38,000	5,000	8,400	0,050	3	3,000
3,500	6,000	38,000	6,000	9,400	0,050	3	3,500
4,000	6,000	38,000	7,000	10,400	0,050	3	4,000
4,500	6,000	38,000	8,000	12,400	0,050	3	4,500
5,000	6,000	38,000	8,000	12,400	0,050	3	5,000
5,500	6,000	38,000	8,000	12,400	0,050	3	5,500
5,750	6,000	38,000	8,000	12,400	0,050	3	5,750
6,000	6,000	38,000	8,000	14,000	0,050	3	6,000
6,750	8,000	42,000	10,000	15,400	0,100	3	6,750
7,000	8,000	42,000	10,000	16,400	0,100	3	7,000
7,750	8,000	42,000	10,000	16,400	0,100	3	7,750
8,000	8,000	43,000	11,000	19,000	0,100	3	8,000
8,700	10,000	48,000	11,000	17,400	0,100	3	8,700
9,000	10,000	48,000	11,000	17,400	0,100	3	9,000
9,700	10,000	48,000	11,000	17,400	0,100	3	9,700
10,000	10,000	50,000	13,000	23,000	0,100	3	10,000
12,000	12,000	55,000	15,000	24,500	0,100	3	12,000
14,000	14,000	58,000	15,000	28,000	0,150	3	14,000
16,000	16,000	62,000	18,000	29,000	0,150	3	16,000
18,000	18,000	70,000	20,000	37,000	0,150	3	18,000
20,000	20,000	75,000	22,000	41,000	0,150	3	20,000

Fraises en CW monobloc

Minifraises à rainurer (3 dents)



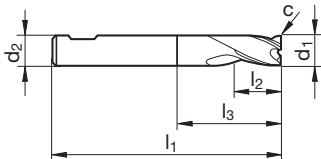
Référence **64180**



P	M	K	N	S	H
	•			•	

Conseils d'util.,
page 568

- version rigide
- coupe au centre
- Fraise optimale «One-Way»



d1 e8 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
1,000	3,000	38,000	2,000	3,900	0,025	3	1,000
1,200	3,000	38,000	2,000	3,900	0,025	3	1,200
1,500	3,000	38,000	3,000	4,900	0,025	3	1,500
1,800	3,000	38,000	3,000	4,900	0,025	3	1,800
2,000	6,000	45,000	4,000	7,400	0,025	3	2,000
2,500	6,000	45,000	5,000	8,400	0,050	3	2,500
3,000	6,000	45,000	6,000	9,400	0,050	3	3,000
3,500	6,000	45,000	6,000	9,400	0,050	3	3,500
4,000	6,000	45,000	7,000	10,400	0,050	3	4,000
4,500	6,000	45,000	8,000	12,400	0,050	3	4,500
5,000	6,000	45,000	8,000	12,400	0,050	3	5,000
5,500	6,000	45,000	8,000	12,400	0,050	3	5,500
5,750	6,000	45,000	10,000	15,000	0,050	3	5,750
6,000	6,000	45,000	10,000	15,000	0,050	3	6,000
6,750	8,000	55,000	10,000	15,400	0,100	3	6,750
7,000	8,000	55,000	12,000	18,400	0,100	3	7,000
7,750	8,000	55,000	12,000	18,400	0,100	3	7,750
8,000	8,000	55,000	13,000	19,000	0,100	3	8,000
8,700	10,000	55,000	14,000	20,400	0,100	3	8,700
9,000	10,000	55,000	14,000	20,400	0,100	3	9,000
9,700	10,000	55,000	16,000	23,400	0,100	3	9,700
10,000	10,000	55,000	16,000	25,000	0,100	3	10,000

Fraises en CW monobloc

Fraises à rainurer (3 dents)



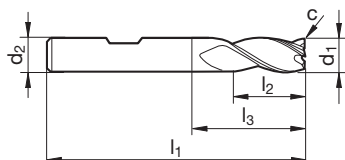
Référence **74522**



P	M	K	N	S	H
•	•	•	•		

Conseils d'util.,
page 566

- extra court
- coupe au centre
- pour applications universelles



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
2,000	6,000	50,000	3,000	7,400	0,025	3	2,000
3,000	6,000	50,000	4,000	8,400	0,050	3	3,000
4,000	6,000	54,000	5,000	10,400	0,050	3	4,000
5,000	6,000	54,000	6,000	12,400	0,050	3	5,000
5,500	6,000	54,000	7,000	14,900	0,050	3	5,500
6,000	6,000	54,000	7,000	18,000	0,050	3	6,000
7,000	8,000	58,000	8,000	16,900	0,100	3	7,000
8,000	8,000	58,000	9,000	22,000	0,100	3	8,000
10,000	10,000	66,000	11,000	26,000	0,100	3	10,000
12,000	12,000	73,000	12,000	28,000	0,100	3	12,000
14,000	14,000	75,000	14,000	30,000	0,150	3	14,000
16,000	16,000	82,000	16,000	34,000	0,150	3	16,000
18,000	18,000	84,000	18,000	36,000	0,150	3	18,000
20,000	20,000	92,000	20,000	42,000	0,150	3	20,000

Fraises en CW monobloc

Fraises à rainurer (3 dents)



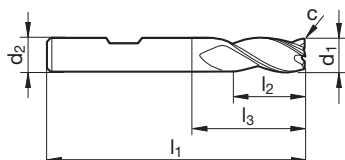
Référence **64522**



P	M	K	N	S	H
•	•	•	○	•	

Conseils d'util.,
page 566

- extra court
- coupe au centre
- pour applications universelles



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
2,000	6,000	50,000	3,000	7,400	0,025	3	2,000
3,000	6,000	50,000	4,000	8,400	0,050	3	3,000
4,000	6,000	54,000	5,000	10,400	0,050	3	4,000
5,000	6,000	54,000	6,000	12,400	0,050	3	5,000
6,000	6,000	54,000	7,000	18,000	0,050	3	6,000
7,000	8,000	58,000	8,000	16,900	0,100	3	7,000
8,000	8,000	58,000	9,000	22,000	0,100	3	8,000
10,000	10,000	66,000	11,000	26,000	0,100	3	10,000
12,000	12,000	73,000	12,000	28,000	0,100	3	12,000
14,000	14,000	75,000	14,000	30,000	0,150	3	14,000
16,000	16,000	82,000	16,000	34,000	0,150	3	16,000
20,000	20,000	92,000	20,000	42,000	0,150	3	20,000

Fraises en CW monobloc

Fraises à rainurer (3 dents)



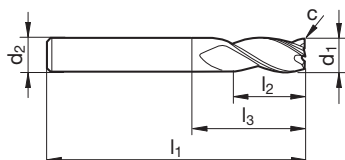
Référence **54523**



P	M	K	N	S	H
•	•	•	○	•	•

Conseils d'util.,
page 568

- coupe au centre
- pour applications universelles



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
2,000	6,000	57,000	6,000	10,400	0,025	3	2,000
2,500	6,000	57,000	7,000	11,400	0,050	3	2,500
3,000	6,000	57,000	7,000	11,400	0,050	3	3,000
3,500	6,000	57,000	7,000	11,400	0,050	3	3,500
4,000	6,000	57,000	8,000	13,900	0,050	3	4,000
4,500	6,000	57,000	8,000	13,900	0,050	3	4,500
5,000	6,000	57,000	10,000	16,900	0,050	3	5,000
6,000	6,000	57,000	10,000	21,000	0,050	3	6,000
8,000	8,000	63,000	16,000	27,000	0,100	3	8,000
10,000	10,000	72,000	19,000	32,000	0,100	3	10,000
12,000	12,000	83,000	22,000	38,000	0,100	3	12,000
14,000	14,000	83,000	22,000	38,000	0,150	3	14,000
16,000	16,000	92,000	26,000	44,000	0,150	3	16,000
18,000	18,000	92,000	26,000	44,000	0,150	3	18,000
20,000	20,000	104,000	32,000	54,000	0,150	3	20,000

Fraises en CW monobloc

Fraises à rainurer (3 dents)



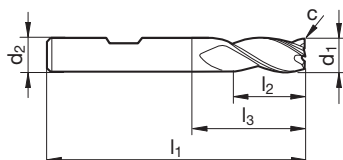
Référence **74523**



P	M	K	N	S	H
•	•	•	•		

Conseils d'util.,
page 566

- coupe au centre
- pour applications universelles



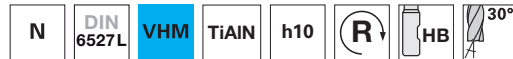
d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
2,000	6,000	57,000	6,000	10,400	0,025	3	2,000
2,500	6,000	57,000	7,000	11,400	0,050	3	2,500
3,000	6,000	57,000	7,000	11,400	0,050	3	3,000
3,500	6,000	57,000	7,000	11,400	0,050	3	3,500
4,000	6,000	57,000	8,000	13,900	0,050	3	4,000
4,500	6,000	57,000	8,000	13,900	0,050	3	4,500
5,000	6,000	57,000	10,000	16,900	0,050	3	5,000
6,000	6,000	57,000	10,000	21,000	0,050	3	6,000
8,000	8,000	63,000	16,000	27,000	0,100	3	8,000
10,000	10,000	72,000	19,000	32,000	0,100	3	10,000
12,000	12,000	83,000	22,000	38,000	0,100	3	12,000
14,000	14,000	83,000	22,000	38,000	0,150	3	14,000
16,000	16,000	92,000	26,000	44,000	0,150	3	16,000
18,000	18,000	92,000	26,000	44,000	0,150	3	18,000
20,000	20,000	104,000	32,000	54,000	0,150	3	20,000

Fraises en CW monobloc

Fraises à rainurer (3 dents)



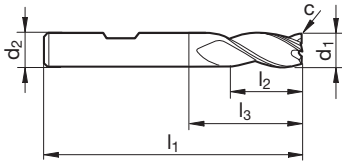
Référence **64523**



P	M	K	N	S	H
•	•	•	○	•	•

Conseils d'util.,
page 568

- coupe au centre
- pour applications universelles



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
2,000	6,000	57,000	6,000	9,400	0,025	3	2,000
2,500	6,000	57,000	7,000	10,400	0,050	3	2,500
3,000	6,000	57,000	7,000	11,900	0,050	3	3,000
3,500	6,000	57,000	7,000	12,400	0,050	3	3,500
4,000	6,000	57,000	8,000	13,400	0,050	3	4,000
4,500	6,000	57,000	8,000	14,900	0,050	3	4,500
5,000	6,000	57,000	10,000	16,900	0,050	3	5,000
6,000	6,000	57,000	10,000	21,000	0,050	3	6,000
8,000	8,000	63,000	16,000	27,000	0,100	3	8,000
10,000	10,000	72,000	19,000	32,000	0,100	3	10,000
12,000	12,000	83,000	22,000	38,000	0,100	3	12,000
14,000	14,000	83,000	22,000	38,000	0,150	3	14,000
16,000	16,000	92,000	26,000	44,000	0,150	3	16,000
18,000	18,000	92,000	26,000	44,000	0,150	3	18,000
20,000	20,000	104,000	32,000	54,000	0,150	3	20,000

Fraises en CW monobloc

Fraises à rainurer (3 dents)



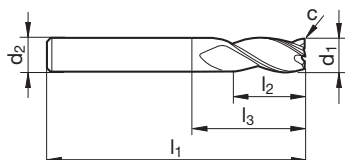
Référence **74424**



P	M	K	N	S	H
●		○	○		

Conseils d'util.,
page 568

- extra long
- coupe au centre
- pour applications universelles



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
3,000	3,000	75,000	20,000	47,000	0,050	3	3,000
4,000	4,000	75,000	25,000	47,000	0,050	3	4,000
5,000	5,000	75,000	30,000	47,000	0,050	3	5,000
6,000	6,000	75,000	30,000	39,000	0,050	3	6,000
8,000	8,000	100,000	40,000	64,000	0,100	3	8,000
10,000	10,000	100,000	40,000	60,000	0,100	3	10,000
12,000	12,000	150,000	45,000	105,000	0,100	3	12,000
16,000	16,000	150,000	65,000	102,000	0,150	3	16,000
20,000	20,000	150,000	65,000	100,000	0,150	3	20,000

Fraises en CW monobloc

Fraises à rainurer (3 dents)



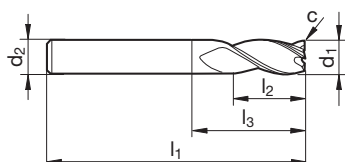
Référence **54424**



P	M	K	N	S	H
●		●	○		

Conseils d'util.,
page 568

- extra long
- coupe au centre
- pour applications universelles



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
3,000	3,000	75,000	20,000	47,000	0,050	3	3,000
4,000	4,000	75,000	25,000	47,000	0,050	3	4,000
5,000	5,000	75,000	30,000	47,000	0,050	3	5,000
6,000	6,000	75,000	30,000	39,000	0,050	3	6,000
8,000	8,000	100,000	40,000	64,000	0,100	3	8,000
10,000	10,000	100,000	40,000	60,000	0,100	3	10,000
12,000	12,000	150,000	45,000	105,000	0,100	3	12,000
16,000	16,000	150,000	65,000	102,000	0,150	3	16,000
20,000	20,000	150,000	65,000	100,000	0,150	3	20,000

Fraises en CW monobloc

Fraises à rainurer (3 dents)



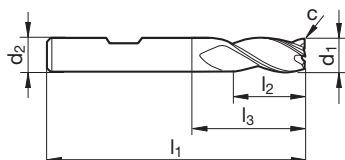
Référence **64570**



P	M	K	N	S	H
•	•	•		○	

Conseils d'util.,
page 568

- Fraise universelle «Haute Performance»
- extra court
- coupe au centre



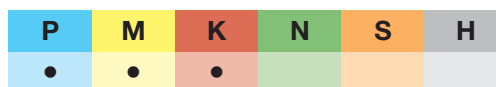
d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
3,000	6,000	50,000	4,000	7,900	0,050	3	3,000
4,000	6,000	54,000	5,000	8,900	0,050	3	4,000
5,000	6,000	54,000	6,000	11,400	0,050	3	5,000
6,000	6,000	54,000	7,000	18,000	0,050	3	6,000
8,000	8,000	58,000	9,000	22,000	0,100	3	8,000
10,000	10,000	66,000	11,000	26,000	0,100	3	10,000
12,000	12,000	73,000	12,000	28,000	0,100	3	12,000
16,000	16,000	82,000	16,000	34,000	0,150	3	16,000
18,000	18,000	84,000	18,000	36,000	0,150	3	18,000
20,000	20,000	92,000	20,000	42,000	0,150	3	20,000

Fraises en CW monobloc

Fraises à rainurer (3 dents)

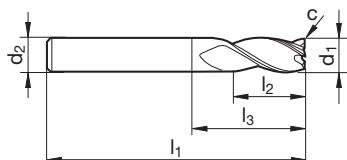


Référence **74478**



Conseils d'util.,
page 566

- Très haut rendement de coupe et silence de fonctionnement
- Fraise universelle «Haute Performance»
- coupe au centre



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
3,000	6,000	57,000	7,000	11,400	0,050	3	3,000
3,500	6,000	57,000	7,000	11,400	0,050	3	3,500
4,000	6,000	57,000	8,000	13,900	0,050	3	4,000
4,500	6,000	57,000	8,000	13,900	0,050	3	4,500
5,000	6,000	57,000	10,000	16,900	0,050	3	5,000
6,000	6,000	57,000	10,000	21,000	0,050	3	6,000
8,000	8,000	63,000	16,000	27,000	0,100	3	8,000
10,000	10,000	72,000	19,000	32,000	0,100	3	10,000
12,000	12,000	83,000	22,000	38,000	0,100	3	12,000
14,000	14,000	83,000	22,000	38,000	0,150	3	14,000
16,000	16,000	92,000	26,000	44,000	0,150	3	16,000
18,000	18,000	92,000	26,000	44,000	0,150	3	18,000
20,000	20,000	104,000	32,000	54,000	0,150	3	20,000

Fraises en CW monobloc

Fraises à rainurer (3 dents)



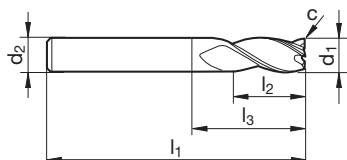
Référence **64478**



P	M	K	N	S	H
•	•	•		○	

Conseils d'util.,
page 568

- Très haut rendement de coupe et silence de fonctionnement
- Fraise universelle «Haute Performance»
- coupe au centre



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
1,000	3,000	38,000	2,000	3,400	0,020	3	1,000
1,500	3,000	38,000	3,000	5,900	0,020	3	1,500
2,000	6,000	57,000	6,000	8,900	0,030	3	2,000
2,500	6,000	57,000	7,000	9,900	0,040	3	2,500
3,000	6,000	57,000	7,000	10,900	0,050	3	3,000
3,500	6,000	57,000	7,000	10,900	0,050	3	3,500
4,000	6,000	57,000	8,000	11,900	0,060	3	4,000
4,500	6,000	57,000	8,000	13,400	0,070	3	4,500
5,000	6,000	57,000	10,000	15,400	0,080	3	5,000
6,000	6,000	57,000	10,000	21,000	0,090	3	6,000
8,000	8,000	63,000	16,000	27,000	0,120	3	8,000
10,000	10,000	72,000	19,000	32,000	0,150	3	10,000
12,000	12,000	83,000	22,000	38,000	0,180	3	12,000
14,000	14,000	83,000	22,000	38,000	0,210	3	14,000
16,000	16,000	92,000	26,000	44,000	0,190	3	16,000
18,000	18,000	92,000	26,000	44,000	0,220	3	18,000
20,000	20,000	104,000	32,000	54,000	0,240	3	20,000

Fraises en CW monobloc

Fraises à rainurer (3 dents)



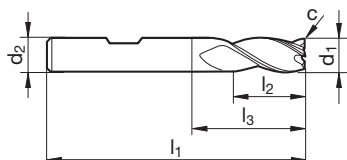
Référence **64571**



P	M	K	N	S	H
•	•	•		○	

Conseils d'util.,
page 568

- Très haut rendement de coupe et silence de fonctionnement
- Fraise universelle «Haute Performance»
- coupe au centre



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
3,000	6,000	57,000	7,000	10,900	0,050	3	3,000
3,500	6,000	57,000	7,000	10,900	0,050	3	3,500
4,000	6,000	57,000	8,000	11,900	0,050	3	4,000
4,500	6,000	57,000	8,000	13,400	0,050	3	4,500
5,000	6,000	57,000	10,000	15,400	0,050	3	5,000
6,000	6,000	57,000	10,000	21,000	0,050	3	6,000
8,000	8,000	63,000	16,000	27,000	0,100	3	8,000
9,000	10,000	72,000	16,000	25,400	0,100	3	9,000
10,000	10,000	72,000	19,000	32,000	0,100	3	10,000
12,000	12,000	83,000	22,000	38,000	0,100	3	12,000
14,000	14,000	83,000	22,000	38,000	0,150	3	14,000
16,000	16,000	92,000	26,000	44,000	0,150	3	16,000
18,000	18,000	92,000	26,000	44,000	0,150	3	18,000
20,000	20,000	104,000	32,000	54,000	0,150	3	20,000

Fraises en CW monobloc

Fraises deux tailles (4 dents)



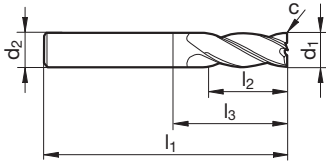
Référence **54524**



P	M	K	N	S	H
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Conseils d'util.,
page 570

- coupe au centre
- pour applications universelles



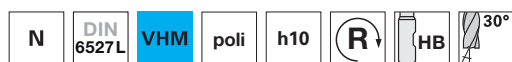
d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
2,000	6,000	57,000	7,000	11,400	0,025	4	2,000
3,000	6,000	57,000	8,000	12,900	0,050	4	3,000
4,000	6,000	57,000	11,000	16,900	0,050	4	4,000
5,000	6,000	57,000	13,000	19,900	0,050	4	5,000
6,000	6,000	57,000	13,000	21,000	0,050	4	6,000
8,000	8,000	63,000	19,000	27,000	0,100	4	8,000
10,000	10,000	72,000	22,000	32,000	0,100	4	10,000
12,000	12,000	83,000	26,000	38,000	0,100	4	12,000
14,000	14,000	83,000	26,000	38,000	0,150	4	14,000
16,000	16,000	92,000	32,000	44,000	0,150	4	16,000
18,000	18,000	92,000	32,000	44,000	0,150	4	18,000
20,000	20,000	104,000	38,000	54,000	0,150	4	20,000

Fraises en CW monobloc

Fraises deux tailles (4 dents)



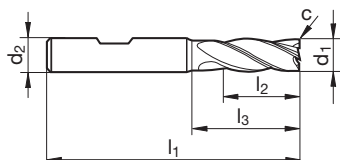
Référence **74525**



P	M	K	N	S	H
•	•	•	•		

Conseils d'util.,
page 570

- coupe au centre
- pour applications universelles



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
3,000	6,000	57,000	8,000	12,900	0,050	4	3,000
4,000	6,000	57,000	11,000	16,900	0,050	4	4,000
5,000	6,000	57,000	13,000	19,900	0,050	4	5,000
6,000	6,000	57,000	13,000	21,000	0,050	4	6,000
8,000	8,000	63,000	19,000	27,000	0,100	4	8,000
10,000	10,000	72,000	22,000	32,000	0,100	4	10,000
12,000	12,000	83,000	26,000	38,000	0,100	4	12,000
14,000	14,000	83,000	26,000	38,000	0,150	4	14,000
16,000	16,000	92,000	32,000	44,000	0,150	4	16,000
18,000	18,000	92,000	32,000	44,000	0,150	4	18,000
20,000	20,000	104,000	38,000	54,000	0,150	4	20,000

Fraises en CW monobloc

Fraises deux tailles (4 dents)



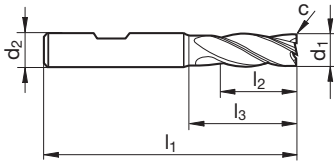
Référence **64525**



P	M	K	N	S	H
●	○	●			

Conseils d'util.,
page 570

- coupe au centre
- pour applications universelles



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
2,000	6,000	57,000	7,000	9,900	0,025	4	2,000
3,000	6,000	57,000	8,000	12,400	0,050	4	3,000
4,000	6,000	57,000	11,000	15,900	0,050	4	4,000
5,000	6,000	57,000	13,000	19,400	0,050	4	5,000
6,000	6,000	57,000	13,000	21,000	0,050	4	6,000
7,000	8,000	63,000	16,000	23,900	0,100	4	7,000
8,000	8,000	63,000	19,000	27,000	0,100	4	8,000
10,000	10,000	72,000	22,000	32,000	0,100	4	10,000
12,000	12,000	83,000	26,000	38,000	0,100	4	12,000
14,000	14,000	83,000	26,000	38,000	0,150	4	14,000
16,000	16,000	92,000	32,000	44,000	0,150	4	16,000
18,000	18,000	92,000	32,000	44,000	0,150	4	18,000
20,000	20,000	104,000	38,000	54,000	0,150	4	20,000

Fraises en CW monobloc

Fraises deux tailles (4 dents)



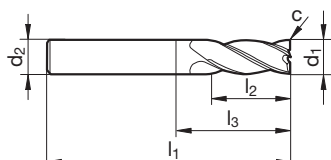
Référence **54444**



P	M	K	N	S	H
•		•	○		

Conseils d'util.,
page 570

- extra long
- coupe au centre
- pour applications universelles



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
3,000	3,000	75,000	20,000	47,000	0,050	4	3,000
4,000	4,000	75,000	25,000	47,000	0,050	4	4,000
5,000	5,000	75,000	30,000	47,000	0,050	4	5,000
6,000	6,000	75,000	30,000	39,000	0,050	4	6,000
8,000	8,000	100,000	40,000	64,000	0,100	4	8,000
10,000	10,000	100,000	40,000	60,000	0,100	4	10,000
12,000	12,000	150,000	45,000	105,000	0,100	4	12,000
14,000	14,000	150,000	45,000	105,000	0,150	4	14,000
16,000	16,000	150,000	65,000	102,000	0,150	4	16,000
18,000	18,000	150,000	65,000	102,000	0,150	4	18,000
20,000	20,000	150,000	65,000	100,000	0,150	4	20,000

Fraises en CW monobloc

Fraises deux tailles à becs rayonnés



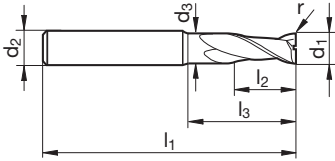
Référence **54522**



P	M	K	N	S	H
•	•	•	○	•	

Conseils d'util.,
page 566

- avec déagagement
- coupe au centre



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	r	Z	N° de code
6,000	6,000	5,700	57,000	10,000	21,000	0,500	2	6,005
6,000	6,000	5,700	57,000	10,000	21,000	1,000	2	6,010
8,000	8,000	7,700	63,000	16,000	27,000	0,500	2	8,005
8,000	8,000	7,700	63,000	16,000	27,000	1,000	2	8,010
8,000	8,000	7,700	63,000	16,000	27,000	1,500	2	8,015
10,000	10,000	9,500	72,000	19,000	32,000	0,500	2	10,005
10,000	10,000	9,500	72,000	19,000	32,000	1,000	2	10,010
10,000	10,000	9,500	72,000	19,000	32,000	1,500	2	10,015
10,000	10,000	9,500	72,000	19,000	32,000	2,000	2	10,020
12,000	12,000	11,500	83,000	22,000	38,000	0,500	2	12,005
12,000	12,000	11,500	83,000	22,000	38,000	1,000	2	12,010
12,000	12,000	11,500	83,000	22,000	38,000	2,000	2	12,020
16,000	16,000	15,500	92,000	26,000	44,000	1,000	2	16,010
16,000	16,000	15,500	92,000	26,000	44,000	2,000	2	16,020

Fraises en CW monobloc

Fraises deux tailles à becs rayonnés



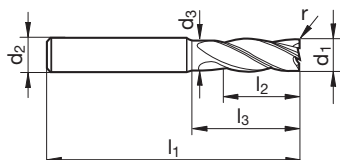
Référence **54526**



P	M	K	N	S	H
•	•	•	○	•	

Conseils d'util.,
page 570

- avec dégagement
- coupe au centre



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	r	Z	N° de code
6,000	6,000	5,700	57,000	13,000	21,000	0,500	4	6,005
6,000	6,000	5,700	57,000	13,000	21,000	1,000	4	6,010
8,000	8,000	7,700	63,000	19,000	27,000	0,500	4	8,005
8,000	8,000	7,700	63,000	19,000	27,000	1,000	4	8,010
8,000	8,000	7,700	63,000	19,000	27,000	1,500	4	8,015
8,000	8,000	7,700	63,000	19,000	27,000	2,000	4	8,020
10,000	10,000	9,500	72,000	22,000	32,000	0,500	4	10,005
10,000	10,000	9,500	72,000	22,000	32,000	0,800	4	10,008
10,000	10,000	9,500	72,000	22,000	32,000	1,000	4	10,010
10,000	10,000	9,500	72,000	22,000	32,000	1,500	4	10,015
10,000	10,000	9,500	72,000	22,000	32,000	2,000	4	10,020
12,000	12,000	11,500	83,000	26,000	38,000	0,500	4	12,005
12,000	12,000	11,500	83,000	26,000	38,000	0,800	4	12,008
12,000	12,000	11,500	83,000	26,000	38,000	1,000	4	12,010
12,000	12,000	11,500	83,000	26,000	38,000	1,500	4	12,015
12,000	12,000	11,500	83,000	26,000	38,000	2,000	4	12,020
16,000	16,000	15,500	92,000	32,000	44,000	1,000	4	16,010
16,000	16,000	15,500	92,000	32,000	44,000	2,000	4	16,020
20,000	20,000	19,500	104,000	38,000	54,000	1,000	4	20,010
20,000	20,000	19,500	104,000	38,000	54,000	2,000	4	20,020

Fraises en CW monobloc

Fraises deux tailles à becs rayonnés



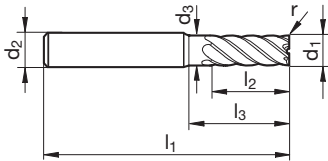
Référence **54206**



P	M	K	N	S	H
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Conseils d'util.,
page 574

- qualité optimale de l'état de surface lors des opérations d'usinages de finition
- avec dégagement
- coupe au centre



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	r	Z	N° de code
6,000	6,000	5,700	57,000	13,000	20,000	0,500	6	6,005
6,000	6,000	5,700	57,000	13,000	20,000	1,000	6	6,010
8,000	8,000	7,700	63,000	19,000	26,000	0,500	6	8,005
8,000	8,000	7,700	63,000	19,000	26,000	1,000	6	8,010
8,000	8,000	7,700	63,000	19,000	26,000	1,500	6	8,015
8,000	8,000	7,700	63,000	19,000	26,000	2,000	6	8,020
10,000	10,000	9,500	72,000	22,000	30,000	0,500	6	10,005
10,000	10,000	9,500	72,000	22,000	30,000	0,800	6	10,008
10,000	10,000	9,500	72,000	22,000	30,000	1,000	6	10,010
10,000	10,000	9,500	72,000	22,000	30,000	1,500	6	10,015
10,000	10,000	9,500	72,000	22,000	30,000	2,000	6	10,020
12,000	12,000	11,500	83,000	26,000	36,000	0,500	6	12,005
12,000	12,000	11,500	83,000	26,000	36,000	0,800	6	12,008
12,000	12,000	11,500	83,000	26,000	36,000	1,000	6	12,010
12,000	12,000	11,500	83,000	26,000	36,000	1,500	6	12,015
12,000	12,000	11,500	83,000	26,000	36,000	2,000	6	12,020
16,000	16,000	15,500	92,000	32,000	42,000	1,000	6	16,010
16,000	16,000	15,500	92,000	32,000	42,000	2,000	6	16,020
20,000	20,000	19,500	104,000	38,000	52,000	1,000	8	20,010
20,000	20,000	19,500	104,000	38,000	52,000	2,000	8	20,020

Fraises en CW monobloc

Fraises de pré-finition, multicoupe



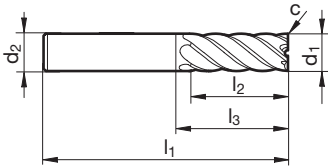
Référence **54205**



P	M	K	N	S	H
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Conseils d'util.,
page 574

- avec un état de surface de très haute qualité
- coupe au centre
- pour la super finition des matériaux jusqu'à 50 HRC



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
3,000	6,000	57,000	8,000	11,400	0,050	6	3,000
4,000	6,000	57,000	11,000	15,900	0,050	6	4,000
5,000	6,000	57,000	13,000	17,900	0,050	6	5,000
6,000	6,000	57,000	13,000	21,000	0,050	6	6,000
8,000	8,000	63,000	19,000	27,000	0,100	6	8,000
10,000	10,000	72,000	22,000	32,000	0,100	6	10,000
12,000	12,000	83,000	26,000	38,000	0,100	6	12,000
14,000	14,000	83,000	26,000	38,000	0,150	6	14,000
16,000	16,000	92,000	32,000	44,000	0,150	6	16,000
18,000	18,000	92,000	32,000	44,000	0,150	8	18,000
20,000	20,000	104,000	38,000	54,000	0,150	8	20,000

Fraises en CW monobloc

Fraises de pré-finition, multicoupe



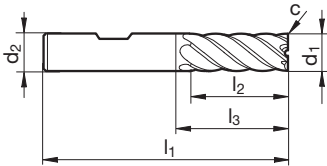
Référence **54201**



P	M	K	N	S	H
●	●	●	○	●	○

Conseils d'util.,
page 574

- avec un état de surface de très haute qualité
- coupe au centre
- pour la super finition des matériaux jusqu'à 50 HRC



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
6,000	6,000	57,000	13,000	21,000	0,050	6	6,000
8,000	8,000	63,000	19,000	27,000	0,100	6	8,000
10,000	10,000	72,000	22,000	32,000	0,100	6	10,000
12,000	12,000	83,000	26,000	38,000	0,100	6	12,000
14,000	14,000	83,000	26,000	38,000	0,150	6	14,000
16,000	16,000	92,000	32,000	44,000	0,150	6	16,000
18,000	18,000	92,000	32,000	44,000	0,150	8	18,000
20,000	20,000	104,000	38,000	54,000	0,150	8	20,000

Fraises en CW monobloc

Fraises de pré-finition, multicoupe



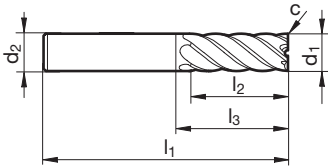
Référence **54225**



P	M	K	N	S	H
●	●	●	○	●	○

Conseils d'util.,
page 574

- avec un état de surface de très haute qualité
- extra long
- coupe au centre
- pour la super finition des matériaux jusqu'à 50 HRC



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
6,000	6,000	75,000	30,000	39,000	0,050	6	6,000
8,000	8,000	100,000	40,000	64,000	0,100	6	8,000
10,000	10,000	100,000	40,000	60,000	0,100	6	10,000
12,000	12,000	150,000	45,000	105,000	0,100	6	12,000
16,000	16,000	150,000	65,000	102,000	0,150	6	16,000
20,000	20,000	150,000	65,000	100,000	0,150	8	20,000

Fraises en CW monobloc

Fraises de pré-finition, multicoupe



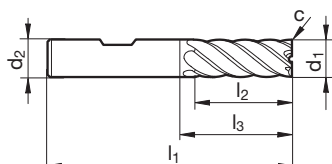
Référence **54221**



P	M	K	N	S	H
●	●	●	○	●	○

Conseils d'util.,
page 574

- avec un état de surface de très haute qualité
- extra long
- coupe au centre
- pour la super finition des matériaux jusqu'à 50 HRC



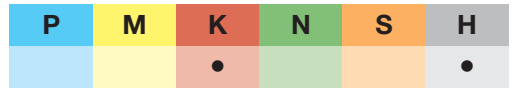
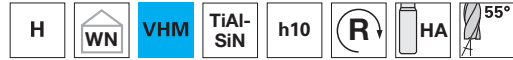
d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
6,000	6,000	75,000	30,000	39,000	0,050	6	6,000
8,000	8,000	100,000	40,000	64,000	0,100	6	8,000
10,000	10,000	100,000	40,000	60,000	0,100	6	10,000
12,000	12,000	150,000	45,000	105,000	0,100	6	12,000
16,000	16,000	150,000	65,000	102,000	0,150	6	16,000
20,000	20,000	150,000	65,000	100,000	0,150	8	20,000

Fraises en CW monobloc

Fraises pour matériaux durs, multicoupe

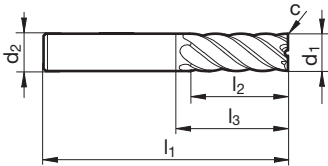


Référence **54207**



Conseils d'util.,
page 574

- avec un état de surface de très haute qualité
- coupe au centre
- pour le fraisage des matériaux durs et fraisage de finition des matériaux avec une dureté jusqu'à 62 HRC et plus



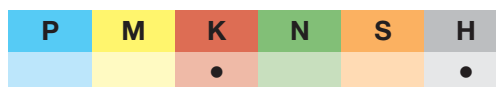
d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
3,000	6,000	57,000	8,000	11,400	0,050	6	3,000
4,000	6,000	57,000	11,000	15,900	0,050	6	4,000
5,000	6,000	57,000	13,000	17,900	0,050	6	5,000
6,000	6,000	57,000	13,000	21,000	0,050	6	6,000
8,000	8,000	63,000	19,000	27,000	0,100	6	8,000
10,000	10,000	72,000	22,000	32,000	0,100	6	10,000
12,000	12,000	83,000	26,000	38,000	0,100	6	12,000
14,000	14,000	83,000	26,000	38,000	0,150	6	14,000
16,000	16,000	92,000	32,000	44,000	0,150	6	16,000
18,000	18,000	92,000	32,000	44,000	0,150	8	18,000
20,000	20,000	104,000	38,000	54,000	0,150	8	20,000

Fraises en CW monobloc

Fraises pour matériaux durs, multicoupe

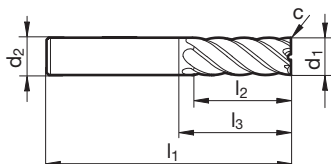


Référence **54227**



Conseils d'util.,
page 574

- avec un état de surface de très haute qualité
- extra long
- coupe au centre
- pour le fraisage des matériaux durs et fraisage de finition des matériaux avec une dureté jusqu'à 62 HRC et plus



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
6,000	6,000	75,000	30,000	39,000	0,050	6	6,000
8,000	8,000	100,000	40,000	64,000	0,100	6	8,000
10,000	10,000	100,000	40,000	60,000	0,100	6	10,000
12,000	12,000	150,000	45,000	105,000	0,100	6	12,000
16,000	16,000	150,000	65,000	102,000	0,150	6	16,000
20,000	20,000	150,000	65,000	100,000	0,150	8	20,000

Fraises en CW monobloc

Fraises d'ébauche



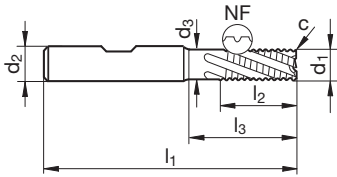
Référence **54496**



P	M	K	N	S	H
●	○	●	○		

Conseils d'util.,
page 572

- pour le rainurage et pour le fraisage d'ébauche
- coupe au centre



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
6,000	6,000	57,000	13,000	20,000	0,300	4	6,000
8,000	8,000	63,000	19,000	26,000	0,300	4	8,000
10,000	10,000	72,000	22,000	30,000	0,300	4	10,000
12,000	12,000	83,000	26,000	36,000	0,500	4	12,000
14,000	14,000	83,000	26,000	36,000	0,500	4	14,000
16,000	16,000	92,000	32,000	42,000	0,500	4	16,000
18,000	18,000	92,000	32,000	42,000	0,500	4	18,000
20,000	20,000	104,000	38,000	52,000	0,500	4	20,000
25,000	25,000	121,000	45,000	63,000	0,600	5	25,000

Fraises en CW monobloc

Fraises d'ébauche



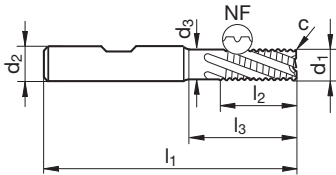
Référence **54497**



P	M	K	N	S	H
●	○	●	○		

Conseils d'util.,
page 572

- pour le fraisage d'ébauche et finition
- coupe au centre



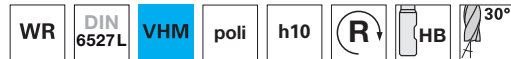
d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
6,000	6,000	57,000	13,000	20,000	0,300	5	6,000
8,000	8,000	63,000	19,000	26,000	0,300	5	8,000
10,000	10,000	72,000	22,000	30,000	0,300	5	10,000
12,000	12,000	83,000	26,000	36,000	0,500	5	12,000
14,000	14,000	83,000	26,000	36,000	0,500	5	14,000
16,000	16,000	92,000	32,000	42,000	0,500	6	16,000
18,000	18,000	92,000	32,000	42,000	0,500	6	18,000
20,000	20,000	104,000	38,000	52,000	0,500	6	20,000
25,000	25,000	121,000	45,000	63,000	0,600	6	25,000

Fraises en CW monobloc

Fraises d'ébauche

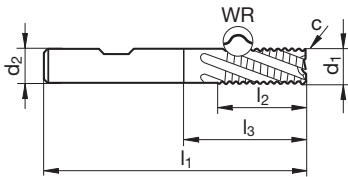


Référence **74203**



Conseils d'util.,
page 572

- haut rendement d'usinage sur les aluminiums et métaux non ferreux grâce au profil d'ébauche grossier
- coupe au centre



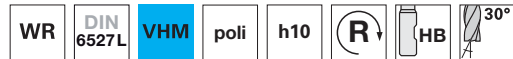
d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
6,000	6,000	57,000	10,000	21,000	0,300	3	6,000
8,000	8,000	63,000	16,000	27,000	0,300	3	8,000
10,000	10,000	72,000	19,000	32,000	0,300	3	10,000
12,000	12,000	83,000	22,000	38,000	0,500	3	12,000
14,000	14,000	83,000	22,000	38,000	0,500	3	14,000
16,000	16,000	92,000	26,000	44,000	0,500	3	16,000
18,000	18,000	92,000	26,000	44,000	0,500	3	18,000
20,000	20,000	104,000	32,000	54,000	0,500	3	20,000

Fraises en CW monobloc

Fraises d'ébauche

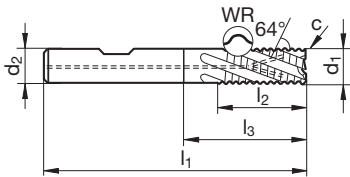


Référence **74303**



Conseils d'util.,
page 572

- avec adduction intérieure du produit de lubrification et de refroidissement afin d'obtenir des tenues de coupe plus élevées et l'évacuation optimale des copeaux
- haut rendement d'usinage sur les aluminiums et métaux non ferreux grâce au profil d'ébauche grossier
- coupe au centre



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
6,000	6,000	57,000	10,000	21,000	0,300	3	6,000
8,000	8,000	63,000	16,000	27,000	0,300	3	8,000
10,000	10,000	72,000	19,000	32,000	0,300	3	10,000
12,000	12,000	83,000	22,000	38,000	0,500	3	12,000
16,000	16,000	92,000	26,000	44,000	0,500	3	16,000
20,000	20,000	104,000	32,000	54,000	0,500	3	20,000

Fraises en CW monobloc

Fraises d'ébauche



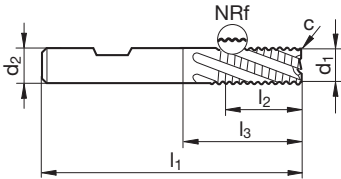
Référence **64495**



P	M	K	N	S	H
•	•	•			

Conseils d'util.,
page 572

- profil d'ébauche fin
- coupe au centre



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
6,000	6,000	57,000	13,000	20,000	0,300	4	6,000
8,000	8,000	63,000	19,000	26,000	0,300	4	8,000
10,000	10,000	72,000	22,000	30,000	0,300	4	10,000
12,000	12,000	83,000	26,000	36,000	0,500	4	12,000
14,000	14,000	83,000	26,000	36,000	0,500	4	14,000
16,000	16,000	92,000	32,000	42,000	0,500	4	16,000
18,000	18,000	92,000	32,000	42,000	0,500	4	18,000
20,000	20,000	104,000	38,000	52,000	0,500	4	20,000

Fraises en CW monobloc

Fraises d'ébauche



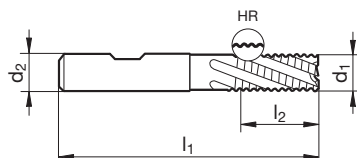
Référence **64497**



P	M	K	N	S	H
•		•			•

Conseils d'util.,
page 572

- profil d'ébauche fin
- profil de diviseur de copeaux
- coupe au centre
- avec un angle de coupe de seulement 3° pour les matériaux très difficiles à usiner
- Particulièrement approprié pour le fraisage des aciers de haute résistance, fontes aciérées, fontes grises et aciers trempés avec une dureté jusqu'à 56 HRC



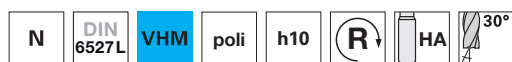
d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
6,000	6,000	57,000	13,000	21,000	0,300	4	6,000
8,000	8,000	63,000	19,000	27,000	0,300	4	8,000
10,000	10,000	72,000	22,000	32,000	0,300	4	10,000
12,000	12,000	83,000	26,000	38,000	0,500	4	12,000
16,000	16,000	92,000	32,000	44,000	0,500	4	16,000
20,000	20,000	104,000	38,000	54,000	0,500	4	20,000

Fraises en CW monobloc

Fraises à bout hémisphérique



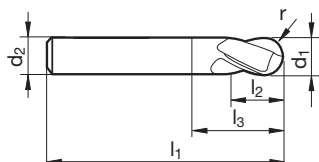
Référence **74543**



P	M	K	N	S	H
•	•	•	○		

Conseils d'util.,
page 574

- coupe au centre
- Rayon hémisphérique



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	r mm	Z	N° de code
3,000	6,000	57,000	7,000	11,400	1,500	2	3,000
4,000	6,000	57,000	8,000	13,900	2,000	2	4,000
5,000	6,000	57,000	10,000	16,900	2,500	2	5,000
6,000	6,000	57,000	10,000	21,000	3,000	2	6,000
8,000	8,000	63,000	16,000	27,000	4,000	2	8,000
10,000	10,000	72,000	19,000	32,000	5,000	2	10,000
12,000	12,000	83,000	22,000	38,000	6,000	2	12,000
14,000	14,000	83,000	22,000	38,000	7,000	2	14,000
16,000	16,000	92,000	26,000	44,000	8,000	2	16,000
18,000	18,000	92,000	26,000	44,000	9,000	2	18,000
20,000	20,000	104,000	32,000	54,000	10,000	2	20,000

Fraises en CW monobloc

Fraises à bout hémisphérique



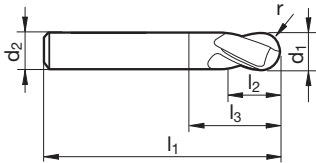
Référence **54541**



P	M	K	N	S	H
•	•	•	○	○	

Conseils d'util.,
page 574

- coupe au centre
- Rayon hémisphérique



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	r mm	Z	N° de code
0,500	3,000	38,000	1,000	2,100	0,250	2	0,500
0,800	3,000	38,000	1,000	2,100	0,400	2	0,800
1,000	3,000	38,000	2,000	3,900	0,500	2	1,000
1,500	3,000	38,000	3,000	6,400	0,750	2	1,500
2,000	6,000	57,000	6,000	9,400	1,000	2	2,000
3,000	6,000	57,000	7,000	11,900	1,500	2	3,000
4,000	6,000	57,000	8,000	13,400	2,000	2	4,000
5,000	6,000	57,000	10,000	16,900	2,500	2	5,000
6,000	6,000	57,000	10,000	21,000	3,000	2	6,000
8,000	8,000	63,000	16,000	27,000	4,000	2	8,000
10,000	10,000	72,000	19,000	32,000	5,000	2	10,000
12,000	12,000	83,000	22,000	38,000	6,000	2	12,000
14,000	14,000	83,000	22,000	38,000	7,000	2	14,000
16,000	16,000	92,000	26,000	44,000	8,000	2	16,000
18,000	18,000	92,000	26,000	44,000	9,000	2	18,000
20,000	20,000	104,000	32,000	54,000	10,000	2	20,000

Fraises en CW monobloc

Fraises à bout hémisphérique



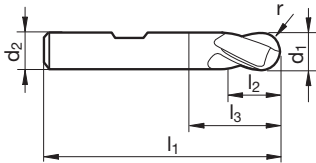
Référence **64542**



P	M	K	N	S	H
•	•	•	○	○	

Conseils d'util.,
page 574

- coupe au centre
- Rayon hémisphérique



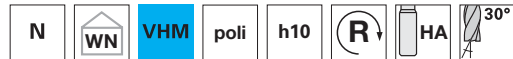
d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	r mm	Z	N° de code
1,000	3,000	38,000	2,000	3,900	0,500	2	1,000
1,500	3,000	38,000	3,000	6,400	0,750	2	1,500
2,000	6,000	57,000	6,000	9,400	1,000	2	2,000
3,000	6,000	57,000	7,000	11,900	1,500	2	3,000
4,000	6,000	57,000	8,000	13,400	2,000	2	4,000
5,000	6,000	57,000	10,000	16,900	2,500	2	5,000
6,000	6,000	57,000	10,000	21,000	3,000	2	6,000
8,000	8,000	63,000	16,000	27,000	4,000	2	8,000
10,000	10,000	72,000	19,000	32,000	5,000	2	10,000
12,000	12,000	83,000	22,000	38,000	6,000	2	12,000
14,000	14,000	83,000	22,000	38,000	7,000	2	14,000
16,000	16,000	92,000	26,000	44,000	8,000	2	16,000
18,000	18,000	92,000	26,000	44,000	9,000	2	18,000
20,000	20,000	104,000	32,000	54,000	10,000	2	20,000

Fraises en CW monobloc

Fraises à bout hémisphérique



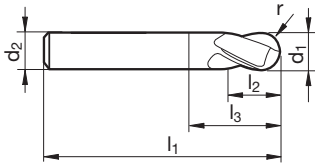
Référence **74545**



P	M	K	N	S	H
●	○	●	○		

Conseils d'util.,
page 574

- extra long
- coupe au centre
- Rayon hémisphérique



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	r mm	Z	N° de code
3,000	3,000	75,000	20,000	47,000	1,500	2	3,000
4,000	4,000	75,000	25,000	47,000	2,000	2	4,000
5,000	5,000	75,000	30,000	47,000	2,500	2	5,000
6,000	6,000	75,000	30,000	39,000	3,000	2	6,000
8,000	8,000	100,000	40,000	64,000	4,000	2	8,000
10,000	10,000	100,000	40,000	60,000	5,000	2	10,000
12,000	12,000	150,000	45,000	105,000	6,000	2	12,000

Fraises en CW monobloc

Fraises à bout hémisphérique



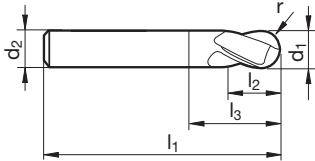
Référence **64545**



P	M	K	N	S	H
•	•	•	○	○	○

Conseils d'util.,
page 574

- extra long
- coupe au centre
- Rayon hémisphérique



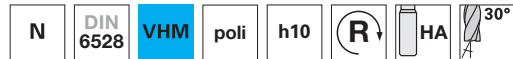
d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	r mm	Z	N° de code
3,000	3,000	75,000	20,000	47,000	1,500	2	3,000
4,000	4,000	75,000	25,000	47,000	2,000	2	4,000
5,000	5,000	75,000	30,000	47,000	2,500	2	5,000
6,000	6,000	75,000	30,000	39,000	3,000	2	6,000
8,000	8,000	100,000	40,000	64,000	4,000	2	8,000
10,000	10,000	100,000	40,000	60,000	5,000	2	10,000
12,000	12,000	150,000	45,000	105,000	6,000	2	12,000

Fraises en CW monobloc

Fraises à bout hémisphérique



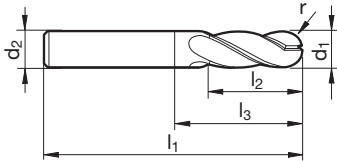
Référence **74531**



P	M	K	N	S	H
•	•	•	○		

Conseils d'util.,
page 574

- coupe au centre
- Rayon hémisphérique



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	r mm	Z	N° de code
4,000	4,000	50,000	11,000	22,000	2,000	4	4,000
5,000	5,000	50,000	13,000	22,000	2,500	4	5,000
6,000	6,000	57,000	13,000	21,000	3,000	4	6,000
8,000	8,000	63,000	19,000	27,000	4,000	4	8,000
10,000	10,000	72,000	22,000	32,000	5,000	4	10,000
12,000	12,000	83,000	26,000	38,000	6,000	4	12,000
16,000	16,000	92,000	32,000	44,000	8,000	4	16,000

Fraises en CW monobloc

Fraises à bout hémisphérique



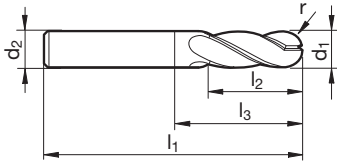
Référence **54531**



P	M	K	N	S	H
•	•	•	○	○	

Conseils d'util.,
page 574

- coupe au centre
- Rayon hémisphérique



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	r mm	Z	N° de code
4,000	4,000	50,000	11,000	22,000	2,000	4	4,000
5,000	5,000	50,000	13,000	22,000	2,500	4	5,000
6,000	6,000	57,000	13,000	21,000	3,000	4	6,000
8,000	8,000	63,000	19,000	27,000	4,000	4	8,000
10,000	10,000	72,000	22,000	32,000	5,000	4	10,000
12,000	12,000	83,000	26,000	38,000	6,000	4	12,000
14,000	14,000	83,000	26,000	38,000	7,000	4	14,000
16,000	16,000	92,000	32,000	44,000	8,000	4	16,000
18,000	18,000	92,000	32,000	44,000	9,000	4	18,000
20,000	20,000	104,000	38,000	54,000	10,000	4	20,000

Fraises en CW monobloc

Fraises à bout hémisphérique



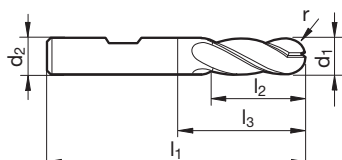
Référence **64532**



P	M	K	N	S	H
●	●	●	○	○	○

Conseils d'util.,
page 574

- coupe au centre
- Rayon hémisphérique



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	r mm	Z	N° de code
3,000	6,000	57,000	8,000	11,400	1,500	4	3,000
4,000	6,000	57,000	11,000	14,400	2,000	4	4,000
5,000	6,000	57,000	13,000	17,400	2,500	4	5,000
6,000	6,000	57,000	13,000	21,000	3,000	4	6,000
8,000	8,000	63,000	19,000	27,000	4,000	4	8,000
10,000	10,000	72,000	22,000	32,000	5,000	4	10,000
12,000	12,000	83,000	26,000	38,000	6,000	4	12,000
14,000	14,000	83,000	26,000	38,000	7,000	4	14,000
16,000	16,000	92,000	32,000	44,000	8,000	4	16,000
18,000	18,000	92,000	32,000	44,000	9,000	4	18,000
20,000	20,000	104,000	38,000	54,000	10,000	4	20,000

Fraises en CW monobloc

Fraises à bout hémisphérique



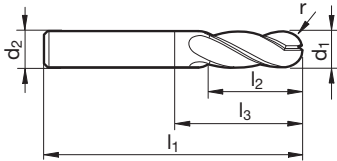
Référence **64535**



P	M	K	N	S	H
•	•	•	○	○	

Conseils d'util.,
page 574

- extra long
- coupe au centre
- Rayon hémisphérique



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	r mm	Z	N° de code
3,000	3,000	75,000	20,000	47,000	1,500	4	3,000
4,000	4,000	75,000	25,000	47,000	2,000	4	4,000
5,000	5,000	75,000	30,000	47,000	2,500	4	5,000
6,000	6,000	75,000	30,000	39,000	3,000	4	6,000
8,000	8,000	100,000	40,000	64,000	4,000	4	8,000
10,000	10,000	100,000	40,000	60,000	5,000	4	10,000
12,000	12,000	150,000	45,000	105,000	6,000	4	12,000

Fraises en CW monobloc

Fraises à copier, à affûtage torique



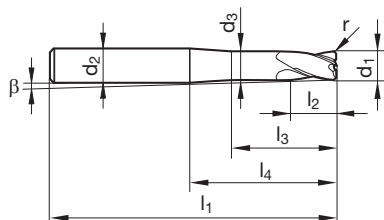
Référence **54304**



P	M	K	N	S	H
•	•	•		○	•

Conseils d'util.,
page 578

- court
- coupe au centre
- pour la construction de moules
- tenue de coupe des outils augmentée grâce au revêtement ultradur



d1 h8 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	l4 mm	r mm	β °	Z	N° de code
3,000	6,000	2,800	57,000	5,000	9,400	21,000	0,500	4,200	4	3,000
4,000	6,000	3,800	57,000	6,000	13,400	21,000	0,500	2,800	4	4,000
5,000	6,000	4,800	57,000	8,000	15,900	21,000	0,500	1,400	4	5,000
6,000	6,000	5,700	57,000	9,000	21,000	21,000	1,000		4	6,000
8,000	8,000	7,700	63,000	12,000	27,000	27,000	1,000		4	8,000
10,000	10,000	9,500	72,000	15,000	32,000	32,000	1,500		4	10,000
12,000	12,000	11,500	83,000	18,000	38,000	38,000	1,500		4	12,000
16,000	16,000	15,500	92,000	24,000	44,000	44,000	2,000		4	16,000

Fraises en CW monobloc

Fraises à copier, à affûtage torique



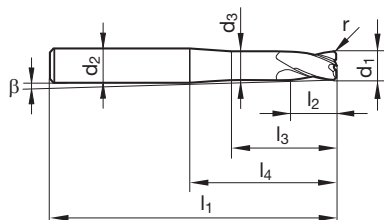
Référence **54305**



P	M	K	N	S	H
•	•	•		•	•

Conseils d'util.,
page 578

- long
- coupe au centre
- avec portée extra longue pour la construction de moules
- tenue de coupe des outils augmentée grâce au revêtement ultradur



d1 h8 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	l4 mm	r mm	β °	Z	N° de code
6,000	6,000	5,700	75,000	9,000	38,000	39,000	1,000		4	6,000
8,000	8,000	7,700	100,000	12,000	63,000	64,000	1,000		4	8,000
10,000	10,000	9,500	100,000	15,000	58,000	60,000	1,500		4	10,000
12,000	12,000	11,500	150,000	18,000	103,000	105,000	1,500		4	12,000
16,000	16,000	15,500	150,000	24,000	100,000	102,000	2,000		4	16,000

Fraises en CW monobloc

Fraises à copier, à affûtage torique



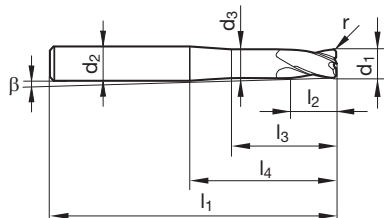
Référence **54302**



P	M	K	N	S	H
•	•	•	•	○	○

Conseils d'util.,
page 576

- pour l'usinage UGV d'ébauche, de finition et de superfinition en fabrication de moules et matrices
- coupe au centre
- approprié pour les matériaux avec une dureté de 40 à 54 HRC
- tenue de coupe des outils augmentée grâce au revêtement ultradur



d1 h8 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	l4 mm	r mm	β °	Z	N° de code
2,000	6,000	1,800	57,000	3,000	6,200	20,000	0,500	5,900	2	2,000
3,000	6,000	2,800	57,000	3,500	8,400	20,000	0,500	4,400	2	3,000
4,000	6,000	3,800	57,000	4,000	9,400	20,000	1,000	3,100	2	4,000
6,000	6,000	5,600	57,000	6,000	19,000	21,000	2,000		2	6,000
8,000	8,000	7,600	63,000	7,000	25,000	27,000	2,000		2	8,000
10,000	10,000	9,600	72,000	8,000	28,000	32,000	3,000		2	10,000
12,000	12,000	11,500	83,000	10,000	33,000	38,000	4,000		2	12,000

Fraises en CW monobloc

Fraises à copier, à affûtage torique



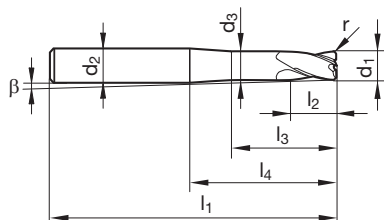
Référence **54303**



P	M	K	N	S	H
•	•	•	•	○	○

Conseils d'util.,
page 576

- avec portée extra longue pour les usinages HSC d'ébauche, de finition et de super finition pour la construction des moules
- coupe au centre
- approprié pour les matériaux avec une dureté de 40 à 54 HRC
- tenue de coupe des outils augmentée grâce au revêtement ultradur



d1 h8 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	l4 mm	r mm	β °	Z	N° de code
2,000	6,000	1,800	80,000	3,000	8,000	40,000	0,500	2,900	2	2,000
3,000	6,000	2,800	80,000	3,500	12,000	40,000	0,500	2,200	2	3,000
4,000	6,000	3,800	80,000	4,000	20,000	40,000	1,000	1,500	2	4,000
6,000	8,000	5,600	100,000	6,000	59,000	60,000	2,000	1,000	2	6,000
8,000	10,000	7,600	120,000	7,000	74,000	75,000	2,000	0,800	2	8,000
10,000	12,000	9,600	120,000	8,000	68,000	70,000	3,000	0,900	2	10,000
12,000	16,000	11,500	150,000	10,000	95,800	100,000	4,000	1,200	2	12,000

Fraises en CW monobloc

Fraises à copier, à bout hémisphérique



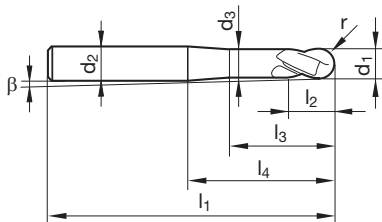
Référence **54306**



P	M	K	N	S	H
•	•	•		•	•

Conseils d'util.,
page 578

- court
- coupe au centre
- tenue de coupe des outils augmentée grâce au revêtement ultradur



d1 h8 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	l4 mm	r mm	β °	Z	N° de code
0,500	3,000	0,400	38,000	0,750	2,600	10,000	0,250	7,400	2	0,500
0,800	3,000	0,700	38,000	1,200	3,500	10,000	0,400	6,600	2	0,800
1,000	3,000	0,900	38,000	1,500	4,000	10,000	0,500	6,100	2	1,000
1,500	3,000	1,400	38,000	2,250	5,500	10,000	0,750	4,700	2	1,500
2,000	6,000	1,900	57,000	3,000	9,400	21,000	1,000	5,800	2	2,000
3,000	6,000	2,700	57,000	5,000	11,600	21,000	1,500	4,400	2	3,000
4,000	6,000	3,700	57,000	6,000	14,500	21,000	2,000	3,100	2	4,000
5,000	6,000	4,700	57,000	8,000	17,300	21,000	2,500	1,600	2	5,000
6,000	6,000	5,700	57,000	9,000	20,000	21,000	3,000		2	6,000
8,000	8,000	7,700	63,000	12,000	26,000	27,000	4,000		2	8,000
10,000	10,000	9,500	72,000	15,000	30,000	32,000	5,000		2	10,000
12,000	12,000	11,500	83,000	18,000	36,000	38,000	6,000		2	12,000
16,000	16,000	15,500	92,000	24,000	42,000	44,000	8,000		2	16,000

Fraises en CW monobloc

Fraises à copier, à bout hémisphérique



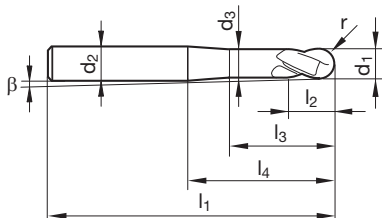
Référence **54307**



P	M	K	N	S	H
•	•	•		•	•

Conseils d'util.,
page 578

- long
- coupe au centre
- avec portée extra longue pour la construction de moules
- tenue de coupe des outils augmentée grâce au revêtement ultradur



d1 h8 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	l4 mm	r mm	β °	Z	N° de code
3,000	6,000	2,700	75,000	5,000	20,000	39,000	1,500	2,300	2	3,000
4,000	6,000	3,700	75,000	6,000	20,000	39,000	2,000	1,600	2	4,000
5,000	6,000	4,700	75,000	8,000	20,000	39,000	2,500	0,800	2	5,000
6,000	6,000	5,700	75,000	9,000	38,000	39,000	3,000		2	6,000
8,000	8,000	7,700	100,000	12,000	63,000	64,000	4,000		2	8,000
10,000	10,000	9,500	100,000	15,000	58,000	60,000	5,000		2	10,000
12,000	12,000	11,500	150,000	18,000	103,000	105,000	6,000		2	12,000
16,000	16,000	15,500	150,000	24,000	100,000	102,000	8,000		2	16,000

Fraises en CW monobloc

Fraises à copier, à bout hémisphérique



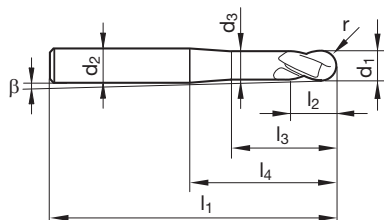
Référence **54300**



P	M	K	N	S	H
•	•	•	•	○	

Conseils d'util.,
page 576

- court
- coupe au centre
- pour l'usinage des matériaux durs avec une dureté jusqu'à 54 HRC
- tenue de coupe des outils augmentée grâce au revêtement ultradur



d1 h8 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	l4 mm	r mm	β °	Z	N° de code
2,000	6,000	1,800	57,000	3,000	6,200	20,000	1,000	6,100	2	2,000
3,000	6,000	2,800	57,000	3,500	8,400	20,000	1,500	4,700	2	3,000
4,000	6,000	3,800	57,000	4,000	9,400	20,000	2,000	3,200	2	4,000
6,000	6,000	5,600	57,000	6,000	19,000	21,000	3,000		2	6,000
8,000	8,000	7,600	63,000	7,000	25,000	27,000	4,000		2	8,000
10,000	10,000	9,600	72,000	8,000	28,000	32,000	5,000		2	10,000
12,000	12,000	11,500	83,000	10,000	33,000	38,000	6,000		2	12,000

Fraises en CW monobloc

Fraises à copier, à bout hémisphérique



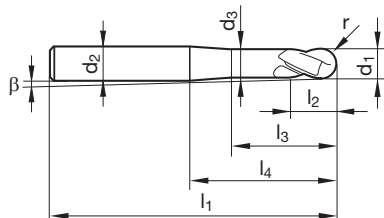
Référence **54301**



P	M	K	N	S	H
•	•	•	•	○	○

Conseils d'util.,
page 576

- long
- coupe au centre
- avec portée extra longue pour les usinages HSC d'ébauche, de finition et de super finition pour la construction des moules
- tenue de coupe des outils augmentée grâce au revêtement ultradur



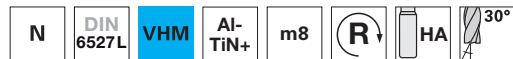
d1 h8 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	l4 mm	r mm	β °	Z	N° de code
2,000	6,000	1,800	80,000	3,000	8,000	40,000	1,000	3,000	2	2,000
3,000	6,000	2,800	80,000	3,500	12,000	40,000	1,500	2,300	2	3,000
4,000	6,000	3,800	80,000	4,000	20,000	40,000	2,000	1,600	2	4,000
6,000	8,000	5,600	100,000	6,000	59,000	60,000	3,000	1,100	2	6,000
8,000	10,000	7,600	120,000	7,000	74,000	75,000	4,000	0,900	2	8,000
10,000	12,000	9,600	120,000	8,000	68,000	70,000	5,000	0,900	2	10,000
12,000	16,000	11,500	150,000	10,000	95,800	100,000	6,000	1,300	2	12,000

Fraises en CW monobloc

Fraises à pilote

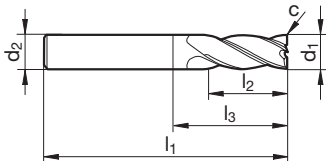


Référence **54700**



P	M	K	N	S	H
•	•	•	•	•	•

- pour l'amorçage du fraisage et la réalisation des perçages pilotes
- comme outil pilote pour le perçage sur surfaces inclinées ou lors de l'utilisation de très longs forets et outils de forage pour les profondeurs > 7 x D comme par exemple SuperV-T et SuperV-NX
- coupe au centre



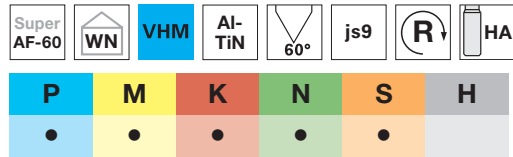
d1 m8 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	N° de code
1,400	3,000	38,000	3,000	5,900	0,010	4	1,400
1,500	3,000	38,000	4,000	6,900	0,020	4	1,500
1,800	3,000	38,000	6,000	8,900	0,020	4	1,800
2,000	3,000	38,000	6,500	9,400	0,020	4	2,000
2,100	3,000	38,000	6,500	9,900	0,020	4	2,100
2,300	3,000	38,000	6,500	9,900	0,020	4	2,300
2,500	3,000	38,000	6,500	9,900	0,030	4	2,500
2,800	3,000	38,000	6,500	10,000	0,030	4	2,800
3,000	6,000	57,000	8,000	12,400	0,030	4	3,000
3,500	6,000	57,000	10,000	14,900	0,040	4	3,500
4,000	6,000	57,000	11,000	15,900	0,040	4	4,000
4,500	6,000	57,000	11,000	17,400	0,050	4	4,500
5,000	6,000	57,000	13,000	19,400	0,050	4	5,000
5,500	6,000	57,000	13,000	20,400	0,060	4	5,500
6,000	8,000	63,000	13,000	20,400	0,060	4	6,000
6,500	8,000	63,000	13,000	20,900	0,070	4	6,500
7,000	8,000	63,000	16,000	23,900	0,070	4	7,000
7,500	8,000	63,000	16,000	23,900	0,080	4	7,500
8,000	10,000	72,000	19,000	26,900	0,080	4	8,000
8,500	10,000	72,000	19,000	28,400	0,090	4	8,500
9,000	10,000	72,000	19,000	28,400	0,090	4	9,000
10,000	12,000	83,000	22,000	31,400	0,100	4	10,000
11,000	12,000	83,000	26,000	36,400	0,110	4	11,000
12,000	14,000	83,000	26,000	37,400	0,120	4	12,000

Outils à ébavurer et à chanfreiner

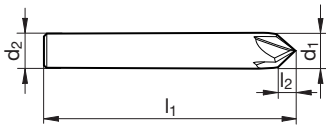
Fraises à ébavurer 60°



Référence **53393**



• Fraises à ébavurer et à chanfreiner, par exemple pour l'usinage des entrées de perçages avec un chanfrein à 60°



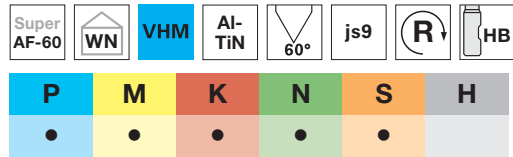
d1 js9 mm	d2 h6 mm	l1 mm	l2 mm	Z	N° de code
4,000	4,000	50,000	3,500	4	4,000
6,000	6,000	57,000	5,200	4	6,000
8,000	8,000	63,000	7,000	4	8,000
10,000	10,000	72,000	8,700	4	10,000
12,000	12,000	83,000	10,400	4	12,000

Outils à ébavurer et à chanfreiner

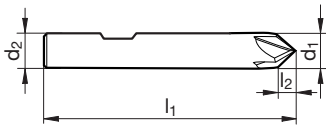
Fraises à ébavurer 60°



Référence **53394**



- Fraises à ébavurer et à chanfreiner, par exemple pour l'usinage des entrées de perçages avec un chanfrein à 60°



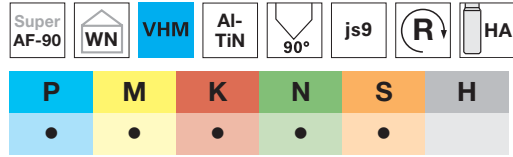
d1 js9 mm	d2 h6 mm	l1 mm	l2 mm	Z	N° de code
6,000	6,000	57,000	5,200	4	6,000
8,000	8,000	63,000	7,000	4	8,000
10,000	10,000	72,000	8,700	4	10,000
12,000	12,000	83,000	10,400	4	12,000

Outils à ébavurer et à chanfreiner

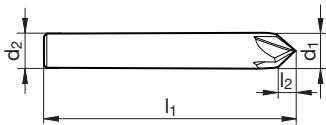
Fraises à ébavurer 90°



Référence **53395**



• Fraise(s) à ébavurer et à chanfreiner, par exemple pour l'usinage des entrées de perçages avec un chanfrein à 90°



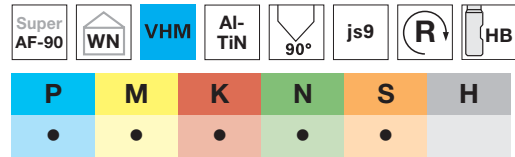
d1 js9 mm	d2 h6 mm	l1 mm	l2 mm	Z	N° de code
4,000	4,000	50,000	2,000	4	4,000
6,000	6,000	57,000	3,000	4	6,000
8,000	8,000	63,000	4,000	4	8,000
10,000	10,000	72,000	5,000	4	10,000
12,000	12,000	83,000	6,000	4	12,000

Outils à ébavurer et à chanfreiner

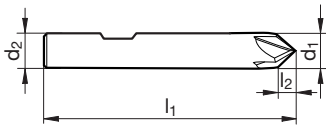
Fraises à ébavurer 90°



Référence **53396**



• Fraise(s) à ébavurer et à chanfreiner, par exemple pour l'usinage des entrées de perçages avec un chanfrein à 90°



d1 js9 mm	d2 h6 mm	l1 mm	l2 mm	Z	N° de code
4,000	4,000	50,000	2,000	4	4,000
6,000	6,000	57,000	3,000	4	6,000
8,000	8,000	63,000	4,000	4	8,000
10,000	10,000	72,000	5,000	4	10,000
12,000	12,000	83,000	6,000	4	12,000

Outils à ébavurer et à chanfreiner

Fraises à ébavurer 120°

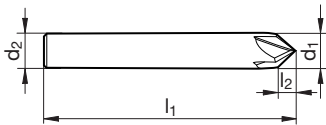


Référence **53397**



P	M	K	N	S	H
•	•	•	•	•	

- Fraise(s) à ébavurer et à chanfreiner, par exemple pour l'usinage des entrées de perçages avec un chanfrein à 120°



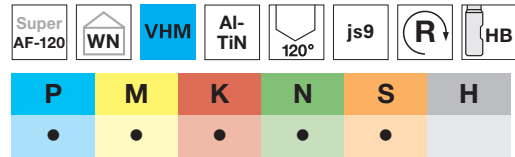
d1 js9 mm	d2 h6 mm	l1 mm	l2 mm	Z	N° de code
4,000	4,000	50,000	1,200	4	4,000
6,000	6,000	57,000	1,800	4	6,000
8,000	8,000	63,000	2,400	4	8,000
10,000	10,000	72,000	2,900	4	10,000
12,000	12,000	83,000	3,500	4	12,000

Outils à ébavurer et à chanfreiner

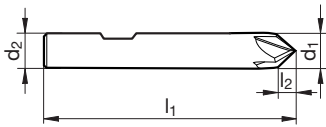
Fraises à ébavurer 120°



Référence **53398**



• Fraise(s) à ébavurer et à chanfreiner, par exemple pour l'usinage des entrées de perçages avec un chanfrein à 120°



d1 js9 mm	d2 h6 mm	l1 mm	l2 mm	Z	N° de code
6,000	6,000	57,000	1,800	4	6,000
8,000	8,000	63,000	2,400	4	8,000
10,000	10,000	72,000	2,900	4	10,000
12,000	12,000	83,000	3,500	4	12,000

Outils à ébavurer et à chanfreiner

Ebavureur avant et arrière 90°

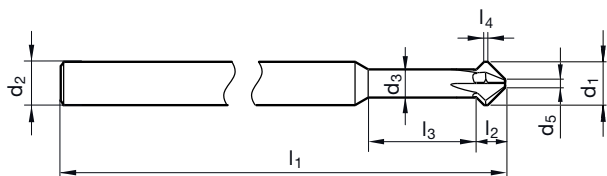


Référence **52365**



P	M	K	N	S	H
•	•				

- outils de chanfreinage et d'ébavurage pour l'usinage des entrées et sorties de perçages avec un angle de chanfreinage à 90°
- pour les mandrins hydrauliques et mandrins à fretter
- avec attachement selon DIN 6535



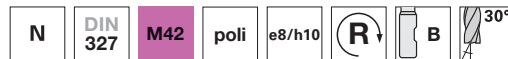
d1 mm	d2 h6 mm	d3 mm	d5 mm	l1 mm	l2 mm	l3 mm	l4 mm	Z	N° de code
3,000	4,000	2,200	0,600	75,000	2,10	9,300	0,500	4	3,000
4,000	4,000	2,900	0,800	75,000	2,70	12,300	0,500	4	4,000
5,000	5,000	3,900	1,000	75,000	3,00	15,000	0,500	4	5,000
6,000	6,000	3,900	1,200	100,000	3,90	14,300	0,500	4	6,000
8,000	6,000	6,000	1,600	100,000	4,70		0,500	4	8,000
10,000	6,000	6,000	2,000	100,000	6,50		0,500	4	10,000
12,000	6,000	6,000	2,400	100,000	8,30		0,500	4	12,000

Fraises HSS

Fraises pour clavettes (2 dents)



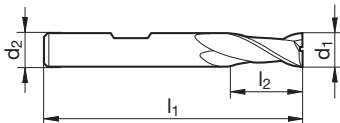
Référence **74231**



P	M	K	N	S	H
•	•	•	•		

Conseils d'util.,
page 580

- extra court
- coupe au centre
- matériaux avec une résistance jusqu'à environ 1200 N/mm²



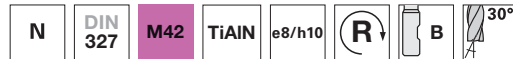
d1 mm	Tolérance d1	d2 mm	l1 mm	l2 mm	Z	N° de code
1,000	h10	6,000	47,000	2,000	2	1,000
1,500	h10	6,000	47,000	3,000	2	1,500
2,000	e8	6,000	48,000	4,000	2	2,000
2,500	e8	6,000	49,000	5,000	2	2,500
3,000	e8	6,000	49,000	5,000	2	3,000
3,500	h10	6,000	50,000	6,000	2	3,500
4,000	e8	6,000	51,000	7,000	2	4,000
4,500	h10	6,000	51,000	7,000	2	4,500
5,000	e8	6,000	52,000	8,000	2	5,000
5,500	h10	6,000	52,000	8,000	2	5,500
6,000	e8	6,000	52,000	8,000	2	6,000
7,000	e8	10,000	60,000	10,000	2	7,000
8,000	e8	10,000	61,000	11,000	2	8,000
9,000	h10	10,000	61,000	11,000	2	9,000
10,000	e8	10,000	63,000	13,000	2	10,000
12,000	e8	12,000	73,000	16,000	2	12,000
14,000	e8	12,000	73,000	16,000	2	14,000
16,000	e8	16,000	79,000	19,000	2	16,000
18,000	e8	16,000	79,000	19,000	2	18,000
20,000	e8	20,000	88,000	22,000	2	20,000
25,000	e8	25,000	102,000	26,000	2	25,000

Fraises HSS

Fraises pour clavettes (2 dents)



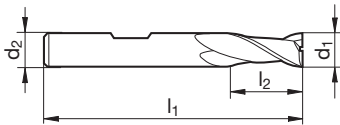
Référence **64640**



P	M	K	N	S	H
●	●	●	○		

Conseils d'util.,
page 580

- extra court
- coupe au centre
- matériaux avec une résistance jusqu'à environ 1200 N/mm²



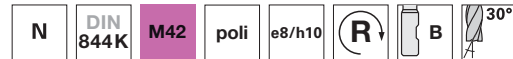
d1 mm	Tolérance d1	d2 mm	l1 mm	l2 mm	Z	N° de code
1,000	h10	6,000	47,000	2,000	2	1,000
1,500	h10	6,000	47,000	3,000	2	1,500
2,000	e8	6,000	48,000	4,000	2	2,000
2,500	e8	6,000	49,000	5,000	2	2,500
3,000	e8	6,000	49,000	5,000	2	3,000
3,500	h10	6,000	50,000	6,000	2	3,500
4,000	e8	6,000	51,000	7,000	2	4,000
4,500	h10	6,000	51,000	7,000	2	4,500
5,000	e8	6,000	52,000	8,000	2	5,000
5,500	h10	6,000	52,000	8,000	2	5,500
6,000	e8	6,000	52,000	8,000	2	6,000
7,000	e8	10,000	60,000	10,000	2	7,000
8,000	e8	10,000	61,000	11,000	2	8,000
9,000	h10	10,000	61,000	11,000	2	9,000
10,000	e8	10,000	63,000	13,000	2	10,000
12,000	e8	12,000	73,000	16,000	2	12,000
14,000	e8	12,000	73,000	16,000	2	14,000
16,000	e8	16,000	79,000	19,000	2	16,000
18,000	e8	16,000	79,000	19,000	2	18,000
20,000	e8	20,000	88,000	22,000	2	20,000

Fraises HSS

Fraises pour clavettes (2 dents)



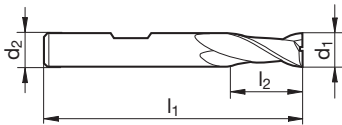
Référence **74243**



P	M	K	N	S	H
•	•	•	•		

Conseils d'util.,
page 580

- coupe au centre
- matériaux avec une résistance jusqu'à environ 1200 N/mm²



d1 mm	Tolérance d1	d2 mm	l1 mm	l2 mm	Z	N° de code
3,000	e8	6,000	52,000	8,000	2	3,000
3,500	h10	6,000	54,000	10,000	2	3,500
4,000	e8	6,000	55,000	11,000	2	4,000
4,500	h10	6,000	55,000	11,000	2	4,500
5,000	e8	6,000	57,000	13,000	2	5,000
5,500	h10	6,000	57,000	13,000	2	5,500
6,000	e8	6,000	57,000	13,000	2	6,000
7,000	e8	10,000	66,000	16,000	2	7,000
8,000	e8	10,000	69,000	19,000	2	8,000
10,000	e8	10,000	72,000	22,000	2	10,000
12,000	e8	12,000	83,000	26,000	2	12,000
14,000	e8	12,000	83,000	26,000	2	14,000
16,000	e8	16,000	92,000	32,000	2	16,000
18,000	e8	16,000	92,000	32,000	2	18,000
20,000	e8	20,000	104,000	38,000	2	20,000

Fraises HSS

Fraises pour clavettes (2 dents)



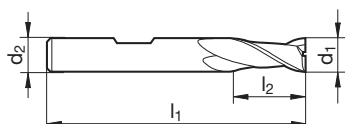
Référence **64670**



P	M	K	N	S	H
•	•	•	○		

Conseils d'util.,
page 580

- coupe au centre
- matériaux avec une résistance jusqu'à environ 1200 N/mm²



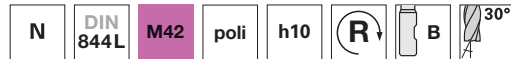
d1 mm	Tolérance d1	d2 mm	l1 mm	l2 mm	Z	N° de code
3,000	e8	6,000	52,000	8,000	2	3,000
4,000	e8	6,000	55,000	11,000	2	4,000
5,000	e8	6,000	57,000	13,000	2	5,000
6,000	e8	6,000	57,000	13,000	2	6,000
8,000	e8	10,000	69,000	19,000	2	8,000
10,000	e8	10,000	72,000	22,000	2	10,000
12,000	e8	12,000	83,000	26,000	2	12,000
16,000	e8	16,000	92,000	32,000	2	16,000
18,000	e8	16,000	92,000	32,000	2	18,000
20,000	e8	20,000	104,000	38,000	2	20,000

Fraises HSS

Fraises pour clavettes (2 dents)



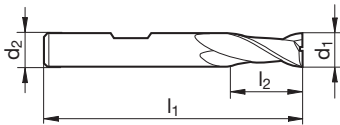
Référence **74244**



P	M	K	N	S	H
•		•	•		

Conseils d'util.,
page 580

- extra long
- coupe au centre
- Matériaux avec une résistance jusqu'à environ 1000 N/mm²



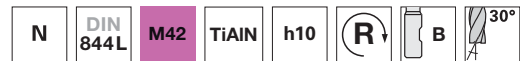
d1 mm	Tolérance d1	d2 mm	l1 mm	l2 mm	Z	N° de code
3,000	h10	6,000	56,000	12,000	2	3,000
4,000	h10	6,000	63,000	19,000	2	4,000
5,000	h10	6,000	68,000	24,000	2	5,000
6,000	h10	6,000	68,000	24,000	2	6,000
8,000	h10	10,000	88,000	38,000	2	8,000
10,000	h10	10,000	95,000	45,000	2	10,000
12,000	h10	12,000	110,000	53,000	2	12,000
14,000	h10	12,000	110,000	53,000	2	14,000
16,000	h10	16,000	123,000	63,000	2	16,000
18,000	h10	16,000	123,000	63,000	2	18,000
20,000	h10	20,000	141,000	75,000	2	20,000

Fraises HSS

Fraises pour clavettes (2 dents)



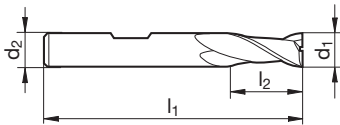
Référence **64671**



P	M	K	N	S	H
•		•			

Conseils d'util.,
page 580

- extra long
- coupe au centre
- Matériaux avec une résistance jusqu'à environ 1000 N/mm²



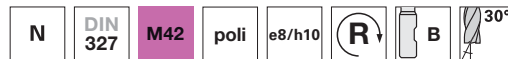
d1 mm	Tolérance d1	d2 mm	l1 mm	l2 mm	Z	N° de code
4,000	h10	6,000	63,000	19,000	2	4,000
5,000	h10	6,000	68,000	24,000	2	5,000
6,000	h10	6,000	68,000	24,000	2	6,000
8,000	h10	10,000	88,000	38,000	2	8,000
10,000	h10	10,000	95,000	45,000	2	10,000
12,000	h10	12,000	110,000	53,000	2	12,000
14,000	h10	12,000	110,000	53,000	2	14,000
16,000	h10	16,000	123,000	63,000	2	16,000
18,000	h10	16,000	123,000	63,000	2	18,000
20,000	h10	20,000	141,000	75,000	2	20,000

Fraises HSS

Fraises à rainurer (3 dents)



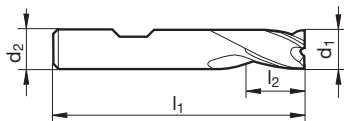
Référence **74280**



P	M	K	N	S	H
•	•	•	•		

Conseils d'util.,
page 580

- extra court
- coupe au centre
- matériaux avec une résistance jusqu'à environ 1200 N/mm²



d1 mm	d1	d2 mm	l1 mm	l2 mm	Z	N° de code
2,800	h10	6,000	49,000	5,000	3	2,800
3,000	e8	6,000	49,000	5,000	3	3,000
3,800	h10	6,000	51,000	7,000	3	3,800
4,000	e8	6,000	51,000	7,000	3	4,000
4,800	h10	6,000	52,000	8,000	3	4,800
5,000	e8	6,000	52,000	8,000	3	5,000
5,750	h10	6,000	52,000	8,000	3	5,750
6,000	e8	6,000	52,000	8,000	3	6,000
6,750	h10	10,000	60,000	10,000	3	6,750
7,000	e8	10,000	60,000	10,000	3	7,000
7,750	h10	10,000	61,000	11,000	3	7,750
8,000	e8	10,000	61,000	11,000	3	8,000
9,700	h10	10,000	63,000	13,000	3	9,700
10,000	e8	10,000	63,000	13,000	3	10,000
11,700	h10	12,000	70,000	13,000	3	11,700
12,000	e8	12,000	73,000	16,000	3	12,000
13,700	h10	12,000	73,000	16,000	3	13,700
14,000	e8	12,000	73,000	16,000	3	14,000
15,700	h10	16,000	79,000	19,000	3	15,700
16,000	e8	16,000	79,000	19,000	3	16,000
18,000	e8	16,000	79,000	19,000	3	18,000
20,000	e8	20,000	88,000	22,000	3	20,000
25,000	e8	25,000	102,000	26,000	3	25,000

Fraises HSS

Fraises à rainurer (3 dents)



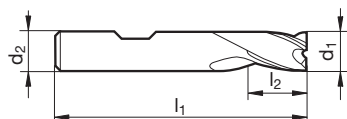
Référence **64604**



P	M	K	N	S	H
●	●	●	○		

Conseils d'util.,
page 580

- extra court
- coupe au centre
- matériaux avec une résistance jusqu'à environ 1200 N/mm²



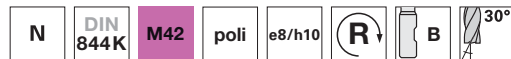
d1 mm	d1	d2 mm	l1 mm	l2 mm	Z	N° de code
2,800	h10	6,000	49,000	5,000	3	2,800
3,000	e8	6,000	49,000	5,000	3	3,000
3,800	h10	6,000	51,000	7,000	3	3,800
4,000	e8	6,000	51,000	7,000	3	4,000
4,800	h10	6,000	52,000	8,000	3	4,800
5,000	e8	6,000	52,000	8,000	3	5,000
5,750	h10	6,000	52,000	8,000	3	5,750
6,000	e8	6,000	52,000	8,000	3	6,000
7,000	e8	10,000	60,000	10,000	3	7,000
7,750	h10	10,000	61,000	11,000	3	7,750
8,000	e8	10,000	61,000	11,000	3	8,000
9,700	h10	10,000	63,000	13,000	3	9,700
10,000	e8	10,000	63,000	13,000	3	10,000
11,700	h10	12,000	70,000	13,000	3	11,700
12,000	e8	12,000	73,000	16,000	3	12,000
14,000	e8	12,000	73,000	16,000	3	14,000
16,000	e8	16,000	79,000	19,000	3	16,000
18,000	e8	16,000	79,000	19,000	3	18,000
20,000	e8	20,000	88,000	22,000	3	20,000
25,000	e8	25,000	102,000	26,000	3	25,000

Fraises HSS

Fraises à rainurer (3 dents)



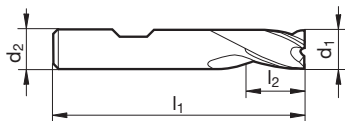
Référence **74282**



P	M	K	N	S	H
•	•	•	•		

Conseils d'util.,
page 580

- coupe au centre
- matériaux avec une résistance jusqu'à environ 1200 N/mm²



d1 mm	d1	d2 mm	l1 mm	l2 mm	Z	N° de code
3,000	e8	6,000	52,000	8,000	3	3,000
4,000	e8	6,000	55,000	11,000	3	4,000
5,000	e8	6,000	57,000	13,000	3	5,000
5,750	h10	6,000	57,000	13,000	3	5,750
6,000	e8	6,000	57,000	13,000	3	6,000
6,750	h10	10,000	66,000	16,000	3	6,750
7,000	e8	10,000	66,000	16,000	3	7,000
7,750	h10	10,000	69,000	19,000	3	7,750
8,000	e8	10,000	69,000	19,000	3	8,000
9,700	h10	10,000	72,000	22,000	3	9,700
10,000	e8	10,000	72,000	22,000	3	10,000
11,700	h10	12,000	79,000	22,000	3	11,700
12,000	e8	12,000	83,000	26,000	3	12,000
13,700	h10	12,000	83,000	26,000	3	13,700
14,000	e8	12,000	83,000	26,000	3	14,000
15,700	h10	16,000	92,000	32,000	3	15,700
16,000	e8	16,000	92,000	32,000	3	16,000
18,000	e8	16,000	92,000	32,000	3	18,000
20,000	e8	20,000	104,000	38,000	3	20,000

Fraises HSS

Fraises à rainurer (3 dents)



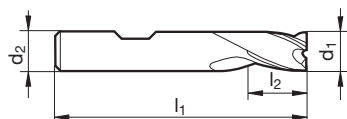
Référence **64641**



P	M	K	N	S	H
•	•	•	○		

Conseils d'util.,
page 580

- coupe au centre
- matériaux avec une résistance jusqu'à environ 1200 N/mm²



d1 mm	d1	d2 mm	l1 mm	l2 mm	Z	N° de code
3,000	e8	6,000	52,000	8,000	3	3,000
4,000	e8	6,000	55,000	11,000	3	4,000
4,800	h10	6,000	57,000	13,000	3	4,800
5,000	e8	6,000	57,000	13,000	3	5,000
6,000	e8	6,000	57,000	13,000	3	6,000
7,000	e8	10,000	66,000	16,000	3	7,000
8,000	e8	10,000	69,000	19,000	3	8,000
10,000	e8	10,000	72,000	22,000	3	10,000
12,000	e8	12,000	83,000	26,000	3	12,000
14,000	e8	12,000	83,000	26,000	3	14,000
16,000	e8	16,000	92,000	32,000	3	16,000
18,000	e8	16,000	92,000	32,000	3	18,000
20,000	e8	20,000	104,000	38,000	3	20,000

Fraises HSS

Fraises à rainurer (3 dents)



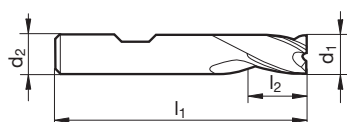
Référence **54294**



P	M	K	N	S	H
•	•	•	•		

Conseils d'util.,
page 580

- extra long
- coupe au centre
- Matériaux avec une résistance jusqu'à environ 1000 N/mm²



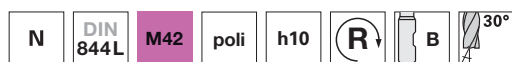
d1 mm	d1	d2 mm	l1 mm	l2 mm	Z	N° de code
4,000	e8	6,000	63,000	19,000	3	4,000
5,000	e8	6,000	68,000	24,000	3	5,000
6,000	e8	6,000	68,000	24,000	3	6,000
8,000	e8	10,000	88,000	38,000	3	8,000
10,000	e8	10,000	95,000	45,000	3	10,000
12,000	e8	12,000	110,000	53,000	3	12,000
14,000	e8	12,000	110,000	53,000	3	14,000
16,000	e8	16,000	123,000	63,000	3	16,000
18,000	e8	16,000	123,000	63,000	3	18,000

Fraises HSS

Fraises à rainurer (3 dents)



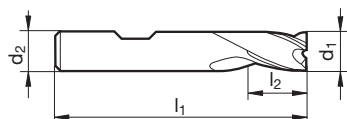
Référence **74294**



P	M	K	N	S	H
•		•	•		

Conseils d'util.,
page 580

- extra long
- coupe au centre
- Matériaux avec une résistance jusqu'à environ 1000 N/mm²



d1 mm	d1	d2 mm	l1 mm	l2 mm	Z	N° de code
3,000	h10	6,000	56,000	12,000	3	3,000
4,000	h10	6,000	63,000	19,000	3	4,000
5,000	h10	6,000	68,000	24,000	3	5,000
6,000	h10	6,000	68,000	24,000	3	6,000
8,000	h10	10,000	88,000	38,000	3	8,000
10,000	h10	10,000	95,000	45,000	3	10,000
12,000	h10	12,000	110,000	53,000	3	12,000
14,000	h10	12,000	110,000	53,000	3	14,000
16,000	h10	16,000	123,000	63,000	3	16,000
18,000	h10	16,000	123,000	63,000	3	18,000
20,000	h10	20,000	141,000	75,000	3	20,000

Fraises HSS

Minifraises à rainurer (3 dents)



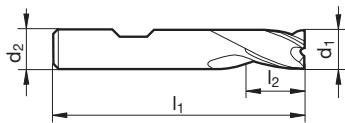
Référence **54080**



P	M	K	N	S	H
○	●	●	●	○	

Conseils d'util.,
page 580

- extra court
- coupe au centre
- matériaux avec une résistance jusqu'à environ 1200 N/mm²



d1 e8 mm	d2 mm	l1 mm	l2 mm	Z	N° de code
3,000	6,000	36,000	5,000	3	3,000
4,000	6,000	38,000	7,000	3	4,000
5,000	6,000	39,000	8,000	3	5,000
6,000	6,000	39,000	8,000	3	6,000
8,000	8,000	43,000	11,000	3	8,000
10,000	10,000	50,000	13,000	3	10,000

Fraises HSS

Minifraises à rainurer (3 dents)



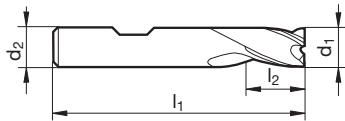
Référence **54180**



P	M	K	N	S	H
○	●	●	●	○	

Conseils d'util.,
page 580

- coupe au centre
- matériaux avec une résistance jusqu'à environ 1200 N/mm²



d1 e8 mm	d2 mm	l1 mm	l2 mm	Z	N° de code
3,000	6,000	39,000	8,000	3	3,000
4,000	6,000	42,000	11,000	3	4,000
5,000	6,000	44,000	13,000	3	5,000
6,000	6,000	44,000	13,000	3	6,000
8,000	8,000	51,000	19,000	3	8,000
10,000	10,000	59,000	22,000	3	10,000

Fraises HSS

Fraises deux tailles à arêtes de coupe multiples



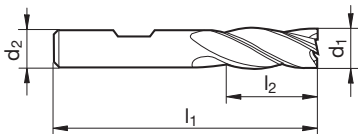
Référence **74617**



P	M	K	N	S	H
●	●	○	○		

Conseils d'util.,
page 582

- coupe au centre
- matériaux avec une résistance jusqu'à environ 1200 N/mm²



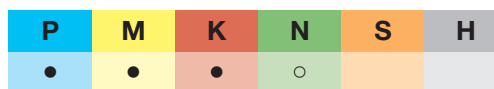
d1 k10 mm	d2 mm	l1 mm	l2 mm	Z	N° de code
2,000	6,000	51,000	7,000	4	2,000
3,000	6,000	52,000	8,000	4	3,000
4,000	6,000	55,000	11,000	4	4,000
5,000	6,000	57,000	13,000	4	5,000
6,000	6,000	57,000	13,000	4	6,000
8,000	10,000	69,000	19,000	4	8,000
9,000	10,000	69,000	19,000	4	9,000
10,000	10,000	72,000	22,000	4	10,000
12,000	12,000	83,000	26,000	4	12,000
14,000	12,000	83,000	26,000	4	14,000
15,000	12,000	83,000	26,000	4	15,000
16,000	16,000	92,000	32,000	4	16,000
18,000	16,000	92,000	32,000	4	18,000
20,000	20,000	104,000	38,000	4	20,000
25,000	25,000	121,000	45,000	5	25,000

Fraises HSS

Fraises deux tailles à arêtes de coupe multiples

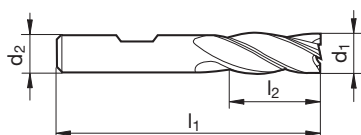


Référence **64667**



Conseils d'util.,
page 582

- coupe au centre
- matériaux avec une résistance jusqu'à environ 1200 N/mm²



d1 k10 mm	d2 mm	l1 mm	l2 mm	Z	N° de code
3,000	6,000	52,000	8,000	4	3,000
4,000	6,000	55,000	11,000	4	4,000
5,000	6,000	57,000	13,000	4	5,000
6,000	6,000	57,000	13,000	4	6,000
7,000	10,000	66,000	16,000	4	7,000
8,000	10,000	69,000	19,000	4	8,000
9,000	10,000	69,000	19,000	4	9,000
10,000	10,000	72,000	22,000	4	10,000
11,000	12,000	79,000	22,000	4	11,000
12,000	12,000	83,000	26,000	4	12,000
13,000	12,000	83,000	26,000	4	13,000
14,000	12,000	83,000	26,000	4	14,000
15,000	12,000	83,000	26,000	4	15,000
16,000	16,000	92,000	32,000	4	16,000
18,000	16,000	92,000	32,000	4	18,000
20,000	20,000	104,000	38,000	4	20,000
25,000	25,000	121,000	45,000	6	25,000

Fraises HSS

Fraises deux tailles à arêtes de coupe multiples



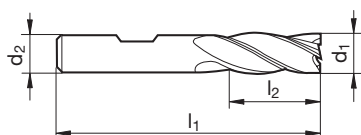
Référence **74847**



P	M	K	N	S	H
●	○	●	○		

Conseils d'util.,
page 582

- long
- coupe au centre
- Matériaux avec une résistance jusqu'à environ 1000 N/mm²



d1 k10 mm	d2 mm	l1 mm	l2 mm	Z	N° de code
3,000	6,000	56,000	12,000	4	3,000
4,000	6,000	63,000	19,000	4	4,000
5,000	6,000	68,000	24,000	4	5,000
6,000	6,000	68,000	24,000	4	6,000
7,000	10,000	80,000	30,000	4	7,000
8,000	10,000	88,000	38,000	4	8,000
9,000	10,000	88,000	38,000	4	9,000
10,000	10,000	95,000	45,000	4	10,000
11,000	12,000	102,000	45,000	4	11,000
12,000	12,000	110,000	53,000	4	12,000
14,000	12,000	110,000	53,000	4	14,000
15,000	12,000	110,000	53,000	4	15,000
16,000	16,000	123,000	63,000	4	16,000
18,000	16,000	123,000	63,000	4	18,000
20,000	20,000	141,000	75,000	4	20,000
25,000	25,000	166,000	90,000	5	25,000

Fraises HSS

Fraises deux tailles à arêtes de coupe multiples



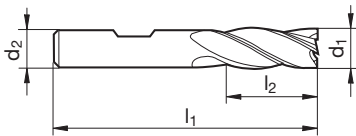
Référence **54847**



P	M	K	N	S	H
•	•	•	○		

Conseils d'util.,
page 582

- long
- coupe au centre
- Matériaux avec une résistance jusqu'à environ 1000 N/mm²



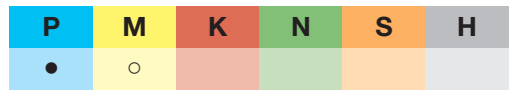
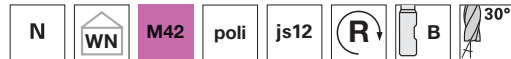
d1 k10 mm	d2 mm	l1 mm	l2 mm	Z	N° de code
3,000	6,000	56,000	12,000	4	3,000
4,000	6,000	63,000	19,000	4	4,000
5,000	6,000	68,000	24,000	4	5,000
6,000	6,000	68,000	24,000	4	6,000
7,000	10,000	80,000	30,000	4	7,000
8,000	10,000	88,000	38,000	4	8,000
10,000	10,000	95,000	45,000	4	10,000
12,000	12,000	110,000	53,000	4	12,000
16,000	16,000	123,000	63,000	4	16,000
20,000	20,000	141,000	75,000	4	20,000
25,000	25,000	166,000	90,000	6	25,000
32,000	32,000	186,000	106,000	6	32,000

Fraises HSS

Fraises deux tailles (4 dents)

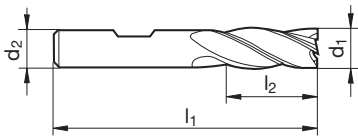


Référence 74800



Conseils d'util.,
page 582

- extra long
- coupe au centre
- Matériaux avec une résistance jusqu'à environ 1000 N/mm²



d1 js12 mm	d2 mm	l1 mm	l2 mm	Z	N° de code
6,000	6,000	79,000	40,000	4	6,000
8,000	10,000	105,000	56,000	4	8,000
10,000	10,000	112,000	63,000	4	10,000
12,000	12,000	125,000	71,000	4	12,000
14,000	12,000	125,000	71,000	4	14,000
16,000	16,000	141,000	80,000	4	16,000
18,000	16,000	141,000	80,000	4	18,000
20,000	20,000	163,000	100,000	4	20,000

Fraises HSS

Fraises d'ébauche et de finition



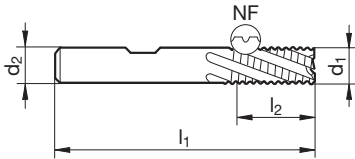
Référence **54815**



P	M	K	N	S	H
•	•	•			

Conseils d'util.,
page 582

- avec denture normale pour le fraisage d'ébauche et finition
- coupe au centre



d1 k12 mm	d2 mm	l1 mm	l2 mm	Z	N° de code
6,000	6,000	57,000	13,000	4	6,000
8,000	10,000	69,000	19,000	4	8,000
10,000	10,000	72,000	22,000	4	10,000
12,000	12,000	83,000	26,000	4	12,000
14,000	12,000	83,000	26,000	4	14,000
16,000	16,000	92,000	32,000	4	16,000
18,000	16,000	92,000	32,000	4	18,000
20,000	20,000	104,000	38,000	4	20,000
25,000	25,000	121,000	45,000	4	25,000

Fraises HSS

Fraises d'ébauche (3 arêtes de coupe frontale)



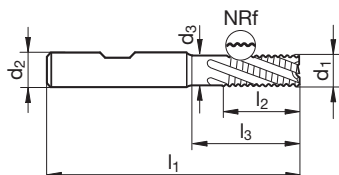
Référence **74825**



P	M	K	N	S	H
•	•	•			

Conseils d'util.,
page 582

- profil d'ébauche fin
- coupe au centre
- pour les matériaux difficiles à usiner avec une résistance jusqu'à environ 1400 N/mm²



d1 k10 mm	d2 h6 mm	l1 mm	l2 mm	Z	N° de code
6,000	6,000	57,000	13,000	3	6,000
8,000	10,000	69,000	19,000	3	8,000
10,000	10,000	72,000	22,000	3	10,000
12,000	12,000	83,000	26,000	3	12,000
14,000	12,000	83,000	26,000	3	14,000
16,000	16,000	92,000	32,000	3	16,000
18,000	16,000	92,000	32,000	3	18,000
20,000	20,000	104,000	38,000	3	20,000

Fraises HSS

Fraises d'ébauche (3 arêtes de coupe frontale)



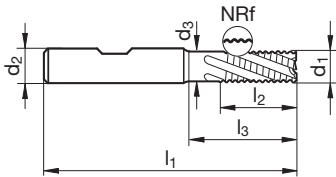
Référence **54825**



P	M	K	N	S	H
•	•	•			

Conseils d'util.,
page 582

- profil d'ébauche fin
- coupe au centre
- pour les matériaux difficiles à usiner avec une résistance jusqu'à environ 1400 N/mm²



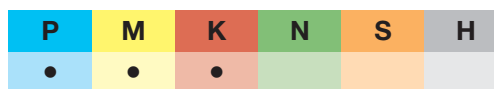
d1 k10 mm	d2 h6 mm	l1 mm	l2 mm	Z	N° de code
6,000	6,000	57,000	13,000	3	6,000
8,000	10,000	69,000	19,000	3	8,000
10,000	10,000	72,000	22,000	3	10,000
12,000	12,000	83,000	26,000	3	12,000
16,000	16,000	92,000	32,000	3	16,000
20,000	20,000	104,000	38,000	3	20,000

Fraises HSS

Fraises d'ébauche (4 arêtes de coupe frontale)

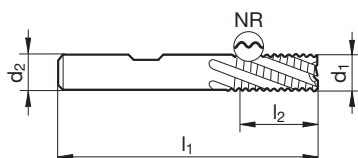


Référence **74816**



Conseils d'util.,
page 582

- profil d'ébauche à grosse denture
- coupe au centre



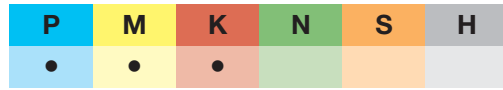
d1 js12 mm	d2 h6 mm	l1 mm	l2 mm	Z	N° de code
6,000	6,000	57,000	13,000	4	6,000
7,000	10,000	66,000	16,000	4	7,000
8,000	10,000	69,000	19,000	4	8,000
9,000	10,000	69,000	19,000	4	9,000
10,000	10,000	72,000	22,000	4	10,000
11,000	12,000	79,000	22,000	4	11,000
12,000	12,000	83,000	26,000	4	12,000
14,000	12,000	83,000	26,000	4	14,000
15,000	12,000	83,000	26,000	4	15,000
16,000	16,000	92,000	32,000	4	16,000
18,000	16,000	92,000	32,000	4	18,000
20,000	20,000	104,000	38,000	4	20,000
25,000	25,000	121,000	45,000	4	25,000
28,000	25,000	121,000	45,000	4	28,000
30,000	25,000	121,000	45,000	4	30,000

Fraises HSS

Fraises d'ébauche (4 arêtes de coupe frontale)

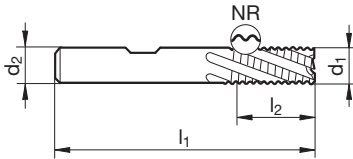


Référence **54816**



Conseils d'util.,
page 582

- profil d'ébauche à grosse denture
- coupe au centre



d1 k12 mm	d2 h6 mm	l1 mm	l2 mm	Z	N° de code
6,000	6,000	57,000	13,000	4	6,000
8,000	10,000	69,000	19,000	4	8,000
10,000	10,000	72,000	22,000	4	10,000
12,000	12,000	83,000	26,000	4	12,000
14,000	12,000	83,000	26,000	4	14,000
16,000	16,000	92,000	32,000	4	16,000
18,000	16,000	92,000	32,000	4	18,000
20,000	20,000	104,000	38,000	4	20,000
22,000	20,000	104,000	38,000	4	22,000
25,000	25,000	121,000	45,000	4	25,000
28,000	25,000	121,000	45,000	4	28,000
30,000	25,000	121,000	45,000	4	30,000
32,000	32,000	133,000	53,000	4	32,000

Fraises HSS

Fraises d'ébauche (4 arêtes de coupe frontale)



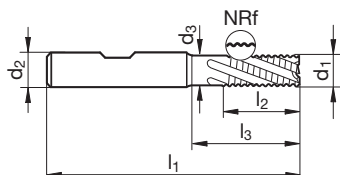
Référence **74845**



P	M	K	N	S	H
•	•	•			

Conseils d'util.,
page 582

- profil d'ébauche fin
- coupe au centre
- pour les matériaux difficiles à usiner avec une résistance jusqu'à environ 1400 N/mm²



d1 k12 mm	d2 h6 mm	l1 mm	l2 mm	Z	N° de code
6,000	6,000	57,000	13,000	4	6,000
8,000	10,000	69,000	19,000	4	8,000
10,000	10,000	72,000	22,000	4	10,000
12,000	12,000	83,000	26,000	4	12,000
14,000	12,000	83,000	26,000	4	14,000
16,000	16,000	92,000	32,000	4	16,000
18,000	16,000	92,000	32,000	4	18,000
20,000	20,000	104,000	38,000	4	20,000
25,000	25,000	121,000	45,000	5	25,000

Fraises HSS

Fraises d'ébauche (4 arêtes de coupe frontale)



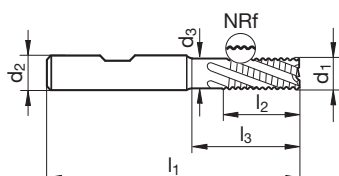
Référence **54845**



P	M	K	N	S	H
•	•	•			

Conseils d'util.,
page 582

- profil d'ébauche fin
- coupe au centre
- pour les matériaux difficiles à usiner avec une résistance jusqu'à environ 1400 N/mm²



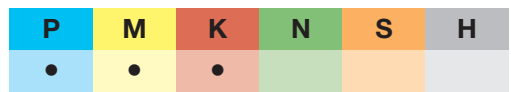
d1 k12 mm	d2 h6 mm	l1 mm	l2 mm	Z	N° de code
6,000	6,000	57,000	13,000	4	6,000
8,000	10,000	69,000	19,000	4	8,000
10,000	10,000	72,000	22,000	4	10,000
12,000	12,000	83,000	26,000	4	12,000
14,000	12,000	83,000	26,000	4	14,000
16,000	16,000	92,000	32,000	4	16,000
18,000	16,000	92,000	32,000	4	18,000
20,000	20,000	104,000	38,000	4	20,000
25,000	25,000	121,000	45,000	5	25,000

Fraises HSS

Fraises d'ébauche (4 arêtes de coupe frontale)

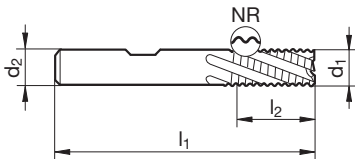


Référence **74836**



Conseils d'util.,
page 582

- profil d'ébauche à grosse denture
- long
- coupe au centre



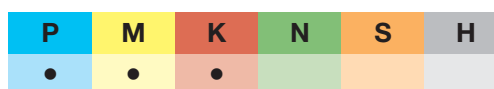
d1 k12 mm	d2 h6 mm	l1 mm	l2 mm	Z	N° de code
6,000	6,000	68,000	24,000	4	6,000
8,000	10,000	88,000	38,000	4	8,000
10,000	10,000	95,000	45,000	4	10,000
12,000	12,000	110,000	53,000	4	12,000
16,000	16,000	123,000	63,000	4	16,000
18,000	16,000	123,000	63,000	4	18,000
20,000	20,000	141,000	75,000	4	20,000
25,000	25,000	166,000	90,000	4	25,000

Fraises HSS

Fraises d'ébauche (4 arêtes de coupe frontale)

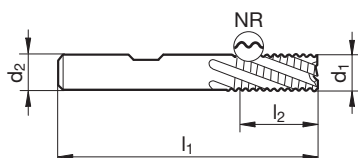


Référence **54836**



Conseils d'util.,
page 582

- profil d'ébauche à grosse denture
- long
- coupe au centre



d1 k12 mm	d2 h6 mm	l1 mm	l2 mm	Z	N° de code
6,000	6,000	68,000	24,000	4	6,000
8,000	10,000	88,000	38,000	4	8,000
10,000	10,000	95,000	45,000	4	10,000
12,000	12,000	110,000	53,000	4	12,000
14,000	12,000	110,000	53,000	4	14,000
16,000	16,000	123,000	63,000	4	16,000
18,000	16,000	123,000	63,000	4	18,000
20,000	20,000	141,000	75,000	4	20,000
25,000	25,000	166,000	90,000	4	25,000

Fraises HSS

Fraises à bout hémisphérique



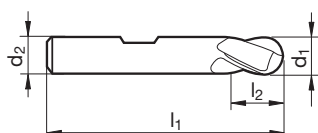
Référence **54275**



P	M	K	N	S	H
•	•	•	•		

Conseils d'util.,
page 580

- extra court
- coupe au centre
- Rayon hémisphérique
- Matériaux avec une résistance jusqu'à environ 1000 N/mm²



d1 mm	d1	d2 mm	l1 mm	l2 mm	Z	N° de code
2,000	e8	6,000	48,000	4,000	2	2,000
3,000	e8	6,000	49,000	5,000	2	3,000
4,000	e8	6,000	51,000	7,000	2	4,000
5,000	e8	6,000	52,000	8,000	2	5,000
6,000	e8	6,000	52,000	8,000	2	6,000
7,000	e8	10,000	60,000	10,000	2	7,000
8,000	e8	10,000	61,000	11,000	2	8,000
10,000	e8	10,000	63,000	13,000	2	10,000
12,000	e8	12,000	73,000	16,000	2	12,000
13,000	h10	12,000	73,000	16,000	2	13,000
14,000	e8	12,000	73,000	16,000	2	14,000
15,000	h10	12,000	73,000	16,000	2	15,000
16,000	e8	16,000	79,000	19,000	2	16,000
20,000	e8	20,000	88,000	22,000	2	20,000

Fraises HSS

Fraises à bout hémisphérique



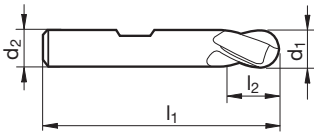
Référence **54276**



P	M	K	N	S	H
•	•	•	•		

Conseils d'util.,
page 580

- coupe au centre
- Rayon hémisphérique
- Matériaux avec une résistance jusqu'à environ 1000 N/mm²



d1 mm	d1	d2 mm	l1 mm	l2 mm	Z	N° de code
3,000	h10	6,000	56,000	8,000	2	3,000
4,000	h10	6,000	63,000	11,000	2	4,000
5,000	h10	6,000	68,000	13,000	2	5,000
6,000	h10	6,000	68,000	13,000	2	6,000
7,000	h10	10,000	80,000	16,000	2	7,000
8,000	h10	10,000	88,000	19,000	2	8,000
10,000	h10	10,000	95,000	22,000	2	10,000
12,000	h10	12,000	110,000	26,000	2	12,000
14,000	h10	12,000	110,000	26,000	2	14,000
16,000	h10	16,000	123,000	32,000	2	16,000
18,000	h10	16,000	123,000	32,000	2	18,000
20,000	h10	20,000	141,000	38,000	2	20,000





OUTILS D'ALESAGE/ CHANFREINAGE



ISO-CODE

P	Aciers communs, aciers hautement alliés
M	Aciers inoxydables
K	Fontes grises, fontes à graphite sphéroïdal et fontes malléables
N	Aluminium et ses alliages ainsi que d'autres métaux non ferreux
S	Alliages de titane, spéciaux et superalliages
H	Aciers trempés et fontes dures

Sur les pages suivantes prix et programmes, sont mentionnées pour chacune des fraises, les recommandations d'utilisation pour chacun des groupes d'usinage par enlèvement de copeaux :

- particulièrement recommandé
- sous réserve



PICTOGRAMMES

MATIERE DE COUPE	VHM	HM	HSS-E	HSS					
	CW monobloc		CW						
REVETEMENT	poli	ni-truré	traité vapeur	AlTiN nano	Al-TiN	TiN			
TOLERANCE	H7	+0,005	+0,004 +0,005	js9					
ANGLE DE FRAISURE									
SENS DE COUPE									
	à droite								
FORME D'ATTACHEMENT									
	Queue Morse								
ANGLE D'HELICE									
NORME	DIN 9	DIN 206	DIN 208	DIN 212-2	DIN 212-3	DIN 311	DIN 334	DIN 335	DIN 373
	DIN 2179	~DIN 8050	~DIN 8051	~DIN 8093	WN				
	Norme usine								
TYPE	SuperR- HS-S	SuperR- HS-D	Super AF-60	Super AF-90	Super AF-120	Super AD-90	SuperE- U		
FORME	A	B	C	D					

P	M	K	N	S	H	Type	Sens de coupe	Forme	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Alésoirs haute performance en CW monobloc

	•	•	•	•	•	SuperR-HS-S	à droite		CW monobloc	AlTiN nano	Norme usine	3,000 - 20,000	72870	694
	•	•	•	•	•	SuperR-HS-D	à droite		CW monobloc	AlTiN nano	Norme usine	3,000 - 20,000	72871	695
	•	•	•	•	•	SuperR-HS-S	à droite		CW monobloc	AlTiN nano	Norme usine	2,970 - 12,030	72872	696
	•	•	•	•	•	SuperR-HS-D	à droite		CW monobloc	AlTiN nano	Norme usine	2,970 - 12,030	72873	698

Alésoirs machines NC

	•	•	•	•	•		à droite	B	CW monobloc	poli	Norme usine	0,980 - 12,050	72920	700
	•	•	•	•	•		à droite	B	CW monobloc	poli	Norme usine	3,000 - 12,000	72930	702

Alésoirs machine, en CW

	•	•	•	•	•	○	à droite	A	CW	poli	~DIN 8050	5,000 - 20,000	72868	704
	•	•	•	•	•	○	à droite	B	CW	poli	~DIN 8050	5,000 - 20,000	72867	705
	•	•	•	•	•	○	à droite	A	CW	poli	~DIN 8051	10,000 - 30,000	72860	708
	•	•	•	•	•	○	à droite	B	CW	poli	~DIN 8051	6,000 - 32,000	72859	709
	•	•	•	•	•	○	à droite	A	CW	poli	~DIN 8093	1,200 - 16,000	72880	706
	•	•	•	•	•	○	à droite	B	CW	poli	~DIN 8093	1,000 - 16,000	72881	707

P	M	K	N	S	H	Type	Sens de coupe	Forme	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Alésoirs machines NC

•	•	•	•	○			à droite	B	HSS-E	poli	DIN 212-3	1,000 - 12,030	72900	710
•	•	•	•	○			à droite	B	HSS-E	poli	DIN 212-3	1,500 - 20,000	72910	712

Alésoirs machine

•	○	•	•	○			à droite	A	HSS-E	poli	DIN 208	8,000 - 35,000	72660	718
•	○	•	•	○			à droite	B	HSS-E	poli	DIN 208	5,000 - 50,000	72670	719
•	○	•	•	○			à droite	A	HSS-E	poli	DIN 212-2	2,200 - 20,000	72640	716
•	○	•	•	○			à droite	B	HSS-E	poli	DIN 212-2	2,200 - 20,000	72650	717
•	○	•	•	○			à droite	B	HSS-E	poli	DIN 212-2	0,980 - 12,000	72654	714

Alésoirs machine, à coupe descendante

•	○	•	•	○			à droite	C	HSS-E	poli	DIN 212-2	4,000 - 13,000	72690	720

Alésoirs de chaudronnerie machine 1:10

•	○	•	•	○			à droite		HSS	nituré	DIN 311	9,500 - 37,000	72680	721

Alésoirs machine coniques

•	○	•	•	○			à droite		HSS-E	poli	DIN 2179	2,000 - 12,000	72741	722

P	M	K	N	S	H	Type	Sens de coupe	Forme	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Alésoirs à main, coniques



•	•	•	•	•	•		à droite	A	HSS	poli	DIN 9	1,000 - 16,000	72730	723
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Alésoirs à main



•	•	•	•	•	•		à droite	A	HSS	poli	DIN 206	2,500 - 34,000	72600	724
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•	•	•	•	•	•		à droite	B	HSS	poli	DIN 206	2,000 - 35,000	72610	725
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Fraises à chanfreiner 60°



•	•	•	•	•	•	•	à droite	C	HSS	TiN	DIN 334	6,300 - 25,000	62327	727
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•	•	•	•	•	•	•	à droite	C	HSS	poli	DIN 334	6,300 - 25,000	72326	726
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Fraises à chanfreiner 90°



•	•	•	•	•	•	•	à droite	A	HSS	traité vapeur	DIN 335	8,000 - 20,000	72345	731
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•	•	•	•	•	•	•	à droite	C	HSS	TiN	DIN 335	4,300 - 31,000	62347	729
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•	•	•	•	•	•	•	à droite	C	HSS	poli	DIN 335	4,300 - 31,000	72346	728
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•	•	•	•	•	•	•	à droite	D	HSS	poli	DIN 335	15,000 - 80,000	72356	730
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P	M	K	N	S	H	Type	Sens de coupe	Forme	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Coffrets de fraises à chanfreiner 90°



•	○	•	○	○			à droite	C	HSS	TiN	DIN 335		62399	733
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•	○	•	•	○			à droite	C	HSS	poli	DIN 335		72399	732
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Fraises à lamer avec pilote, tolérance fine



•	○	•	•	○			à droite		HSS	poli	DIN 373	6,000 - 20,000	72304	734
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Fraises à lamer avec pilote, tolérance moyenne



•	○	•	•	○			à droite		HSS	poli	DIN 373	6,000 - 18,000	72305	735
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Fraises à ébavurer 60°



•	•	•	•	•		SuperAF-60	à droite		CW monobloc	AITiN	Norme usine	4,000 - 12,000	53393	736
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•	•	•	•	•		SuperAF-60	à droite		CW monobloc	AITiN	Norme usine	6,000 - 12,000	53394	737
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Fraises à ébavurer 90°



•	•	•	•	•		SuperAF-90	à droite		CW monobloc	AITiN	Norme usine	4,000 - 12,000	53395	738
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P	M	K	N	S	H	Type	Sens de coupe	Forme	Matière de coupe	Surface	Norme	d1/mm	Référence	Progr., page
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Fraises à ébavurer 90°



•	•	•	•	•		SuperAF-90	à droite		CW monobloc	AITiN	Norme usine	4,000 - 12,000	53396	739
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Fraises à ébavurer 120°



•	•	•	•	•		Super-AF-120	à droite		CW monobloc	AITiN	Norme usine	4,000 - 12,000	53397	740
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•	•	•	•	•		Super-AF-120	à droite		CW monobloc	AITiN	Norme usine	6,000 - 12,000	53398	741
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Ebavureur avant et arrière 90°



•	•	•	•	•		SuperAD-90	à droite		CW monobloc	AITiN nano	Norme usine	3,000 - 12,000	52365	742
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Outils d'ébavurage



•	•	•	○	•		SuperE-U	à droite		CW monobloc	poli	Norme usine		52360	743
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Conseils d'utilisation pour les alésoirs

Gamme d'avances								
Lettre-Code	E	F	G	H	I	J		
Outil Ø mm	3,15	0,080	0,100	0,125	0,300	0,500	0,800	Avances f (mm/rev.)
	4,00	0,100	0,125	0,160	0,300	0,500	1,000	
	5,00	0,100	0,125	0,160	0,400	0,600	1,000	
	6,30	0,125	0,160	0,200	0,400	0,700	1,200	
	8,00	0,160	0,200	0,250	0,600	1,000	1,800	
	10,00	0,200	0,250	0,315	0,600	1,200	1,800	
	12,50	0,200	0,250	0,315	0,800	1,200	2,000	
	16,00	0,250	0,315	0,400	0,800	1,400	2,200	
	20,00	0,315	0,400	0,500	0,800	1,400	2,200	

Les outils dont les lettres sont indiquées en caractères gras doivent être utilisées en priorité pour le groupe de matière correspondant.

Diamètres Surépaisseurs (Valeurs recommandées)

< 6 mm	0,1 - 0,2 mm
< 10 mm	0,2 mm
< 16 mm	0,2 - 0,3 mm
< 25 mm	0,3 - 0,4 mm
> 25 mm	0,4 mm

Produits de réfrigération:

Huile de coupe très active, lubrifiant de surface tensio-actif avec additifs à réaction chimique produisant un film lubrifiant bien adhérent et anti-usure.

Emulsion d'huile à forer

sans lubrifiant

seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		■
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		■
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		■
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		■
Aciers de ciment, non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		■
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		■ ■
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		■ ■
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		■ ■
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		■
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	■ ■
Aciers trempés	-		≤40-48 HRC >48-60 HRC	■ ■
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		■ ■
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		■ ■
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		■ ■
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		■ □
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	■ ■
Fontes dures	-		≤350 HB	■ ■
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			■ □
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		■ □
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		■ ■
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		■ ■
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		■ ■
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		■ ■
Alliages d'Al d'inject. ≤10%Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		■ ■
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		■ ■
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		□
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		■ ■
Laiton à copeaux courts à copeaux longs	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		■ ■
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		■ ■
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		■ ■
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren		-	□
Thermoplastiques	Plexiglas, Hostalen, Novodur, Makralon		-	■ □
Kevlar - plast. renf. de fibres	Kevlar		-	□
d'aramide, de verre ou de carb.	GFK/CFK		-	□

Alésoirs SuperR-HS

Référence	72870	72871
Mat. de coupe	CW/K10	
Version	AlTiN nano	
DIN	N. usine	N. usine
Forme		
Page	694	695

72872	72873
CW/K10	
AlTiN nano	
N. usine	N. usine
696	698

Alésoirs CN

72920	72930
CW/K10	
poli	poli
N. usine	N. usine
B	B
700	702

Alésoirs machine

72868	72867	72860	72859	72880	72881
CW/K10					
poli	poli	poli	poli	poli	poli
8050	8050	8051	8051	8093	8093
A	B	A	B	A	B
704	705	708	709	706	707



v_c m/min	Code d'avances		v_c m/min	Code d'avances		v_c m/min	Code d'avances		v_c m/min	Code d'avances						
185	I-J	I-J	185	I-J	I-J	18	F	F	18	F	F	F	F	F	F	F
185	I-J	I-J	185	I-J	I-J	16	F	F	16	F	F	F	F	F	F	F
185	I-J	I-J	185	I-J	I-J	18	F	F	18	F	F	F	F	F	F	F
185	I-J	I-J	185	I-J	I-J	16	F	F	16	F	F	F	F	F	F	F
185	I-J	I-J	185	I-J	I-J	18	E	E	18	E	E	E	E	E	E	E
185	I-J	I-J	185	I-J	I-J	16	F	F	16	F	F	F	F	F	F	F
185	I-J	I-J	185	I-J	I-J	14	E	E	14	E	E	E	E	E	E	E
185	I-J	I-J	185	I-J	I-J	14	E	E	14	E	E	E	E	E	E	E
185	I-J	I-J	185	I-J	I-J	12	E	E	12	E	E	E	E	E	E	E
185	I-J	I-J	185	I-J	I-J	18	E	E	18	E	E	E	E	E	E	E
185	I-J	I-J	185	I-J	I-J	14	E	E	14	E	E	E	E	E	E	E
185	I-J	I-J	185	I-J	I-J	12	E	E	12	E	E	E	E	E	E	E
185	I-J	I-J	185	I-J	I-J	14	E	E	14	E	E	E	E	E	E	E
185	I-J	I-J	185	I-J	I-J	12	E	E	12	E	E	E	E	E	E	E
185	I-J	I-J	185	I-J	I-J	10	E	E	10	E	E	E	E	E	E	E
185	I-J	I-J	185	I-J	I-J	10	E	E	10	E	E	E	E	E	E	E
90	I-J	I-J	90	I-J	I-J											
45	G-H	G-H	45	G-H	G-H											
50	G-H	G-H	50	G-H	G-H											
45	G-H	G-H	45	G-H	G-H											
90	H-I	H-I	90	H-I	H-I	8	E	E	8	E	E	E	E	E	E	E
60	H-I	H-I	60	H-I	H-I	6	E	E	6	E	E	E	E	E	E	E
90	H-I	H-I	90	H-I	H-I	6	E	E	6	E	E	E	E	E	E	E
100	I-J	I-J	100	I-J	I-J	20	E	E	20	E	E	E	E	E	E	E
100	I-J	I-J	100	I-J	I-J	18	E	E	18	E	E	E	E	E	E	E
185	I-J	I-J	185	I-J	I-J	20	E	E	20	E	E	E	E	E	E	E
90	I-J	I-J	90	I-J	I-J	18	E	E	18	E	E	E	E	E	E	E
40	H-I	H-I	40	H-I	H-I											
80	I-J	I-J	80	I-J	I-J	16	E	E	16	E	E	E	E	E	E	E
80	I-J	I-J	80	I-J	I-J	16	E	E	16	E	E	E	E	E	E	E
80	I-J	I-J	80	I-J	I-J											
80	I-J	I-J	80	I-J	I-J											
50	G-H	G-H	50	G-H	G-H											
60	H-I	H-I	60	H-I	H-I	10	E	E	10	E	E	E	E	E	E	E
60	H-I	H-I	60	H-I	H-I	10	E	E	10	E	E	E	E	E	E	E
						30	G	G	30	G	G	G	G	G	G	G
						30	G	G	30	G	G	G	G	G	G	G
						40	F	F	40	F	F	F	F	F	F	F
						30	F	F	30	F	F	F	F	F	F	F
120	I-J	I-J	120	I-J	I-J	25	F	F	25	F	F	F	F	F	F	F
						25	F	F	25	F	F	F	F	F	F	F
175	I-J	I-J	175	I-J	I-J	35	F	F	35	F	F	F	F	F	F	F
						30	F	F	30	F	F	F	F	F	F	F
175	I-J	I-J	175	I-J	I-J	35	F	F	35	F	F	F	F	F	F	F
175	I-J	I-J	175	I-J	I-J	30	F	F	30	F	F	F	F	F	F	F
						30	F	F	30	F	F	F	F	F	F	F
						25	F	F	25	F	F	F	F	F	F	F
140	I-J	I-J	140	I-J	I-J	20	G	G	20	G	G	G	G	G	G	G
140	I-J	I-J	140	I-J	I-J	20	G	G	20	G	G	G	G	G	G	G
80	E	E	80	E	E											
80	E	E	80	E	E											

Conseils d'utilisation pour les alésoirs

Gamme d'avances							
Lettre-Code	E	F	G	H	I	J	
Outil Ø mm	3,15	0,080	0,100	0,125	0,300	0,500	0,800
	4,00	0,100	0,125	0,160	0,300	0,500	1,000
	5,00	0,100	0,125	0,160	0,400	0,600	1,000
	6,30	0,125	0,160	0,200	0,400	0,700	1,200
	8,00	0,160	0,200	0,250	0,600	1,000	1,800
	10,00	0,200	0,250	0,315	0,600	1,200	1,800
	12,50	0,200	0,250	0,315	0,800	1,200	2,000
	16,00	0,250	0,315	0,400	0,800	1,400	2,200
	20,00	0,315	0,400	0,500	0,800	1,400	2,200

Les outils dont les lettres sont indiquées en caractères gras doivent être utilisées en priorité pour le groupe de matière correspondant.

Avances
f (mm/rev.)

Diamètres Surépaisseurs (Valeurs recommandées)

< 6 mm	0,1 - 0,2 mm
< 10 mm	0,2 mm
< 16 mm	0,2 - 0,3 mm
< 25 mm	0,3 - 0,4 mm
> 25 mm	0,4 mm

Produits de réfrigération:

Huile de coupe très active, lubrifiant de surface tensio-actif avec additifs à réaction chimique produisant un film lubrifiant bien adhérent et anti-usure.

Emulsion d'huile à forer

sans lubrifiant
seulement air

Matière	Exemple Caractères gras = N° de matières suivant DIN EN	Résistance MPa (N/mm ²)	Dureté	Prod. de refr.
Aciers de construction	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de décolletage	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration non alliés	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers d'amélioration alliés	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de ciment, non alliés	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Aciers de cémentation alliés	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers de nitruration	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers à outils	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers rapides	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Aciers à ressort	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/>
Aciers trempés	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aciers inoxydables, sulfurés	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		<input checked="" type="checkbox"/>
austénitiques	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		<input checked="" type="checkbox"/>
martensitiques	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		<input checked="" type="checkbox"/>
Fontes	FGL100...FGL200 FGL250...FGL450	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes à graphite sphéroïdal et fontes malléables	FGS500 7 FGS700 2Q		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Fontes dures	-		≤350 HB	<input checked="" type="checkbox"/>
Nouveau fontes GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nouveau fontes ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alliages spéciaux	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titane et alliages de titane	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium et alliages d'Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Alliages malléables d'Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Alliages d'Al d'inject. ≤10%Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input checked="" type="checkbox"/>
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input checked="" type="checkbox"/>
Alliages de Magnésium	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Cuivre, faiblement allié	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/>
Laiton à copeaux courts à copeaux longs	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux courts	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, à copeaux longs	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Thermodurcissables	Résine époxy, Résopal, Pertinax, Moltopren			<input type="checkbox"/>
Thermoplastiques	Plexiglas, Hostalen, Novodur, Makralon			<input checked="" type="checkbox"/>
Kevlar - plast. renf. de fibres	Kevlar			<input type="checkbox"/>
d'aramide, de verre ou de carb.	GFK/CFK			<input type="checkbox"/>

Alésoirs de chaudr.

Alésoirs machine CN

Alésoirs coniques

Alésoirs machine

Alésoirs machine à coupe descendante

Référence	72680
Mat. de coupe	HSS
Version	nitruré
DIN	311
Forme	
Page	721

	72900	72910
	HSS-E	
	poli	poli
	N. usine	N. usine
	B	B
	710	712

	72741
	HSS-E
	poli
	2179
	722

	72640	72654	72650	72660	72670
	HSS-E				
	poli	poli	poli	poli	poli
	212	212	212	208	208
	A	B	B	A	B
	716	714	717	718	719

	72690
	HSS-E
	poli
	212
	C
	720



v _c m/min	Code d'avances
14	F
12	F
10	F
10	E
8	E
6	E
12	F
6	E
8	E
12	E
8	E
5	E
4	E
12	E
12	E
10	E
4	E
3	E
18	G
18	G
18	G
18	G
16	F
16	F
20	E
16	F
14	F
10	F

v _c m/min	Code d'avances
16	F F
12	F F
12	F F
10	E E
14	F F
12	E E
10	E E
10	E E
8	E E
16	F F
10	E E
8	E E
10	E E
8	E E
14	F F
10	E E
10	E E
6	F F
6	F F
4	F F
14	E E
12	E E
10	E E
8	E E
8	E E
6	E E
4	E E
18	G G
18	G G
20	F F
18	F F
20	F F
18	F F
16	F F
20	F F
18	F F
16	F F
20	F F
18	F F
14	F F
12	G G
14	G G

v _c m/min	Code d'avances
8	F
8	F
8	F
8	E
8	E
8	E
8	E
6	E
6	E
6	E
6	E
6	E
6	E
6	E
6	E
6	E
6	E
6	E
6	E
6	E
6	E
6	E
8	G
8	G
8	G
8	G
8	F
8	F
8	F
8	F
8	F
8	F
8	F
8	F
8	F

v _c m/min	Code d'avances
16	F F F F F
12	F F F F F
12	F F F F F
10	E E E E E
14	F F F F F
12	E E E E E
10	E E E E E
10	E E E E E
8	E E E E E
16	F F F F F
10	E E E E E
8	E E E E E
10	E E E E E
8	E E E E E
14	F F F F F
10	E E E E E
10	E E E E E
6	F F F F F
6	F F F F F
4	F F F F F
14	E E E E E
12	E E E E E
12	E E E E E
10	E E E E E
8	E E E E E
8	E E E E E
6	E E E E E
4	E E E E E
18	G G G G G
18	G G G G G
20	F F F F F
18	F F F F F
20	F F F F F
18	F F F F F
16	F F F F F
20	F F F F F
18	F F F F F
16	F F F F F
20	F F F F F
18	F F F F F
14	F F F F F
12	G G G G G
14	G G G G G

v _c m/min	Code d'avances
16	G
12	G
12	G
14	G
12	G
16	G
10	G
5	E
22	G
22	G
20	G
16	G
18	G
12	G
14	G

Outils d'alésage carbure

Alésoirs haute performance en CW monobloc



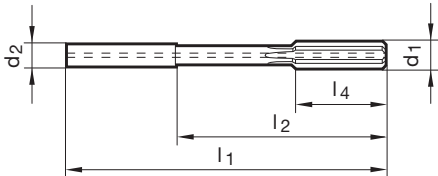
Référence **72870**



P	M	K	N	S	H
•	•	•	•	•	•

Conseils d'util.,
page 690

- avec canal axial d'adduction du produit de lubrification et de refroidissement, pour les perçages borgnes
- pour l'usinage avec des paramètres de coupe extrêmement élevés tout en obtenant une qualité supérieure des perçages et alésages
- à goujures droites, avec des arêtes de coupe fortement décalées
- attachements cyl. h6 pour mandrins hydrauliques ou mandrins à fretter
- permet de réaliser d'importantes économies au niveau des coûts et prix de revient de fabrication



d1 mm	d2 h6 mm	l1 mm	l2 mm	l4 mm	Z	N° de code
3,000	4,000	68,000	40,000	12,000	4	3,000
3,500	4,000	68,000	40,000	12,000	4	3,500
4,000	4,000	68,000	40,000	12,000	4	4,000
4,500	6,000	76,000	40,000	12,000	4	4,500
5,000	6,000	76,000	40,000	12,000	4	5,000
5,500	6,000	76,000	40,000	12,000	4	5,500
6,000	6,000	76,000	40,000	12,000	4	6,000
6,500	8,000	101,000	65,000	16,000	6	6,500
7,000	8,000	101,000	65,000	16,000	6	7,000
7,500	8,000	101,000	65,000	16,000	6	7,500
8,000	8,000	101,000	65,000	16,000	6	8,000
8,500	10,000	101,000	61,000	19,000	6	8,500
9,000	10,000	101,000	61,000	19,000	6	9,000
9,500	10,000	101,000	61,000	19,000	6	9,500
10,000	10,000	101,000	61,000	19,000	6	10,000
10,500	12,000	130,000	85,000	19,000	6	10,500
11,000	12,000	130,000	85,000	19,000	6	11,000
11,500	12,000	130,000	85,000	19,000	6	11,500
12,000	12,000	130,000	85,000	19,000	6	12,000
13,000	14,000	130,000	85,000	22,000	6	13,000
14,000	14,000	130,000	85,000	22,000	6	14,000
15,000	16,000	150,000	102,000	22,000	6	15,000
16,000	16,000	150,000	102,000	22,000	6	16,000
17,000	18,000	150,000	102,000	25,000	6	17,000
18,000	18,000	150,000	102,000	25,000	6	18,000
19,000	20,000	150,000	100,000	25,000	6	19,000
20,000	20,000	150,000	100,000	25,000	6	20,000

Outils d'alésage carbure

Alésoirs haute performance en CW monobloc



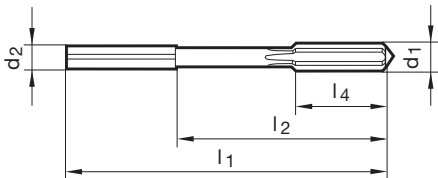
Référence **72871**



P	M	K	N	S	H
•	•	•	•	•	•

Conseils d'util.,
page 690

- avec rainures longitudinales sur la périphérie de l'attache afin d'assurer l'adduction du produit de lubrification et de refroidissement, pour les perçages débouchants
- à goujures droites, avec des arêtes de coupe fortement décalées
- pour l'usinage avec des paramètres de coupe extrêmement élevés tout en obtenant une qualité supérieure des perçages et alésages
- attachements cyl. h6 pour mandrins hydrauliques ou mandrins à fretter
- permet de réaliser d'importantes économies au niveau des coûts et prix de revient de fabrication



d1 mm	d2 h6 mm	l1 mm	l2 mm	l4 mm	Z	N° de code
3,000	4,000	68,000	40,000	12,000	4	3,000
3,500	4,000	68,000	40,000	12,000	4	3,500
4,000	4,000	68,000	40,000	12,000	4	4,000
4,500	6,000	76,000	40,000	12,000	4	4,500
5,000	6,000	76,000	40,000	12,000	4	5,000
5,500	6,000	76,000	40,000	12,000	4	5,500
6,000	6,000	76,000	40,000	12,000	4	6,000
6,500	8,000	101,000	65,000	16,000	6	6,500
7,000	8,000	101,000	65,000	16,000	6	7,000
7,500	8,000	101,000	65,000	16,000	6	7,500
8,000	8,000	101,000	65,000	16,000	6	8,000
8,500	10,000	101,000	61,000	19,000	6	8,500
9,000	10,000	101,000	61,000	19,000	6	9,000
9,500	10,000	101,000	61,000	19,000	6	9,500
10,000	10,000	101,000	61,000	19,000	6	10,000
10,500	12,000	130,000	85,000	19,000	6	10,500
11,000	12,000	130,000	85,000	19,000	6	11,000
11,500	12,000	130,000	85,000	19,000	6	11,500
12,000	12,000	130,000	85,000	19,000	6	12,000
13,000	14,000	130,000	85,000	22,000	6	13,000
14,000	14,000	130,000	85,000	22,000	6	14,000
15,000	16,000	150,000	102,000	22,000	6	15,000
16,000	16,000	150,000	102,000	22,000	6	16,000
17,000	18,000	150,000	102,000	25,000	6	17,000
18,000	18,000	150,000	102,000	25,000	6	18,000
19,000	20,000	150,000	100,000	25,000	6	19,000
20,000	20,000	150,000	100,000	25,000	6	20,000

Outils d'alésage carbure

Alésoirs haute performance en CW monobloc



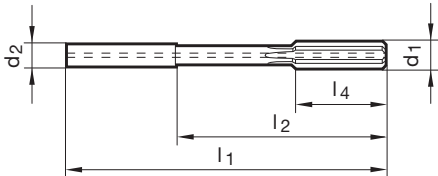
Référence **72872**



P	M	K	N	S	H
•	•	•	•	•	•

Conseils d'util.,
page 690

- avec canal axial d'adduction du produit de lubrification et de refroidissement, pour les perçages borgnes
- pour l'usinage avec des paramètres de coupe extrêmement élevés tout en obtenant une qualité supérieure des perçages et alésages
- à goujures droites, avec des arêtes de coupe fortement décalées
- attachements cyl. h6 pour mandrins hydrauliques ou mandrins à fretter
- permet de réaliser d'importantes économies au niveau des coûts et prix de revient de fabrication



d1 mm	d2 h6 mm	l1 mm	l2 mm	l4 mm	Z	N° de code
2,970	4,000	68,000	40,000	12,000	4	2,970
2,980	4,000	68,000	40,000	12,000	4	2,980
2,990	4,000	68,000	40,000	12,000	4	2,990
3,000	4,000	68,000	40,000	12,000	4	3,000
3,010	4,000	68,000	40,000	12,000	4	3,010
3,020	4,000	68,000	40,000	12,000	4	3,020
3,030	4,000	68,000	40,000	12,000	4	3,030
3,970	4,000	68,000	40,000	12,000	4	3,970
3,980	4,000	68,000	40,000	12,000	4	3,980
3,990	4,000	68,000	40,000	12,000	4	3,990
4,000	4,000	68,000	40,000	12,000	4	4,000
4,010	4,000	68,000	40,000	12,000	4	4,010
4,020	4,000	68,000	40,000	12,000	4	4,020
4,030	4,000	68,000	40,000	12,000	4	4,030
4,970	6,000	76,000	40,000	12,000	4	4,970
4,980	6,000	76,000	40,000	12,000	4	4,980
4,990	6,000	76,000	40,000	12,000	4	4,990
5,000	6,000	76,000	40,000	12,000	4	5,000
5,010	6,000	76,000	40,000	12,000	4	5,010
5,020	6,000	76,000	40,000	12,000	4	5,020
5,030	6,000	76,000	40,000	12,000	4	5,030
5,970	6,000	76,000	40,000	12,000	4	5,970
5,980	6,000	76,000	40,000	12,000	4	5,980
5,990	6,000	76,000	40,000	12,000	4	5,990
6,000	6,000	76,000	40,000	12,000	4	6,000
6,010	6,000	76,000	40,000	12,000	4	6,010
6,020	6,000	76,000	40,000	12,000	4	6,020
6,030	6,000	76,000	40,000	12,000	4	6,030
7,000	8,000	101,000	65,000	16,000	6	7,000
7,970	8,000	101,000	65,000	16,000	6	7,970
7,980	8,000	101,000	65,000	16,000	6	7,980
7,990	8,000	101,000	65,000	16,000	6	7,990
8,000	8,000	101,000	65,000	16,000	6	8,000
8,010	8,000	101,000	65,000	16,000	6	8,010
8,020	8,000	101,000	65,000	16,000	6	8,020
8,030	8,000	101,000	65,000	16,000	6	8,030
9,000	10,000	101,000	61,000	19,000	6	9,000
9,970	10,000	101,000	61,000	19,000	6	9,970
9,980	10,000	101,000	61,000	19,000	6	9,980
9,990	10,000	101,000	61,000	19,000	6	9,990
10,000	10,000	101,000	61,000	19,000	6	10,000
10,010	10,000	101,000	61,000	19,000	6	10,010
10,020	10,000	101,000	61,000	19,000	6	10,020
10,030	10,000	101,000	61,000	19,000	6	10,030
11,000	12,000	130,000	85,000	19,000	6	11,000
11,970	12,000	130,000	85,000	19,000	6	11,970
11,980	12,000	130,000	85,000	19,000	6	11,980
11,990	12,000	130,000	85,000	19,000	6	11,990

d1 mm	d2 h6 mm	l1 mm	l2 mm	l4 mm	Z	N° de code
12,000	12,000	130,000	85,000	19,000	6	12,000
12,010	12,000	130,000	85,000	19,000	6	12,010
12,020	12,000	130,000	85,000	19,000	6	12,020
12,030	12,000	130,000	85,000	19,000	6	12,030

Outils d'alésage carbure

Alésoirs haute performance en CW monobloc



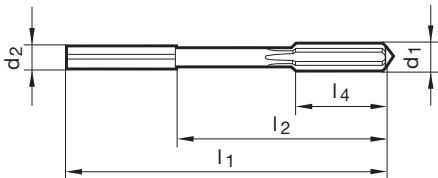
Référence **72873**



P	M	K	N	S	H
•	•	•	•	•	•

Conseils d'util.,
page 690

- avec rainures longitudinales sur la périphérie de l'attache afin d'assurer l'adduction du produit de lubrification et de refroidissement, pour les perçages débouchants
- à goujures droites, avec des arêtes de coupe fortement décalées
- pour l'usinage avec des paramètres de coupe extrêmement élevés tout en obtenant une qualité supérieure des perçages et alésages
- attachements cyl. h6 pour mandrins hydrauliques ou mandrins à fretter
- permet de réaliser d'importantes économies au niveau des coûts et prix de revient de fabrication

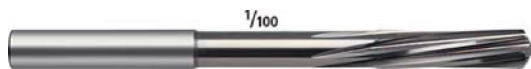


d1 mm	d2 h6 mm	l1 mm	l2 mm	l4 mm	Z	N° de code
2,970	4,000	68,000	40,000	12,000	4	2,970
2,980	4,000	68,000	40,000	12,000	4	2,980
2,990	4,000	68,000	40,000	12,000	4	2,990
3,000	4,000	68,000	40,000	12,000	4	3,000
3,010	4,000	68,000	40,000	12,000	4	3,010
3,020	4,000	68,000	40,000	12,000	4	3,020
3,030	4,000	68,000	40,000	12,000	4	3,030
3,970	4,000	68,000	40,000	12,000	4	3,970
3,980	4,000	68,000	40,000	12,000	4	3,980
3,990	4,000	68,000	40,000	12,000	4	3,990
4,000	4,000	68,000	40,000	12,000	4	4,000
4,010	4,000	68,000	40,000	12,000	4	4,010
4,020	4,000	68,000	40,000	12,000	4	4,020
4,030	4,000	68,000	40,000	12,000	4	4,030
4,970	6,000	76,000	40,000	12,000	4	4,970
4,980	6,000	76,000	40,000	12,000	4	4,980
4,990	6,000	76,000	40,000	12,000	4	4,990
5,000	6,000	76,000	40,000	12,000	4	5,000
5,010	6,000	76,000	40,000	12,000	4	5,010
5,020	6,000	76,000	40,000	12,000	4	5,020
5,030	6,000	76,000	40,000	12,000	4	5,030
5,970	6,000	76,000	40,000	12,000	4	5,970
5,980	6,000	76,000	40,000	12,000	4	5,980
5,990	6,000	76,000	40,000	12,000	4	5,990
6,000	6,000	76,000	40,000	12,000	4	6,000
6,010	6,000	76,000	40,000	12,000	4	6,010
6,020	6,000	76,000	40,000	12,000	4	6,020
6,030	6,000	76,000	40,000	12,000	4	6,030
7,000	8,000	101,000	65,000	16,000	6	7,000
7,970	8,000	101,000	65,000	16,000	6	7,970
7,980	8,000	101,000	65,000	16,000	6	7,980
7,990	8,000	101,000	65,000	16,000	6	7,990
8,000	8,000	101,000	65,000	16,000	6	8,000
8,010	8,000	101,000	65,000	16,000	6	8,010
8,020	8,000	101,000	65,000	16,000	6	8,020
8,030	8,000	101,000	65,000	16,000	6	8,030
9,000	10,000	101,000	61,000	19,000	6	9,000
9,970	10,000	101,000	61,000	19,000	6	9,970
9,980	10,000	101,000	61,000	19,000	6	9,980
9,990	10,000	101,000	61,000	19,000	6	9,990
10,000	10,000	101,000	61,000	19,000	6	10,000
10,010	10,000	101,000	61,000	19,000	6	10,010
10,020	10,000	101,000	61,000	19,000	6	10,020
10,030	10,000	101,000	61,000	19,000	6	10,030
11,000	12,000	130,000	85,000	19,000	6	11,000
11,970	12,000	130,000	85,000	19,000	6	11,970
11,980	12,000	130,000	85,000	19,000	6	11,980
11,990	12,000	130,000	85,000	19,000	6	11,990

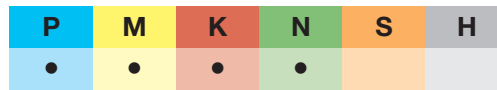
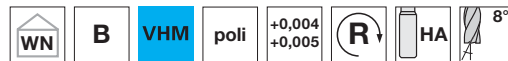
d1 mm	d2 h6 mm	l1 mm	l2 mm	l4 mm	Z	N° de code
12,000	12,000	130,000	85,000	19,000	6	12,000
12,010	12,000	130,000	85,000	19,000	6	12,010
12,020	12,000	130,000	85,000	19,000	6	12,020
12,030	12,000	130,000	85,000	19,000	6	12,030

Outils d'alésage carbure

Alésoirs machines NC

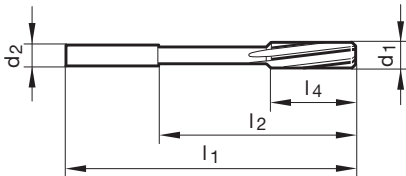


Référence **72920**



Conseils d'util.,
page 690

- $\varnothing > 3,75$ mm avec coupe fortement décalée
- $\leq \varnothing 5,50$ mm: 0,00/+0,004
- $> \varnothing 5,50$ mm: 0,00/+0,005
- attachements cyl. h6 pour mandrins hydrauliques ou mandrins à fretter



d1 mm	d2 h6 mm	l1 mm	l2 mm	l4 mm	Z	N° de code
0,980	4,000	50,000	22,000	6,000	3	0,980
0,990	4,000	50,000	22,000	6,000	3	0,990
1,000	4,000	50,000	22,000	6,000	3	1,000
1,010	4,000	50,000	22,000	6,000	3	1,010
1,020	4,000	50,000	22,000	6,000	3	1,020
1,030	4,000	50,000	22,000	9,000	3	1,030
1,480	4,000	50,000	22,000	9,000	3	1,480
1,490	4,000	50,000	22,000	9,000	3	1,490
1,500	4,000	50,000	22,000	9,000	3	1,500
1,510	4,000	50,000	22,000	9,000	3	1,510
1,520	4,000	50,000	22,000	9,000	3	1,520
1,530	4,000	50,000	22,000	9,000	3	1,530
1,980	4,000	50,000	22,000	12,000	4	1,980
1,990	4,000	50,000	22,000	12,000	4	1,990
2,000	4,000	50,000	22,000	12,000	4	2,000
2,010	4,000	50,000	22,000	12,000	4	2,010
2,020	4,000	50,000	22,000	12,000	4	2,020
2,030	4,000	50,000	22,000	12,000	4	2,030
2,480	4,000	60,000	32,000	16,000	4	2,480
2,490	4,000	60,000	32,000	16,000	4	2,490
2,500	4,000	60,000	32,000	16,000	4	2,500
2,510	4,000	60,000	32,000	16,000	4	2,510
2,520	4,000	60,000	32,000	16,000	4	2,520
2,530	4,000	60,000	32,000	16,000	4	2,530
2,970	4,000	64,000	36,000	17,000	6	2,970
2,980	4,000	64,000	36,000	17,000	6	2,980
2,990	4,000	64,000	36,000	17,000	6	2,990
3,000	4,000	64,000	36,000	17,000	6	3,000
3,010	4,000	64,000	36,000	17,000	6	3,010
3,020	4,000	64,000	36,000	17,000	6	3,020
3,030	4,000	64,000	36,000	17,000	6	3,030
3,970	4,000	77,000	45,000	21,000	6	3,970
3,980	4,000	77,000	45,000	21,000	6	3,980
3,990	4,000	77,000	45,000	21,000	6	3,990
4,000	4,000	77,000	45,000	21,000	6	4,000
4,010	4,000	77,000	45,000	21,000	6	4,010
4,020	4,000	77,000	45,000	21,000	6	4,020
4,030	4,000	77,000	45,000	21,000	6	4,030
4,970	6,000	93,000	59,000	26,000	6	4,970
4,980	6,000	93,000	59,000	26,000	6	4,980
4,990	6,000	93,000	59,000	26,000	6	4,990
5,000	6,000	93,000	59,000	26,000	6	5,000
5,010	6,000	93,000	59,000	26,000	6	5,010
5,020	6,000	93,000	59,000	26,000	6	5,020
5,030	6,000	93,000	59,000	26,000	6	5,030
5,970	6,000	93,000	57,000	26,000	6	5,970
5,980	6,000	93,000	57,000	26,000	6	5,980
5,990	6,000	93,000	57,000	26,000	6	5,990

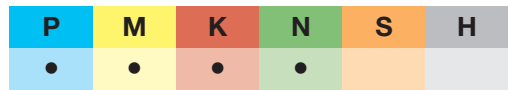
d1 mm	d2 h6 mm	l1 mm	l2 mm	l4 mm	Z	N° de code
6,000	6,000	93,000	57,000	26,000	6	6,000
6,010	6,000	93,000	57,000	26,000	6	6,010
6,020	6,000	93,000	57,000	26,000	6	6,020
6,030	6,000	93,000	57,000	26,000	6	6,030
7,000	8,000	109,000	69,000	31,000	6	7,000
7,970	8,000	117,000	75,000	33,000	6	7,970
7,980	8,000	117,000	75,000	33,000	6	7,980
7,990	8,000	117,000	75,000	33,000	6	7,990
8,000	8,000	117,000	75,000	33,000	6	8,000
8,010	8,000	117,000	75,000	33,000	6	8,010
8,020	8,000	117,000	75,000	33,000	6	8,020
8,030	8,000	117,000	75,000	33,000	6	8,030
8,040	8,000	117,000	75,000	33,000	6	8,040
9,000	10,000	125,000	81,000	36,000	6	9,000
9,970	10,000	133,000	87,000	38,000	6	9,970
9,980	10,000	133,000	87,000	38,000	6	9,980
9,990	10,000	133,000	87,000	38,000	6	9,990
10,000	10,000	133,000	87,000	38,000	6	10,000
10,010	10,000	133,000	87,000	38,000	6	10,010
10,020	10,000	133,000	87,000	38,000	6	10,020
10,030	10,000	133,000	87,000	38,000	6	10,030
10,040	10,000	133,000	87,000	38,000	6	10,040
10,050	10,000	133,000	87,000	38,000	6	10,050
11,970	12,000	151,000	105,000	44,000	6	11,970
11,980	12,000	151,000	105,000	44,000	6	11,980
11,990	12,000	151,000	105,000	44,000	6	11,990
12,000	12,000	151,000	105,000	44,000	6	12,000
12,010	12,000	151,000	105,000	44,000	6	12,010
12,020	12,000	151,000	105,000	44,000	6	12,020
12,030	12,000	151,000	105,000	44,000	6	12,030
12,040	12,000	151,000	105,000	44,000	6	12,040
12,050	12,000	151,000	105,000	44,000	6	12,050

Outils d'alésage carbure

Alésoirs machines NC

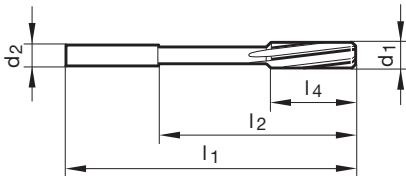


Référence **72930**



Conseils d'util.,
page 690

- $\varnothing > 3,75$ mm avec coupe fortement décalée
- attachements cyl. h6 pour mandrins hydrauliques ou mandrins à fretter



d1 mm	d2 h6 mm	l1 mm	l2 mm	l4 mm	Z	N° de code
3,000	4,000	64,000	36,000	17,000	6	3,000
3,100	4,000	68,000	40,000	18,000	6	3,100
3,200	4,000	68,000	40,000	18,000	6	3,200
3,300	4,000	68,000	40,000	18,000	6	3,300
3,400	4,000	74,000	46,000	20,000	6	3,400
3,500	4,000	74,000	46,000	20,000	6	3,500
3,600	4,000	74,000	46,000	20,000	6	3,600
3,700	4,000	74,000	46,000	20,000	6	3,700
3,800	4,000	77,000	45,000	21,000	6	3,800
3,900	4,000	77,000	45,000	21,000	6	3,900
4,000	4,000	77,000	45,000	21,000	6	4,000
4,100	6,000	82,000	50,000	23,000	6	4,100
4,200	6,000	82,000	50,000	23,000	6	4,200
4,300	6,000	82,000	50,000	23,000	6	4,300
4,400	6,000	82,000	50,000	23,000	6	4,400
4,500	6,000	82,000	50,000	23,000	6	4,500
4,600	6,000	82,000	50,000	23,000	6	4,600
4,700	6,000	82,000	50,000	23,000	6	4,700
4,800	6,000	93,000	59,000	26,000	6	4,800
4,900	6,000	93,000	59,000	26,000	6	4,900
5,000	6,000	93,000	59,000	26,000	6	5,000
5,100	6,000	93,000	59,000	26,000	6	5,100
5,200	6,000	93,000	59,000	26,000	6	5,200
5,300	6,000	93,000	59,000	26,000	6	5,300
5,400	6,000	93,000	57,000	26,000	6	5,400
5,500	6,000	93,000	57,000	26,000	6	5,500
5,600	6,000	93,000	57,000	26,000	6	5,600
5,700	6,000	93,000	57,000	26,000	6	5,700
5,800	6,000	93,000	57,000	26,000	6	5,800
5,900	6,000	93,000	57,000	26,000	6	5,900
6,000	6,000	93,000	57,000	26,000	6	6,000
6,100	8,000	101,000	63,000	28,000	6	6,100
6,200	8,000	101,000	63,000	28,000	6	6,200
6,300	8,000	101,000	63,000	28,000	6	6,300
6,400	8,000	101,000	63,000	28,000	6	6,400
6,500	8,000	101,000	63,000	28,000	6	6,500
6,600	8,000	101,000	63,000	28,000	6	6,600
6,700	8,000	101,000	63,000	28,000	6	6,700
6,800	8,000	109,000	69,000	31,000	6	6,800
6,900	8,000	109,000	69,000	31,000	6	6,900
7,000	8,000	109,000	69,000	31,000	6	7,000
7,100	8,000	109,000	69,000	31,000	6	7,100
7,200	8,000	109,000	69,000	31,000	6	7,200
7,300	8,000	109,000	69,000	31,000	6	7,300
7,400	8,000	109,000	69,000	31,000	6	7,400
7,500	8,000	109,000	69,000	31,000	6	7,500
7,600	8,000	109,000	69,000	31,000	6	7,600
7,700	8,000	117,000	75,000	33,000	6	7,700

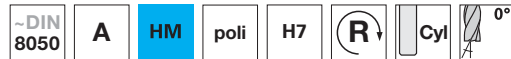
d1 mm	d2 h6 mm	l1 mm	l2 mm	l4 mm	Z	N° de code
7,800	8,000	117,000	75,000	33,000	6	7,800
7,900	8,000	117,000	75,000	33,000	6	7,900
8,000	8,000	117,000	75,000	33,000	6	8,000
8,100	10,000	117,000	75,000	33,000	6	8,100
8,200	10,000	117,000	75,000	33,000	6	8,200
8,300	10,000	117,000	75,000	33,000	6	8,300
8,400	10,000	117,000	75,000	33,000	6	8,400
8,500	10,000	117,000	75,000	33,000	6	8,500
8,600	10,000	117,000	75,000	33,000	6	8,600
8,700	10,000	125,000	81,000	36,000	6	8,700
8,800	10,000	125,000	81,000	36,000	6	8,800
8,900	10,000	125,000	81,000	36,000	6	8,900
9,000	10,000	125,000	81,000	36,000	6	9,000
9,100	10,000	125,000	81,000	36,000	6	9,100
9,200	10,000	125,000	81,000	36,000	6	9,200
9,300	10,000	125,000	81,000	36,000	6	9,300
9,400	10,000	125,000	81,000	36,000	6	9,400
9,500	10,000	125,000	81,000	36,000	6	9,500
9,600	10,000	125,000	81,000	36,000	6	9,600
9,700	10,000	133,000	87,000	38,000	6	9,700
9,800	10,000	133,000	87,000	38,000	6	9,800
9,900	10,000	133,000	87,000	38,000	6	9,900
10,000	10,000	133,000	87,000	38,000	6	10,000
10,100	10,000	133,000	87,000	38,000	6	10,100
10,200	10,000	133,000	87,000	38,000	6	10,200
10,300	10,000	133,000	87,000	38,000	6	10,300
10,400	10,000	133,000	87,000	38,000	6	10,400
10,500	10,000	133,000	87,000	38,000	6	10,500
10,600	10,000	133,000	87,000	38,000	6	10,600
10,700	10,000	142,000	96,000	41,000	6	10,700
10,800	10,000	142,000	96,000	41,000	6	10,800
10,900	10,000	142,000	96,000	41,000	6	10,900
11,000	10,000	142,000	96,000	41,000	6	11,000
11,100	10,000	142,000	96,000	41,000	6	11,100
11,200	10,000	142,000	96,000	41,000	6	11,200
11,300	10,000	142,000	96,000	41,000	6	11,300
11,400	10,000	142,000	96,000	41,000	6	11,400
11,500	10,000	142,000	96,000	41,000	6	11,500
11,600	10,000	142,000	96,000	41,000	6	11,600
11,700	10,000	142,000	96,000	41,000	6	11,700
11,800	10,000	142,000	96,000	41,000	6	11,800
11,900	12,000	151,000	105,000	44,000	6	11,900
12,000	12,000	151,000	105,000	44,000	6	12,000

Outils d'alésage carbure

Alésoirs machine, en CW



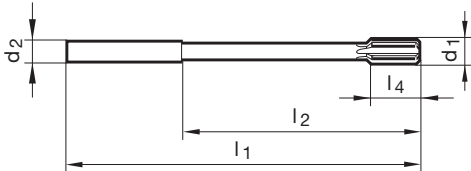
Référence **72868**



P	M	K	N	S	H
•	•	•	•		○

Conseils d'util.,
page 690

- > Ø 9,50 mm: avec plaquette de coupe cw
- ≤ Ø 9,50 mm: carbure monobloc
- ≤ Ø 9,50 mm centre extérieur aux 2 extrémités
- > Ø 9,50 mm centre intérieur aux 2 extrémités
- pour des valeurs de résistance à la traction jusqu'à maximum 1400 N / mm² / 44 HRC



d1 mm	d2 h6 mm	l1 mm	l2 mm	l4 mm	Z	N° de code
5,000	5,000	86,000	52,000	12,000	6	5,000
6,000	5,600	93,000	57,000	12,000	6	6,000
7,000	7,100	109,000	69,000	16,000	6	7,000
8,000	8,000	117,000	75,000	16,000	6	8,000
9,000	9,000	125,000	81,000	19,000	6	9,000
10,000	10,000	133,000	87,000	12,000	6	10,000
12,000	10,000	151,000	105,000	12,000	6	12,000
14,000	12,000	160,000	110,000	16,000	6	14,000
15,000	12,000	162,000	112,000	16,000	6	15,000
16,000	12,000	170,000	120,000	19,000	6	16,000
20,000	16,000	195,000	137,000	19,000	6	20,000

Outils d'alésage carbure

Alésoirs machine, en CW



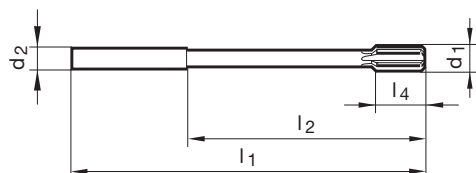
Référence **72867**



P	M	K	N	S	H
•	•	•	•		○

Conseils d'util.,
page 690

- > Ø 9,50 mm: avec plaquette de coupe cw
- ≤ Ø 9,50 mm: carbure monobloc
- ≤ Ø 9,50 mm centre extérieur aux 2 extrémités
- > Ø 9,50 mm centre intérieur aux 2 extrémités
- pour des valeurs de résistance à la traction jusqu'à maximum 1400 N / mm² / 44 HRC
- seulement pour les perçages débouchants



d1 mm	d2 h6 mm	l1 mm	l2 mm	l4 mm	Z	N° de code
5,000	5,000	86,000	52,000	12,000	6	5,000
6,000	5,600	93,000	57,000	12,000	6	6,000
7,000	7,100	109,000	69,000	16,000	6	7,000
8,000	8,000	117,000	75,000	16,000	6	8,000
9,000	9,000	125,000	81,000	19,000	6	9,000
10,000	10,000	133,000	87,000	12,000	6	10,000
11,000	10,000	142,000	96,000	12,000	6	11,000
12,000	10,000	151,000	105,000	12,000	6	12,000
13,000	10,000	151,000	105,000	12,000	6	13,000
14,000	12,000	160,000	110,000	16,000	6	14,000
15,000	12,000	162,000	112,000	16,000	6	15,000
16,000	12,000	170,000	120,000	19,000	6	16,000
18,000	14,000	182,000	130,000	19,000	6	18,000
20,000	16,000	195,000	137,000	19,000	6	20,000

Outils d'alésage carbure

Alésoirs machine, en CW

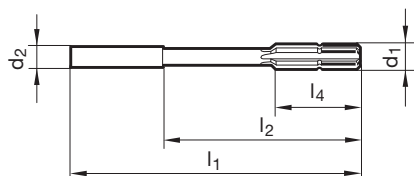


Référence **72880**



P	M	K	N	S	H
•	•	•	•		○

Conseils d'util.,
page 690



- $\geq \varnothing 3,0\text{-mm}\cdot\varnothing$ avec coupe fortement décalée
- $\leq \varnothing 9,50\text{ mm}$: carbure monobloc
- $> \varnothing 9,50\text{ mm}$: avec plaquette de coupe cw
- $\leq \varnothing 9,50\text{ mm}$ centre extérieur aux 2 extrémités
- $> \varnothing 9,50\text{ mm}$ centre intérieur aux 2 extrémités
- \varnothing d'attachem. $< 10,0\text{ mm}$ tolérance h9, \varnothing d'attachem. $\geq 10,0\text{ mm}$ tolérance h6
- pour des valeurs de résistance à la traction jusqu'à maximum 1400 N / mm^2 / 44 HRC

d1 mm	d2 h6 mm	l1 mm	l2 mm	l4 mm	Z	N° de code
1,200	1,200	38,000	16,500	7,500	3	1,200
1,500	1,500	40,000	18,000	8,000	3	1,500
1,600	1,600	43,000	20,000	9,000	3	1,600
2,000	2,000	49,000	24,000	11,000	4	2,000
2,500	2,500	57,000	29,000	14,000	4	2,500
3,000	3,000	61,000	33,000	15,000	6	3,000
4,000	4,000	75,000	43,000	19,000	6	4,000
4,500	4,500	80,000	47,000	21,000	6	4,500
5,000	5,000	86,000	52,000	23,000	6	5,000
6,000	5,600	93,000	57,000	26,000	6	6,000
7,000	7,100	109,000	69,000	31,000	6	7,000
8,000	8,000	117,000	75,000	33,000	6	8,000
9,000	9,000	125,000	81,000	36,000	6	9,000
10,000	10,000	133,000	87,000	38,000	6	10,000
11,000	10,000	142,000	96,000	41,000	6	11,000
12,000	10,000	151,000	105,000	44,000	6	12,000
13,000	10,000	151,000	105,000	44,000	6	13,000
14,000	12,000	160,000	110,000	47,000	6	14,000
16,000	12,000	170,000	120,000	52,000	6	16,000

Outils d'alésage carbure

Alésoirs machine, en CW

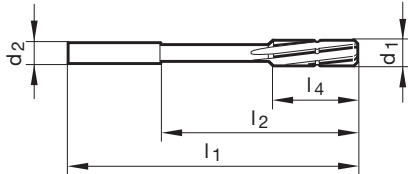


Référence **72881**



P	M	K	N	S	H
•	•	•	•		○

Conseils d'util.,
page 690



- $\geq \varnothing 3,0\text{-mm}\cdot\varnothing$ avec coupe fortement décalée
- $\leq \varnothing 9,50\text{ mm}$: carbure monobloc
- $> \varnothing 9,50\text{ mm}$: avec plaquette de coupe cw
- $\leq \varnothing 9,50\text{ mm}$ centre extérieur aux 2 extrémités
- $> \varnothing 9,50\text{ mm}$ centre intérieur aux 2 extrémités
- \varnothing d'attachem. $< 10,0\text{ mm}$ tolérance h9, \varnothing d'attachem. $\geq 10,0\text{ mm}$ tolérance h6
- pour des valeurs de résistance à la traction jusqu'à maximum 1400 N/mm^2 / 44 HRC
- seulement pour les perçages débouchants

d1 mm	d2 h6 mm	l1 mm	l2 mm	l4 mm	Z	N° de code
1,000	1,000	34,000	15,000	5,500	3	1,000
1,200	1,200	38,000	16,500	7,500	3	1,200
1,500	1,500	40,000	18,000	8,000	3	1,500
2,000	2,000	49,000	24,000	11,000	4	2,000
2,500	2,500	57,000	29,000	14,000	4	2,500
3,000	3,000	61,000	33,000	15,000	6	3,000
3,500	3,500	70,000	42,000	18,000	6	3,500
4,000	4,000	75,000	43,000	19,000	6	4,000
4,500	4,500	80,000	47,000	21,000	6	4,500
5,000	5,000	86,000	52,000	23,000	6	5,000
6,000	5,600	93,000	57,000	26,000	6	6,000
7,000	7,100	109,000	69,000	31,000	6	7,000
8,000	8,000	117,000	75,000	33,000	6	8,000
9,000	9,000	125,000	81,000	36,000	6	9,000
10,000	10,000	133,000	87,000	38,000	6	10,000
11,000	10,000	142,000	96,000	41,000	6	11,000
12,000	10,000	151,000	105,000	44,000	6	12,000
13,000	10,000	151,000	105,000	44,000	6	13,000
14,000	12,000	160,000	110,000	47,000	6	14,000
16,000	12,000	170,000	120,000	52,000	6	16,000

Outils d'alésage carbure

Alésoirs machine, en CW

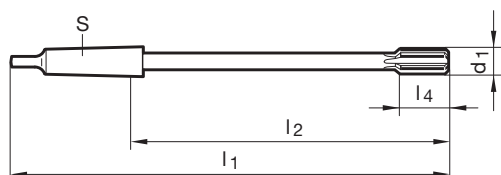


Référence **72860**



P	M	K	N	S	H
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Conseils d'util.,
page 690



- $\leq \varnothing 9,50$ mm: carbure monobloc
- $> \varnothing 9,50$ mm: avec plaquette de coupe cw
- $\leq \varnothing 9,50$ mm avec pointe de centrage côté coupe
- centre intérieur côté queue
- $> \varnothing 9,50$ mm centre intérieur aux 2 extrémités
- pour des valeurs de résistance à la traction jusqu'à maximum 1400 N / mm² / 44 HRC

d1 mm	S	l1 mm	l4 mm	l4 mm	Z	N° de code
10,000	MK-1	168,000	106,000	12,000	6	10,000
12,000	MK-1	182,000	120,000	12,000	6	12,000
13,000	MK-1	182,000	120,000	12,000	6	13,000
14,000	MK-1	189,000	127,000	16,000	6	14,000
15,000	MK-2	204,000	129,000	16,000	6	15,000
16,000	MK-2	210,000	135,000	19,000	6	16,000
17,000	MK-2	214,000	139,000	19,000	6	17,000
18,000	MK-2	219,000	144,000	19,000	6	18,000
20,000	MK-2	228,000	153,000	19,000	6	20,000
22,000	MK-2	237,000	162,000	22,000	6	22,000
24,000	MK-3	268,000	174,000	22,000	6	24,000
25,000	MK-3	268,000	174,000	22,000	6	25,000
28,000	MK-3	277,000	183,000	25,000	6	28,000
30,000	MK-3	281,000	187,000	25,000	6	30,000

Outils d'alésage carbure

Alésoirs machine, en CW



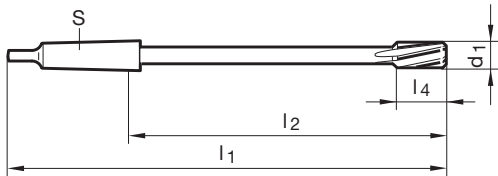
Référence **72859**



P	M	K	N	S	H
•	•	•	•		○

Conseils d'util.,
page 690

- $\leq \varnothing 9,50$ mm: carbure monobloc
- $> \varnothing 9,50$ mm: avec plaquette de coupe cw
- $\leq \varnothing 9,50$ mm avec pointe de centrage côté coupe
- centre intérieur côté queue
- $> \varnothing 9,50$ mm centre intérieur aux 2 extrémités
- pour des valeurs de résistance à la traction jusqu'à maximum 1400 N / mm² / 44 HRC



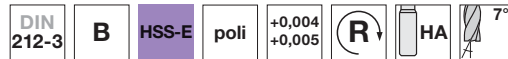
d1 mm	S	l1 mm	l4 mm	l4 mm	Z	N° de code
6,000	MK-1	138,000	76,000	12,000	6	6,000
8,000	MK-1	156,000	94,000	16,000	6	8,000
10,000	MK-1	168,000	106,000	12,000	6	10,000
11,000	MK-1	175,000	113,000	12,000	6	11,000
12,000	MK-1	182,000	120,000	12,000	6	12,000
13,000	MK-1	182,000	120,000	12,000	6	13,000
14,000	MK-1	189,000	127,000	16,000	6	14,000
15,000	MK-2	204,000	129,000	16,000	6	15,000
16,000	MK-2	210,000	135,000	19,000	6	16,000
17,000	MK-2	214,000	139,000	19,000	6	17,000
18,000	MK-2	219,000	144,000	19,000	6	18,000
20,000	MK-2	228,000	153,000	19,000	6	20,000
21,000	MK-2	232,000	157,000	22,000	6	21,000
22,000	MK-2	237,000	162,000	22,000	6	22,000
23,000	MK-2	241,000	166,000	22,000	6	23,000
24,000	MK-3	268,000	174,000	22,000	8	24,000
25,000	MK-3	268,000	174,000	22,000	8	25,000
26,000	MK-3	273,000	179,000	22,000	8	26,000
27,000	MK-3	277,000	183,000	25,000	8	27,000
30,000	MK-3	281,000	187,000	25,000	8	30,000
32,000	MK-4	317,000	199,500	25,000	8	32,000

Outils HSS d'alésage

Alésoirs machines NC



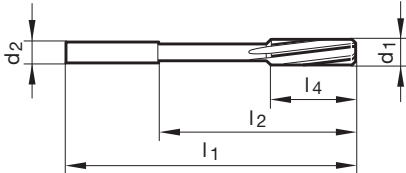
Référence **72900**



P	M	K	N	S	H
•	•	•	•	○	

Conseils d'util.,
page 692

- > Ø 3,75 mm centre intérieur aux 2 extrémités
- ≤ Ø 3,75 mm centre extérieur aux 2 extrémités
- ≤ Ø 5,50 mm: 0,00/+0,004
- > Ø 5,50 mm: 0,00/+0,005
- attachements cyl. h6 pour mandrins hydrauliques ou mandrins à fretter
- pour des valeurs de résistance à la traction jusqu'à maximum 1000 N / mm²



d1 mm	d2 h6 mm	l1 mm	l2 mm	l4 mm	Z	N° de code
1,000	1,000	34,000	15,000	5,500	3	1,000
1,010	1,000	34,000	15,000	5,500	3	1,010
1,020	1,000	34,000	15,000	5,500	3	1,020
1,030	1,000	34,000	15,000	5,500	3	1,030
1,500	2,000	40,000	18,000	8,000	3	1,500
1,510	2,000	43,000	20,000	9,000	3	1,510
1,520	2,000	43,000	20,000	9,000	3	1,520
1,530	2,000	43,000	20,000	9,000	3	1,530
1,970	2,000	49,000	24,000	11,000	4	1,970
1,980	2,000	49,000	24,000	11,000	4	1,980
1,990	2,000	49,000	24,000	11,000	4	1,990
2,000	2,000	49,000	24,000	11,000	4	2,000
2,010	2,000	49,000	24,000	11,000	4	2,010
2,020	2,000	49,000	24,000	11,000	4	2,020
2,030	2,000	49,000	24,000	11,000	4	2,030
2,470	3,000	57,000	29,000	14,000	4	2,470
2,480	3,000	57,000	29,000	14,000	4	2,480
2,490	3,000	57,000	29,000	14,000	4	2,490
2,500	3,000	57,000	29,000	14,000	4	2,500
2,510	3,000	57,000	29,000	14,000	4	2,510
2,520	3,000	57,000	29,000	14,000	4	2,520
2,530	3,000	57,000	29,000	14,000	4	2,530
2,970	3,000	61,000	33,000	15,000	6	2,970
2,980	3,000	61,000	33,000	15,000	6	2,980
2,990	3,000	61,000	33,000	15,000	6	2,990
3,000	3,000	61,000	33,000	15,000	6	3,000
3,010	4,000	65,000	37,000	16,000	6	3,010
3,020	4,000	65,000	37,000	16,000	6	3,020
3,030	4,000	65,000	37,000	16,000	6	3,030
3,970	4,000	75,000	47,000	19,000	6	3,970
3,980	4,000	75,000	47,000	19,000	6	3,980
3,990	4,000	75,000	47,000	19,000	6	3,990
4,000	4,000	75,000	47,000	19,000	6	4,000
4,010	4,000	75,000	47,000	19,000	6	4,010
4,020	4,000	75,000	47,000	19,000	6	4,020
4,030	4,000	75,000	47,000	19,000	6	4,030
4,970	5,000	86,000	58,000	23,000	6	4,970
4,980	5,000	86,000	58,000	23,000	6	4,980
4,990	5,000	86,000	58,000	23,000	6	4,990
5,000	5,000	86,000	58,000	23,000	6	5,000
5,010	5,000	86,000	58,000	23,000	6	5,010
5,020	5,000	86,000	58,000	23,000	6	5,020
5,030	5,000	86,000	58,000	23,000	6	5,030
5,970	6,000	93,000	57,000	26,000	6	5,970
5,980	6,000	93,000	57,000	26,000	6	5,980
5,990	6,000	93,000	57,000	26,000	6	5,990
6,000	6,000	93,000	57,000	26,000	6	6,000
6,010	6,000	101,000	65,000	28,000	6	6,010

d1 mm	d2 h6 mm	l1 mm	l2 mm	l4 mm	Z	N° de code
6,020	6,000	101,000	65,000	28,000	6	6,020
6,030	6,000	101,000	65,000	28,000	6	6,030
7,970	8,000	117,000	81,000	33,000	6	7,970
7,980	8,000	117,000	81,000	33,000	6	7,980
7,990	8,000	117,000	81,000	33,000	6	7,990
8,000	8,000	117,000	81,000	33,000	6	8,000
8,010	8,000	117,000	81,000	33,000	6	8,010
8,020	8,000	117,000	81,000	33,000	6	8,020
8,030	8,000	117,000	81,000	33,000	6	8,030
9,000	10,000	125,000	85,000	36,000	6	9,000
9,010	10,000	125,000	85,000	36,000	6	9,010
9,020	10,000	125,000	85,000	36,000	6	9,020
9,030	10,000	125,000	85,000	36,000	6	9,030
9,970	10,000	133,000	93,000	38,000	6	9,970
9,980	10,000	133,000	93,000	38,000	6	9,980
9,990	10,000	133,000	93,000	38,000	6	9,990
10,000	10,000	133,000	93,000	38,000	6	10,000
10,010	10,000	133,000	93,000	38,000	6	10,010
10,020	10,000	133,000	93,000	38,000	6	10,020
10,030	10,000	133,000	93,000	38,000	6	10,030
11,970	10,000	151,000	111,000	44,000	6	11,970
11,980	10,000	151,000	111,000	44,000	6	11,980
11,990	10,000	151,000	111,000	44,000	6	11,990
12,000	10,000	151,000	111,000	44,000	6	12,000
12,010	10,000	151,000	111,000	44,000	6	12,010
12,020	10,000	151,000	111,000	44,000	6	12,020
12,030	10,000	151,000	111,000	44,000	6	12,030

Outils HSS d'alésage

Alésoirs machines NC



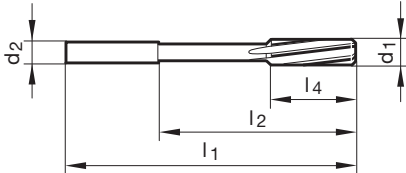
Référence **72910**



P	M	K	N	S	H
•	•	•	•	○	○

Conseils d'util.,
page 692

- $\leq \varnothing 3,75$ mm centre extérieur aux 2 extrémités
- $> \varnothing 3,75$ mm centre intérieur aux 2 extrémités
- attachements cyl. h6 pour mandrins hydrauliques ou mandrins à fretter
- pour des valeurs de résistance à la traction jusqu'à maximum 1000 N / mm²

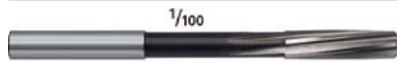


d1 mm	d2 h6 mm	l1 mm	l2 mm	l4 mm	Z	N° de code
1,500	2,000	40,000	18,000	8,000	3	1,500
1,600	2,000	43,000	20,000	9,000	3	1,600
1,700	2,000	43,000	20,000	9,000	3	1,700
1,800	2,000	46,000	22,000	10,000	4	1,800
1,900	2,000	46,000	22,000	10,000	4	1,900
2,000	2,000	49,000	24,000	11,000	4	2,000
2,100	2,000	49,000	24,000	11,000	4	2,100
2,200	3,000	53,000	25,000	12,000	4	2,200
2,300	3,000	53,000	25,000	12,000	4	2,300
2,400	3,000	57,000	29,000	14,000	4	2,400
2,500	3,000	57,000	29,000	14,000	4	2,500
2,600	3,000	57,000	29,000	14,000	4	2,600
2,700	3,000	61,000	33,000	15,000	6	2,700
2,800	3,000	61,000	33,000	15,000	6	2,800
2,900	3,000	61,000	33,000	15,000	6	2,900
3,000	3,000	61,000	33,000	15,000	6	3,000
3,100	4,000	65,000	37,000	16,000	6	3,100
3,200	4,000	65,000	37,000	16,000	6	3,200
3,300	4,000	65,000	37,000	16,000	6	3,300
3,400	4,000	70,000	42,000	18,000	6	3,400
3,500	4,000	70,000	42,000	18,000	6	3,500
3,600	4,000	70,000	42,000	18,000	6	3,600
3,700	4,000	70,000	42,000	18,000	6	3,700
3,800	4,000	75,000	47,000	19,000	6	3,800
3,900	4,000	75,000	47,000	19,000	6	3,900
4,000	4,000	75,000	47,000	19,000	6	4,000
4,100	4,000	75,000	47,000	19,000	6	4,100
4,200	4,000	75,000	47,000	19,000	6	4,200
4,300	5,000	80,000	52,000	21,000	6	4,300
4,400	5,000	80,000	52,000	21,000	6	4,400
4,500	5,000	80,000	52,000	21,000	6	4,500
4,600	5,000	80,000	52,000	21,000	6	4,600
4,700	5,000	80,000	52,000	21,000	6	4,700
4,800	5,000	86,000	58,000	23,000	6	4,800
4,900	5,000	86,000	58,000	23,000	6	4,900
5,000	5,000	86,000	58,000	23,000	6	5,000
5,100	5,000	86,000	58,000	23,000	6	5,100
5,200	5,000	86,000	58,000	23,000	6	5,200
5,300	5,000	86,000	58,000	23,000	6	5,300
5,400	6,000	93,000	57,000	26,000	6	5,400
5,500	6,000	93,000	57,000	26,000	6	5,500
5,600	6,000	93,000	57,000	26,000	6	5,600
5,700	6,000	93,000	57,000	26,000	6	5,700
5,800	6,000	93,000	57,000	26,000	6	5,800
5,900	6,000	93,000	57,000	26,000	6	5,900
6,000	6,000	93,000	57,000	26,000	6	6,000
6,100	6,000	101,000	65,000	28,000	6	6,100
6,200	6,000	101,000	65,000	28,000	6	6,200

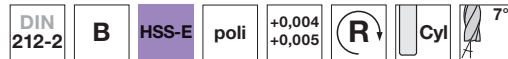
d1 mm	d2 h6 mm	l1 mm	l2 mm	l4 mm	Z	N° de code
6,300	6,000	101,000	65,000	28,000	6	6,300
6,400	6,000	101,000	65,000	28,000	6	6,400
6,500	6,000	101,000	65,000	28,000	6	6,500
6,600	6,000	101,000	65,000	28,000	6	6,600
6,700	6,000	101,000	65,000	28,000	6	6,700
6,800	8,000	109,000	73,000	31,000	6	6,800
6,900	8,000	109,000	73,000	31,000	6	6,900
7,000	8,000	109,000	73,000	31,000	6	7,000
7,100	8,000	109,000	73,000	31,000	6	7,100
7,200	8,000	109,000	73,000	31,000	6	7,200
7,300	8,000	109,000	73,000	31,000	6	7,300
7,400	8,000	109,000	73,000	31,000	6	7,400
7,500	8,000	109,000	73,000	31,000	6	7,500
7,600	8,000	117,000	81,000	33,000	6	7,600
7,700	8,000	117,000	81,000	33,000	6	7,700
7,800	8,000	117,000	81,000	33,000	6	7,800
7,900	8,000	117,000	81,000	33,000	6	7,900
8,000	8,000	117,000	81,000	33,000	6	8,000
8,100	8,000	117,000	81,000	33,000	6	8,100
8,200	8,000	117,000	81,000	33,000	6	8,200
8,300	8,000	117,000	81,000	33,000	6	8,300
8,400	8,000	117,000	81,000	33,000	6	8,400
8,500	8,000	117,000	81,000	33,000	6	8,500
8,600	10,000	125,000	85,000	36,000	6	8,600
8,700	10,000	125,000	85,000	36,000	6	8,700
8,800	10,000	125,000	85,000	36,000	6	8,800
8,900	10,000	125,000	85,000	36,000	6	8,900
9,000	10,000	125,000	85,000	36,000	6	9,000
9,100	10,000	125,000	85,000	36,000	6	9,100
9,200	10,000	125,000	85,000	36,000	6	9,200
9,300	10,000	125,000	85,000	36,000	6	9,300
9,400	10,000	125,000	85,000	36,000	6	9,400
9,500	10,000	125,000	85,000	36,000	6	9,500
9,600	10,000	133,000	93,000	38,000	6	9,600
9,700	10,000	133,000	93,000	38,000	6	9,700
9,800	10,000	133,000	93,000	38,000	6	9,800
9,900	10,000	133,000	93,000	38,000	6	9,900
10,000	10,000	133,000	93,000	38,000	6	10,000
11,000	10,000	142,000	102,000	41,000	6	11,000
12,000	10,000	151,000	111,000	44,000	6	12,000
13,000	10,000	151,000	111,000	44,000	6	13,000
14,000	14,000	160,000	115,000	47,000	8	14,000
15,000	14,000	162,000	117,000	50,000	8	15,000
16,000	14,000	170,000	125,000	52,000	8	16,000
17,000	14,000	175,000	130,000	54,000	8	17,000
18,000	14,000	182,000	137,000	56,000	8	18,000
19,000	16,000	189,000	141,000	58,000	8	19,000
20,000	16,000	195,000	147,000	60,000	8	20,000

Outils HSS d'alésage

Alésoirs machine



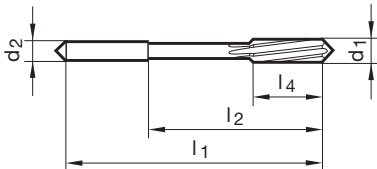
Référence **72654**



P	M	K	N	S	H
●	○	●	●	○	

Conseils d'util.,
page 692

- pour la fabrication de grandes séries sur machines automatiques
- avec entrée courte, $\leq \varnothing 3,75$ mm: 15° , $> \varnothing 3,75$ mm: 45°
- \varnothing ascendant par 0,01 mm
- $\leq \varnothing 3,75$ mm centre extérieur aux 2 extrémités
- $> \varnothing 3,75$ mm centre intérieur aux 2 extrémités
- tolérance de fabrication:
 - $\varnothing 0,95 - 5,50$ mm: $0,00/+0,004$
 - $\varnothing 5,51 - 12,05$ mm: $0,00/+0,005$
- pour des valeurs de résistance à la traction jusqu'à maximum 1000 N/mm^2



d1 mm	d2 h6 mm	l1 mm	l2 mm	l4 mm	Z	N° de code
0,980	1,000	34,000	15,000	5,500	3	0,980
0,990	1,000	34,000	15,000	5,500	3	0,990
1,000	1,000	34,000	15,000	5,500	3	1,000
1,010	1,100	34,000	15,000	5,500	3	1,010
1,020	1,100	34,000	15,000	5,500	3	1,020
1,100	1,100	36,000	15,500	6,500	3	1,100
1,200	1,200	38,000	16,500	7,500	3	1,200
1,300	1,300	38,000	16,500	7,500	3	1,300
1,400	1,400	40,000	18,000	8,000	3	1,400
1,480	1,500	40,000	18,000	8,000	3	1,480
1,490	1,500	40,000	18,000	8,000	3	1,490
1,500	1,500	40,000	18,000	8,000	3	1,500
1,510	1,600	43,000	20,000	9,000	3	1,510
1,520	1,600	43,000	20,000	9,000	3	1,520
1,600	1,600	43,000	20,000	9,000	3	1,600
1,700	1,700	43,000	20,000	9,000	3	1,700
1,800	1,800	46,000	22,000	10,000	4	1,800
1,980	2,000	49,000	24,000	11,000	4	1,980
1,990	2,000	49,000	24,000	11,000	4	1,990
2,000	2,000	49,000	24,000	11,000	4	2,000
2,010	2,100	49,000	24,000	11,000	4	2,010
2,030	2,100	49,000	24,000	11,000	4	2,030
2,100	2,000	49,000	24,000	11,000	4	2,100
2,200	2,200	53,000	25,000	12,000	4	2,200
2,300	2,300	53,000	25,000	12,000	4	2,300
2,400	2,500	57,000	29,000	14,000	4	2,400
2,500	2,500	57,000	29,000	14,000	4	2,500
2,600	2,500	57,000	29,000	14,000	4	2,600
2,700	2,800	61,000	33,000	15,000	6	2,700
2,750	2,800	61,000	33,000	15,000	6	2,750
2,800	2,800	61,000	33,000	15,000	6	2,800
2,900	3,000	61,000	33,000	15,000	6	2,900
2,980	3,000	61,000	33,000	15,000	6	2,980
2,990	3,000	61,000	33,000	15,000	6	2,990
3,000	3,000	61,000	33,000	15,000	6	3,000
3,010	3,200	65,000	37,000	16,000	6	3,010
3,020	3,200	65,000	37,000	16,000	6	3,020
3,050	3,200	65,000	37,000	16,000	6	3,050
3,100	3,200	65,000	37,000	16,000	6	3,100
3,200	3,200	65,000	37,000	16,000	6	3,200
3,250	3,200	65,000	37,000	16,000	6	3,250
3,300	3,200	65,000	37,000	16,000	6	3,300
3,400	3,500	70,000	42,000	18,000	6	3,400
3,500	3,500	70,000	42,000	18,000	6	3,500
3,600	3,500	70,000	42,000	18,000	6	3,600
3,700	3,500	70,000	42,000	18,000	6	3,700
3,800	4,000	75,000	47,000	19,000	6	3,800
3,900	4,000	75,000	47,000	19,000	6	3,900

d1 mm	d2 h6 mm	l1 mm	l2 mm	l4 mm	Z	N° de code
3,970	4,000	75,000	47,000	19,000	6	3,970
3,980	4,000	75,000	47,000	19,000	6	3,980
3,990	4,000	75,000	47,000	19,000	6	3,990
4,000	4,000	75,000	47,000	19,000	6	4,000
4,010	4,000	75,000	47,000	19,000	6	4,010
4,020	4,000	75,000	47,000	19,000	6	4,020
4,030	4,000	75,000	47,000	19,000	6	4,030
4,040	4,000	75,000	47,000	19,000	6	4,040
4,100	4,000	75,000	47,000	19,000	6	4,100
4,200	4,000	75,000	47,000	19,000	6	4,200
4,500	4,500	80,000	52,000	21,000	6	4,500
4,800	5,000	86,000	58,000	23,000	6	4,800
4,980	5,000	86,000	58,000	23,000	6	4,980
4,990	5,000	86,000	58,000	23,000	6	4,990
5,000	5,000	86,000	58,000	23,000	6	5,000
5,010	5,000	86,000	58,000	23,000	6	5,010
5,020	5,000	86,000	58,000	23,000	6	5,020
5,030	5,000	86,000	58,000	23,000	6	5,030
5,100	5,000	86,000	58,000	23,000	6	5,100
5,200	5,000	86,000	58,000	23,000	6	5,200
5,500	5,600	93,000	57,000	26,000	6	5,500
5,800	5,600	93,000	57,000	26,000	6	5,800
5,980	5,600	93,000	57,000	26,000	6	5,980
5,990	5,600	93,000	57,000	26,000	6	5,990
6,000	5,600	93,000	57,000	26,000	6	6,000
6,010	6,300	101,000	65,000	28,000	6	6,010
6,020	6,300	101,000	65,000	28,000	6	6,020
6,100	6,300	101,000	65,000	28,000	6	6,100
6,200	6,300	101,000	65,000	28,000	6	6,200
6,350	6,300	101,000	65,000	28,000	6	6,350
6,500	6,300	101,000	65,000	28,000	6	6,500
7,000	7,100	109,000	73,000	31,000	6	7,000
7,010	7,100	109,000	73,000	31,000	6	7,010
7,020	7,100	109,000	73,000	31,000	6	7,020
7,100	7,100	109,000	73,000	31,000	6	7,100
7,500	7,100	109,000	73,000	31,000	6	7,500
7,980	8,000	117,000	81,000	33,000	6	7,980
8,000	8,000	117,000	81,000	33,000	6	8,000
8,010	8,000	117,000	81,000	33,000	6	8,010
8,020	8,000	117,000	81,000	33,000	6	8,020
8,030	8,000	117,000	81,000	33,000	6	8,030
8,050	8,000	117,000	81,000	33,000	6	8,050
8,100	8,000	117,000	81,000	33,000	6	8,100
8,200	8,000	117,000	81,000	33,000	6	8,200
8,500	8,000	117,000	81,000	33,000	6	8,500
8,900	9,000	125,000	85,000	36,000	6	8,900
9,000	9,000	125,000	85,000	36,000	6	9,000
9,010	9,000	125,000	85,000	36,000	6	9,010
9,020	9,000	125,000	85,000	36,000	6	9,020
9,500	9,000	125,000	85,000	36,000	6	9,500
9,980	10,000	133,000	93,000	38,000	6	9,980
10,000	10,000	133,000	93,000	38,000	6	10,000
10,010	10,000	133,000	93,000	38,000	6	10,010
10,020	10,000	133,000	93,000	38,000	6	10,020
10,030	10,000	133,000	93,000	38,000	6	10,030
10,500	10,000	133,000	93,000	38,000	6	10,500
11,000	10,000	142,000	102,000	41,000	6	11,000
11,010	10,000	142,000	102,000	41,000	6	11,010
11,020	10,000	142,000	102,000	41,000	6	11,020
11,500	10,000	142,000	102,000	41,000	6	11,500
12,000	10,000	151,000	111,000	44,000	6	12,000

Outils HSS d'alésage

Alésoirs machine



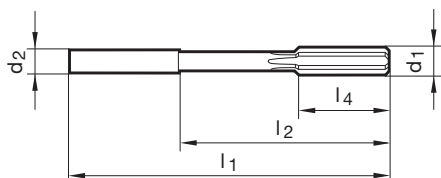
Référence **72640**



P	M	K	N	S	H
●	○	●	●	○	○

Conseils d'util.,
page 692

- $\leq \varnothing 3,75$ mm centre extérieur aux 2 extrémités
- $> \varnothing 3,75$ mm centre intérieur aux 2 extrémités
- pour des valeurs de résistance à la traction jusqu'à maximum 1000 N / mm²



d1 mm	d2 h6 mm	l1 mm	l2 mm	l4 mm	Z	N° de code
2,200	2,200	53,000	25,000	12,000	4	2,200
2,800	2,800	61,000	33,000	15,000	6	2,800
3,200	3,200	65,000	37,000	16,000	6	3,200
3,500	3,500	70,000	42,000	18,000	6	3,500
4,000	4,000	75,000	47,000	19,000	6	4,000
4,500	4,500	80,000	52,000	21,000	6	4,500
5,000	5,000	86,000	58,000	23,000	6	5,000
6,000	5,600	93,000	57,000	26,000	6	6,000
7,000	7,100	109,000	73,000	31,000	6	7,000
8,000	8,000	117,000	81,000	33,000	6	8,000
9,000	9,000	125,000	85,000	36,000	6	9,000
10,000	10,000	133,000	93,000	38,000	6	10,000
11,000	10,000	142,000	102,000	41,000	6	11,000
12,000	10,000	151,000	111,000	44,000	6	12,000
13,000	10,000	151,000	111,000	44,000	6	13,000
14,000	12,500	160,000	115,000	47,000	6	14,000
15,000	12,500	162,000	117,000	50,000	6	15,000
16,000	12,500	170,000	125,000	52,000	6	16,000
17,000	14,000	175,000	130,000	54,000	6	17,000
19,000	16,000	189,000	141,000	58,000	6	19,000
20,000	16,000	195,000	147,000	60,000	6	20,000

Outils HSS d'alésage

Alésoirs machine



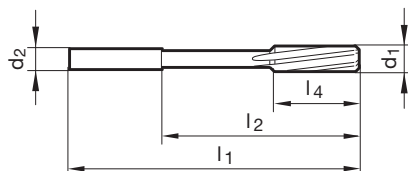
Référence **72650**



P	M	K	N	S	H
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Conseils d'util.,
page 692

- > Ø 3,75 mm centre intérieur aux 2 extrémités
- ≤ Ø 3,75 mm centre extérieur aux 2 extrémités
- pour des valeurs de résistance à la traction jusqu'à maximum 1000 N / mm²
- seulement pour les perçages débouchants



d1 mm	d2 h6 mm	l1 mm	l2 mm	l4 mm	Z	N° de code
2,200	2,200	53,000	25,000	12,000	6	2,200
2,800	2,800	61,000	33,000	15,000	6	2,800
3,200	3,200	65,000	37,000	16,000	6	3,200
4,000	4,000	75,000	47,000	19,000	6	4,000
4,500	4,500	80,000	52,000	21,000	6	4,500
5,000	5,000	86,000	58,000	23,000	6	5,000
5,500	5,600	93,000	57,000	26,000	6	5,500
6,000	5,600	93,000	57,000	26,000	6	6,000
6,500	6,300	101,000	65,000	28,000	6	6,500
7,000	7,100	109,000	73,000	31,000	6	7,000
8,000	8,000	117,000	81,000	33,000	6	8,000
9,000	9,000	125,000	85,000	36,000	6	9,000
10,000	10,000	133,000	93,000	38,000	6	10,000
11,000	10,000	142,000	102,000	41,000	6	11,000
12,000	10,000	151,000	111,000	44,000	6	12,000
13,000	10,000	151,000	111,000	44,000	6	13,000
14,000	12,500	160,000	115,000	47,000	6	14,000
15,000	12,500	162,000	117,000	50,000	6	15,000
16,000	12,500	170,000	125,000	52,000	6	16,000
17,000	14,000	175,000	130,000	54,000	6	17,000
18,000	14,000	182,000	137,000	56,000	6	18,000
20,000	16,000	195,000	147,000	60,000	6	20,000

Outils HSS d'alésage

Alésoirs machine



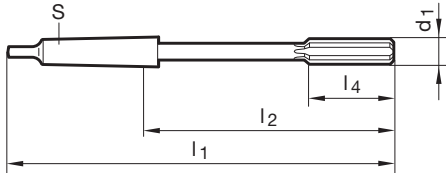
Référence **72660**



P	M	K	N	S	H
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Conseils d'util.,
page 692

- Ø 3,00 mm pointe de centrage côté coupe, centre intérieur côté queue
- ≤ Ø 4,00 mm selon norme usine
- > Ø 3,00 mm centre intérieur aux 2 extrémités
- pour des valeurs de résistance à la traction jusqu'à maximum 1000 N / mm²



d1 mm	S	l1 mm	l2 mm	l4 mm	Z	N° de code
8,000	MK-1	156,000	94,000	33,000	6	8,000
9,000	MK-1	162,000	100,000	36,000	6	9,000
10,000	MK-1	168,000	106,000	38,000	6	10,000
11,000	MK-1	175,000	113,000	41,000	6	11,000
12,000	MK-1	182,000	120,000	44,000	6	12,000
13,000	MK-1	182,000	120,000	44,000	6	13,000
14,000	MK-1	189,000	127,000	47,000	8	14,000
15,000	MK-2	204,000	129,000	50,000	8	15,000
16,000	MK-2	210,000	135,000	52,000	8	16,000
17,000	MK-2	214,000	139,000	54,000	8	17,000
18,000	MK-2	219,000	144,000	56,000	8	18,000
19,000	MK-2	223,000	148,000	58,000	8	19,000
20,000	MK-2	228,000	153,000	60,000	8	20,000
21,000	MK-2	232,000	157,000	62,000	8	21,000
22,000	MK-2	237,000	162,000	64,000	8	22,000
23,000	MK-2	241,000	166,000	66,000	8	23,000
24,000	MK-3	268,000	174,000	68,000	8	24,000
25,000	MK-3	268,000	174,000	68,000	8	25,000
26,000	MK-3	273,000	179,000	70,000	8	26,000
28,000	MK-3	277,000	183,000	71,000	10	28,000
30,000	MK-3	281,000	187,000	73,000	10	30,000
35,000	MK-4	321,000	203,500	78,000	10	35,000

Outils HSS d'alésage

Alésoirs machine



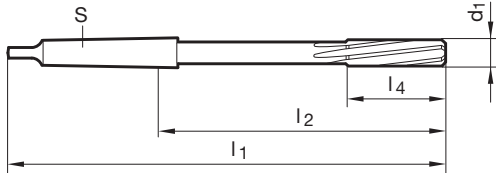
Référence **72670**



P	M	K	N	S	H
●	○	●	●	○	

Conseils d'util.,
page 692

- $\leq \varnothing 4,00$ mm selon norme usine
- $> \varnothing 3,00$ mm centre intérieur aux 2 extrémités
- $\varnothing 3,00$ mm pointe de centrage côté coupe, centre intérieur côté queue
- pour des valeurs de résistance à la traction jusqu'à maximum 1000 N / mm^2
- seulement pour les perçages débouchants



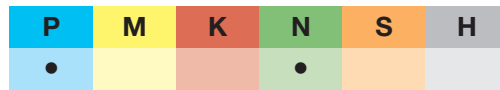
d1 mm	S	l1 mm	l2 mm	l4 mm	Z	N° de code
5,000	MK-1	133,000	71,000	23,000	6	5,000
6,000	MK-1	138,000	76,000	26,000	6	6,000
7,000	MK-1	150,000	88,000	31,000	6	7,000
8,000	MK-1	156,000	94,000	33,000	6	8,000
9,000	MK-1	162,000	100,000	36,000	6	9,000
10,000	MK-1	168,000	106,000	38,000	6	10,000
11,000	MK-1	175,000	113,000	41,000	6	11,000
12,000	MK-1	182,000	120,000	44,000	6	12,000
13,000	MK-1	182,000	120,000	44,000	6	13,000
14,000	MK-1	189,000	127,000	47,000	8	14,000
15,000	MK-2	204,000	129,000	50,000	8	15,000
16,000	MK-2	210,000	135,000	52,000	8	16,000
17,000	MK-2	214,000	139,000	54,000	8	17,000
18,000	MK-2	219,000	144,000	56,000	8	18,000
19,000	MK-2	223,000	148,000	58,000	8	19,000
20,000	MK-2	228,000	153,000	60,000	8	20,000
21,000	MK-2	232,000	157,000	62,000	8	21,000
22,000	MK-2	237,000	162,000	64,000	8	22,000
23,000	MK-2	241,000	166,000	66,000	8	23,000
24,000	MK-3	268,000	174,000	68,000	8	24,000
25,000	MK-3	268,000	174,000	68,000	8	25,000
26,000	MK-3	273,000	179,000	70,000	8	26,000
27,000	MK-3	277,000	183,000	71,000	10	27,000
28,000	MK-3	277,000	183,000	71,000	10	28,000
29,000	MK-3	281,000	187,000	73,000	10	29,000
30,000	MK-3	281,000	187,000	73,000	10	30,000
31,000	MK-3	285,000	191,000	75,000	10	31,000
32,000	MK-4	317,000	199,500	77,000	10	32,000
33,000	MK-4	317,000	199,500	77,000	10	33,000
34,000	MK-4	321,000	203,500	78,000	10	34,000
35,000	MK-4	321,000	203,500	78,000	10	35,000
38,000	MK-4	329,000	211,500	81,000	10	38,000
40,000	MK-4	329,000	211,500	81,000	10	40,000
44,000	MK-4	336,000	218,500	83,000	12	44,000
45,000	MK-4	336,000	218,500	83,000	12	45,000
50,000	MK-4	344,000	226,500	86,000	12	50,000

Outils HSS d'alésage

Alésoirs machine, à coupe descendante

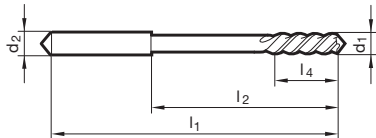


Référence **72690**



Conseils d'util.,
page 692

- avec entrée conique, env. 1/6 de la longueur du taillant.
- la géométrie spécifique de ces outils nécessite une augmentation de la surépaisseur, avant l'alésage, de 50 à 100 %
- > Ø 3,75 mm centre intérieur aux 2 extrémités
- ≤ Ø 3,75 mm centre extérieur aux 2 extrémités
- l'avance devrait être choisie 50% plus haute que pour les autres alésoirs
- pour des valeurs de résistance à la traction jusqu'à maximum 1000 N / mm²



d1 mm	d2 h6 mm	l1 mm	l2 mm	l4 mm	Z	N° de code
4,000	4,000	75,000	47,000	19,000	3	4,000
4,500	4,500	80,000	52,000	21,000	3	4,500
5,000	5,000	86,000	58,000	23,000	3	5,000
5,500	5,600	93,000	57,000	26,000	3	5,500
6,000	5,600	93,000	57,000	26,000	3	6,000
7,000	7,100	109,000	73,000	31,000	3	7,000
8,000	8,000	117,000	81,000	33,000	3	8,000
9,000	9,000	125,000	85,000	36,000	3	9,000
10,000	10,000	133,000	93,000	38,000	3	10,000
12,000	10,000	151,000	111,000	44,000	3	12,000
13,000	10,000	151,000	111,000	44,000	3	13,000

Outils HSS d'alésage

Alésoirs de chaudronnerie machine 1:10

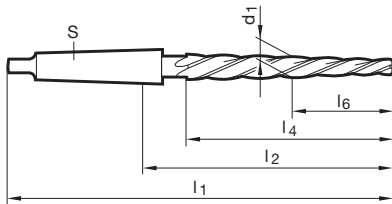


Référence **72680**



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●	○	●	●		

Conseils d'util.,
page 692



- avec longue entrée conique 1 : 10
- corrige le décalage des perçages des tôles superposées en paquets, et réalise le perçage au Ø souhaité (par exemple, avant le rivetage ou avant l'assemblage par vissage)
- tolérance de fabrication k11
- centre intérieur aux 2 extrémités
- Domaine principal d'applications:
 - constructions métalliques, fabrications de chaudières et réservoirs, constructions navales
 - outils à haut rendement d'enlèvement de copeaux
 - aussi pour les perceuses à main levée, à basse vitesse de rotation
 - pour des valeurs de résistance à la traction jusqu'à maximum 1000 N / mm²

d1 mm	S	l1 mm	l2 mm	l4 mm	l6 mm	Z	N° de code
9,500	MK-1	166,000	104,000	90,000	27,000	4	9,500
10,000	MK-1	171,000	109,000	95,000	30,000	4	10,000
12,000	MK-2	199,000	124,000	105,000	39,000	4	12,000
13,000	MK-2	199,000	124,000	105,000	39,000	4	13,000
15,000	MK-2	219,000	144,000	125,000	45,000	5	15,000
17,000	MK-3	251,000	157,000	135,000	51,000	5	17,000
19,000	MK-3	261,000	167,000	145,000	58,000	5	19,000
20,000	MK-3	271,000	177,000	155,000	62,000	5	20,000
21,000	MK-3	271,000	177,000	155,000	62,000	5	21,000
23,000	MK-3	281,000	187,000	165,000	66,000	5	23,000
25,000	MK-3	296,000	202,000	180,000	72,000	5	25,000
36,000	MK-4	364,000	246,500	220,000	88,000	5	36,000
37,000	MK-4	364,000	246,500	220,000	88,000	5	37,000

Outils HSS d'alésage

Alésoirs machine coniques

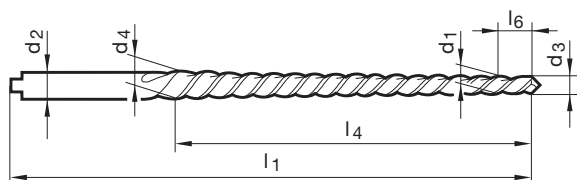


Référence **72741**



P	M	K	N	S	H
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Conseils d'util.,
page 692



- pour la fabrication à l'unité et réparations
- avec cône 1:50 pour l'alésage des trous de goupilles selon DIN 1, 258, 7977 et 7978
- > Ø 4,00 mm centre intérieur aux 2 extrémités
- ≤ Ø 4,00 mm centre extérieur aux 2 extrémités
- pré perçage: cylindrique
- avec tenon suiv. DIN 1809
- pour des valeurs de résistance à la traction jusqu'à maximum 1000 N / mm²

d1 mm	d2 mm	d3 mm	d4 mm	l1 mm	l4 mm	l6 mm	Z	N° de code
2,000	3,150	1,900	2,860	86,000	48,000	5,000	3	2,000
2,500	3,150	2,400	3,360	86,000	48,000	5,000	3	2,500
3,000	4,000	2,900	4,060	100,000	58,000	5,000	3	3,000
4,000	5,000	3,900	5,260	112,000	68,000	5,000	3	4,000
5,000	6,300	4,900	6,360	122,000	73,000	5,000	3	5,000
6,000	8,000	5,900	8,000	160,000	105,000	5,000	3	6,000
6,500	8,500	6,400	8,780	188,000	119,000	5,000	3	6,500
8,000	10,000	7,900	10,800	207,000	145,000	5,000	3	8,000
10,000	12,500	9,900	13,400	245,000	175,000	5,000	3	10,000
12,000	16,000	11,860	16,000	290,000	210,000	7,000	3	12,000

Outils HSS d'alésage

Alésoirs à main, coniques

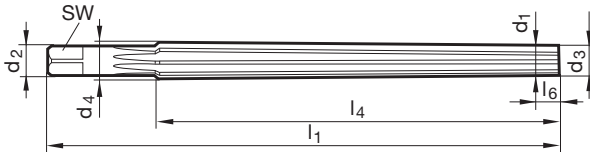


Référence **72730**



P	M	K	N	S	H
•		•	•		

- pour la fabrication à l'unité et réparations
- avec cône 1:50 pour l'alésage des trous de goupilles
- avec carré suivant DIN 10
- Ø 3,50; 4,50; 5,50; 6,50; 7,00; 9,00; 13,00 et 14,00 mm selon norme usine
- pré perçage: cylindrique
- pour des valeurs de résistance à la traction jusqu'à maximum 900 N / mm²



d1 mm	d2 mm	d3 mm	d4 mm	l1 mm	l4 mm	l6 mm	SW mm	Z	N° de code
1,000	3,150	0,900	1,460	46,000	28,000	5,000	2,400	3	1,000
1,200	3,150	1,100	1,740	50,000	32,000	5,000	2,400	3	1,200
2,000	3,150	1,900	2,860	68,000	48,000	5,000	2,400	3	2,000
3,000	4,000	2,900	4,060	80,000	58,000	5,000	3,000	5	3,000
4,000	5,000	3,900	5,260	93,000	68,000	5,000	3,800	5	4,000
5,000	6,300	4,900	6,360	100,000	73,000	5,000	4,900	5	5,000
6,000	8,000	5,900	8,000	135,000	105,000	5,000	6,200	6	6,000
8,000	10,000	7,900	10,800	180,000	145,000	5,000	8,000	6	8,000
10,000	12,500	9,900	13,400	215,000	175,000	5,000	10,000	6	10,000
12,000	14,000	11,800	16,000	255,000	210,000	10,000	11,000	8	12,000
16,000	18,000	15,800	20,400	280,000	230,000	10,000	14,500	8	16,000

Outils HSS d'alésage

Alésoirs à main

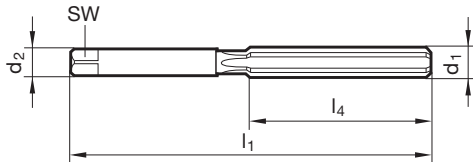


Référence **72600**



P	M	K	N	S	H
•		•	•		

- pour la fabrication à l'unité et réparations
- avec entrée longue, conique, env. 1/3 de la longueur du taillant
- de par leur longue entrée, non recommandé pour les perçages borgnes
- avec carré suivant DIN 10
- $\leq \varnothing 3,75$ mm centre extérieur aux 2 extrémités
- $> \varnothing 3,75$ mm centre intérieur aux 2 extrémités
- $\leq 1,75$ mm selon norme usine
- pour des valeurs de résistance à la traction jusqu'à maximum 900 N / mm²



d1 mm	d2 mm	l1 mm	l4 mm	SW mm	Z	N° de code
2,500	2,500	58,000	29,000	2,100	4	2,500
3,000	3,000	62,000	31,000	2,400	6	3,000
4,000	4,000	76,000	38,000	3,000	6	4,000
4,500	4,500	81,000	41,000	3,400	6	4,500
5,000	5,000	87,000	44,000	3,800	6	5,000
5,500	5,500	93,000	47,000	4,300	6	5,500
6,000	6,000	93,000	47,000	4,900	6	6,000
8,000	8,000	115,000	58,000	6,200	6	8,000
9,000	9,000	124,000	62,000	7,000	6	9,000
10,000	10,000	133,000	66,000	8,000	6	10,000
11,000	11,000	142,000	71,000	9,000	6	11,000
12,000	12,000	152,000	76,000	9,000	6	12,000
13,000	13,000	152,000	76,000	10,000	6	13,000
14,000	14,000	163,000	81,000	11,000	8	14,000
15,000	15,000	163,000	81,000	12,000	8	15,000
16,000	16,000	175,000	87,000	12,000	8	16,000
17,000	17,000	175,000	87,000	13,000	8	17,000
18,000	18,000	188,000	93,000	14,500	8	18,000
19,000	19,000	188,000	93,000	14,500	8	19,000
20,000	20,000	201,000	100,000	16,000	8	20,000
25,000	25,000	231,000	115,000	20,000	8	25,000
28,000	28,000	247,000	124,000	22,000	10	28,000
32,000	32,000	265,000	133,000	24,000	10	32,000
34,000	34,000	284,000	142,000	26,000	10	34,000

Outils HSS d'alésage

Alésoirs à main

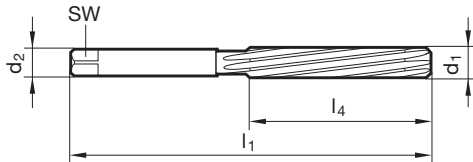


Référence **72610**



P	M	K	N	S	H
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- pour la fabrication à l'unité et réparations
- avec entrée longue, conique, env. 1/3 de la longueur du taillant
- pour perçages avec coupe interrompue, p. ex. pièces divisées, interruptions de paroi, perçage transversal etc.
- avec carré suivant DIN 10
- $\leq \varnothing 3,75$ mm centre extérieur aux 2 extrémités
- $> \varnothing 3,75$ mm centre intérieur aux 2 extrémités
- $\leq 1,75$ mm selon norme usine
- pour des valeurs de résistance à la traction jusqu'à maximum 900 N / mm²



d1 mm	d2 mm	l1 mm	l4 mm	SW mm	Z	N° de code
2,000	2,000	50,000	25,000	1,600	4	2,000
2,800	2,800	62,000	31,000	2,100	6	2,800
3,000	3,000	62,000	31,000	2,400	6	3,000
4,000	4,000	76,000	38,000	3,000	6	4,000
4,500	4,500	81,000	41,000	3,400	6	4,500
5,000	5,000	87,000	44,000	3,800	6	5,000
6,000	6,000	93,000	47,000	4,900	6	6,000
7,000	7,000	107,000	54,000	5,500	6	7,000
8,000	8,000	115,000	58,000	6,200	6	8,000
9,000	9,000	124,000	62,000	7,000	6	9,000
10,000	10,000	133,000	66,000	8,000	6	10,000
12,000	12,000	152,000	76,000	9,000	6	12,000
13,000	13,000	152,000	76,000	10,000	6	13,000
14,000	14,000	163,000	81,000	11,000	8	14,000
15,000	15,000	163,000	81,000	12,000	8	15,000
16,000	16,000	175,000	87,000	12,000	8	16,000
18,000	18,000	188,000	93,000	14,500	8	18,000
19,000	19,000	188,000	93,000	14,500	8	19,000
20,000	20,000	201,000	100,000	16,000	8	20,000
22,000	22,000	215,000	107,000	18,000	8	22,000
24,000	24,000	231,000	115,000	18,000	8	24,000
25,000	25,000	231,000	115,000	20,000	8	25,000
28,000	28,000	247,000	124,000	22,000	10	28,000
30,000	30,000	247,000	124,000	24,000	10	30,000
32,000	32,000	265,000	133,000	24,000	10	32,000
34,000	34,000	284,000	142,000	26,000	10	34,000
35,000	35,000	284,000	142,000	29,000	10	35,000

Fraises à chanfreiner en HSS

Fraises à chanfreiner 60°

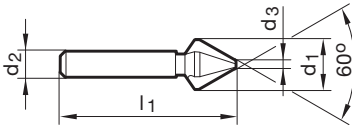


Référence **72326**



P	M	K	N	S	H
●	○	●	●	●	

- outils universels d'ébavurage et de chanfreinage, par exemple pour les perçages avant filetages
- détalonnage radial
- 3 dents



d1 mm	d2 mm	d3 mm	l1 mm	Z	N° de code
6,300	5,000	1,600	45,000	3	6,300
8,000	6,000	2,000	50,000	3	8,000
12,500	8,000	3,200	56,000	3	12,500
16,000	10,000	4,000	63,000	3	16,000
20,000	10,000	5,000	67,000	3	20,000
25,000	10,000	6,300	71,000	3	25,000

Fraises à chanfreiner en HSS

Fraises à chanfreiner 60°

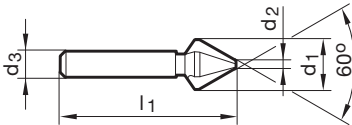


Référence **62327**



P	M	K	N	S	H
•	•	•	•	○	

- outils universels d'ébavurage et de chanfreinage, par exemple pour les perçages avant filetages
- détalonnage radial
- 3 dents



d1 mm	d2 mm	d3 mm	l1 mm	Z	N° de code
6,300	5,000	1,600	45,000	3	6,300
8,000	6,000	2,000	50,000	3	8,000
12,500	8,000	3,200	56,000	3	12,500
25,000	10,000	6,300	71,000	3	25,000

Fraises à chanfreiner en HSS

Fraises à chanfreiner 90°

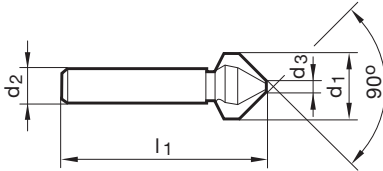


Référence **72346**



P	M	K	N	S	H
●	○	●	●	●	

- outils universels d'ébavurage et de chanfreinage, par exemple pour les perçages avant filetages
- détalonnage radial
- 3 dents



d1 mm	d2 mm	d3 mm	l1 mm	Z	N° de code
4,300	4,000	1,300	40,000	3	4,300
5,000	4,000	1,500	40,000	3	5,000
5,300	4,000	1,500	40,000	3	5,300
5,800	5,000	1,500	45,000	3	5,800
6,000	5,000	1,500	45,000	3	6,000
6,300	5,000	1,500	45,000	3	6,300
7,000	6,000	1,800	50,000	3	7,000
7,300	6,000	1,800	50,000	3	7,300
8,000	6,000	2,000	50,000	3	8,000
8,300	6,000	2,000	50,000	3	8,300
9,400	6,000	2,200	50,000	3	9,400
10,000	6,000	2,500	50,000	3	10,000
10,400	6,000	2,500	50,000	3	10,400
11,500	8,000	2,800	56,000	3	11,500
12,400	8,000	2,800	56,000	3	12,400
13,400	8,000	2,900	56,000	3	13,400
15,000	10,000	3,200	60,000	3	15,000
16,500	10,000	3,200	60,000	3	16,500
19,000	10,000	3,500	63,000	3	19,000
20,500	10,000	3,500	63,000	3	20,500
23,000	10,000	3,800	67,000	3	23,000
25,000	10,000	3,800	67,000	3	25,000
26,000	10,000	3,800	67,000	3	26,000
28,000	12,000	4,000	71,000	3	28,000
30,000	12,000	4,200	71,000	3	30,000
31,000	12,000	4,200	71,000	3	31,000

Fraises à chanfreiner en HSS

Fraises à chanfreiner 90°

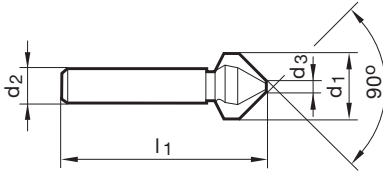


Référence **62347**



P	M	K	N	S	H
●	○	●	○	●	

- outils universels d'ébavurage et de chanfreinage, par exemple pour les perçages avant filetages
- détalonnage radial
- 3 dents



d1 mm	d2 mm	d3 mm	l1 mm	Z	N° de code
4,300	4,000		40,000	3	4,300
5,000	4,000	1,500	40,000	3	5,000
6,300	5,000	1,500	45,000	3	6,300
7,300	6,000	1,800	50,000	3	7,300
8,000	6,000	2,000	50,000	3	8,000
8,300	6,000	2,000	50,000	3	8,300
9,400	6,000	2,200	50,000	3	9,400
10,000	6,000	2,500	50,000	3	10,000
10,400	6,000	2,500	50,000	3	10,400
11,500	8,000	2,800	56,000	3	11,500
12,400	8,000	2,800	56,000	3	12,400
15,000	10,000	3,200	60,000	3	15,000
16,500	10,000	3,200	60,000	3	16,500
19,000	10,000	3,500	63,000	3	19,000
20,500	10,000	3,500	63,000	3	20,500
25,000	10,000	3,800	67,000	3	25,000
30,000	12,000	4,200	71,000	3	30,000
31,000	12,000	4,200	71,000	3	31,000

Fraises à chanfreiner en HSS

Fraises à chanfreiner 90°

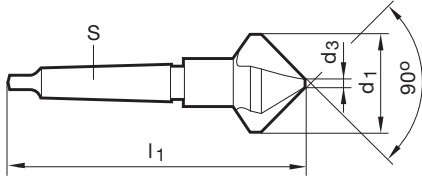


Référence 72356



P	M	K	N	S	H
●	○	●	●	●	

- outils universels d'ébavurage et de chanfreinage, par exemple pour les perçages avant filetages
- détalonnage radial
- 3 dents



d1 mm	S	d3 mm	l1 mm	Z	N° de code
15,000	MK-1	3,200	85,000	3	15,000
19,000	MK-2	3,500	100,000	3	19,000
20,500	MK-2	3,500	100,000	3	20,500
25,000	MK-2	3,800	106,000	3	25,000
30,000	MK-2	4,200	112,000	3	30,000
31,000	MK-2	4,200	112,000	3	31,000
34,000	MK-2	4,500	118,000	3	34,000
37,000	MK-2	4,800	118,000	3	37,000
40,000	MK-3	10,000	140,000	3	40,000
50,000	MK-3	14,000	150,000	3	50,000
63,000	MK-4	16,000	180,000	3	63,000
80,000	MK-4	22,000	190,000	3	80,000

Fraises à chanfreiner en HSS

Fraises à chanfreiner 90°

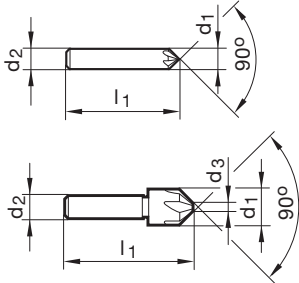


Référence **72345**



P	M	K	N	S	H
•	○	•	•	•	

- à goujures droites
- à arêtes de coupe multiples



d1 mm	d2 mm	d3 mm	l1 mm	Z	N° de code
8,000	8,000		48,000	5	8,000
12,500	8,000	2,000	48,000	5	12,500
16,000	10,000	3,200	56,000	7	16,000
20,000	10,000	5,000	60,000	7	20,000

Fraises à chanfreiner en HSS

Coffrets de fraises à chanfreiner 90°



DIN 335	C	HSS	poli	90°	R	Cyl
P	M	K	N	S	H	
●	○	●	●	○		

- jeu en coffret, composé de la référence 72346 Ø 6,30 / 8,30 / 10,40 / 12,40 / 16,50 / 20,50 mm
- outils universels d'ébavurage et de chanfreinage, par exemple pour les perçages avant filetages
- détalonnage radial
- 3 dents

Référence 72399

N° de code	d1 mm	Pièce/jeu
8,000	6,30-20,50	6

Fraises à chanfreiner en HSS

Coffrets de fraises à chanfreiner 90°



P	M	K	N	S	H
●	○	●	○	○	

- jeu en coffret, composé des n° de catalogue 62347 Ø 6,30 / 8,30 / 10,40 / 12,40 / 16,50 / 20,50 mm
- outils universels d'ébavurage et de chanfreinage, par exemple pour les perçages avant filetages
- détalonnage radial
- 3 dents

Référence **62399**

N° de code	d1 mm	Pièce/jeu
8,000	6,30-20,50	6

Fraises à chanfreiner en HSS

Fraises à lamer avec pilote, tolérance fine

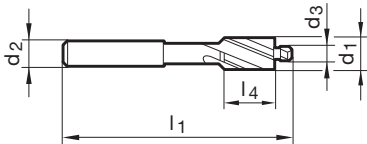


Référence **72304**



P	M	K	N	S	H
●	○	●	●	○	

- avec pilote fixe
- goujures hélicoïdales à droite



d1 mm	d2 mm	d3 mm	l1 mm	l4 mm	G	Z	N° de code
6,000	5,000	3,200	71,000	14,000	M 3	3	6,000
8,000	5,000	4,300	71,000	14,000	M 4	3	8,000
10,000	8,000	5,300	80,000	18,000	M 5	3	10,000
11,000	8,000	6,400	80,000	18,000	M 6	3	11,000
15,000	12,500	8,400	100,000	22,000	M 8	3	15,000
18,000	12,500	10,500	100,000	22,000	M 10	3	18,000
20,000	12,500	13,000	100,000	22,000	M 12	3	20,000

Fraises à chanfreiner en HSS

Fraises à lamer avec pilote, tolérance moyenne

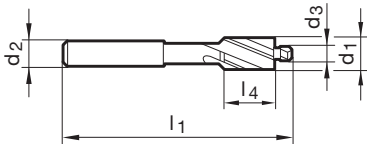


Référence **72305**



P	M	K	N	S	H
●	○	●	●	○	

- avec pilote fixe
- goujures hélicoïdales à droite
- pour lamage/chanfreinage DIN 974, partie1



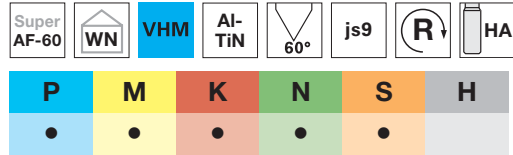
d1 mm	d2 mm	d3 mm	l1 mm	l6 mm	d1	Z	N° de code
6,000	5,000	3,400	71,000	14,000	M 3	3	6,000
8,000	5,000	4,500	71,000	14,000	M 4	3	8,000
10,000	8,000	5,500	80,000	18,000	M 5	3	10,000
11,000	8,000	6,600	80,000	18,000	M 6	3	11,000
15,000	12,500	9,000	100,000	22,000	M 8	3	15,000
18,000	12,500	11,000	100,000	22,000	M 10	3	18,000

Outils à ébavurer et à chanfreiner

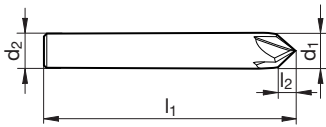
Fraises à ébavurer 60°



Référence **53393**



- Fraises à ébavurer et à chanfreiner, par exemple pour l'usinage des entrées de perçages avec un chanfrein à 60°



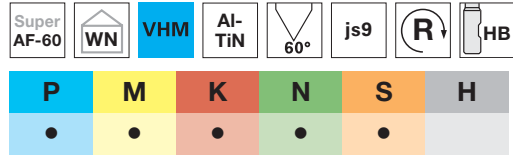
d1 js9 mm	d2 h6 mm	l1 mm	l2 mm	Z	N° de code
4,000	4,000	50,000	3,500	4	4,000
6,000	6,000	57,000	5,200	4	6,000
8,000	8,000	63,000	7,000	4	8,000
10,000	10,000	72,000	8,700	4	10,000
12,000	12,000	83,000	10,400	4	12,000

Outils à ébavurer et à chanfreiner

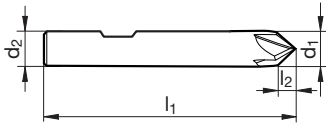
Fraises à ébavurer 60°



Référence **53394**



• Fraises à ébavurer et à chanfreiner, par exemple pour l'usinage des entrées de perçages avec un chanfrein à 60°



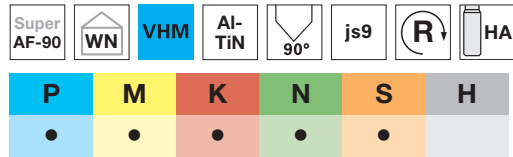
d1 js9 mm	d2 h6 mm	l1 mm	l2 mm	Z	N° de code
6,000	6,000	57,000	5,200	4	6,000
8,000	8,000	63,000	7,000	4	8,000
10,000	10,000	72,000	8,700	4	10,000
12,000	12,000	83,000	10,400	4	12,000

Outils à ébavurer et à chanfreiner

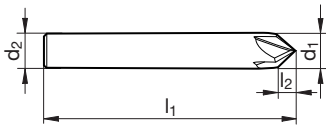
Fraises à ébavurer 90°



Référence **53395**



• Fraise(s) à ébavurer et à chanfreiner, par exemple pour l'usinage des entrées de perçages avec un chanfrein à 90°



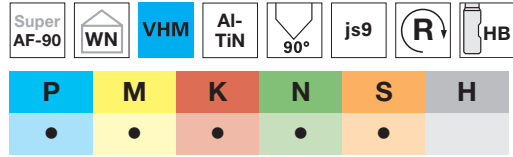
d1 js9 mm	d2 h6 mm	l1 mm	l2 mm	Z	N° de code
4,000	4,000	50,000	2,000	4	4,000
6,000	6,000	57,000	3,000	4	6,000
8,000	8,000	63,000	4,000	4	8,000
10,000	10,000	72,000	5,000	4	10,000
12,000	12,000	83,000	6,000	4	12,000

Outils à ébavurer et à chanfreiner

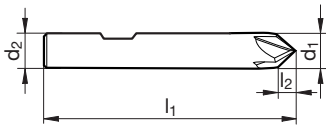
Fraises à ébavurer 90°



Référence **53396**



• Fraise(s) à ébavurer et à chanfreiner, par exemple pour l'usinage des entrées de perçages avec un chanfrein à 90°



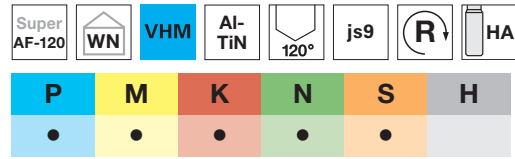
d1 js9 mm	d2 h6 mm	l1 mm	l2 mm	Z	N° de code
4,000	4,000	50,000	2,000	4	4,000
6,000	6,000	57,000	3,000	4	6,000
8,000	8,000	63,000	4,000	4	8,000
10,000	10,000	72,000	5,000	4	10,000
12,000	12,000	83,000	6,000	4	12,000

Outils à ébavurer et à chanfreiner

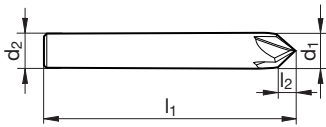
Fraises à ébavurer 120°



Référence **53397**



• Fraise(s) à ébavurer et à chanfreiner, par exemple pour l'usinage des entrées de perçages avec un chanfrein à 120°



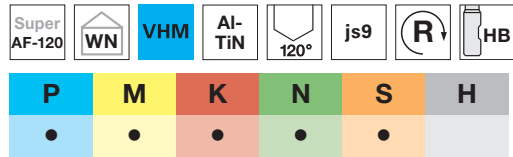
d1 js9 mm	d2 h6 mm	l1 mm	l2 mm	Z	N° de code
4,000	4,000	50,000	1,200	4	4,000
6,000	6,000	57,000	1,800	4	6,000
8,000	8,000	63,000	2,400	4	8,000
10,000	10,000	72,000	2,900	4	10,000
12,000	12,000	83,000	3,500	4	12,000

Outils à ébavurer et à chanfreiner

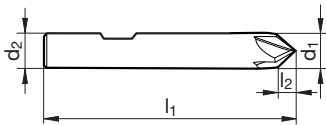
Fraises à ébavurer 120°



Référence **53398**



- Fraise(s) à ébavurer et à chanfreiner, par exemple pour l'usinage des entrées de perçages avec un chanfrein à 120°



d1 js9 mm	d2 h6 mm	l1 mm	l2 mm	Z	N° de code
6,000	6,000	57,000	1,800	4	6,000
8,000	8,000	63,000	2,400	4	8,000
10,000	10,000	72,000	2,900	4	10,000
12,000	12,000	83,000	3,500	4	12,000

Outils à ébavurer et à chanfreiner

Ebavureur avant et arrière 90°

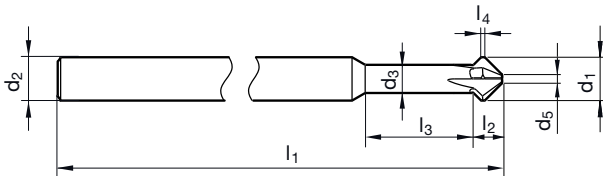


Référence **52365**



P	M	K	N	S	H
•	•				

- outils de chanfreinage et d'ébavurage pour l'usinage des entrées et sorties de perçages avec un angle de chanfreinage à 90°
- pour les mandrins hydrauliques et mandrins à fretter
- avec attachement selon DIN 6535



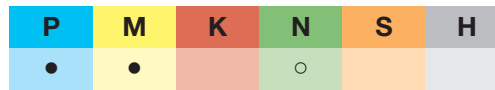
d1 mm	d2 h6 mm	d3 mm	d5 mm	l1 mm	l2 mm	l3 mm	l4 mm	Z	N° de code
3,000	4,000	2,200	0,600	75,000	2,10	9,300	0,500	4	3,000
4,000	4,000	2,900	0,800	75,000	2,70	12,300	0,500	4	4,000
5,000	5,000	3,900	1,000	75,000	3,00	15,000	0,500	4	5,000
6,000	6,000	3,900	1,200	100,000	3,90	14,300	0,500	4	6,000
8,000	6,000	6,000	1,600	100,000	4,70		0,500	4	8,000
10,000	6,000	6,000	2,000	100,000	6,50		0,500	4	10,000
12,000	6,000	6,000	2,400	100,000	8,30		0,500	4	12,000

Outils à ébavurer et à chanfreiner

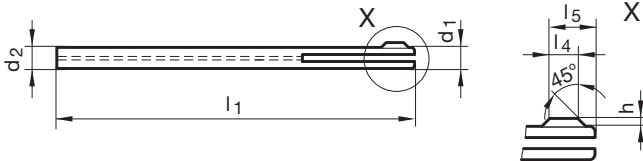
Outils d'ébavurage



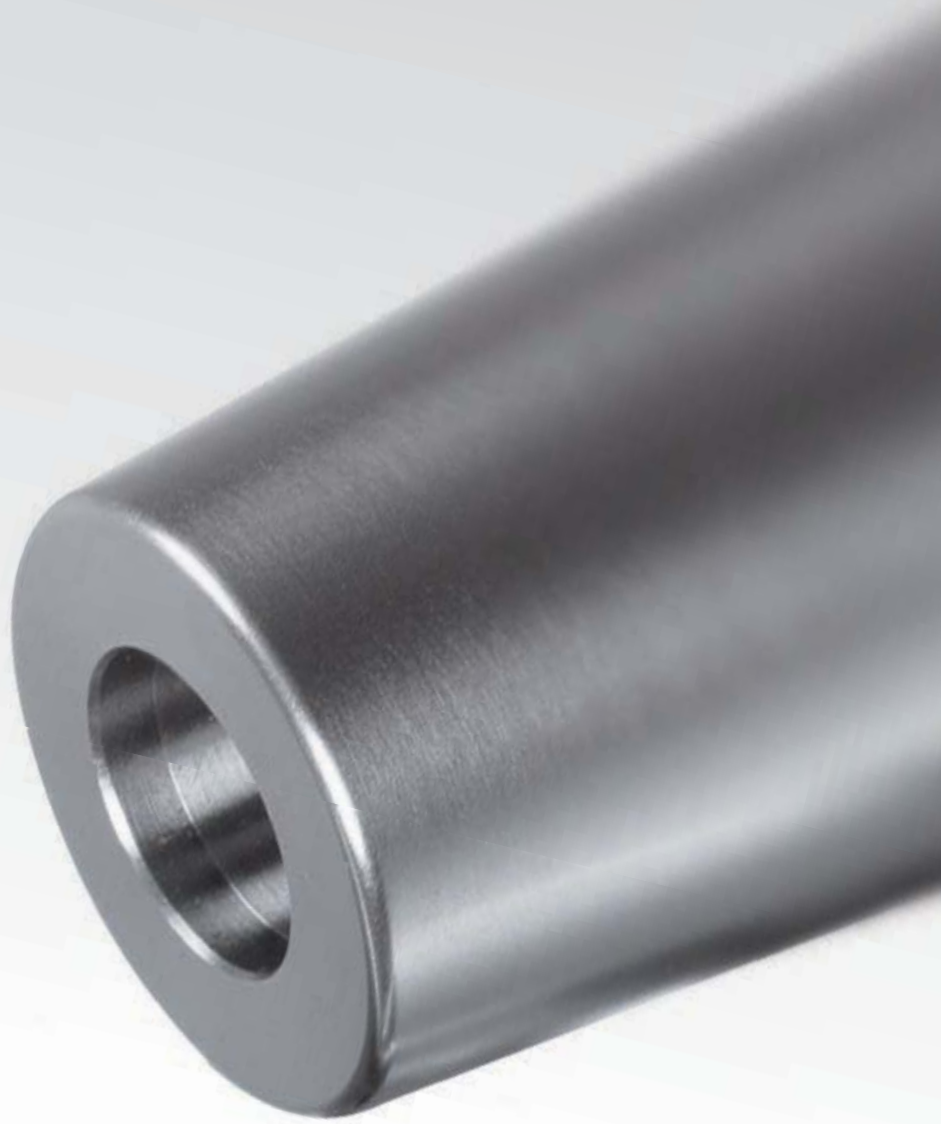
Référence **52360**



- outil d'ébarbage pour l'usinage d'entrées et de sorties de perçages ainsi que pour perçages latéraux.
- avec attachement selon DIN 6535
- avec diam. d'attach. cyl. identique au diam. nominal, pour les pinces de serrage
- avec lubrification intér.
- pour applications universelles







N° de code	Capacité Ø mm	d1 mm	d2 mm	l1 mm	l4 mm	l5 mm	h mm
2,000	1,91 -2,15	1,900	1,900	80,000	1,000	2,050	0,350
2,250	2,16 -2,40	2,100	2,100	80,000	1,500	2,600	0,400
2,500	2,41 -2,70	2,400	2,400	80,000	1,500	2,900	0,400
2,750	2,71 -2,90	2,600	2,600	90,000	1,500	2,950	0,450
3,000	2,91 -3,25	2,900	2,900	90,000	2,000	3,650	0,450
3,500	3,26 -3,60	3,200	3,200	90,000	2,000	3,800	0,600
4,000	3,61 -4,25	3,600	3,600	90,000	2,000	4,100	0,700
4,500	4,26 -4,75	4,200	4,200	90,000	2,500	4,600	0,700
5,000	4,76 -5,30	4,700	4,700	100,000	2,500	4,850	0,750
5,500	5,31 -5,80	5,200	5,200	100,000	2,500	4,850	0,750
6,000	5,81 -6,20	5,600	5,600	110,000	3,000	5,800	0,800
6,500	6,21 -6,70	6,000	6,000	110,000	3,000	5,900	0,900
7,000	6,71 -7,10	6,500	6,500	110,000	3,000	5,850	0,850
7,500	7,11 -7,60	6,900	6,900	110,000	3,500	6,950	0,950
8,000	7,61 -8,05	7,300	7,300	110,000	3,500	7,000	1,000








ATTACHEMENTS D'OUTILS

Attachements d'outils

		ISO DIN 69871	MAS/BT JIS B6339	HSK-A DIN 69893
Mandrin hydraulique		78213 , p. 749	78221 , p. 750	78299 , p. 748
Mandrin à serrage par frettage		78738 , p. 755 78729 avec lubrification périphérique, p. 756	78739 , p. 757	78736 , p. 753 78755 avec lubrification périphérique, p. 754
Attachements cylindriques „Weldon“/ „Whistle-Notch“		78317 Weldon, p. 760 78322 Whistle-Notch, p. 761	78234 Weldon, p. 763 78233 Whistle-Notch, p. 762	78232 Weldon, p. 758 78334 Whistle-Notch, p. 759
Mandrins de taraudage		* 78326 Mandrin de taraudage synchro avec attachement cylindrique et avec lub. centrale, p. 767 * 78340 Mandrin de tar. à changement rapide sans lub. centrale , p. 769	* 78326 Mandrin de taraudage synchro avec attachement cylindrique et avec lub. centrale, p. 767 * 78340 Mandrin de tar. à changement rapide sans lub. centrale , p. 769	* 78326 Mandrin de taraudage synchro avec attachement cylindrique et avec lub. centrale, p. 767 * 78340 Mandrin de tar. à changement rapide sans lub. centrale , p. 769

*combiné avec l'attachement cylindrique adéquat ou avec l'attachement de base

	Mandrin à serrage par frettage	Mandrin hydraulique	Mandrin de serrage „Weldon“ / „Whistle-Notch“
Mandrins de serrage / attachements d'outils pour les attachements cylindriques			
Propriétés	Grande coaxialité; très faible encombrement; grande rigidité; grande force de serrage; longueurs modulaires; vis d'amortissement patentée garantit une coaxialité optimale	Un grand amortissement avec une excellente coaxialité; facilité d'utilisation, flexibilité avec les douilles de réduction, disponible également avec la lubrification périphérique	Mandrin de serrage à excellent rapport qualité/prix et robuste; pour des usinages lourds à couple et précision réduits
Applications	Forage, chanfreinage, fraisage, alésage; pour des usinages universels et avec une grande précision	Surtout pour des usinages axiaux tels que forage, chanfreinage et alésage; pour des usinages universels et à grandes vitesses; fraisage doux	Operations d'ébauchage; forage et fraisage
Propriétés principales	Précision, universel, faible encombrement avec une grande force de serrage	Précision, facilité d'utilisation	Facilité d'utilisation, sûreté de serrage
Coaxialité à la base	< 3µm	< 3µm	< 10µm
à 5xD	< 5µm	< 5µm	< 25µm
Force de serrage	très forte	très forte	très sûre
Rigidité	très forte	forte	très forte
Amortissement	faible	très fort	faible
Encombrement	faible	moyen	important
Facilité d'utilisation	facile	très facile / très flexible	facile
Utilisation	Machine de frettage	Clé allen	Clé allen

Mandrins hydrauliques

Mandrin hydraulique HSK-A à serrage renforcé

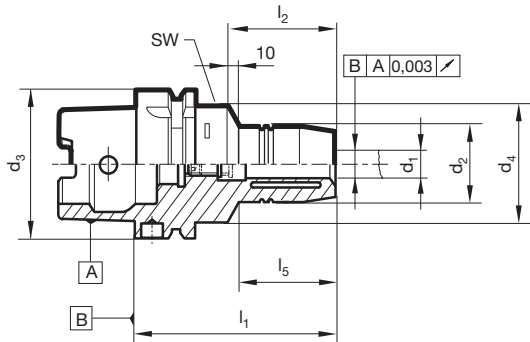


Référence **78299**

DIN
69882-7

poli

- qualité d'équilibrage: G 2,5 / 25 000 Tr./mn
- réglage axial des longueurs
- approprié pour les outils avec adduction intérieure du produit de lubrification et de refroidissement
- pour les attachements d'outils avec une tolérance h6
- surlongueurs l1 = 150 mm, 160 mm (erreur de battement 5 µm) et 200 mm (erreur de battement 7 µm)
- HSK - A selon Norme ISO 12164 - 1 / DIN 69893 - 1
- Contenu de la livraison:
 - y compris vis de réglage
 - y compris clé de serrage
 - à commander séparément, ensemble adducteur de lubrification



d3	d1 mm	d2 mm	d4 mm	l1 mm	l2 mm	l5 mm	SW mm	kg	N° de code
HSK-A 63	6,000	26,000	50,000	70,000	37,000	24,000	5,0	1,000	6,063
HSK-A 63	8,000	28,000	50,000	70,000	37,000	24,000	5,0	1,056	8,063
HSK-A 63	10,000	30,000	50,000	80,000	41,000	35,000	5,0	1,000	10,063
HSK-A 63	12,000	32,000	50,000	85,000	46,000	40,000	5,0	1,100	12,063
HSK-A 63	14,000	34,000	50,000	85,000	46,000	40,000	5,0	1,100	14,063
HSK-A 63	16,000	38,000	50,000	90,000	49,000	46,000	5,0	1,200	16,063
HSK-A 63	18,000	40,000	50,000	90,000	49,000	47,000	5,0	1,275	18,063
HSK-A 63	20,000	42,000	50,000	90,000	51,000	48,000	5,0	1,200	20,063
HSK-A 63	25,000	57,000	63,000	120,000	57,000	59,000	6,0	2,100	25,063
HSK-A 63	32,000	64,000	75,000	125,000	61,000	63,000	6,0	2,400	32,063
HSK-A 100	6,000	26,000	50,000	75,000	37,000	26,000	5,0	2,400	6,100
HSK-A 100	8,000	28,000	50,000	75,000	37,000	26,000	5,0	2,400	8,100
HSK-A 100	10,000	30,000	50,000	90,000	41,000	42,000	5,0	2,500	10,100
HSK-A 100	12,000	32,000	50,000	95,000	46,000	47,000	5,0	2,500	12,100
HSK-A 100	14,000	34,000	50,000	95,000	46,000	47,000	5,0	2,500	14,100
HSK-A 100	16,000	38,000	50,000	100,000	49,000	53,000	5,0	2,755	16,100
HSK-A 100	18,000	40,000	50,000	100,000	49,000	53,000	5,0	2,700	18,100
HSK-A 100	20,000	42,000	75,000	105,000	51,000	59,000	5,0	3,200	20,100
HSK-A 100	25,000	57,000	75,000	110,000	57,000	62,000	6,0	3,300	25,100
HSK-A 100	32,000	64,000	75,000	110,000	61,000	62,000	6,0	3,800	32,100

Mandrins hydrauliques

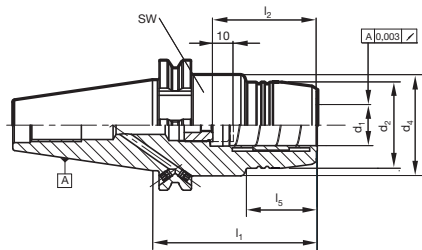
Mandrin hydraulique SA à serrage renforcé



Référence **78213**



- cône SA selon Norme DIN ISO 7388 - 1 Forme AD / AF
- avec perçages forme B, obturés avec vis pointeau lors de la livraison
- qualité d'équilibrage: G 2,5 / 25 000 Tr./mn
- réglage axial des longueurs
- pour les attachements d'outils avec une tolérance h6
- approprié pour les outils avec adduction intérieure du produit de lubrification et de refroidissement
- Contenu de la livraison:
 - y compris vis de réglage
 - y compris clé de serrage
 - à commander séparément, tirette



d3	d1 mm	d2 mm	d4 mm	l1 mm	l2 mm	l5 mm	SW mm	kg	N° de code
SK 40	6,000	26,000	49,500	80,500	37,000	29,500	5,0	1,500	6,040
SK 40	8,000	28,000	49,500	80,500	37,000	30,000	5,0	1,500	8,040
SK 40	10,000	30,000	49,500	80,500	41,000	31,000	5,0	1,396	10,040
SK 40	12,000	32,000	49,500	80,500	46,000	31,500	5,0	1,500	12,040
SK 40	14,000	34,000	49,500	80,500	46,000	31,500	5,0	1,500	14,040
SK 40	16,000	38,000	49,500	80,500	49,000	33,000	5,0	1,500	16,040
SK 40	18,000	40,000	49,500	80,500	49,000	33,000	5,0	1,500	18,040
SK 40	20,000	49,500	49,500	64,500	51,000		5,0	1,500	20,040
SK 40	20,000	42,000	49,500	80,500	51,000	34,000	5,0	1,500	20,140
SK 50	12,000	32,000	49,500	80,500	46,000	31,500	5,0	3,500	12,050
SK 50	20,000	42,000	49,500	80,500	51,000	34,000	5,0	4,000	20,050
SK 50	32,000	72,000	72,000	81,000	61,000		6,0	4,000	32,050

Mandrins hydrauliques

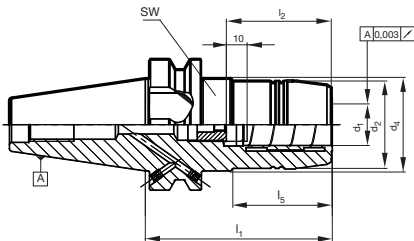
Mandrin hydraulique MAS/BT à serrage renforcé



Référence **78221**



- qualité d'équilibrage: G 2,5 / 25 000 Tr./mn
- réglage axial des longueurs
- pour les attachements d'outils avec une tolérance h6
- approprié pour les outils avec adduction intérieure du produit de lubrification et de refroidissement
- cône MAS / BT selon Norme DIN ISO 7388 - 2 Forme JD / JF (Forme AD / B)
- Contenu de la livraison:
- y compris vis de réglage
- y compris clé de serrage
- à commander séparément, tirette



d3	Forme	d1 mm	d2 mm	d4 mm	l1 mm	l2 mm	l5 mm	SW mm	kg	N° de code
BT 40	JD/JF	6,000	26,000	44,500	90,000	37,000	43,000	5,0	1,500	6,040
BT 40	JD/JF	8,000	28,000	44,500	90,000	37,000	44,500	5,0	1,500	8,040
BT 40	JD/JF	10,000	30,000	44,500	90,000	41,000	44,500	5,0	1,500	10,040
BT 40	JD/JF	12,000	32,000	44,500	90,000	46,000	44,500	5,0	1,500	12,040
BT 40	JD/JF	14,000	34,000	44,500	90,000	46,000	44,500	5,0	1,500	14,040
BT 40	JD/JF	16,000	38,000	44,500	90,000	49,000	47,500	5,0	1,500	16,040
BT 40	JD/JF	18,000	40,000	44,500	90,000	49,000	47,500	5,0	1,500	18,040
BT 40	JD/JF	20,000	49,500	49,500	72,500	51,000		5,0	1,500	20,040
BT 40	JD/JF	20,000	42,000	44,500	90,000	51,000	47,500	5,0	1,483	20,140
BT 50	JD/JF	12,000	32,000	44,500	90,000	46,000	34,000	5,0	4,000	12,050
BT 50	JD/JF	20,000	42,000	44,500	90,000	51,000	34,000	5,0	4,000	20,050
BT 50	JD/JF	32,000	72,000	72,000	90,000	61,000		6,0	4,000	32,050

Mandrins hydrauliques

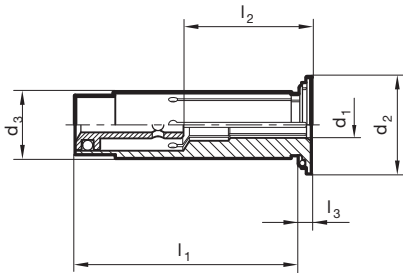
Douille de réduction p. mandrin hydraul. sans lubr. périphérique



Référence **78368**



- pour le serrage des attachements de plus petits diamètres dans les mandrins à serrage hydraulique
- diamètre de serrage prévu pour les attachements d'outils avec une tolérance h6
- partie frontale obturée donc, étanchéité du produit de lubrification et de refroidissement jusqu'à une pression de 80 bars
- erreur de battement $\leq 2 \mu\text{m}$
- avec butée réglable
- lors de l'utilisation avec des douilles de réduction, le couple d'entraînement admis peut être augmenté d'environ 25% par rapport au serrage direct
- Contenu de la livraison:
- y compris élément de butée



d3 mm	d1 mm	d2 mm	l1 mm	l3 mm	l2 mm	N° de code
12,000	3,000	16,500	45,000	2,000	26,500	3,012
12,000	4,000	16,500	45,000	2,000	26,500	4,012
12,000	6,000	16,500	45,000	2,000	34,500	6,012
12,000	8,000	16,500	45,000	2,000	34,500	8,012
20,000	3,000	24,100	50,500	2,000	28,500	3,020
20,000	4,000	24,100	50,500	2,000	28,500	4,020
20,000	6,000	24,100	50,500	2,000	37,500	6,020
20,000	8,000	24,100	50,500	2,000	37,500	8,020
20,000	10,000	24,100	50,500	2,000	42,500	10,020
20,000	12,000	24,100	50,500	2,000	47,500	12,020
20,000	14,000	24,100	50,500	2,000	47,500	14,020
20,000	16,000	24,100	50,500	2,000	47,500	16,020
32,000	6,000	35,500	60,500	3,000	35,500	6,032
32,000	8,000	35,500	60,500	3,000	35,500	8,032
32,000	10,000	35,500	60,500	3,000	40,500	10,032
32,000	12,000	35,500	60,500	3,000	42,500	12,032
32,000	14,000	35,500	60,500	3,000	42,500	14,032
32,000	16,000	35,500	60,500	3,000	50,500	16,032
32,000	18,000	35,500	60,500	3,000	50,500	18,032
32,000	20,000	35,500	60,500	3,000	50,500	20,032
32,000	25,000	35,500	60,500	3,000	58,500	25,032

Mandrins hydrauliques

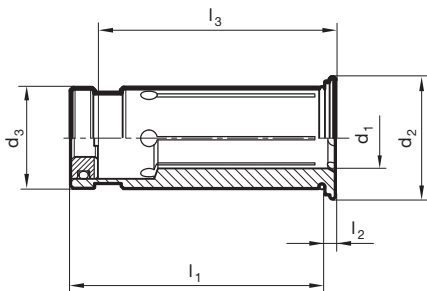
Douilles de réduction pour mandrins hydrauliques



Référence **78369**



- pour le serrage des attachements de plus petits diamètres dans les mandrins à serrage hydraulique
- diamètre de serrage prévu pour les attachements d'outils avec une tolérance h6
- avec rainures longitudinales sur la périphérie de l'attachement afin d'assurer l'adduction du produit de lubrification et de refroidissement, ce qui signifie amélioration du procédé de fabrication et augmentation de la tenue de coupe des outils
- erreur de battement $\leq 2 \mu\text{m}$
- avec butée réglable
- lors de l'utilisation avec des douilles de réduction, le couple d'entraînement admis peut être augmenté d'environ 25% par rapport au serrage direct
- Contenu de la livraison:
- y compris élément de butée



d3 mm	d1 mm	d2 mm	l1 mm	l3 mm	l2 mm	N° de code
12,000	3,000	16,500	45,000	2,000	26,500	3,012
12,000	4,000	16,500	45,000	2,000	26,500	4,012
12,000	6,000	16,500	45,000	2,000	34,500	6,012
12,000	8,000	16,500	45,000	2,000	34,500	8,012
20,000	3,000	24,100	50,500	2,000	28,500	3,020
20,000	4,000	24,100	50,500	2,000	28,500	4,020
20,000	6,000	24,100	50,500	2,000	37,500	6,020
20,000	8,000	24,100	50,500	2,000	37,500	8,020
20,000	10,000	24,100	50,500	2,000	42,500	10,020
20,000	12,000	24,100	50,500	2,000	47,500	12,020
20,000	14,000	24,100	50,500	2,000	47,500	14,020
20,000	16,000	24,100	50,500	2,000	47,500	16,020
32,000	6,000	35,500	60,500	3,000	35,500	6,032
32,000	8,000	35,500	60,500	3,000	35,500	8,032
32,000	10,000	35,500	60,500	3,000	40,500	10,032
32,000	12,000	35,500	60,500	3,000	42,500	12,032
32,000	14,000	35,500	60,500	3,000	42,500	14,032
32,000	16,000	35,500	60,500	3,000	50,500	16,032
32,000	18,000	35,500	60,500	3,000	50,500	18,032
32,000	20,000	35,500	60,500	3,000	50,500	20,032
32,000	25,000	35,500	60,500	3,000	58,500	25,032

Mandrins à serrage par frettage

Mandrin à serrage par frettage HSK-A

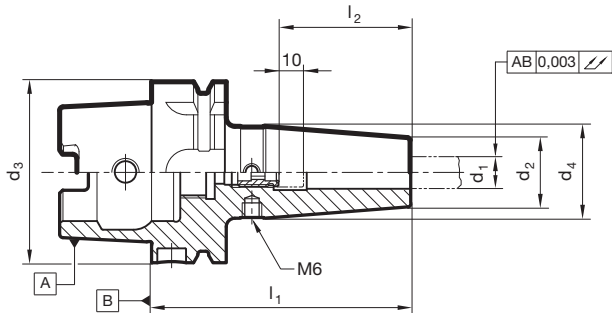


Référence **78736**

DIN
69882-8

poli

- qualité d'équilibrage: G 2,5 / 25 000 Tr./mn ou U < 1 gmm
- y compris filetages pour les vis d'équilibrages 4 x M 6 / 6 x M 6
- pour les attachements d'outils avec une tolérance h6
- surlongueurs l1 = 120 mm, 160 mm (erreur de battement 5 µm) et 200 mm (erreur de battement 7 µm)
- HSK - A selon Norme ISO 12164 - 1 / DIN 69893 - 1
- approprié pour les outils avec adduction intérieure du produit de lubrification et de refroidissement
- Contenu de la livraison:
- y compris vis de réglage
- pour l'adduction conventionnelle du produit de lubrification et de refroidissement, à commander séparément, ensemble adducteur de lubrification



d3	d1 mm	d2 mm	d4 mm	l1 mm	l2 ± mm	kg	N° de code
HSK-A 63	3,000	10,000	18,000	80,000	30,000	0,700	3,063
HSK-A 63	4,000	10,000	18,000	80,000	35,000	0,700	4,063
HSK-A 63	6,000	21,000	27,000	80,000	36,000	0,800	6,063
HSK-A 63	8,000	21,000	27,000	80,000	36,000	0,800	8,063
HSK-A 63	10,000	24,000	32,000	85,000	41,000	0,900	10,063
HSK-A 63	12,000	24,000	32,000	90,000	46,000	0,945	12,063
HSK-A 63	14,000	27,000	34,000	90,000	46,000	1,000	14,063
HSK-A 63	16,000	27,000	34,000	95,000	49,000	1,000	16,063
HSK-A 63	18,000	33,000	42,000	95,000	49,000	1,200	18,063
HSK-A 63	20,000	33,000	42,000	100,000	51,000	1,200	20,063
HSK-A 63	25,000	44,000	53,000	115,000	57,000	1,800	25,063
HSK-A 63	32,000	44,000	53,000	120,000	61,000	1,700	32,063
HSK-A 100	6,000	21,000	27,000	85,000	36,000	2,200	6,100
HSK-A 100	8,000	21,000	27,000	85,000	36,000	2,200	8,100
HSK-A 100	10,000	24,000	32,000	90,000	41,000	2,300	10,100
HSK-A 100	12,000	24,000	32,000	95,000	46,000	2,300	12,100
HSK-A 100	14,000	27,000	34,000	95,000	46,000	2,300	14,100
HSK-A 100	16,000	27,000	34,000	100,000	49,000	2,300	16,100
HSK-A 100	18,000	33,000	42,000	100,000	49,000	2,500	18,100
HSK-A 100	20,000	33,000	42,000	105,000	51,000	2,500	20,100
HSK-A 100	25,000	44,000	53,000	115,000	57,000	3,000	25,100
HSK-A 100	32,000	44,000	53,000	120,000	61,000	3,000	32,100

Mandrins à serrage par frettage

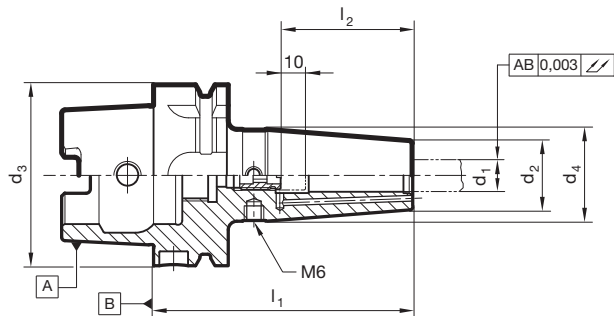
Mandrins à fretter HSK A avec refroidissement périphérique



Référence **78755**



- qualité d'équilibrage: G 2,5 / 25 000 Tr./mn ou U < 1 gmm
- y compris filetages pour les vis d'équilibrages 4 x M 6 / 6 x M 6
- pour les attachements d'outils avec une tolérance h6
- canaux de lubrification: d1 = 6,00 à 10,00 mm avec 2 canaux d'adduction et d1 = 12,00 à 32,00 mm avec 4 canaux d'adduction
- HSK - A selon Norme ISO 12164 - 1 / DIN 69893 - 1
- aussi approprié pour les outils avec adduction intérieure du produit de lubrification et de refroidissement
- Contenu de la livraison:
- y compris vis de réglage
- pour l'adduction conventionnelle du produit de lubrification et de refroidissement, à commander séparément, ensemble adducteur de lubrification



d3	d1 mm	d2 mm	d4 mm	l1 mm	l2 ± mm	kg	N° de code
HSK-A 63	6,000	21,000	27,000	80,000	36,000	0,859	6,063
HSK-A 63	8,000	21,000	27,000	80,000	36,000	0,800	8,063
HSK-A 63	10,000	24,000	32,000	85,000	41,000	0,927	10,063
HSK-A 63	12,000	24,000	32,000	90,000	46,000	0,938	12,063
HSK-A 63	14,000	27,000	34,000	90,000	46,000	0,985	14,063
HSK-A 63	16,000	27,000	34,000	95,000	49,000	0,999	16,063
HSK-A 63	18,000	33,000	42,000	95,000	49,000	1,167	18,063
HSK-A 63	20,000	33,000	42,000	100,000	51,000	1,191	20,063
HSK-A 100	6,000	21,000	27,000	85,000	36,000	2,200	6,100
HSK-A 100	8,000	21,000	27,000	85,000	36,000	2,200	8,100
HSK-A 100	10,000	24,000	32,000	90,000	41,000	2,300	10,100
HSK-A 100	12,000	24,000	32,000	95,000	46,000	2,300	12,100
HSK-A 100	14,000	27,000	34,000	95,000	46,000	2,300	14,100
HSK-A 100	16,000	27,000	34,000	100,000	49,000	2,300	16,100
HSK-A 100	18,000	33,000	42,000	100,000	49,000	2,500	18,100
HSK-A 100	20,000	33,000	42,000	105,000	51,000	2,500	20,100
HSK-A 100	25,000	44,000	53,000	115,000	57,000	3,000	25,100
HSK-A 100	32,000	44,000	53,000	120,000	61,000	3,000	32,100

Mandrins à serrage par frettage

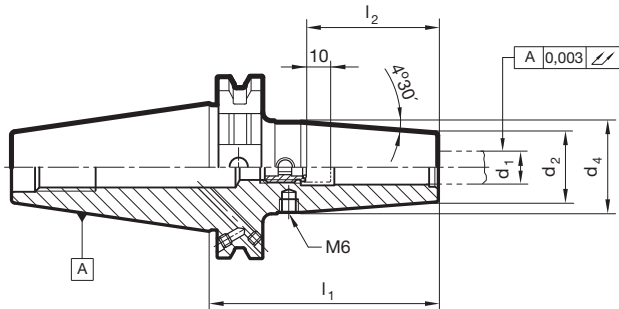
Mandrin à serrage par frettage SA



Référence **78738**



- qualité d'équilibrage: G 2,5 / 25 000 Tr./mn ou U < 1 gmm
- y compris filetages pour les vis d'équilibrages 4 x M 6 / 6 x M 6
- cône SA selon Norme DIN ISO 7388 - 1 Forme AD / AF
- pour les attachements d'outils avec une tolérance h6
- surlongueurs l1 = 120 mm, 160 mm (erreur de battement 5 µm) et 200 mm (erreur de battement 7 µm)
- approprié pour les outils avec adduction intérieure du produit de lubrification et de refroidissement
- Contenu de la livraison:
- y compris vis de réglage
- à commander séparément, tirette



d3	d1 mm	d2 mm	d4 mm	l1 mm	l2 ± mm	kg	N° de code
SK 40	3,000	10,000	18,000	80,000	30,000	0,900	3,040
SK 40	4,000	10,000	18,000	80,000	35,000	0,900	4,040
SK 40	6,000	21,000	27,000	80,000	36,000	1,000	6,040
SK 40	8,000	21,000	27,000	80,000	36,000	1,000	8,040
SK 40	10,000	24,000	32,000	80,000	41,000	1,100	10,040
SK 40	12,000	24,000	32,000	81,600	46,000	1,000	12,040
SK 40	14,000	27,000	34,000	81,800	46,000	1,100	14,040
SK 40	16,000	27,000	34,000	82,000	49,000	1,100	16,040
SK 40	18,000	33,000	42,000	82,300	49,000	1,200	18,040
SK 40	20,000	33,000	42,000	82,600	51,000	1,500	20,040
SK 40	25,000	44,000	53,000	103,100	57,000	1,500	25,040
SK 40	32,000	44,000	53,000	100,000	61,000	1,500	32,040
SK 50	3,000	10,000	18,000	80,000	30,000	2,600	3,050
SK 50	4,000	10,000	18,000	80,000	35,000	2,600	4,050
SK 50	6,000	21,000	27,000	80,000	36,000	2,900	6,050
SK 50	8,000	21,000	27,000	80,000	36,000	2,900	8,050
SK 50	10,000	24,000	32,000	80,000	41,000	2,900	10,050
SK 50	12,000	24,000	32,000	81,600	46,000	2,900	12,050
SK 50	14,000	27,000	34,000	81,800	46,000	3,000	14,050
SK 50	16,000	27,000	34,000	82,000	49,000	3,000	16,050
SK 50	18,000	33,000	42,000	82,300	49,000	3,000	18,050
SK 50	20,000	33,000	42,000	82,600	51,000	3,000	20,050
SK 50	25,000	44,000	53,000	103,100	57,000	3,600	25,050
SK 50	32,000	44,000	53,000	100,000	61,000	3,500	32,050

Mandrins à serrage par frettage

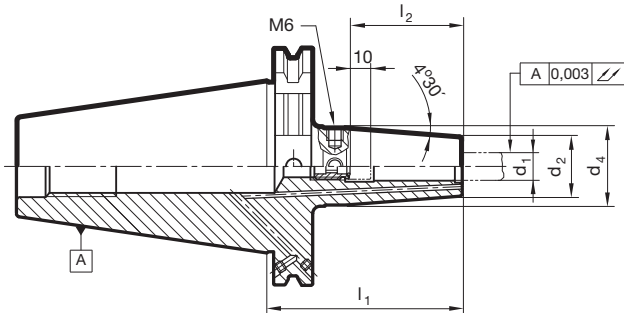
Mandrins à serrage par frettage cône ISO



Référence **78729**



- qualité d'équilibrage: G 2,5 / 25 000 Tr./mn ou U < 1 gmm
- y compris filetages pour les vis d'équilibrages 4 x M 6 / 6 x M 6
- cône SA selon Norme DIN ISO 7388 - 1 Forme AD / AF
- pour les attachements d'outils avec une tolérance h6
- canaux de lubrification: d1 = 6,00 à 10,00 mm avec 2 canaux d'adduction et d1 = 12,00 à 32,00 mm avec 4 canaux d'adduction
- aussi approprié pour les outils avec adduction intérieure du produit de lubrification et de refroidissement
- Contenu de la livraison:
- y compris vis de réglage
- à commander séparément, tirette



d3	d1 mm	d2 mm	d4 mm	l1 mm	l2 ± mm	kg	N° de code
SK 40	6,000	21,000	27,000	80,000	36,000	1,000	6,040
SK 40	8,000	21,000	27,000	80,000	36,000	1,019	8,040
SK 40	10,000	24,000	32,000	80,000	41,000	1,100	10,040
SK 40	12,000	24,000	32,000	80,000	46,000	1,000	12,040
SK 40	14,000	27,000	34,000	80,000	46,000	1,100	14,040
SK 40	16,000	27,000	34,000	80,000	49,000	1,100	16,040
SK 40	18,000	33,000	42,000	80,000	49,000	1,234	18,040
SK 40	20,000	33,000	42,000	80,000	51,000	1,500	20,040
SK 50	6,000	21,000	27,000	80,000	36,000	2,800	6,050
SK 50	8,000	21,000	27,000	80,000	36,000	2,800	8,050
SK 50	10,000	24,000	32,000	80,000	41,000	2,800	10,050
SK 50	12,000	24,000	32,000	80,000	46,000	2,800	12,050
SK 50	14,000	27,000	34,000	80,000	46,000	2,800	14,050
SK 50	16,000	27,000	34,000	80,000	49,000	2,800	16,050
SK 50	18,000	33,000	42,000	80,000	49,000	3,000	18,050
SK 50	20,000	33,000	42,000	80,000	51,000	3,000	20,050
SK 50	25,000	44,000	53,000	100,000	57,000	3,500	25,050
SK 50	32,000	44,000	53,000	100,000	61,000	3,300	32,050

Mandrins à serrage par frettage

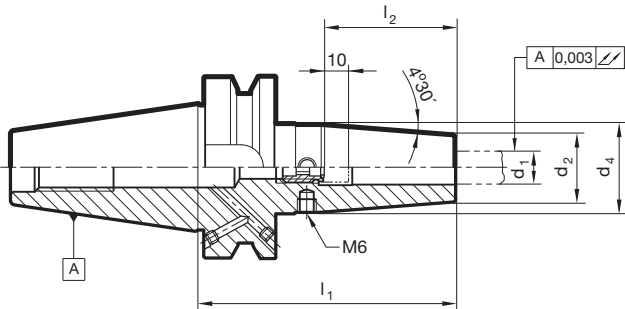
Mandrin à serrage par frettage MAS/BT



Référence **78739**



- qualité d'équilibrage: G 2,5 / 25 000 Tr./mn ou U < 1 gmm
- y compris filetages pour les vis d'équilibrages 4 x M 6 / 6 x M 6
- cône MAS / BT selon Norme DIN ISO 7388 - 2 Forme JD / JF (Forme AD / B)
- pour les attachements d'outils avec une tolérance h6
- approprié pour les outils avec adduction intérieure du produit de lubrification et de refroidissement
- Contenu de la livraison:
- y compris vis de réglage
- à commander séparément, tirette



d3	Forme	d1 mm	d2 mm	d4 mm	l1 ± mm	l2 mm	kg	N° de code
BT 40	JD/JF	3,000	10,000	18,000	85,000	30,000	1,000	3,040
BT 40	JD/JF	4,000	10,000	18,000	85,000	35,000	1,000	4,040
BT 40	JD/JF	6,000	21,000	27,000	90,000	36,000	1,200	6,040
BT 40	JD/JF	8,000	21,000	27,000	90,000	36,000	1,200	8,040
BT 40	JD/JF	10,000	24,000	32,000	90,000	41,000	1,300	10,040
BT 40	JD/JF	12,000	24,000	32,000	90,000	46,000	1,300	12,040
BT 40	JD/JF	14,000	27,000	34,000	90,000	46,000	1,400	14,040
BT 40	JD/JF	16,000	27,000	34,000	90,000	49,000	1,400	16,040
BT 40	JD/JF	18,000	33,000	42,000	90,000	49,000	1,400	18,040
BT 40	JD/JF	20,000	33,000	42,000	90,000	51,000	1,700	20,040
BT 40	JD/JF	25,000	44,000	53,000	100,000	57,000	1,800	25,040
BT 40	JD/JF	32,000	44,000	53,000	100,000	61,000	1,700	32,040
BT 50	JD/JF	6,000	21,000	27,000	100,000	36,000	2,900	6,050
BT 50	JD/JF	8,000	21,000	27,000	100,000	36,000	2,900	8,050
BT 50	JD/JF	10,000	24,000	32,000	100,000	41,000	2,900	10,050
BT 50	JD/JF	12,000	24,000	32,000	100,000	46,000	2,900	12,050
BT 50	JD/JF	14,000	27,000	34,000	100,000	46,000	3,000	14,050
BT 50	JD/JF	16,000	27,000	34,000	100,000	49,000	3,000	16,050
BT 50	JD/JF	18,000	33,000	42,000	100,000	49,000	1,900	18,050
BT 50	JD/JF	20,000	33,000	42,000	100,000	51,000	1,900	20,050
BT 50	JD/JF	25,000	44,000	53,000	110,000	57,000	2,200	25,050
BT 50	JD/JF	32,000	44,000	53,000	110,000	61,000	2,200	32,050

Attachements d'outils

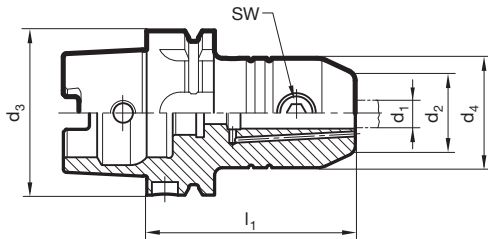
Attachements Weldon HSK-A pour attachements cyl.



Référence **78232**



- qualité d'équilibrage: G 6,3 / 15 000 Tr./mn
- pour les attachements d'outils avec une tolérance h6
- avec alésage cylindrique pour attachements Forme B selon Norme DIN 1835 «Weldon»
- à partir d'un Ø d'attachement d1 = 25,00 mm, avec deux vis de serrage
- avec canaux d'adduction du produit de lubrification et de refroidissement pour arrosage périphérique, afin d'assurer de meilleurs rendements et tenues de coupe des outils
- canaux de lubrification: d1 = 6,00 à 14,00 mm avec 2 canaux d'adduction et d1 = 16,00 à 40,00 mm avec 4 canaux d'adduction
- HSK - A selon Norme ISO 12164 - 1 / DIN 69893 - 1
- approprié pour les outils avec adduction intérieure du produit de lubrification et de refroidissement
- Contenu de la livraison:
- y compris vis de serrage
- à commander séparément, ensemble adducteur de lubrification



d3	d1 mm	d2 mm	d4 mm	l1 mm	SW ± mm	kg	N° de code
HSK-A 63	6,000	15,000	25,000	65,000	3,0	0,800	6,063
HSK-A 63	8,000	20,000	28,000	65,000	4,0	0,800	8,063
HSK-A 63	10,000	25,000	35,000	65,000	5,0	0,900	10,063
HSK-A 63	12,000	30,000	42,000	80,000	6,0	1,200	12,063
HSK-A 63	14,000	32,000	44,000	80,000	6,0	1,200	14,063
HSK-A 63	16,000	36,000	48,000	80,000	6,0	1,300	16,063
HSK-A 63	18,000	38,000	50,000	80,000	6,0	1,400	18,063
HSK-A 63	20,000	40,000	52,000	80,000	8,0	1,400	20,063
HSK-A 63	25,000	45,000	65,000	110,000	10,0	2,400	25,063
HSK-A 63	32,000	56,000	72,000	110,000	10,0	2,700	32,063
HSK-A 100	6,000	15,000	25,000	80,000	3,0	3,000	6,100
HSK-A 100	8,000	20,000	28,000	80,000	4,0	3,200	8,100
HSK-A 100	10,000	25,000	35,000	80,000	5,0	3,400	10,100
HSK-A 100	12,000	30,000	42,000	80,000	6,0	3,400	12,100
HSK-A 100	14,000	32,000	44,000	80,000	6,0	3,500	14,100
HSK-A 100	16,000	36,000	48,000	100,000	6,0	3,800	16,100
HSK-A 100	18,000	38,000	50,000	100,000	6,0	3,800	18,100
HSK-A 100	20,000	40,000	52,000	100,000	8,0	3,900	20,100
HSK-A 100	25,000	45,000	65,000	100,000	10,0	3,900	25,100
HSK-A 100	32,000	56,000	72,000	100,000	10,0	4,200	32,100
HSK-A 100	40,000	60,000	80,000	110,000	10,0	4,600	40,100

Attachements d'outils

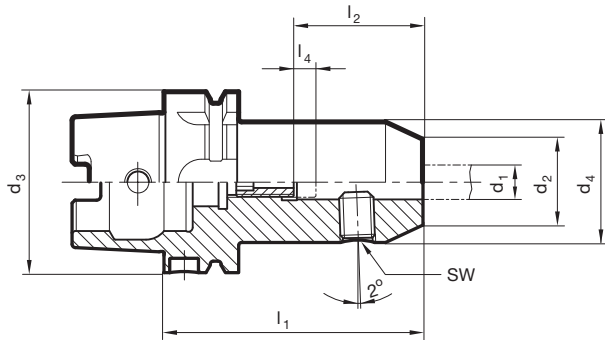
Attachements cylindriques Whistle Notch HSK-A



Référence **78334**



- qualité d'équilibrage: G 6,3 / 15 000 Tr./mn
- pour les attachements d'outils avec une tolérance h6
- avec alésage cylindrique pour attachements Forme E selon Norme DIN 1835 - 2 «Whistle Notch» avec rainure frontale pour l'identification
- à partir d'un Ø d'attachement d1 = 25,00 mm, avec deux vis de serrage
- HSK - A selon Norme ISO 12164 - 1 / DIN 69893 - 1
- approprié pour les outils avec adduction intérieure du produit de lubrification et de refroidissement
- Contenu de la livraison:
 - y compris vis de réglage et vis de serrage
 - à commander séparément, ensemble adducteur de lubrification



d3	d1 mm	d2 mm	d4 mm	l1 mm	l2 mm	l4 mm	SW mm	kg	N° de code
HSK-A 63	6,000	15,000	25,000	80,000	36,000	10,000	3,0	0,860	6,063
HSK-A 63	8,000	20,000	28,000	80,000	36,000	10,000	4,0	0,900	8,063
HSK-A 63	10,000	25,000	35,000	80,000	40,000	10,000	5,0	1,000	10,063
HSK-A 63	12,000	30,000	42,000	90,000	45,000	10,000	6,0	1,240	12,063
HSK-A 63	14,000	32,000	44,000	90,000	45,000	10,000	6,0	1,280	14,063
HSK-A 63	16,000	36,000	48,000	100,000	48,000	10,000	6,0	1,530	16,063
HSK-A 63	18,000	38,000	50,000	100,000	48,000	10,000	6,0	1,600	18,063
HSK-A 63	20,000	40,000	52,000	100,000	50,000	10,000	8,0	1,650	20,063
HSK-A 63	25,000	45,000	65,000	110,000	56,000	10,000	10,0	2,340	25,063
HSK-A 63	32,000	56,000	72,000	110,000	60,000	10,000	10,0	2,540	32,063
HSK-A 100	6,000	15,000	25,000	90,000	36,000	10,000	3,0	2,600	6,100
HSK-A 100	8,000	20,000	28,000	90,000	36,000	10,000	4,0	2,600	8,100
HSK-A 100	10,000	25,000	35,000	90,000	40,000	10,000	5,0	2,600	10,100
HSK-A 100	12,000	30,000	42,000	100,000	45,000	10,000	6,0	2,800	12,100
HSK-A 100	14,000	32,000	44,000	100,000	45,000	10,000	6,0	2,850	14,100
HSK-A 100	16,000	36,000	48,000	100,000	48,000	10,000	6,0	2,970	16,100
HSK-A 100	18,000	38,000	50,000	100,000	48,000	10,000	6,0	3,100	18,100
HSK-A 100	20,000	40,000	52,000	110,000	50,000	10,000	8,0	3,230	20,100
HSK-A 100	25,000	45,000	65,000	120,000	56,000	10,000	10,0	4,060	25,100
HSK-A 100	32,000	56,000	72,000	120,000	60,000	10,000	10,0	4,400	32,100

Attachements d'outils

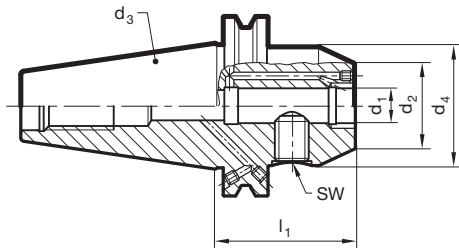
Attachements Weldon SK pour attachements cyl.



Référence **78317**



- qualité d'équilibrage: G 6,3 / 15 000 Tr./mn
- pour les attachements d'outils avec une tolérance h6
- avec alésage cylindrique pour attachements Forme B selon Norme DIN 1835 «Weldon»
- cône SA selon Norme DIN ISO 7388 - 1 Forme AD / AF
- avec perçages forme B, obturés avec vis pointeau lors de la livraison
- avec canaux d'adduction du produit de lubrification et de refroidissement dans l'alésage de l'attachement pour arrosage périphérique, afin d'assurer de meilleurs rendements et tenues de coupe des outils
- à partir d'un Ø d'attachement d1 = 25,00 mm, avec deux vis de serrage
- canaux de lubrification: d1 = 6 - 14 mm avec deux canaux, d1 = 16 - 32 mm avec quatre canaux de lubrification
- approprié pour les outils avec adduction intérieure du produit de lubrification et de refroidissement
- Contenu de la livraison:
- y compris vis de serrage
- à commander séparément, tirette



d3	Forme	d1 mm	d2 mm	d4 mm	l1 ± mm	SW mm	kg	N° de code
SK 40	AD/AF	6,000	15,000	25,000	50,000	3,0	0,900	6,040
SK 40	AD/AF	8,000	20,000	28,000	50,000	4,0	0,900	8,040
SK 40	AD/AF	10,000	25,000	35,000	50,000	5,0	1,000	10,040
SK 40	AD/AF	12,000	30,000	42,000	50,000	6,0	1,200	12,040
SK 40	AD/AF	14,000	32,000	44,000	50,000	6,0	1,200	14,040
SK 40	AD/AF	16,000	36,000	48,000	63,000	6,0	1,200	16,040
SK 40	AD/AF	18,000	38,000	50,000	63,000	6,0	1,400	18,040
SK 40	AD/AF	20,000	40,000	52,000	63,000	8,0	1,500	20,040
SK 40	AD/AF	25,000	45,000	65,000	100,000	10,0	2,300	25,040
SK 40	AD/AF	32,000	56,000	72,000	100,000	10,0	2,500	32,040
SK 50	AD/AF	6,000	15,000	25,000	63,000	3,0	2,700	6,050
SK 50	AD/AF	8,000	20,000	28,000	63,000	4,0	2,700	8,050
SK 50	AD/AF	10,000	25,000	35,000	63,000	5,0	2,900	10,050
SK 50	AD/AF	12,000	30,000	42,000	63,000	6,0	3,000	12,050
SK 50	AD/AF	14,000	32,000	44,000	63,000	6,0	3,000	14,050
SK 50	AD/AF	16,000	36,000	48,000	63,000	6,0	3,000	16,050
SK 50	AD/AF	18,000	38,000	50,000	63,000	6,0	3,000	18,050
SK 50	AD/AF	20,000	40,000	52,000	63,000	8,0	3,100	20,050
SK 50	AD/AF	25,000	45,000	65,000	80,000	10,0	3,700	25,050
SK 50	AD/AF	32,000	56,000	72,000	100,000	10,0	4,500	32,050

Attachements d'outils

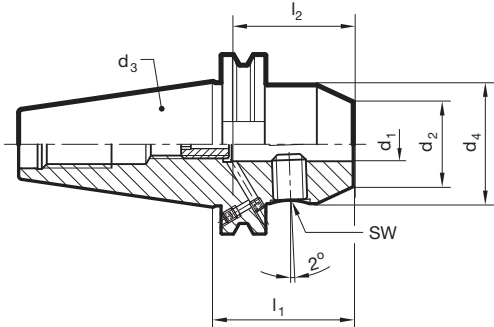
Attachements cylindriques Whistle Notch SA



Référence **78322**



- qualité d'équilibrage: G 6,3 / 15 000 Tr./mn
- pour les attachements d'outils avec une tolérance h6
- avec alésage cylindrique pour attachements Forme E selon Norme DIN 1835 - 2 «Whistle Notch»
- cône SA selon Norme DIN ISO 7388 - 1 Forme AD / AF
- à partir d'un Ø d'attachement d1 = 25,00 mm, avec deux vis de serrage
- approprié pour les outils avec adduction intérieure du produit de lubrification et de refroidissement
- Contenu de la livraison:
- y compris vis de réglage et vis de serrage
- à commander séparément, tirette



d3	d1 mm	d2 mm	d4 mm	l1 mm	l2 ± mm	SW mm	kg	N° de code
SK 40	6,000	15,000	25,000	50,000	36,000	3,0	0,900	6,040
SK 40	8,000	20,000	28,000	50,000	36,000	4,0	0,900	8,040
SK 40	10,000	25,000	35,000	50,000	40,000	5,0	1,000	10,040
SK 40	12,000	30,000	42,000	50,000	45,000	6,0	1,200	12,040
SK 40	14,000	32,000	44,000	50,000	45,000	6,0	1,200	14,040
SK 40	16,000	36,000	48,000	63,000	48,000	6,0	1,200	16,040
SK 40	18,000	38,000	50,000	63,000	48,000	6,0	1,400	18,040
SK 40	20,000	40,000	52,000	63,000	50,000	8,0	1,500	20,040
SK 40	25,000	45,000	65,000	100,000	56,000	10,0	2,300	25,040
SK 40	32,000	56,000	72,000	100,000	60,000	10,0	2,500	32,040
SK 50	6,000	15,000	25,000	63,000	36,000	3,0	2,700	6,050
SK 50	8,000	20,000	28,000	63,000	36,000	4,0	2,700	8,050
SK 50	10,000	25,000	35,000	63,000	40,000	5,0	2,900	10,050
SK 50	12,000	30,000	42,000	63,000	45,000	6,0	3,000	12,050
SK 50	14,000	32,000	44,000	63,000	45,000	6,0	3,000	14,050
SK 50	16,000	36,000	48,000	63,000	48,000	6,0	3,000	16,050
SK 50	18,000	38,000	50,000	63,000	48,000	6,0	3,000	18,050
SK 50	20,000	40,000	52,000	63,000	50,000	8,0	3,100	20,050
SK 50	25,000	45,000	65,000	80,000	56,000	10,0	3,700	25,050
SK 50	32,000	56,000	72,000	100,000	60,000	10,0	4,500	32,050

Attachements d'outils

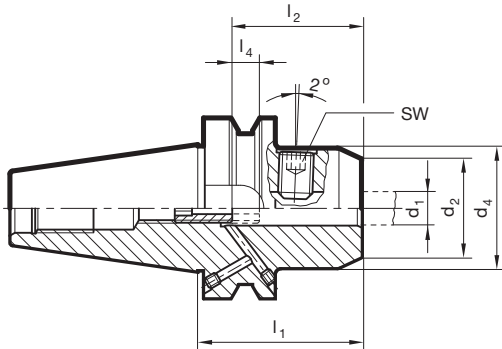
Attachements cylindriques WhistleNotch MAS/BT



Référence **78233**



- qualité d'équilibrage: G 6,3 / 15 000 Tr./mn
- pour les attachements d'outils avec une tolérance h6
- MAS / BT selon Norme DIN ISO 7388 - 2 Forme JD / JF
- avec alésage cylindrique pour attachements Forme E selon Norme DIN 1835 - 2 «Whistle Notch»
- à partir d'un Ø d'attachement d1 = 25,00 mm, avec deux vis de serrage
- avec adduction du produit de lubrification forme JD / JF (* BT 50 version JD sans adduction sur la face d'appui et collet de butée)
- approprié pour les outils avec adduction intérieure du produit de lubrification et de refroidissement
- Contenu de la livraison:
- y compris vis de réglage et vis de serrage
- à commander séparément, tirette



d3	Forme	d1 mm	d2 mm	d4 mm	l1 mm	l2 mm	l4 mm	SW mm	kg	N° de code
BT 40	JD/JF	6,000	15,000	25,000	50,000	36,000	10,000	3,0	5,882	6,040
BT 40	JD/JF	8,000	20,000	28,000	50,000	36,000	10,000	4,0	5,890	8,040
BT 40	JD/JF	10,000	25,000	35,000	63,000	40,000	10,000	5,0	6,024	10,040
BT 40	JD/JF	12,000	30,000	42,000	63,000	45,000	10,000	6,0	6,160	12,040
BT 40	JD/JF	14,000	32,000	44,000	63,000	45,000	10,000	6,0	6,175	14,040
BT 40	JD/JF	16,000	36,000	48,000	116,400	48,000	10,000	6,0	6,050	16,040
BT 40	JD/JF	18,000	38,000	50,000	63,000	48,000	10,000	6,0	6,280	18,040
BT 40	JD/JF	20,000	40,000	52,000	63,000	50,000	10,000	8,0	6,110	20,040
BT 40	JD/JF	25,000	45,000	63,000	90,000	56,000	10,000	10,0	6,750	25,040
BT 40	JD/JF	32,000	56,000	72,000	100,000	60,000	10,000	10,0	7,180	32,040
BT 50	JD	6,000	15,000	25,000	62,600	36,000	10,000	3,0	8,090	6,050
BT 50	JD	8,000	20,000	28,000	62,600	36,000	10,000	4,0	8,430	8,050
BT 50	JD	10,000	25,000	35,000	62,600	40,000	10,000	5,0	8,490	10,050
BT 50	JD	12,000	30,000	42,000	80,000	45,000	10,000	6,0	8,600	12,050
BT 50	JD	14,000	32,000	44,000	80,000	45,000	10,000	6,0	8,370	14,050
BT 50	JD	16,000	36,000	48,000	80,000	48,000	10,000	6,0	8,370	16,050
BT 50	JD	18,000	38,000	50,000	80,000	48,000	10,000	6,0	8,430	18,050
BT 50	JD	20,000	40,000	52,000	80,000	50,000	10,000	8,0	8,685	20,050
BT 50	JD	25,000	45,000	65,000	100,000	56,000	10,000	10,0	9,240	25,050
BT 50	JD	32,000	56,000	72,000	105,000	60,000	10,000	10,0	9,480	32,050

Attachements d'outils

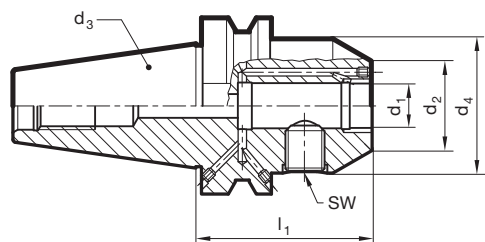
Attachements Weldon MAS/BT pour attachements cyl.



Référence **78234**



- qualité d'équilibrage: G 6,3 / 15 000 Tr./mn
- pour les attachements d'outils avec une tolérance h6
- avec alésage cylindrique pour attachements Forme B selon Norme DIN 1835 «Weldon»
- à partir d'un Ø d'attachement d1 = 25,00 mm, avec deux vis de serrage
- avec canaux d'adduction du produit de lubrification et de refroidissement pour arrosage périphérique, afin d'assurer de meilleurs rendements et tenues de coupe des outils
- adduction du produit de lubrification et de refroidissement de forme JD / JF
- aussi approprié pour les outils avec adduction intérieure du produit de lubrification et de refroidissement
- Contenu de la livraison:
- y compris vis de serrage
- à commander séparément, tirette



d3	Forme	d1 mm	d2 mm	d4 mm	l1 ± mm	SW mm	kg	N° de code
BT 40	JD/JF	6,000	15,000	25,000	50,000	3,0	5,810	6,040
BT 40	JD/JF	8,000	20,000	28,000	50,000	4,0	5,800	8,040
BT 40	JD/JF	10,000	25,000	35,000	63,000	5,0	6,050	10,040
BT 40	JD/JF	12,000	30,000	42,000	63,000	6,0	6,000	12,040
BT 40	JD/JF	14,000	32,000	44,000	63,000	6,0	5,930	14,040
BT 40	JD/JF	16,000	36,000	48,000	63,000	6,0	5,980	16,040
BT 40	JD/JF	18,000	38,000	50,000	63,000	6,0	6,170	18,040
BT 40	JD/JF	20,000	40,000	52,000	63,000	8,0	6,150	20,040
BT 40	JD/JF	25,000	45,000	63,000	90,000	10,0	6,700	25,040
BT 40	JD/JF	32,000	56,000	72,000	100,000	10,0	7,170	32,040

Attachements d'outils

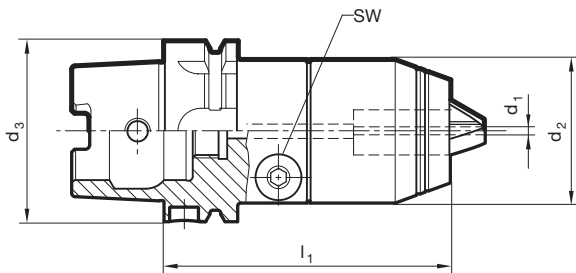
Mandrin de serrage pour outils NC HSK-A avec lub. centrale



Référence **78346**



- pour le serrage de tous les attachements cylindriques d'outils
- HSK - A selon Norme ISO 12164 - 1 / DIN 69893 - 1
- capacité de serrage des diamètres à action progressive
- énorme force de serrage grâce à l'engrenage à vis sans fin, très robuste
- pression maximale du liquide de lubrification et de refroidissement 50 bars
- les mandrins NC sont prévus et appropriés pour des vitesses de rotation jusqu'à 7 000 trs./mn. Avec équilibrage de précision, optionnel, jusqu'à 18 000 trs./mn maximum
- aussi approprié pour les outils avec adduction intérieure du produit de lubrification et de refroidissement
- Contenu de la livraison:
- y compris clé de serrage
- à commander séparément, ensemble adducteur de lubrification



d3	d1	d2 mm	l1 mm	SW mm	kg	N° de code
HSK-A 63	1,0-16	50,000	98,000	4,0	1,900	16,063
HSK-A 100	1,0-16	50,000	104,000	4,0	3,300	16,100

Attachements d'outils

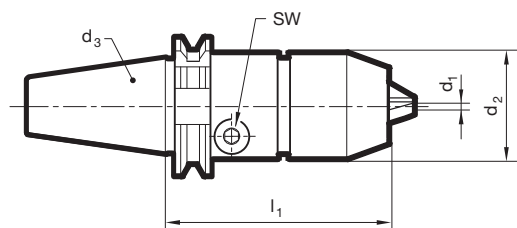
Mandrin de serrage pour outils NC SA avec lub. centrale



Référence **78242**



- pour le serrage de tous les attachements cylindriques d'outils
- cône SA selon Norme DIN ISO 7388 - 1 Forme AD
- capacité de serrage des diamètres à action progressive
- énorme force de serrage grâce à l'engrenage à vis sans fin, très robuste
- pression maximale du liquide de lubrification et de refroidissement 50 bars
- les mandrins NC sont prévus et appropriés pour des vitesses de rotation jusqu'à 7 000 trs./mn. Avec équilibrage de précision, optionnel, jusqu'à 18 000 trs./mn maximum
- aussi approprié pour les outils avec adduction intérieure du produit de lubrification et de refroidissement
- Contenu de la livraison:
- y compris clé de serrage
- à commander séparément, tirette



d3	d1	d2 mm	l1 mm	SW mm	kg	N° de code
SK 40	1,0-16	50,000	80,000	4,0	1,557	16,040
SK 50	1,0-16	50,000	80,000	4,0	3,500	16,050

Attachements d'outils

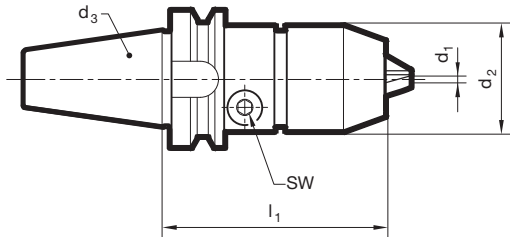
Mandrin de serrage pour outils NC MAS/BT avec lub. centrale



Référence **78240**



- pour le serrage de tous les attachements cylindriques d'outils
- cône MAS / BT selon Norme DIN ISO 7388 - 2 Forme JD
- capacité de serrage des diamètres à action progressive
- énorme force de serrage grâce à l'engrenage à vis sans fin, très robuste
- pression maximale du liquide de lubrification et de refroidissement 50 bars
- les mandrins NC sont prévus et appropriés pour des vitesses de rotation jusqu'à 7 000 trs./mn. Avec équilibrage de précision, optionnel, jusqu'à 18 000 trs./mn maximum
- aussi approprié pour les outils avec adduction intérieure du produit de lubrification et de refroidissement
- Contenu de la livraison:
- y compris clé de serrage
- à commander séparément, tirette



d3	d1	d2 mm	l1 mm	SW mm	kg	N° de code
BT 40	1,0-16	50,000	88,000	4,0	1,500	16,040
BT 50	1,0-16	50,000	99,000	4,0	3,500	16,050

Mandrins de taraudage

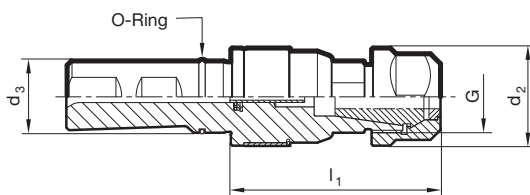
Mandrin de taraudage synchro avec attachement cylindrique



Référence **78326**



- compense les erreurs de synchronisation
- compensation minimale des longueurs, dans les 2 sens, pression et traction, entre la broche synchronisée et l'outil de filetage, ce qui réduit les efforts de friction sur les flancs de filetage, augmente la qualité du filetage et la tenue des outils de filetage
- la vis de réglage permet un rajustement sur 2 - 3 mm
- approprié pour l'adduction intérieure
- pression maximale du liquide de lubrification et de refroidissement 50 bars
- Contenu de la livraison:
 - y compris écrou de serrage IC / IR, étanche
 - y compris clé de réglage pour les vis de réglage
- vis de réglage, «plan» N° d'article du catalogue: 78364, pince de serrage n° d'article: 78308 pour taraud, disque d'étanchéité n° d'article 78335 et clé de serrage, à commander séparément



d3 mm	Taille nom.	d2 mm	G	l1 mm	± mm	Couple Nm	kg	N° de code
25,000	ER20	34,000	M25 X1,5	73,000	0,150	40	0,591	20,025
25,000	ER32	50,000	M40 X1,5	87,500	0,150	170	1,300	32,025

Mandrins de taraudage

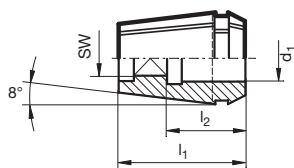
Pincettes de taraudage



Référence **78308**



- pour le serrage des attachements d'outils de filetages pourvus d'un carré d'entraînement dans les mandrins de taraudage Synchro ou attachements à pince



Taille nom.	d1 mm	SW mm	l1 mm	l2 mm	N° de code
ER20	4,000	3,2	31,500	18,000	4,020
ER20	4,500	3,4	31,500	18,000	4,520
ER20	5,500	4,3	31,500	18,000	5,520
ER20	6,000	4,9	31,500	18,000	6,020
ER20	7,000	5,5	31,500	18,000	7,020
ER20	8,000	6,2	31,500	22,000	8,020
ER20	9,000	7,0	31,500	22,000	9,020
ER20	10,000	8,0	31,500	25,000	10,020
ER20	11,000	9,0	31,500	25,000	11,020
ER32	4,000	3,2	40,000	18,000	4,032
ER32	4,500	3,4	40,000	18,000	4,532
ER32	5,500	4,3	40,000	18,000	5,532
ER32	6,000	4,9	40,000	18,000	6,032
ER32	7,000	5,5	40,000	18,000	7,032
ER32	8,000	6,2	40,000	22,000	8,032
ER32	9,000	7,0	40,000	22,000	9,032
ER32	10,000	8,0	40,000	25,000	10,032
ER32	11,000	9,0	40,000	25,000	11,032
ER32	12,000	9,0	40,000	25,000	12,032
ER32	14,000	11,0	40,000	25,000	14,032
ER32	16,000	12,0	40,000	25,000	16,032
ER32	18,000	14,5	40,000	25,000	18,032
ER32	20,000	16,0	40,000	28,000	20,032

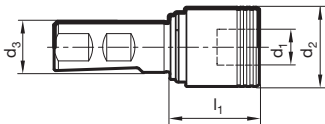
Mandrins de taraudage

Mandrin de tar. à changement rapide sans lubrification centrale



- les mandrins de filetages avec douilles de serrage à changement rapide sont pourvus d'un système de compensation axiale, très souple, de par un guidage sur billes, afin de compenser les valeurs des différences entre l'avance de la broche et le pas du filetage

Référence **78340**



Taille nom.	d1 mm	d2 mm	d3 mm	l1 mm	± mm	kg	N° de code
M3-M12	19,000	36,000	25,000	39,000	7,500	0,431	19,025
M8-M20	31,000	53,000	25,000	63,000	10,000	0,900	31,025

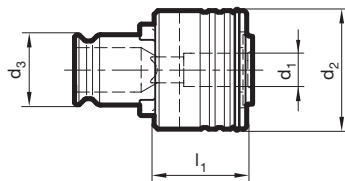
Mandrins de taraudage

Douille de serrage pour mandrin de tar. à changement rapide



Référence **78206**

- avec accouplement de sûreté
- approprié pour les outils de filetages en HSS
- sur les outils de filetages en CW monobloc, il est nécessaire de réaliser une rainure sur l'attache afin d'assurer une meilleure tenue de l'outil dans le mandrin
- approprié pour l'adduction intérieure
- pression maximale du liquide de lubrification et de refroidissement 50 bars



Taille nom.	d1 mm	SW mm	d3 mm	d2 mm	l1 mm	N° de code
M3-M12	2,200		19,000	32,000	25,000	19,022
M3-M12	2,500	2,1	19,000	32,000	25,000	19,025
M3-M12	2,800	2,1	19,000	32,000	25,000	19,028
M3-M12	3,500	2,7	19,000	32,000	25,000	19,035
M3-M12	4,000	3,0	19,000	32,000	25,000	19,040
M3-M12	4,500	3,4	19,000	32,000	25,000	19,045
M3-M12	5,500	4,5	19,000	32,000	25,000	19,055
M3-M12	6,000	4,9	19,000	32,000	25,000	19,060
M3-M12	7,000	5,5	19,000	32,000	25,000	19,070
M3-M12	8,000	6,2	19,000	32,000	25,000	19,080
M3-M12	9,000	7,0	19,000	32,000	25,000	19,090
M3-M12	10,000	8,0	19,000	32,000	25,000	19,100
M8-M20	6,000	4,9	31,000	50,000	34,000	31,060
M8-M20	7,000	5,5	31,000	50,000	34,000	31,070
M8-M20	8,000	6,2	31,000	50,000	34,000	31,080
M8-M20	9,000	7,0	31,000	50,000	34,000	31,090
M8-M20	10,000	8,0	31,000	50,000	34,000	31,100
M8-M20	11,000	9,0	31,000	50,000	34,000	31,110
M8-M20	12,000	9,0	31,000	50,000	34,000	31,120
M8-M20	14,000	11,0	31,000	50,000	34,000	31,140
M8-M20	16,000	12,0	31,000	50,000	34,000	31,160

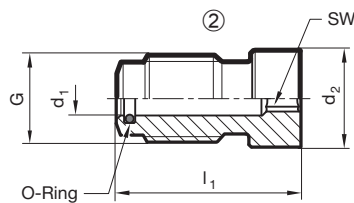
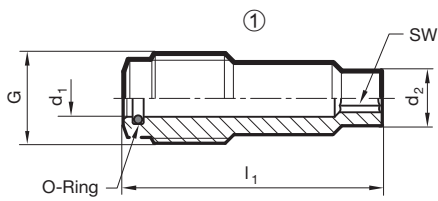
Mandrins de taraudage

Vis de réglage « plan » p. mandrins de taraud.e synchro av. lub. centrale



Référence **78364**

- pour mandrins Synchro avec attachement cylindrique n° de catalogue 78326
- pour adduction intérieure conventionnelle
- avec face de butée plane pour les extrémités d'attachements normales
- appliquer la vis de réglage contre l'attachement du taraud
- la course de la vis de réglage permet le réglage sur une longueur de 3 mm
- Contenu de la livraison:
- étanchéité fiable, assurée par joint torique



Taille nom.	□ mm	G	d1 mm	d2 mm	l1 mm	SW mm	Type	N° de code
ER20	4,900	M 8X1	3,600	4,800	26,000	2,5	1	6,020
ER20	5,500	M 8X1	3,600	5,400	25,800	2,5	1	7,020
ER20	6,200	M 8X1	3,600	6,100	20,900	2,5	1	8,020
ER20	7,000	M 8X1	3,600	6,900	20,250	2,5	1	9,020
ER20	8,000	M 8X1	3,600	7,800	15,800	2,5	2	10,020
ER20	9,000	M 8X1	3,600	8,800	14,800	2,5	2	11,020
ER32	4,900	M10X1	4,100	4,800	34,000	3,0	1	6,032
ER32	5,500	M10X1	4,100	5,400	33,800	3,0	1	7,032
ER32	6,200	M10X1	4,100	6,100	28,800	3,0	1	8,032
ER32	7,000	M10X1	4,100	6,900	28,250	3,0	1	9,032
ER32	8,000	M10X1	4,100	7,800	23,800	3,0	1	10,032
ER32	9,000	M10X1	4,100	8,800	22,900	3,0	1	11,032
ER32	11,000	M10X1	4,100	10,800	20,650	3,0	2	14,032
ER32	12,000	M10X1	4,100	11,800	19,650	3,0	2	16,032
ER32	14,500	M10X1	4,100	14,300	18,000	3,0	2	18,032

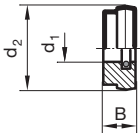
Mandrins de taraudage

Rondelle d'étanchéité



- Le secteur d'utilisation du disque d'étanchéité n° de catalogue 78335 est valable du Ø nominal d1 jusqu'à la prochaine dimension inférieure, ce qui signifie pour un Ø = 6,30 mm (pour la taille nominale ER20) il faut commander un disque d'étanchéité d1 = 6,50 mm (Code n°: 6,520)

Référence **78335**



Taille nom.	d1 mm	d2 mm	l1 mm	N° de code
ER 16	3,000	13,000	4,000	3,016
ER 16	3,500	13,000	4,000	3,516
ER 16	4,000	13,000	4,000	4,016
ER 16	4,500	13,000	4,000	4,516
ER 16	5,000	13,000	4,000	5,016
ER 16	5,500	13,000	4,000	5,516
ER 16	6,000	13,000	4,000	6,016
ER 16	6,500	13,000	4,000	6,516
ER 16	7,000	13,000	4,000	7,016
ER 16	7,500	13,000	4,000	7,516
ER 16	8,000	13,000	4,000	8,016
ER 16	8,500	13,000	4,000	8,516
ER 16	9,000	13,000	4,000	9,016
ER 16	9,500	13,000	4,000	9,516
ER 16	10,000	13,000	4,000	10,016
ER 20	3,000	16,000	4,000	3,020
ER 20	3,500	16,000	4,000	3,520
ER 20	4,000	16,000	4,000	4,020
ER 20	4,500	16,000	4,000	4,520
ER 20	5,000	16,000	4,000	5,020
ER 20	5,500	16,000	4,000	5,520
ER 20	6,000	16,000	4,000	6,020
ER 20	6,500	16,000	4,000	6,520
ER 20	7,000	16,000	4,000	7,020
ER 20	7,500	16,000	4,000	7,520
ER 20	8,000	16,000	4,000	8,020
ER 20	8,500	16,000	4,000	8,520
ER 20	9,000	16,000	4,000	9,020
ER 20	9,500	16,000	4,000	9,520
ER 20	10,000	16,000	4,000	10,020
ER 20	10,500	16,000	4,000	10,520
ER 20	11,000	16,000	4,000	11,020
ER 20	11,500	16,000	4,000	11,520
ER 20	12,000	16,000	4,000	12,020
ER 20	12,500	16,000	4,000	12,520
ER 20	13,000	16,000	4,000	13,020
ER 25	3,000	21,000	4,000	3,025
ER 25	3,500	21,000	4,000	3,525
ER 25	4,000	21,000	4,000	4,025
ER 25	4,500	21,000	4,000	4,525
ER 25	5,000	21,000	4,000	5,025
ER 25	5,500	21,000	4,000	5,525

Taille nom.	d1 mm	d2 mm	l1 mm	N° de code
ER 25	6,000	21,000	4,000	6,025
ER 25	6,500	21,000	4,000	6,525
ER 25	7,000	21,000	4,000	7,025
ER 25	7,500	21,000	4,000	7,525
ER 25	8,000	21,000	4,000	8,025
ER 25	8,500	21,000	4,000	8,525
ER 25	9,000	21,000	4,000	9,025
ER 25	9,500	21,000	4,000	9,525
ER 25	10,000	21,000	4,000	10,025
ER 25	10,500	21,000	4,000	10,525
ER 25	11,000	21,000	4,000	11,025
ER 25	11,500	21,000	4,000	11,525
ER 25	12,000	21,000	4,000	12,025
ER 25	12,500	21,000	4,000	12,525
ER 25	13,000	21,000	4,000	13,025
ER 25	13,500	21,000	4,000	13,525
ER 25	14,000	21,000	4,000	14,025
ER 25	14,500	21,000	4,000	14,525
ER 25	15,000	21,000	4,000	15,025
ER 25	15,500	21,000	4,000	15,525
ER 25	16,000	21,000	4,000	16,025
ER 32	3,000	27,000	4,000	3,032
ER 32	3,500	27,000	4,000	3,532
ER 32	4,000	27,000	4,000	4,032
ER 32	4,500	27,000	4,000	4,532
ER 32	5,000	27,000	4,000	5,032
ER 32	5,500	27,000	4,000	5,532
ER 32	6,000	27,000	4,000	6,032
ER 32	6,500	27,000	4,000	6,532
ER 32	7,000	27,000	4,000	7,032
ER 32	7,500	27,000	4,000	7,532
ER 32	8,000	27,000	4,000	8,032
ER 32	8,500	27,000	4,000	8,532
ER 32	9,000	27,000	4,000	9,032
ER 32	9,500	27,000	4,000	9,532
ER 32	10,000	27,000	4,000	10,032
ER 32	10,500	27,000	4,000	10,532
ER 32	11,000	27,000	4,000	11,032
ER 32	11,500	27,000	4,000	11,532
ER 32	12,000	27,000	4,000	12,032
ER 32	12,500	27,000	4,000	12,532
ER 32	13,000	27,000	4,000	13,032
ER 32	13,500	27,000	4,000	13,532
ER 32	14,000	27,000	4,000	14,032
ER 32	14,500	27,000	4,000	14,532
ER 32	15,000	27,000	4,000	15,032
ER 32	15,500	27,000	4,000	15,532
ER 32	16,000	27,000	4,000	16,032
ER 32	16,500	27,000	4,000	16,532
ER 32	17,000	27,000	4,000	17,032
ER 32	17,500	27,000	4,000	17,532
ER 32	18,000	27,000	4,000	18,032
ER 32	18,500	27,000	4,000	18,532
ER 32	19,000	27,000	4,000	19,032
ER 32	19,500	27,000	4,000	19,532
ER 32	20,000	27,000	4,000	20,032
ER 40	3,500	33,500	4,000	3,540
ER 40	4,000	33,500	4,000	4,040
ER 40	4,500	33,500	4,000	4,540
ER 40	5,000	33,500	4,000	5,040
ER 40	5,500	33,500	4,000	5,540
ER 40	6,000	33,500	4,000	6,040
ER 40	6,500	33,500	4,000	6,540
ER 40	7,000	33,500	4,000	7,040
ER 40	7,500	33,500	4,000	7,540
ER 40	8,000	33,500	4,000	8,040
ER 40	8,500	33,500	4,000	8,540
ER 40	9,000	33,500	4,000	9,040
ER 40	9,500	33,500	4,000	9,540
ER 40	10,000	33,500	4,000	10,040
ER 40	10,500	33,500	4,000	10,540
ER 40	11,000	33,500	4,000	11,040

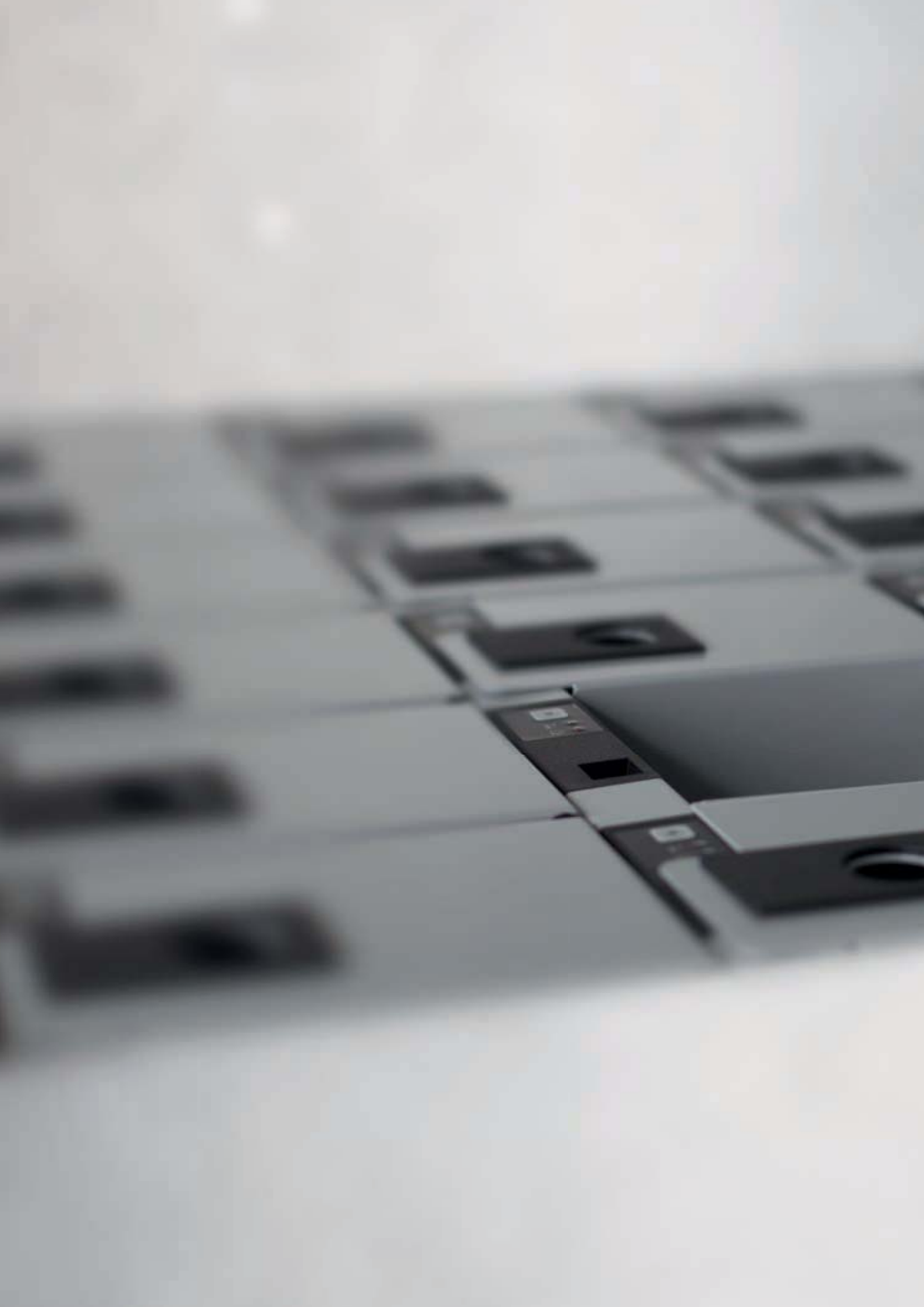
Taille nom.	d1 mm	d2 mm	l1 mm	N° de code
ER 40	11,500	33,500	4,000	11,540
ER 40	12,000	33,500	4,000	12,040
ER 40	12,500	33,500	4,000	12,540
ER 40	13,000	33,500	4,000	13,040
ER 40	13,500	33,500	4,000	13,540
ER 40	14,000	33,500	4,000	14,040
ER 40	14,500	33,500	4,000	14,540
ER 40	15,000	33,500	4,000	15,040
ER 40	15,500	33,500	4,000	15,540
ER 40	16,000	33,500	4,000	16,040
ER 40	16,500	33,500	4,000	16,540
ER 40	17,000	33,500	4,000	17,040
ER 40	17,500	33,500	4,000	17,540
ER 40	18,000	33,500	4,000	18,040
ER 40	18,500	33,500	4,000	18,540
ER 40	19,000	33,500	4,000	19,040
ER 40	19,500	33,500	4,000	19,540
ER 40	20,000	33,500	4,000	20,040
ER 40	20,500	33,500	4,000	20,540
ER 40	21,000	33,500	4,000	21,040
ER 40	21,500	33,500	4,000	21,540
ER 40	22,000	33,500	4,000	22,040
ER 40	22,500	33,500	4,000	22,540
ER 40	23,000	33,500	4,000	23,040
ER 40	23,500	33,500	4,000	23,540
ER 40	24,000	33,500	4,000	24,040
ER 40	24,500	33,500	4,000	24,540
ER 40	25,000	33,500	4,000	25,040
ER 40	25,500	33,500	4,000	25,540
ER 40	26,000	33,500	4,000	26,040

STOCK OUTILS SPECIAUX

Solutions spéciales pour besoins individuels du client



Formulaires de demande à partir de page 816.





SYSTÈMES DE STOCKAGE D'OUTILS



TSC mini



L'équipement de gestion d'outils TSC mini est un système modulaire à commande numérique pourvu de toutes les fonctionnalités du logiciel TSC.

Le verrouillage électronique des tiroirs de stockage permet le contrôle de chacune des transitions. Les dimensions en hauteur de chacun des tiroirs ainsi que leur répartition sont spécifiquement réalisées en fonction du besoin individuel de notre client.



Tiroirs de stockage à verrouillage électronique



Casiers modulaires



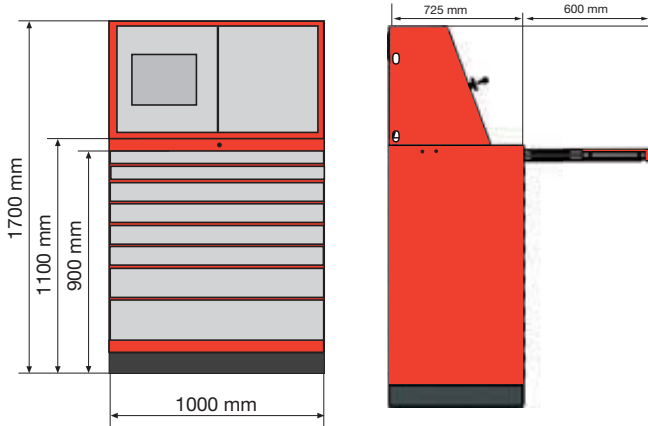
Tiroirs à cavités



Parois intercalaires

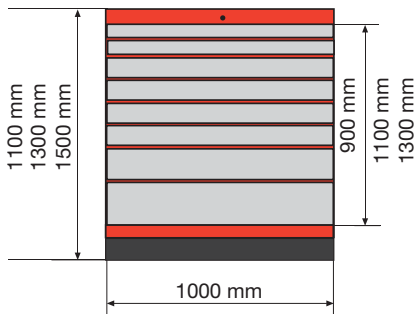
TSC mini – Versions et Dimensions

Unité de base



- Meuble de stockage à verrouillage électronique, construction très rigide, en tôle
- Tiroir à ouverture manuelle, avec interruption de sortie (Charge maximale pour chacun des tiroirs: 200 kg)
- Hauteurs des tiroirs selon besoin individuel de l'utilisateur
- Agencement intérieur des tiroirs selon besoin individuel de l'utilisateur
- Logiciel TSC
- Ordinateur équipé du système Microsoft (Windows)
- Scanneur de codes-barres
- Système accessible à plusieurs fournisseurs
- Fonctions de commande utilisables pour les systèmes de stockage annexes complémentaires (TSC maxi, TSC midi)
- Socle prévu pour la manutention par transpalette avec cache démontable
- Alimentation électrique: 230 V / 50 Hz
- Coloris spéciaux selon « RAL – Standard » sur demande

Unité d'extension



- Meuble de stockage à verrouillage électronique, construction très rigide, en tôle
- Tiroir à ouverture manuelle, avec interruption de sortie (Charge maximale pour chacun des tiroirs: 200 kg)
- Hauteurs des tiroirs selon besoin individuel de l'utilisateur
- Agencement intérieur des tiroirs selon besoin individuel de l'utilisateur
- Trois différentes hauteurs de meubles disponibles: 1100 mm / 1300 mm / 1500 mm

- **Tiroirs standards**
Dimensions intérieures: 600 x 900 mm
Hauteurs: 75 mm / 100 mm / 125 mm / 150 mm
200 mm / 250 mm / 300 mm / 400 mm

Matériel de compartimentage disponible:

- Habillage antiglisse
 - Insert de rangement à cavités
 - Casiers modulables
 - Parois intercalaires
 - Différents supports d'outil
- **Tiroirs à spires hélicoïdales**
Hauteur de tiroir: 150 mm
Module pour un maximum de 10 spires

Tiroir de prélèvement avec trappe et 3 casiers à verrouillage manuel
Hauteur de tiroir: 150 mm

- **Tiroirs disponibles avec casiers de stockage pourvus de leur propre verrouillage électronique individuel:**

Disponibles avec des hauteurs de 75/100/125/150/200/250 mm

Casiers par tiroir	Dimensions intérieures des casiers Largeur x Profondeur	Répartition des casiers Largeur x Profondeur
4	440 mm x 259 mm	2 x 2
8	440 mm x 125 mm	2 x 4
12	440 mm x 75 mm	2 x 6
12	225 mm x 200 mm	3 x 4
16	220 mm x 125 mm	4 x 4
18	146 mm x 175 mm	6 x 3
20	220 mm x 95 mm	4 x 5
24	146 mm x 125 mm	6 x 4
24	220 mm x 75 mm	4 x 6
32	109 mm x 125 mm	8 x 4
36	146 mm x 75 mm	6 x 6
40	109 mm x 95 mm	8 x 5
48	109 mm x 75 mm	8 x 6

TSC midi



Avec l'équipement TSC midi, vous profitez d'un contrôle absolu sur le prélèvement de tous les outils. Les tiroirs de l'équipement TSC s'ouvrent par trame, juste à la profondeur nécessaire au prélèvement des outils, tout cela en fonction de la quantité à prélever, programmée selon vos besoins. La comptabilité est d'une transparence maximale et permet l'analyse des coûts par unité de gestion.

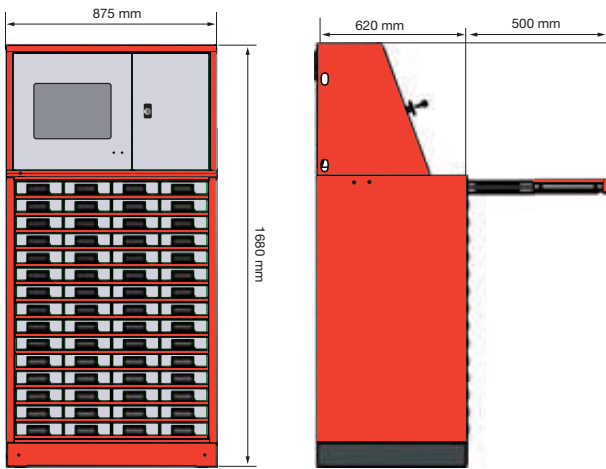
Variantes de tiroirs

La configuration des tiroirs est variable et spécifiquement adaptée aux besoins clients

Hauteurs utiles disponibles: 42 / 60 / 113 / 186 / 258 mm

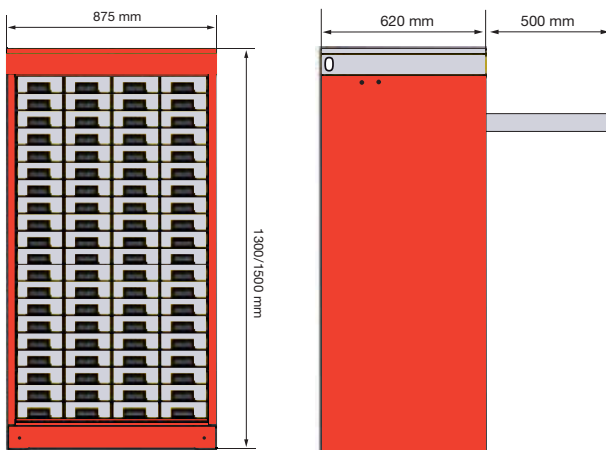
Largeurs utiles disponibles: 50 mm / 8 tiroirs par étage
110 mm / 5 tiroirs par étage
150 mm / 4 tiroirs par étage
215 mm / 3 tiroirs par étage
350 mm / 2 tiroirs par étage

TSC midi - Versions et Dimensions



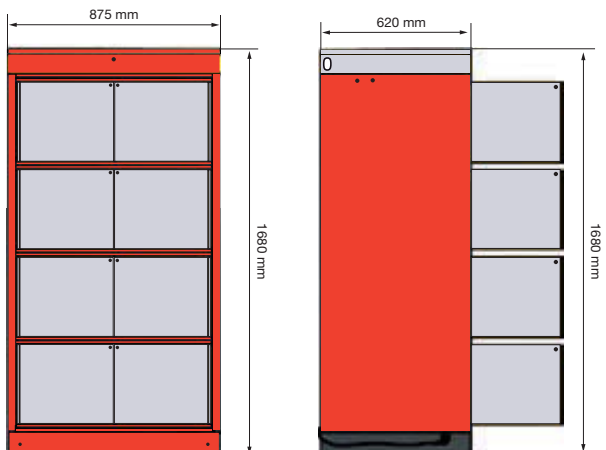
Unité de base

- Meuble de stockage à verrouillage électronique, construction très rigide, en tôle
- Tiroir à ouverture manuelle, avec interruption de sortie électronique (Charge maximale pour chacun des casiers: 20 kg)
- Hauteurs et largeurs des tiroirs selon besoin individuel de l'utilisateur
- Logiciel TSC
- Ordinateur équipé du système Microsoft (Windows)
- Scanneur de codes-barres
- Système accessible à plusieurs fournisseurs
- Fonctions de commande utilisables pour les systèmes de stockage annexes complémentaires (TSC maxi, TSC midi)
- Socle prévu pour la manutention par transpalette avec cache démontable
- Alimentation électrique: 230 V / 50 Hz
- Coloris spéciaux selon « RAL – Standard » sur demande



Unité d'extension à tiroirs

- Deux différentes hauteurs de tiroirs sont disponibles 1300 mm / 1500 mm
- Meuble de stockage à verrouillage électronique, construction très rigide, en tôle
- Tiroir à ouverture manuelle, avec interruption de sortie électronique (Charge maximale pour chacun des casiers: 20 kg)
- Hauteurs et largeurs des tiroirs selon besoin individuel de l'utilisateur



Unité d'extension à casiers sécurisés

- Variantes de modules à casiers sécurisés à 8 ou à 16 casiers
- A 8 casiers sécurisés 360x340x590 (L x H x P)
- A 16 casiers sécurisés 360x150x590 (L x H x P)

TSC maxi

L'équipement de gestion d'outils TSC maxi est la solution de stockage parfaite lorsqu'il s'agit de stocker de grandes quantités d'outils, très compacts, dans le plus petit volume d'encombrement. Effectivement, le module à spires hélicoïdales du système TSC maxi permet un stockage compact de faible encombrement avec garantie absolue de sécurité. La distribution des outils choisis est assurée par un système d'ascenseur.

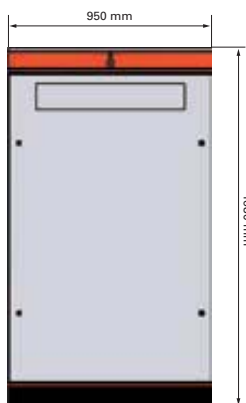


TSC maxi - Versions et dimensions



Module de commande

- 3 tiroirs de stockage à ouverture manuelle
- Logiciel TSC
- Ordinateur équipé du système Microsoft (Windows)
- Scanneur de codes-barres
- Système accessible à plusieurs fournisseurs
- Fonctions de commande utilisables pour les systèmes de stockage annexes complémentaires (TSC mini & TSC midi)
- Socle prévu pour la manutention par transpalette avec cache démontable
- Alimentation électrique: 230 V / 50 Hz
- Coloris spéciaux selon « RAL – Standard » sur demande



Module de stockage et de distribution

- Prélèvement selon la méthode « Fifo »
- Charge maximale par rangée de spires 90 kg
- Prélèvement en haut
- Ascenseur de transport d'outils intégré

- **Rangées de spires**

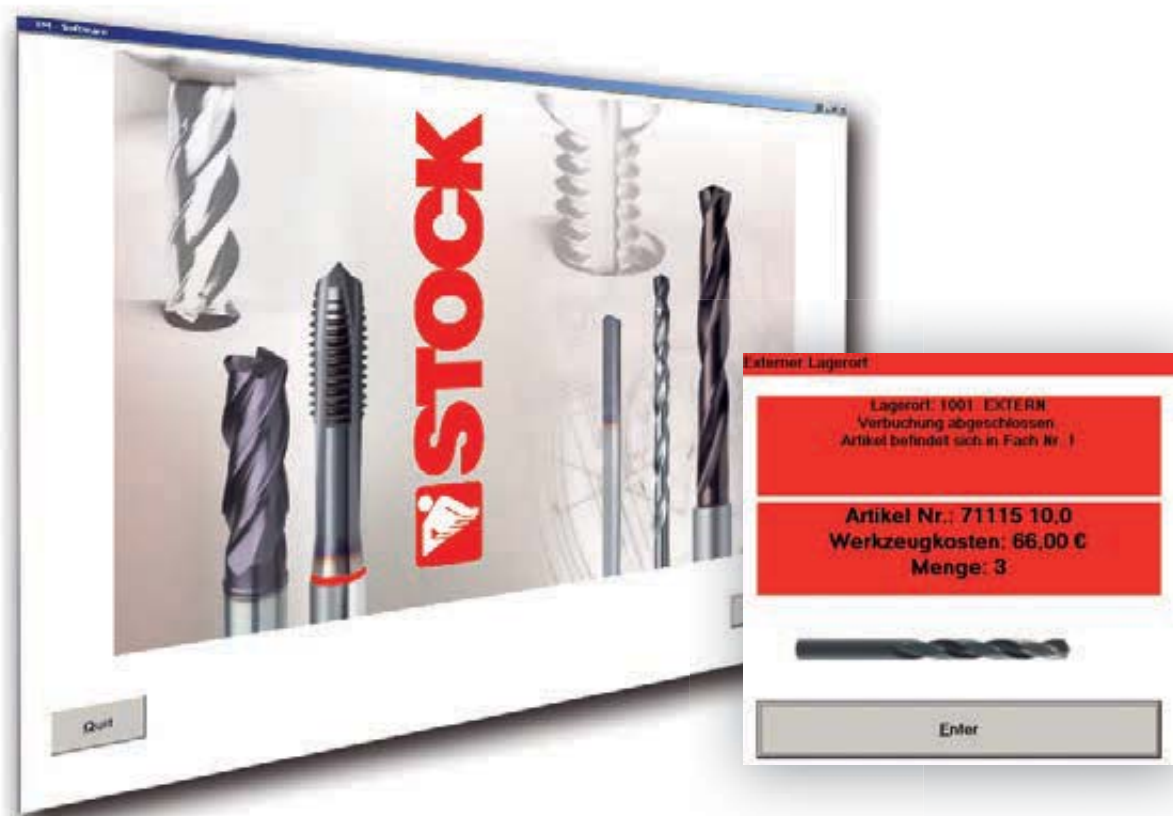
6 / 7 ou 8 rangées avec jusqu'à 10 spires

- **Répartition des spires**

Pour 9 / 13 / 15 / 21 / 24 / 31 unités de conditionnement

Sur demande, variantes d'agencement assurant un résultat optimal de l'équipement.

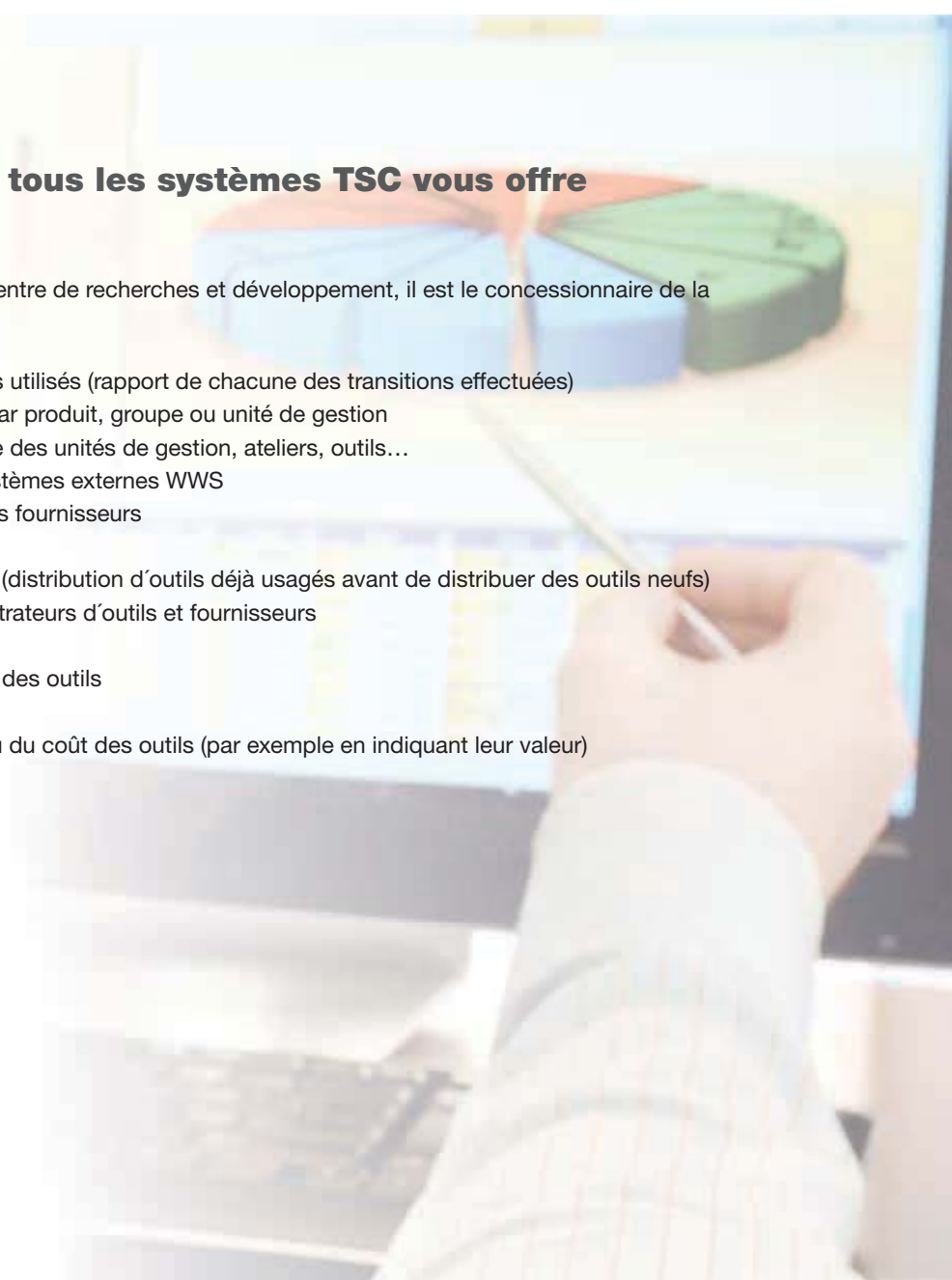
Logiciel TSC



Le logiciel TSC peut être connecté, sans restriction, avec tous les modules de l'infrastructure existante et systèmes IT. En outre, il offre toutes les possibilités de gérer les modules de stockage auxiliaires, étrangers, pourvus de systèmes de distribution à déroulement automatique ou avec élévateur. Grâce à l'intégration du logiciel TSC à l'infrastructure existante, les départements achats, bureaux de construction et préparation de fabrication accèdent aux données et profitent des avantages de l'équipement de stockage et de gestion.

L'uniformité du logiciel de tous les systèmes TSC vous offre les avantages suivants:

- Puisque Stock dispose de son propre centre de recherches et développement, il est le concessionnaire de la licence
- Utilisation intuitive et très simple
- Contrôle permanent de tous les produits utilisés (rapport de chacune des transitions effectuées)
- Calcul et attribution des coûts d'outils par produit, groupe ou unité de gestion
- Analyse ABC par exemple pour chacune des unités de gestion, ateliers, outils...
- Interfaces pour les systèmes ERP et systèmes externes WWS
- Contact Online par Internet avec tous les fournisseurs
- Remise en stock des outils
- Gestion des outils réaffûtés ou modifiés (distribution d'outils déjà usagés avant de distribuer des outils neufs)
- Système accessible à plusieurs administrateurs d'outils et fournisseurs
- Gestion d'outils de modules externes
- Gestion du réaffûtage ou de la réfection des outils
- Gestion des moyens de contrôle
- Sensibilisation des opérateurs au niveau du coût des outils (par exemple en indiquant leur valeur)



9 S 20

1010

ISO

1.7149

1 1/2

HSCO
HSS-E

bright

TiN

K20-K40

+34

H11

CO content
[M-%]

pitch
P

X 53
CrMnNiN
21 9

BT (min)

SCR 415 (H)

<700°

$9,3 \cdot 10^{-6}$

N7



TABLEAUX

Matières de coupe

Les principaux groupes cw des domaines d'applications

Sorte	Taux de cobalt Co en %	Granulométrie des CW en µ	Dureté [HV]	Classification ISO [ISO 513]	Caractéristiques
DK460UF	10	0,5	1620	K20-K40 revêtu : P, M20-M40, H, S, N25	Nuance très universelle, généralement revêtue, pour la plupart des applications sur les aciers, l'Al et ses alliages, les fontes mais aussi sur les « Superalliages » comme l'Inconel 718. Actuellement, cette nuance est l'une des principales activités de notre fabrication de CW.
DK500UF	12	0,5	1680	K25 revêtu : P, M, H, S, N25	Cette nuance, spécialement développée et réalisée pour l'usinage des matériaux durs, est plus dure que le DK 460 UF et sa tolérance de déformation est plus large. Le taux de cobalt est plus élevé, c'est pourquoi il est recommandé de faire un revêtement.
DK255F	8	0,7	1720	K20 revêtu : P, M, H, S, N20	Cette nuance est réservée à l'usinage des matériaux durs, fontes dures et alliages d'aluminium chargés de Si et durs, ainsi que pour l'usinage MQL. Il est conseillé de faire un revêtement.
DK120	6	1,3	1620	K15 revêtu : N15	Nuance particulièrement recommandée lorsqu'il est prévu de réaliser un revêtement diamant sur l'outil.
DK120UF	7	0,5	1850	K05	Nuance de granulométrie ultrafine avec une énorme résistance à l'usure, prévue sur machines très rigides, bien appropriée pour les alésoirs.
K55SF	9	0,2 -0,5	1920	K10-K30	Pour l'usinage des mat. résist. à l'usure donc difficiles à usiner, les aciers inox., les composites comme le Kevlar, ainsi que les usinages UGV, UTGV et MQL.
DK400N	10	0,7	1580	K35M revêtu : P, M, S, N35M	Nuance très tenace pour l'usinage des métaux réfractaires.

Aciers rapides

Tous nos outils en acier rapide sont systématiquement réalisés à partir de matières de coupe de qualité! Nous choisissons ces alliages en fonction de leurs éléments composants avec les propriétés optimales pour chacun des cas d'usinage :

Le tungstène et le molybdène favorisent la résistance au revenu et à l'usure

Le Vanadium améliore la résistance à l'usure. Le Cobalt améliore la résistance à l'usure, ce qui augmente sa résistance aux températures d'usinage plus élevées.

Références	Références aciers en Allemagne	N° de matière	Domaine d'application, propriétés	Comparaison d'aciers					
				USA	France	Italie	Grande-Bretagne	Chine	Japon
HSS	HS 6-5-2 (DMo5)	1.3343	matière standard pour utilisation universelle	M 2	Z 90 WDCV 06-05-04-02	HS 6-5-2	BM 2	W6Mo5 Cr4V2	SKH51
HSCO HSS-E	HS 6-5-2-5 (EMo5Co5)	1.3243	grande dureté à chaud, en particulier pour températures de coupe élevées ou refroidissement défavorable	M 35	Z 90 WDKCV 06-05-05-04-02	HS 6-5-2-5	BM 35	W6Mo5 Cr4V2Co5	SKH55
HSS-E	HS 6-5-3 (EMo5V3)	1.3344	bonne résistance à l'abrasion et grande stabilité de l'arête de coupe, critère important, surtout en alésage	M 3	Z 120 WDCV 06-05-04-03	HS 6-5-3	-	W6Mo5 Cr4V3	SKH52
M42 HSS-E	HS 2-9-1-8	1.3247	dureté très élevée et grande résistance à la chaleur, bien approprié à l'usinage des matières difficiles à usiner	M 42	Z 110 DKCWV 09-08-04-02-01	HS 2-9-1-8	BM 42	W2Mo9Cr4 VCo8	SKH59
HSS-E-PM	10-2-5-8 PM52 HS 6-5-3-8 PM30	1.3253 1.3294	dureté très élevée, bonne résistance à la chaleur et grande stabilité de l'arête de coupe, structure très dense et régulière	-					

Amélioration de l'état de surface, revêtement

Propriétés de base

Poli

Les outils en acier rapide ou en cw sans traitement de surface ou sans revêtement sont pourvus, en général, d'excellentes propriétés. En outre, les outils Stock polis du programme standard servent d'outils de base pouvant rapidement être revêtus avec les revêtements Stock, à un prix très avantageux, selon les besoins du client.

Nitruré vapeur

Listels nitrurés

Surtout recommandé pour l'usinage des matériaux comme les fontes grises, aluminium avec haut % Si, matériaux synthétiques, aciers avec haut % de perlite. En fonction de l'application d'usinage, la nitruration est obtenue suivant différents procédés.

Procédé d'amélioration des états de surface

Pour les cas d'usinages spéciaux, il est recommandé d'utiliser un état de surface plus affiné, plus résistant à l'usure et avec un meilleur coefficient de friction afin d'éliminer le collage. Comme les revêtements durs et tendres améliorent considérablement les résultats, l'amélioration des surfaces perd de son importance.

Traité vapeur

Les outils traités vapeur peuvent éviter le collage à froid sur les aciers pauvres en carbone, toutefois, ils sont exclusivement réservés à l'usinage des métaux ferreux.

Les revêtements Stock

	AlTiN	AlTiN + AlTiN nano	TiSiN	TiCN	DLC	Diamant
Couleur	violet	gris-violet	cuivre	gris-violet	noir	anthracite
Dureté	3200 HV	3400 HV	4000 HV	3000 HV	> 6000 HV	> 8000 HV
Coefficient de friction	0,55	0,6	0,5	0,4	< 0,1	< 0,1
Température maximale d'utilisation	< 800°	< 900°	< 800°	< 400°	< 700°	< 700°
Description abrégée	Revêtement dur, pour mat. abrasifs, UGV et MQL	Revêtement dur p.usinages difficiles, mat. très durs, UGV et MQL	Revêtement très dur et résistant à l'usure	Revêtement dur et tenace	Revêtement extrêmement dur	Revêtement diamant extrêmement dur

	TiAlN/ TiAlN nano	AlCrN	TiN	TiAlSiN	AlTiZrN	CrN
Couleur	violet	gris - bleu	jaune or	rouge - bronze	or pâle	gris métallique
Dureté	3300 HV	3200 HV	2300 HV	5500 HV	3400 HV	3500 HV
Coefficient de friction	0,6	0,35	0,5	0,55	0,5	0,6
Température maximale d'utilisation	< 800°	< 1100°	< 600°	< 800°	< 800°	< 1000°
Description abrégée	Revêtement multicouche très résistant à l'usure, aussi pour MQL	Revêtement résistant à l'usure avec grande résistance à l'oxydation et hautes températures	Revêtement standard à un prix avantageux.	Revêtement multicouche, de grande dureté très résistant à la chaleur	Revêtement dur et résistant à l'usure	Revêtement dur très résistant à la chaleur

Tarauds-Éléments de base

Formes d'entrée - sélection et utilisation

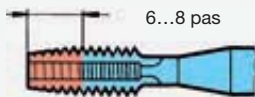
Pour un filetage intérieur, l'ensemble du travail de coupe est réalisé par les dents de l'entrée. C'est pourquoi il est important de bien choisir l'entrée la plus appropriée, ce qui aura une grosse influence sur la longévité du taraud ainsi que sur la qualité du filetage.

La forme et la longueur de l'entrée dépendent directement de la forme du trou, qu'il soit borgne ou débouchant. Le trou débouchant ne nécessite pas d'explications particulières. Pour les trous borgnes par contre, le perçage doit être exécuté de telle sorte que lors du taraudage et du détarudage, les copeaux ne puissent gêner l'avance et le retour du taraud. Les trous borgnes peuvent donc très bien être aussi débouchants.

Les longueurs d'entrée déterminent en elles-même des effets contradictoires. Pour éviter une surcharge, une usure précoce et de très grands taraudages, il faudrait que le nombre de dents de l'entrée soit suffisamment important. D'autre part une entrée trop longue augmente le couple de rotation et en même temps le danger de casse. L'entrée hélicoïdale GUN forme B permet que l'évacuation des copeaux se fasse toujours dans la direction de poussée.

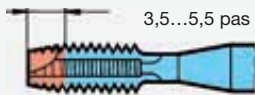
Formes d'entrée selon la norme DIN 2197

Forme A



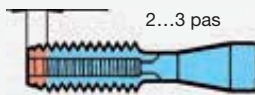
longue, 6 - 8 pas
pour trous
débouchants courts

Forme B



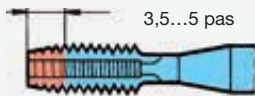
moyenne, 3,5 - 5 pas,
entrée hélicoïdale GUN,
pour tous les trous
débouchants et profonds pour matières
à copeaux moyens et longs

Forme C



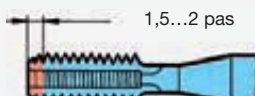
courte, 2 - 3 pas
pour trous borgnes
et tous les aluminiums,
fontes grises et laiton

Forme D



moyenne, 3,5 - 5 pas
pour trous
débouchants courts

Forme E



extrêmement courte, 1,5-2 pas,
pour trous borgnes et filetage
avec très courte longueur de filets
incomplets

Forme F



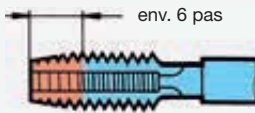
extrêmement courte, 1-1,5 pas,
pour trous borgnes et filetage
avec très courte longueur de filets
incomplets. A éviter si possible.

Tarauds-Éléments de base

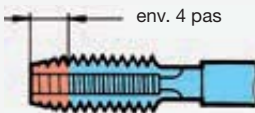
Formes d'entrée - sélection et utilisation

Longueur des entrées des jeux de 3 tarauds

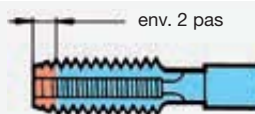
Forme A
taraud ébauche



Forme D
taraud intermédiaire

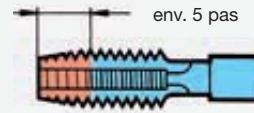


Forme C
taraud de finition

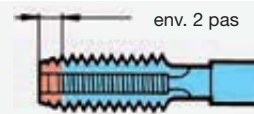


Longueur des entrées des jeux de 2 tarauds

Forme D
taraud ébauche



Forme C
taraud de finition



Recommandation d'application

La forme du trou détermine l'entrée, mais les autres caractéristiques des tarauds comme leur forme, le nombre et le sens des goujures, l'angle d'entrée etc.. sont aussi liés à la matière à usiner et au cas d'usinage. Les tarauds pour filetage métrique ISO et pour l'usinage de l'acier jusqu'à M16 ont en général 3 ou 4 goujures hélicoïdales ou plus.

Les tarauds rainurés à gauche et les tarauds à entrée hélicoïdale GUN poussent les copeaux dans le sens de coupe et conviennent particulièrement bien au travail des trous débouchants. Les tarauds à rainures droites et à longue entrée (forme D) donnent là aussi de bons résultats.

Pour les trous borgnes, nous recommandons les tarauds rainurés à droite ou tarauds à rainure droite et à entrée courte. Les outils rainurés à droite font remonter les copeaux vers l'arrière, en direction de la queue. L'entrée se présente de telle manière que les copeaux ne se coincent pas au retour, mais qu'ils puissent être brisés sans problème.

Pour le travail de l'aluminium, de la fonte grise ou du laiton, utilisez de préférence des tarauds avec entrée courte, que ce soit pour un trou borgne ou un trou débouchant. Une entrée longue agirait comme un taraud perceur avec goujure hélicoïdale et ne percerait que le trou sur le diamètre nominal du filetage au lieu de découper le filet.

Les tarauds à goujures droites, sans entrée hélicoïdale GUN sont des outils classiques qui ne donnent pas toujours les meilleurs résultats. Cela vaut vraiment la peine de choisir l'outil le plus approprié au travail demandé. C'est pourquoi nous avons réalisé un guide de taraudage qui, en fonction des matières à usiner, vous aide à choisir le taraud le mieux approprié.

Trou débouchant



Taraud à goujures droites et entrée hélicoïdale GUN



Taraud à goujures hélicoïdales à gauche



Taraud à goujures droites et entrée longue

Trou borgne



Taraud à goujures hélicoïdales à droite



Taraud à goujures droites et entrée courte

Diamètres des perçages avant le taraudage par enlèvement de copeaux

Filetages métriques ISO DIN 13				Filetages métriques ISO fins DIN 13				Filetages UNC ASME B1.1							
Ø nom.	pas P	Ø perçage DIN 336	Ø avant-trou filetage écrou 6H*	Ø nom.	pas P	Ø perçage DIN 336	Ø avant-trou filetage écrou 6H	Ø nom.	pas P	Ø perçage DIN 336	Ø avant-trou filetage écrou 6H	Ø nom.	filets par pouce	Ø perçage DIN 336	Ø avant-trou filetage écrou 2B
	mm	mm	min. mm max. mm		mm	mm	min. mm max. mm		mm	mm	min. mm max. mm			mm	min. mm max. mm
M 1	0,25	0,75	0,729 0,785	M 2,5 x 0,35		2,15	2,121 2,221	M 22 x 1,50		20,50	20,376 20,676	Nr. 1 - 64		1,55	1,425 1,580
M 1,1	0,25	0,85	0,829 0,885	M 3,0 x 0,35		2,65	2,621 2,721	M 22 x 2,00		20,00	19,835 20,210	Nr. 2 - 56		1,85	1,694 1,872
M 1,2	0,25	0,95	0,929 0,985	M 3,5 x 0,35		3,15	3,121 3,221	M 24 x 1,00		23,00	22,917 23,153	Nr. 3 - 48		2,10	1,941 2,146
M 1,4	0,30	1,10	1,075 1,142	M 4,0 x 0,50		3,50	3,459 3,599	M 24 x 1,50		22,50	22,376 22,676	Nr. 4 - 40		2,35	2,157 2,385
M 1,6	0,35	1,25	1,221 1,321	M 4,5 x 0,50		4,00	3,959 4,099	M 24 x 2,00		22,00	21,835 22,210	Nr. 5 - 40		2,65	2,487 2,698
M 1,8	0,35	1,45	1,421 1,521	M 5,0 x 0,50		4,50	4,459 4,599	M 25 x 1,00		24,00	23,917 24,153	Nr. 6 - 32		2,85	2,642 2,896
M 2	0,40	1,60	1,567 1,679	M 5,5 x 0,50		5,00	4,959 5,099	M 25 x 1,50		23,50	23,376 23,676	Nr. 8 - 32		3,50	3,302 3,531
M 2,2	0,45	1,75	1,713 1,838	M 6,0 x 0,75		5,20	5,188 5,378	M 25 x 2,00		23,00	22,835 23,210	Nr. 10 - 24		3,90	3,683 3,937
M 2,5	0,45	2,05	2,013 2,138	M 7,0 x 0,75		6,20	6,188 6,378	M 27 x 1,00		26,00	25,917 26,153	Nr. 12 - 24		4,50	4,343 4,597
M 3	0,50	2,50	2,459 2,599	M 8,0 x 0,50		7,50	7,459 7,599	M 27 x 1,50		25,50	25,376 25,676	1/4 - 20		5,10	4,978 5,258
M 3,5	0,60	2,90	2,850 3,010	M 8,0 x 0,75		7,20	7,188 7,378	M 27 x 2,00		25,00	24,835 25,210	5/16 - 18		6,60	6,401 6,731
M 4	0,70	3,30	3,242 3,422	M 8,0 x 1,00		7,00	6,917 7,153	M 28 x 1,00		27,00	26,917 27,153	3/8 - 16		8,00	7,798 8,153
M 4,5	0,75	3,70	3,688 3,878	M 9,0 x 0,75		8,20	8,188 8,378	M 28 x 1,50		26,50	26,376 26,676	7/16 - 14		9,40	9,144 9,550
M 5	0,80	4,20	4,134 4,334	M 9,0 x 1,00		8,00	7,917 8,153	M 28 x 2,00		26,00	25,835 26,210	1/2 - 13		10,80	10,592 11,024
M 6	1,00	5,00	4,917 5,153	M 10 x 0,75		9,20	9,188 9,378	M 30 x 1,00		29,00	28,917 29,153	9/16 - 12		12,20	11,989 12,446
M 7	1,00	6,00	5,917 6,153	M 10 x 1,00		9,00	8,917 9,153	M 30 x 1,50		28,50	28,376 28,676	5/8 - 11		13,50	13,386 13,868
M 8	1,25	6,80	6,647 6,912	M 10 x 1,25		8,80	8,647 8,912	M 30 x 2,00		28,00	27,835 28,210	3/4 - 10		16,50	16,307 16,840
M 9	1,25	7,80	7,647 7,912	M 11 x 0,75		10,20	10,188 10,378	M 30 x 3,00		27,00	26,752 27,252	7/8 - 9		19,50	19,177 19,761
M 10	1,50	8,50	8,376 8,676	M 11 x 1,00		10,00	9,917 10,153	M 32 x 1,50		30,50	30,376 30,676	1 - 8		22,25	21,971 22,606
M 11	1,50	9,50	9,376 9,676	M 12 x 1,00		11,00	10,917 11,153	M 32 x 2,00		30,00	29,835 30,210	1 1/8 - 7		25,00	24,638 25,349
M 12	1,75	10,20	10,106 10,441	M 12 x 1,25		10,80	10,647 10,912	M 33 x 1,50		31,50	31,376 31,676	1 1/4 - 7		28,00	27,813 28,524
M 14	2,00	12,00	11,835 12,210	M 12 x 1,50		10,50	10,376 10,676	M 33 x 2,00		31,00	30,835 31,210	1 3/8 - 6		30,75	30,353 31,115
M 16	2,00	14,00	13,835 14,210	M 14 x 1,00		13,00	12,917 13,153	M 33 x 3,00		30,00	29,752 30,252	1 1/2 - 6		34,00	33,528 34,290
M 18	2,50	15,50	15,294 15,744	M 14 x 1,25		12,80	12,647 12,912	M 35 x 1,50		33,50	33,376 33,676	1 3/4 - 5		39,50	38,938 39,802
M 20	2,50	17,50	17,294 17,744	M 14 x 1,50		12,50	12,376 12,676	M 36 x 1,50		34,50	34,376 34,676	2 - 4,5		45,00	44,679 45,593
M 22	2,50	19,50	19,294 19,744	M 15 x 1,00		14,00	13,917 14,153								
M 24	3,00	21,00	20,752 21,252	M 15 x 1,50		13,50	13,376 13,676								
M 27	3,00	24,00	23,752 24,252	M 16 x 1,00		15,00	14,917 15,153								
M 30	3,50	26,50	26,211 26,771	M 16 x 1,25		14,80	14,647 14,912								
M 33	3,50	29,50	29,211 29,771	M 16 x 1,50		14,50	14,376 14,676								
M 36	4,00	32,00	31,670 32,270	M 17 x 1,00		16,00	15,917 16,153								
M 39	4,00	35,00	34,670 35,270	M 17 x 1,50		15,50	15,376 15,676								
M 42	4,50	37,50	37,129 37,799	M 18 x 1,00		17,00	16,917 17,153								
M 45	4,50	40,50	40,129 40,799	M 18 x 1,50		16,50	16,376 16,676								
M 48	5,00	43,00	42,587 43,297	M 20 x 1,00		19,00	18,917 19,153								
M 52	5,00	47,00	46,587 47,297	M 20 x 1,50		18,50	18,376 18,676								
M 56	5,50	50,50	50,046 50,796	M 20 x 2,00		18,00	17,835 18,210								
				M 22 x 1,00		21,00	20,917 21,153								

* M 1,1 jusqu'à M 1,4 Ø de l'avant - trou filetage écrou 5H

Filetages MJ DIN ISO 5855				Filetages UNC ISO 3161				Filetages UNF ISO 3161			
Ø nom.	x pas P	Ø perçage DIN 336	Ø avant-trou filetage écrou 5H*	Ø nom.	filets par pouce	Ø perçage DIN 336	Ø avant-trou filetage écrou 3B	Ø nom.	filets par pouce	Ø perçage DIN 336	Ø avant-trou filetage écrou 3B
	mm	mm	min. mm max. mm			mm	min. mm max. mm			mm	min. mm max. mm
MJ 3	x 0,50	2,60	2,513 2,653	Nr. 6 - 32		2,85	2,733 2,939	Nr. 6 - 40		3,00	2,888 3,053
MJ 4	x 0,70	3,40	3,318 3,498	Nr. 8 - 32		3,55	3,393 3,599	Nr. 8 - 36		3,60	3,480 3,663
MJ 5	x 0,80	4,30	4,221 4,421	Nr. 10 - 24		4,00	3,795 4,064	Nr. 10 - 32		4,20	4,054 4,255
MJ 6	x 0,50	5,55	5,513 5,625	Nr. 12 - 24		4,60	4,455 4,704	Nr. 12 - 28		4,75	4,602 4,816
MJ 6	x 0,75	5,35	5,269 5,419	1/4 - 20		5,30	5,113 5,387	1/4 - 28		5,60	5,466 5,662
MJ 6	x 1,00	5,10	5,026 5,216	5/16 - 18		6,75	6,563 6,833	5/16 - 24		7,00	6,906 7,109
MJ 8	x 0,50	7,55	7,513 7,625	3/8 - 16		8,20	7,978 8,255	3/8 - 24		8,60	8,494 8,679
MJ 8	x 0,75	7,35	7,269 7,419	7/16 - 14		9,60	9,346 9,639	7/16 - 20		10,00	9,876 10,084
MJ 8	x 1,00	7,10	7,026 7,216	1/2 - 13		11,00	10,798 11,095	1/2 - 20		11,60	11,463 11,661
MJ 8	x 1,25	6,90	6,782 6,994	9/16 - 12		12,40	12,228 12,482	9/16 - 18		13,00	12,913 13,122
MJ 10	x 1,00	9,10	9,026 9,216	5/8 - 11		13,80	13,627 13,904	5/8 - 18		14,60	14,501 14,702
MJ 10	x 1,25	8,90	8,782 8,994								
MJ 10	x 1,50	8,60	8,539 8,775								
MJ 12	x 1,75	10,40	10,295 10,560								
MJ 16	x 2,00	14,20	14,051 14,351								

* MJ 3 x 0,50 jusqu'à MJ 5 x 0,80 Ø de l'avant - trou filetage écrou 6H

Diamètres des perçages avant le taraudage par enlèvement de copeaux

Filetages UNF ASME B1.1					Filetages Whitworth BSW BS84					Filetages Whitworth BSP (selon DIN-ISO 228-1)					Filetages électriques Pg selon DIN 40430				
Ø nom.	filets par pouce	Ø perçage DIN 336 mm	Ø avant-trou filetage écrou 2B min. mm max. mm		Ø nom.	filets par pouce	Ø perçage DIN 336 mm	Ø avant-trou filetage écrou min. mm max. mm		Ø nom.	filets par pouce	Ø perçage DIN 336 mm	Ø avant-trou filetage écrou min. mm max. mm		Ø nom.	filets par pouce	Ø perçage DIN 336 mm	Ø avant-trou filetage écrou min. mm max. mm	
Nr. 1 - 72		1,55	1,473	1,610	W 1/16	60	1,20	1,045	1,230	G 1/16	28	6,80	6,561	6,843	Pg 7	20	11,40	11,280	11,430
Nr. 2 - 64		1,85	1,755	1,910	W 3/32	48	1,80	1,704	1,912	G 1/8	28	8,80	8,566	8,848	Pg 9	18	14,00	13,860	14,010
Nr. 3 - 56		2,15	2,024	2,197	W 1/8	40	2,50	2,362	2,591	G 1/4	19	11,80	11,445	11,890	Pg 11	18	17,30	17,260	17,410
Nr. 4 - 48		2,40	2,271	2,459	W 5/32	32	3,20	2,952	3,214	G 3/8	19	15,25	14,950	15,395	Pg 13,5	18	19,00	19,060	19,210
Nr. 5 - 44		2,70	2,550	2,741	W 3/16	24	3,60	3,407	3,745	G 1/2	14	19,00	18,631	19,172	Pg 16	18	21,30	21,160	21,310
Nr. 6 - 40		2,95	2,819	3,023	W 7/32	24	4,50	4,201	4,539	G 5/8	14	21,00	20,587	21,128	Pg 21	16	26,90	26,780	27,030
Nr. 8 - 36		3,50	3,404	3,607	W 1/4	20	5,10	4,724	5,156	G 3/4	14	24,50	24,117	24,658	Pg 29	16	35,50	35,480	35,730
Nr. 10 - 32		4,10	3,962	4,166	W 5/16	18	6,50	6,130	6,590	G 7/8	14	28,25	27,877	28,418	Pg 36	16	45,50	45,480	45,730
Nr. 12 - 28		4,60	4,496	4,724	W 3/8	16	7,90	7,492	7,987	G 1	11	30,75	30,291	30,931	Pg 42	16	52,50	52,480	52,730
1/4 - 28		5,50	5,359	5,588	W 7/16	14	9,20	8,789	9,330	G 1 1/8	11	35,50	34,939	35,579	Pg 48	16	57,80	57,780	58,030
5/16 - 24		6,90	6,782	7,036	W 1/2	12	10,50	9,989	10,591	G 1 1/4	11	39,50	38,952	39,592					
3/8 - 24		8,50	8,382	8,636	W 9/16	12	12,00	11,577	12,179	G 1 1/2	11	45,25	44,845	45,485					
7/16 - 20		9,90	9,728	10,033	W 5/8	11	13,50	12,918	13,558	G 1 3/4	11	51,00	50,788	51,428					
1/2 - 20		11,50	11,328	11,608	W 3/4	10	16,25	15,797	16,483	G 2	11	57,00	56,656	57,296					
9/16 - 18		12,90	12,751	13,081	W 7/8	9	19,25	18,611	19,353										
5/8 - 18		14,50	14,351	14,681	W 1	8	22,00	21,334	22,147										
3/4 - 16		17,50	17,323	17,678	W 1 1/8	7	24,50	23,928	24,832										
7/8 - 14		20,40	20,269	20,650	W 1 1/4	7	27,75	27,103	28,007										
1 - 12		23,25	23,114	23,571	W 1 3/8	6	30,50	29,504	30,528										
1 1/8 - 12		26,50	26,289	26,746	W 1 1/2	6	33,50	32,679	33,703										
1 1/4 - 12		29,50	29,464	29,921	W 1 5/8	5	35,50	34,769	35,963										
1 3/8 - 12		32,75	32,639	33,096	W 1 3/4	5	39,00	37,944	39,138										
1 1/2 - 12		36,00	35,814	36,271	W 2	4,5	44,50	43,571	44,877										

Filetages coniques NPT ANSI B 2.1 cône 1:16							
Version A (à proscrire)	Version B	Ø nom.	filets par pouce	perçage cylindr. (A) d ₁	perçage conique (B) D ₁	long. de filet. ET mm	prof. perc. BT (min) mm
		1/16	- 27	6,15	6,39	9,29	10,7
		1/8	- 27	8,40	8,74	9,32	10,8
		1/4	- 18	11,10	11,36	13,52	15,6
		3/8	- 18	14,30	14,80	13,83	16,0
		1/2	- 14	17,90	18,32	18,07	20,8
		3/4	- 14	23,30	23,67	18,55	21,3
		1	- 11,5	29,00	29,69	22,29	25,6
		1 1/4	- 11,5	37,70	38,45	22,80	26,1
		1 1/2	- 11,5	43,70	44,52	22,80	26,1
		2	- 11,5	55,60	56,56	23,20	26,5
		2 1/2	- 8	66,30	67,62	31,75	36,3
		3	- 8	82,30	83,52	33,74	38,5

Filetages EG métr. / métr.fins (EG M 14 x 1,25) pour filets rapportés selon DIN 8140				
Ø nom.	x pas P mm	Ø perçage DIN 336 mm	Ø avant-trou filetage écrou min. mm max. mm	
EG M 4	0,70	4,20	4,152	4,292
EG M 5	0,80	5,25	5,174	5,334
EG M 6	1,00	6,30	6,217	6,407
EG M 8	1,25	8,40	8,271	8,483
EG M10	1,50	10,50	10,324	10,560
EG M12	1,75	12,50	12,379	12,644
EG M14 x 1,25	1,25	14,40	14,271	14,483
EG M16	2,00	16,50	16,433	16,733

Filetages EG UNC (UNC-STI) pour filets rapportés ASME B 18.29.1				
Ø nom.	filets par pouce	Ø perçage DIN 336 mm	Ø avant-trou filetage écrou min. mm max. mm	
EG Nr. 6	- 32	3,80	3,678	3,879
EG Nr. 8	- 32	4,40	4,338	4,524
EG Nr. 10	- 24	5,20	5,055	5,283
EG Nr. 12	- 24	5,80	5,715	5,944
EG 1/4	- 20	6,70	6,624	6,868
EG 5/16	- 18	8,40	8,242	8,489
EG 3/8	- 16	10,00	9,868	10,127
EG 7/16	- 14	11,60	11,506	11,783
EG 1/2	- 13	13,30	13,122	13,393
EG 9/16	- 12	14,90	14,747	15,032
EG 5/8	- 11	16,50	16,375	16,673

Filetages EG UNF (UNF-STI) pour filets rapportés ASME B 18.29.1				
Ø nom.	filets par pouce	Ø perçage DIN 336 mm	Ø avant-trou filetage écrou min. mm max. mm	
EG Nr. 6	- 40	3,70	3,644	3,818
EG Nr. 8	- 36	4,40	4,321	4,498
EG Nr. 10	- 32	5,10	4,999	5,184
EG Nr. 12	- 28	5,70	5,682	5,809
EG 1/4	- 28	6,60	6,546	6,721
EG 5/16	- 24	8,25	8,166	8,352
EG 3/8	- 24	9,80	9,754	9,931
EG 7/16	- 20	11,50	11,389	11,585
EG 1/2	- 20	13,10	12,974	13,172
EG 9/16	- 18	14,70	14,592	14,798
EG 5/8	- 18	16,25	16,180	16,386

Diamètres des perçages avant le taraudage par déformation

Filetages métriques ISO DIN 13						
Ø nom.	pas	Ø perçage	Ø perçage		Ø avant-trou filetage écrou 7H*	
			min. mm	max. mm	min. mm	max. mm
mm	mm	mm	mm	mm	mm	mm
M 1	0,25	0,75	0,729	0,785		
M 1,1	0,25	0,85	0,829	0,885		
M 1,2	0,25	0,95	0,929	0,985		
M 1,4	0,30	1,10	1,075	1,142		
M 1,6	0,35	1,25	1,221	1,321		
M 1,8	0,35	1,45	1,421	1,521		
M 2	0,40	1,85	1,84	1,88	1,567	1,679
M 2,2	0,45	2,00	2,01	2,05	1,713	1,838
M 2,5	0,45	2,30	2,28	2,32	2,013	2,138
M 3	0,50	2,80	2,78	2,85	2,459	2,639
M 3,5	0,60	3,25	3,23	3,30	2,850	3,050
M 4	0,70	3,70	3,68	3,76	3,242	3,466
M 4,5	0,75	4,20				
M 5	0,80	4,65	4,62	4,71	4,134	4,384
M 6	1,00	5,55	5,52	5,62	4,917	5,217
M 7	1,00	6,55	6,52	6,62	5,917	6,217
M 8	1,25	7,40	7,36	7,47	6,647	6,982
M 9	1,25	8,40	8,36	8,47	7,647	7,982
M 10	1,50	9,30	9,26	9,38	8,376	8,751
M 11	1,50	10,30	10,26	10,38	9,376	9,751
M 12	1,75	11,20	11,15	11,29	10,106	10,531
M 14	2,00	13,10	13,05	13,20	11,835	12,310
M 16	2,00	15,10	15,05	15,20	13,835	14,310
M 18	2,50	16,90	16,83	17,02	15,294	15,854
M 20	2,50	18,90	18,83	19,02	17,294	17,854
M 22	2,50	20,90	20,83	21,02	19,294	19,854
M 24	3,00	22,70	22,62	22,80	20,752	21,382
M 27	3,00	25,70	25,62	25,80	23,752	24,382
M 30	3,50	28,50	28,40	28,60	26,211	26,921
M 33	3,50	31,50	31,40	31,60	29,211	29,921
M 36	4,00	34,30	34,17	34,40	31,670	32,420
M 39	4,00	37,30	37,17	37,40	34,670	35,420
M 42	4,50	40,10	39,95	40,20	37,129	37,979

M 2 jusqu'à M 2,5 Ø de l'avant - trou filetage écrou 6H

Filetages métriques ISO fins DIN 13											
Ø x pas nom.	Ø perçage	Ø perçage		Ø avant-trou filetage écrou 7H*		Ø x pas nom.	Ø perçage	Ø perçage		Ø avant-trou filetage écrou 7H*	
		min. mm	max. mm	min. mm	max. mm			min. mm	max. mm		
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
M 2,5 x 0,35	2,35	2,35	2,38	2,121	2,221	M 20 x 1,50	19,30	19,26	19,38	18,376	19,751
M 3 x 0,35	2,85	2,85	2,88	2,621	2,721	M 24 x 1,00	23,55	23,52	23,62	22,917	23,217
M 4 x 0,35	3,85	3,85	3,88	3,621	3,721	M 24 x 1,50	23,30	23,26	23,38	22,376	22,751
M 4 x 0,50	3,80	3,78	3,83	3,459	3,639	M 24 x 2,00	23,10	23,05	23,20	21,835	22,310
M 5 x 0,50	4,80	4,78	4,83	4,459	4,639	M 27 x 1,50	26,30	26,26	26,38	25,376	25,751
M 5,5 x 0,50	5,30	5,28	5,33	4,959	5,139	M 30 x 1,50	29,30	29,26	29,38	28,376	28,751
M 6 x 0,75	5,65	5,62	5,70	5,188	5,424	M 33 x 1,50	32,30	32,26	32,38	31,376	31,751
M 7 x 0,75	6,65	6,62	6,70	6,188	6,424	M 36 x 1,50	35,30	35,26	35,38	34,376	34,751
M 8 x 0,75	7,65	7,62	7,70	7,188	7,424	M 39 x 1,50	38,30	38,26	38,38	37,376	37,751
M 8 x 1,00	7,55	7,52	7,62	6,917	7,217	M 42 x 1,50	41,30	41,26	41,38	40,376	40,751
M 9 x 0,75	8,65	8,62	8,70	8,188	8,424						
M 9 x 1,00	8,55	8,52	8,62	7,917	8,217						
M 10 x 0,75	9,65	9,62	9,70	9,188	9,424						
M 10 x 1,00	9,55	9,52	9,62	8,917	9,217						
M 10 x 1,25	9,40	9,36	9,47	8,647	8,982						
M 11 x 0,75	10,65	10,62	10,70	10,188	10,424						
M 11 x 1,00	10,55	10,52	10,62	9,917	10,217						
M 12 x 1,00	11,55	11,52	11,62	10,917	11,217						
M 12 x 1,25	11,40	11,36	11,47	10,647	10,982						
M 12 x 1,50	11,30	11,26	11,38	10,376	10,751						
M 14 x 1,00	13,55	13,52	13,62	12,917	13,217						
M 14 x 1,25	13,40	13,36	13,47	12,647	12,982						
M 14 x 1,50	13,30	13,26	13,38	12,376	12,751						
M 15 x 1,00	14,55	14,52	14,62	13,917	14,217						
M 15 x 1,50	14,30	14,26	14,38	13,376	13,751						
M 16 x 1,00	15,55	15,52	15,62	14,917	15,217						
M 16 x 1,50	15,30	15,26	15,38	14,376	14,751						
M 17 x 1,00	16,55	16,52	16,62	15,917	16,217						
M 17 x 1,50	16,30	16,26	16,38	15,376	15,751						
M 18 x 1,00	17,55	17,52	17,62	16,917	17,217						
M 18 x 1,50	17,30	17,26	17,38	16,376	16,751						
M 18 x 2,00	17,10	17,05	17,20	15,835	16,310						
M 20 x 1,00	19,55	19,52	19,62	18,917	19,217						

* M 2,5 x 0,35 jusqu'à M 4 x 0,35 Ø de l'avant-trou filetage écrou 6H

Classe de tol. du dia. de perçage avant le taraudage par déformation (selon la Norme DIN 13, paragr. 50)

En taraudage par refoulement, il n'est pas nécessaire de respecter la classe 6 H ; la classe de tolérance 7 H suffit. La valeur du recouvrement des flancs du filetage de la vis et des flancs du filetage de l'écrou doit être au moins égale à la valeur de 0,32 x le pas du filetage. En outre, les filetages réalisés par refoulement de la matière sont plus résistants aux efforts de traction que ceux obtenus par enlèvement de copeaux puisque les tissus fibreux sont comprimés au lieu d'être interrompus.



Diamètres des perçages avant le taraudage par déformation

Filetages UNC ASME B1.1						Filetages UNF ASME B1.1						Filetages Whitworth BSP DIN EN ISO 228-1								
Ø nom.	filets par pouce	Ø perçage		Ø avant-trou filetage écrou 2B		Ø nom.	filets par pouce	Ø perçage		Ø avant-trou filetage écrou 2B		Ø nom. pouce	filets par pouce	Ø perçage		Ø avant-trou filetage écrou				
		mm	min. mm	max. mm	min. mm			max. mm	mm	min. mm	max. mm			min. mm	max. mm	mm	min. mm	max. mm	min. mm	max. mm
Nr. 1 - 64		1,68	1,67	1,70	1,425	1,580	Nr. 1 - 72		1,70	1,69	1,72	1,473	1,610	G 1/16 28		7,30	7,28	7,35	6,561	6,843
Nr. 2 - 56		1,98	1,97	2,01	1,694	1,872	Nr. 2 - 64		2,00	1,99	2,03	1,755	1,910	G 1/8 28		9,30	9,28	9,35	8,566	8,848
Nr. 3 - 48		2,28	2,27	2,32	1,941	2,146	Nr. 3 - 56		2,30	2,29	2,34	2,024	2,197	G 1/4 19		12,50	12,48	12,55	11,445	11,890
Nr. 4 - 40		2,55	2,54	2,59	2,157	2,385	Nr. 4 - 48		2,60	2,59	2,63	2,271	2,459	G 3/8 19		16,00	15,98	16,05	14,950	15,395
Nr. 5 - 40		2,90	2,89	2,94	2,487	2,698	Nr. 5 - 44		2,90	2,89	2,93	2,550	2,741	G 1/2 14		20,00	19,98	20,12	18,631	19,172
Nr. 6 - 32		3,15	3,14	3,19	2,642	2,896	Nr. 6 - 40		3,20	3,19	3,24	2,819	3,023	G 5/8 14		22,00	21,98	22,12	20,587	21,128
Nr. 8 - 32		3,80	3,78	3,82	3,302	3,531	Nr. 8 - 36		3,85	3,83	3,88	3,404	3,607	G 3/4 14		25,50	25,48	25,62	24,117	24,658
Nr. 10 - 24		4,35	4,33	4,39	3,683	3,937	Nr. 10 - 32		4,45	4,43	4,49	3,962	4,166	G 7/8 14		29,25	29,23	29,37	27,877	28,418
Nr. 12 - 24		5,00	4,97	5,03	4,343	4,597	Nr. 12 - 28		5,10	5,07	5,13	4,496	4,724	G 1 11		32,00	31,98	32,15	30,291	30,931
1/4 - 20		5,75	5,72	5,80	4,978	5,258	1/4 - 28		5,95	5,92	5,99	5,359	5,588	G 1 1/4 11		40,75	40,70	40,85	38,952	39,592
5/16 - 18		7,30	7,26	7,37	6,401	6,731	5/16 - 24		7,45	7,42	7,50	6,782	7,036							
3/8 - 16		8,80	8,77	8,88	7,798	8,153	3/8 - 24		9,05	9,02	9,10	8,838	8,636							
7/16 - 14		10,30	10,27	10,37	9,144	9,550	7/16 - 20		10,55	10,48	10,58	9,728	10,033							
1/2 - 13		11,80	11,77	11,88	10,592	11,024	1/2 - 20		12,10	12,08	12,18	11,328	11,608							
9/16 - 12		13,30	13,28	13,39	11,989	12,446	9/16 - 18		13,65	13,61	13,72	12,751	13,081							
5/8 - 11		14,80	14,78	14,90	13,386	13,868	5/8 - 18		15,25	15,21	15,32	14,351	14,681							
3/4 - 10		17,90	17,85	17,97	16,307	16,840	3/4 - 16		18,35	18,30	18,41	17,323	17,678							
7/8 - 9		21,00	20,95	21,10	19,177	19,761	7/8 - 14		21,40	21,35	21,49	20,269	20,650							
1 - 8		24,00	23,95	24,12	21,971	22,606	1 - 12		24,45	24,40	24,54	23,114	23,571							

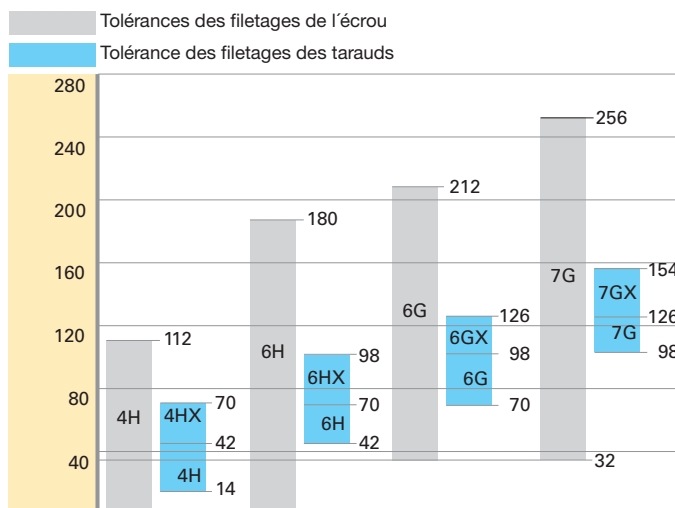
Zones de tol. (filetage de l'écrou)/Zones de tol. (filetage du taraud)

Les qualités et les seuils de tolérance déterminent les zones de tolérance, qui sont identifiées par les chiffres et les lettres appropriées.

Les abréviations pour les classes de tolérance des tarauds correspondent à la zone de tolérance des filetages intérieurs, pour lesquelles les tarauds sont très utilisés. La zone de tolérance des tarauds n'est donc pas toujours identique à celle des filetages intérieurs.

Les tarauds avec d'autres valeurs de tolérances que celles selon la norme DIN 802 partie 1 sont marqués de la lettre « X » (6 HX, 6 GX). Nous vous recommandons de vous référer au tableau ci-dessous :

Valeurs des zones de tolérances



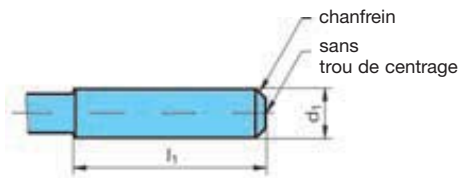
DIN EN 22857		Zone de tolérance des filetages intérieurs				DIN 802 partie 1 (retirée)
Classe d'application des tarauds Appellation * Référence						Zone de tolérance des tarauds
Classe 1	ISO 1	4H	5H			4H
Classe 2	ISO 2			6H		6H
Classe 3	ISO 3				6G	6G
-	-				7G	7G

* La tolérance des 3 classes d'application est calculée selon les données suivantes dépendant de l'unité de tolérance t valeur qui correspond à la valeur du diamètre sur flancs TD2 de la classe de tolérance 5 du filetage de l'écrou (extrapolé jusqu'à 0,2 mm de pas) :
t = TD2 classe de tolérance 5 du filetage de l'écrou

Types de queues

Queues cylindriques pour forets hélicoïdaux et fraises 2 tailles en CW DIN 6535

Forme HA, lisse

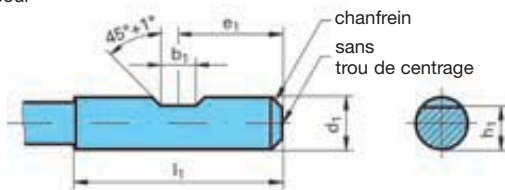


Dimensions en mm

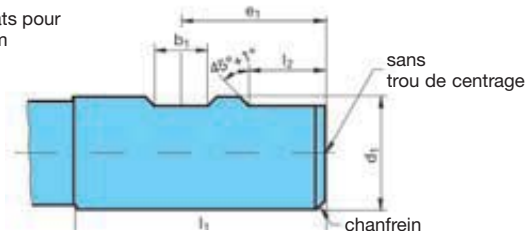
d1	l1 +2 0	d1	l1 +2 0
h6		h6	
2	28	14	45
3	28	16	48
4	28	18	48
5	28	20	50
6	36	25	56
8	36	32	60
10	40		
12	45		

Forme HB, avec méplat

avec un méplat pour
d1 = 6 et 20 mm



avec deux méplats pour
d1 = 25 et 32 mm



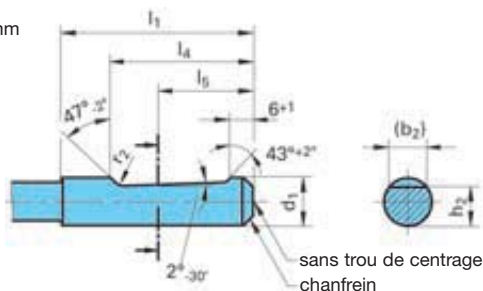
Dimensions en mm

d1	b1 +0,05 0	e1 0 -1	h1	l1 +2 0	l2 +1 0
h6			h11		
6	4,2	18	5,1	36	-
8	5,5	18	6,9	36	-
10	7	20	8,5	40	-
12	8	22,5	10,4	45	-
14	8	22,5	12,7	45	-
16	10	24	14,2	48	-
18	10	24	16,2	48	-
20	11	25	18,2	50	-
25	12	32	23	56	17
32	14	36	30	60	19

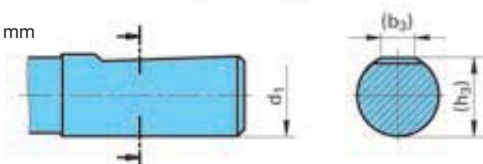
Forme HE, avec méplat incliné sans trou d'huile*

* Forme : Les queues cylindriques suivant DIN 6535 sont livrables avec ou sans trou d'huile. Applications variées, dimensions et position des trous d'huile sont décrites dans la norme.

pour d1 = 6 à 20 mm



pour d1 = 25 et 32 mm



Dimensions en mm

d1	(b2)	(b3)	h2	(h3)	l1 +2 0	l4 0 -1	l5 taille nom.	r2 min.
h6	≈		h11					
6	4,3	-	5,1	-	36	25	18	1,2
8	5,5	-	6,9	-	36	25	18	1,2
10	7,1	-	8,5	-	40	28	20	1,2
12	8,2	-	10,4	-	45	33	22,5	1,2
14	8,1	-	12,7	-	45	33	22,5	1,2
16	10,1	-	14,2	-	48	36	24	1,6
18	10,8	-	16,2	-	48	36	24	1,6
20	11,4	-	18,2	-	50	38	25	1,6
25	13,6	9,3	23,0	24,1	56	44	32	1,6
32	15,5	9,9	30,0	31,2	60	48	35	1,6

L'accouplement HSK

Technique et avantages

- **Forces très élevées au couple et position radiale définie**

De par la pression exercée sur l'attachement cône face creux sur la broche, nous obtenons une adhésion extrême donc un entraînement parfait sur les surfaces coniques et planes (Fig. 1). Deux clavettes, placées à l'extrémité du support de l'outil, assurent un positionnement radial exact et sans erreur possible.

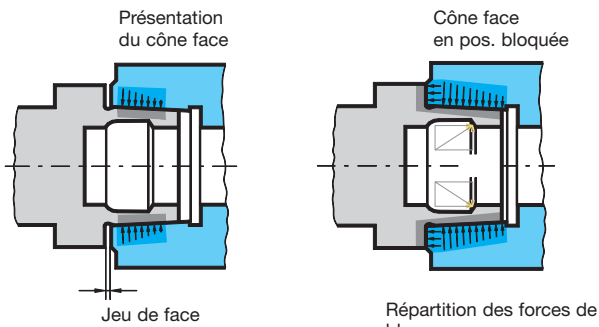
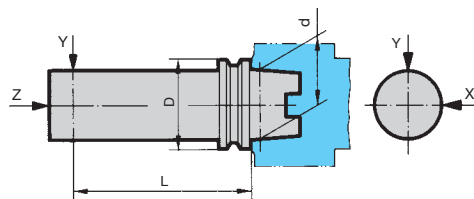


Fig. 1
Forces de précontrainte et de friction du cône face creux de l'attachement manuel ou automatique

- **Exactitude invraisemblable aux changements répétés**

Les éléments de serrage, en forme de cercle, s'enclenchent sur le système creux et assurent un ensemble, broche et outil, sans jeu (Fig. 1 und 2).



Taille HSK D	d mm	L mm	X mm	Y mm	Z mm
32	24	50	0,002	0,002	0,002
40	30	60	0,002	0,002	0,002
50	38	75	0,002	0,002	0,002
63	48	100	0,002	0,002	0,002
100	75	150	0,002	0,002	0,002

Fig. 2
Précision des positionnements, radiaux et axiaux, aux changements répétés sur les attachements manuels ou automatiques.

- **Bon comportement à haute vitesse**

En augmentant la vitesse de rotation, les forces centrifuges s'accroissent et renforcent le blocage du système de serrage. La précision de fabrication prévue avec des tolérances bien déterminées entre l'attachement conique du système et la broche compense l'éventuelle dilatation de la broche, provenant de la force centrifuge, et élimine complètement le jeu radial (Fig. 1). La face du cône face empêche un déplacement axial.

- **Temps de changement extrêmement courts**

Le changement rapide est assuré par un cône plus court (environ 1/3 de la longueur du cône 7/24") et moins lourd (environ 50% du cône 7/24").

- **La conception du cône face est très simple et peu coûteuse**

Pas de pièces en mouvement donc pas d'usure de pièces!

- **Insensibilité aux impuretés**

La surface du cône face ne présentant pas d'interruption, elle reste propre. Il est recommandé de nettoyer l'accouplement à l'air comprimé pendant le changement automatique de l'outil.

- **Codification, identification**

Sur la collerette, un perçage de 10 mm de diamètre sur 4,5 mm de profondeur est prévu comme logement pour l'élément microprocesseur de codification ou d'identification.

- **Standardisation, normalisation de l'accouplement**

selon norme DIN 69893

- **Alimentation de la lubrification**

Pour l'échange automatique des outils HSK-A et E, les attachements sont pourvus d'un tube central d'adduction du lubrifiant ou de canaux radiaux. L'alimentation sur les attachements GM 300 à serrage manuel est aussi centrale. Les éléments de serrage n'ont donc aucun contact avec les produits lubrifiants. Ainsi ces éléments restent toujours exempts d'impuretés.

- **Montage du système d'adduction du lubrifiant**

Avec chacun des attachements du système GM 300, il faut commander séparément l'adducteur de lubrification approprié. Le montage du tube adducteur, selon les instructions est pratiqué par l'utilisateur.

Technique et avantages

Avec les attachements coniques ISO et MAS-BT, notre programme s'est largement agrandi. Nous les réalisons soigneusement, ce sont des attachements de qualité supérieure. Nous fabriquons nos cônes ISO ou MAS-BT à partir d'aciers de cémentation alliés, spéciaux, avec une résistance à cœur supérieure à 900 N / mm². Grâce aux traitements thermiques spécifiques, nous obtenons, pour ainsi dire sans déformation, une dureté de surface de 58 HRC sur une profondeur de 0.80 à 1,00 mm. Afin de prolonger leur durée de vie, leur surface est protégée contre la corrosion par un brunissage.

Indice de qualité : la précision !

La plus grande précision de réalisation des attachements reste l'un de nos atouts majeurs. C'est pourquoi nous rectifions nos cônes ISO et MAS-BT sur machines ultramodernes de rectification haute précision avec des valeurs Ra < 0,2 sur le cône et Ra < 0,4 sur la face d'appui. La qualité de la tolérance sur cône est supérieure à AT 3 mesurée avec un procédé de mesurage étalonné à < 1 µm. Dans ce catalogue, vous trouverez les données spécifiques détaillées des valeurs et du positionnement des tolérances, de chacun de ces attachements, sur les pages concernées. La valeur des tolérances des ajustements intérieurs ou extérieurs de nos attachements est inférieure aux 2/3 de la valeur des tolérances selon la Norme DIN.

Qualité d'équilibrage

Les attachements d'outils prévus pour des vitesses de rotation plus élevées sont généralement pré équilibrés. Après avoir relevé le balourd des mandrins, nous prescrivons des méplats et des perçages sur les plans. Ainsi équilibrés, ces mandrins sont prévus pour des vitesses de rotation jusqu'à environ 8000 tr./mn. Dès qu'il s'agit de vitesses de rotation supérieures, il est nécessaire de prévoir une meilleure qualité d'équilibrage, plus précise, de G 6,3 voire G 2,5.

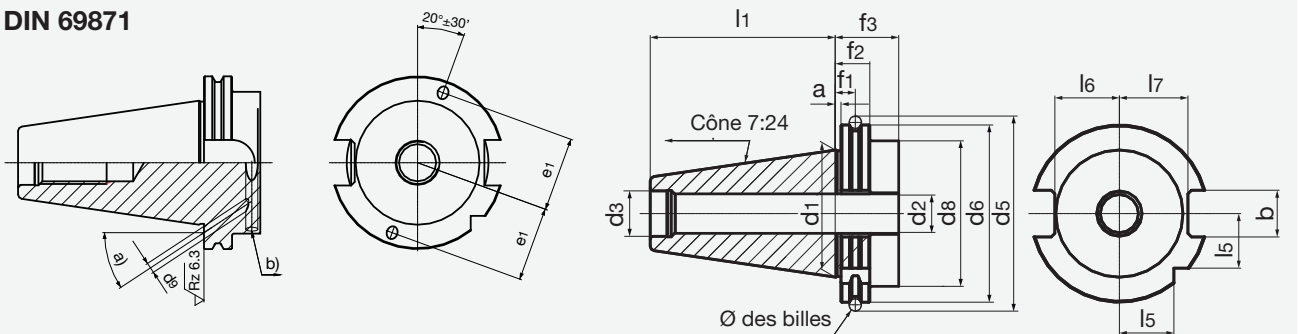
Versions AD/AF

Nous réalisons les attachements coniques ISO en versions AD/AF. Toutefois, ils sont livrés en versions AD et les canaux de lubrification sur la face d'appui sont obturés par des vis.

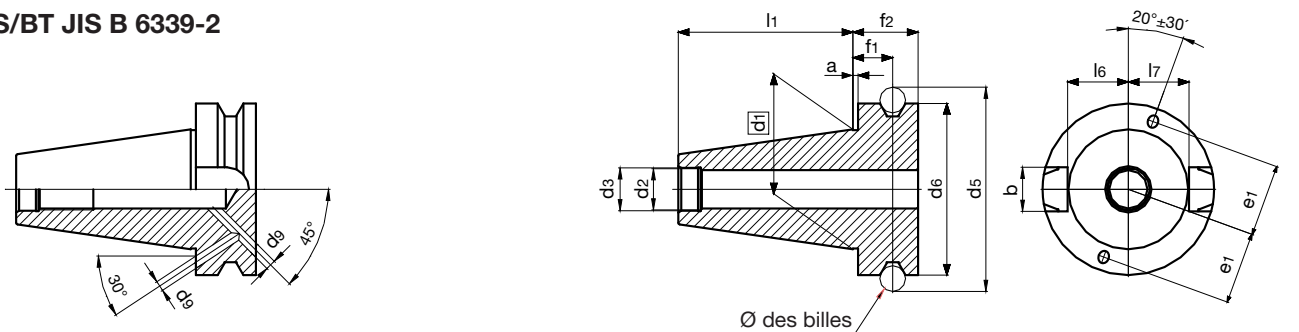
Dimensions et tolérances générales

Nous fabriquons nos attachements coniques ISO et MAS-BT selon les dimensions suivantes :

ISO DIN 69871



MAS/BT JIS B 6339-2



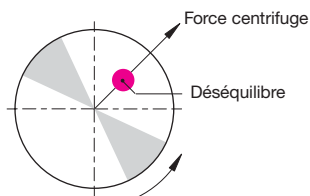
Cône	a mm	Ø des billes mm	b mm	d ₁ mm	d ₂ mm	d ₃ mm	d ₅ mm	d ₆ mm	d ₈ mm	d ₉ mm	e ₁ mm	f ₁ mm	f ₂ mm	f ₃ mm	l ₁ mm	l ₅ mm	l ₆ mm	l ₇ mm
ISO30	3,2	7	16,1	31,75	M12	13	59,3	50,00	45	4	21	11,1	19,1	35	47,80	15,00	16,4	19,0
ISO40	3,2	7	16,1	44,45	M16	17	72,3	63,55	50	4	27	11,1	19,1	35	68,40	18,5	22,8	25,0
ISO50	3,2	7	25,7	69,85	M24	25	107,25	97,50	80	6	42	11,1	19,1	35	101,75	30,0	35,5	37,7
BT30	2,0	8	16,1	31,75	M12	12,5	56,03	46,00	-	-	-	13,6	22,0	-	48,40	-	16,3	16,3
BT40	2,0	10	16,1	44,45	M16	17	75,56	63,00	-	4	27	16,6	27,0	-	65,4	-	22,6	22,6
BT50	3,0	15	25,7	69,85	M24	25	118,89	100,00	-	5,4	42	23,2	38,0	-	101,8	-	35,4	35,4

Effets d'équilibrage sur les broches, les attachements et les outils

Le déséquilibre

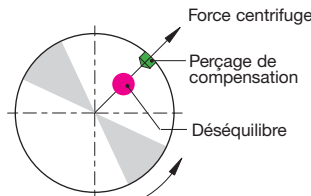
Sur une broche rotative, le déséquilibre provoque une force centrifuge engendrant des vibrations qui se répercutent sur l'outil. Un tel déséquilibre influence l'usinage et la durée de vie du roulement de la broche. Tandis que les forces centrifuges F sont linéairement proportionnelles au déséquilibre, elles s'accroissent au carré avec la vitesse de la rotation, selon la formule ci-dessous.

$$F = U \cdot \omega$$



Equilibrer

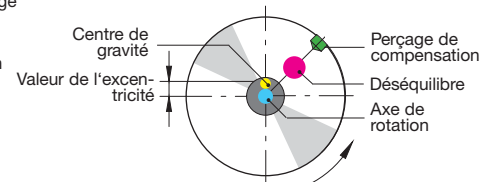
Eliminer les forces centrifuges signifie compenser, répartir symétriquement la masse autour de son axe de rotation, de façon à ce qu'il n'y ait plus de balourd, recentrer le point de gravité. Sur les attachements, l'on réalise des perçages ou des méplats de compensation. Ainsi, les forces centrifuges résultantes se recentrent vers le point „zéro“ qui lui, est l'axe de rotation (voir DIN - ISO 1940).



Décalage du centre de gravité

Le balourd sur une broche est excentrique par rapport à son axe symétrique et est localisé par un intervalle; sa définition est : Valeur de l'excentricité e ou, décalage du centre de gravité e . Le taux du déséquilibre (U) est dépendant de la valeur du balourd (m) et de sa localisation.

$$e = \frac{U}{m}$$



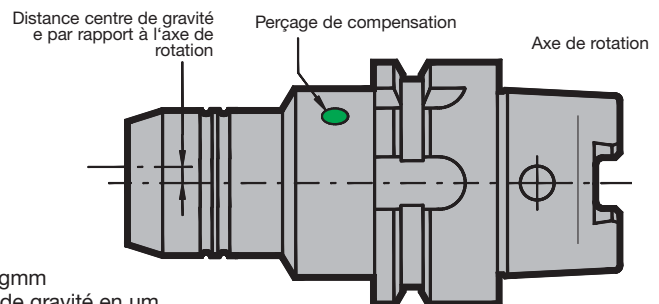
Calcul du déséquilibre

Le déséquilibre est une valeur qui indique le degré de répartition asymétrique en direction radiale par rapport à l'axe de rotation. Cette valeur est donnée en gmm. La valeur de l'intervalle „ e “ indique la distance du centre de gravité d'une pièce par rapport à l'axe de rotation.

La valeur du déséquilibre „ U “ résulte de la formule :

$$U = m \cdot e$$

U = déséquilibre en gmm
 e = distance centre de gravité en μm
 m = masse en kg



Limites d'équilibrage

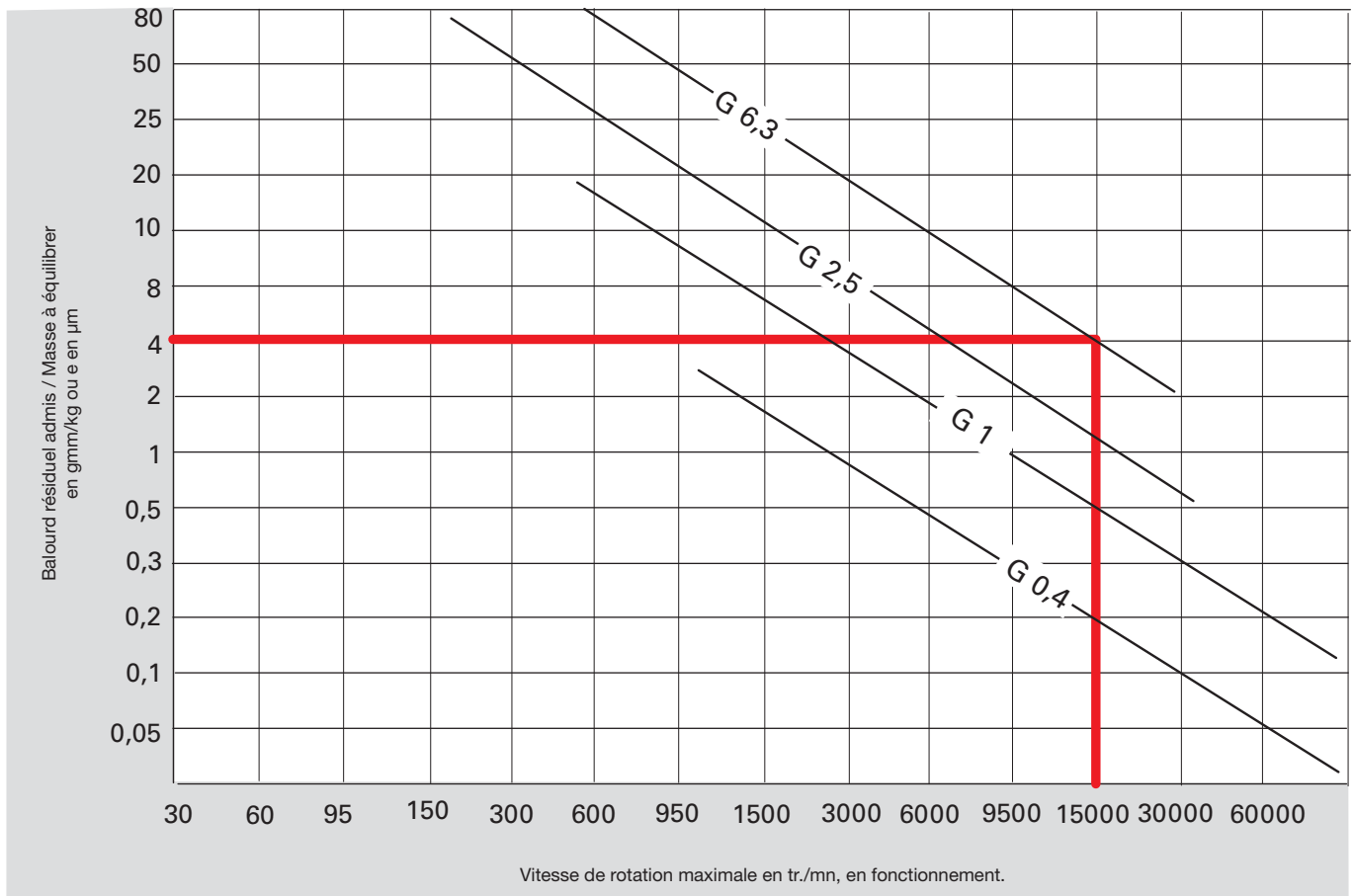
Selon la Norme DIN ISO 1940, la lettre «G» et la valeur «gmm/kg ou μm » représentent la qualité d'équilibrage rapportée à une certaine vitesse de rotation. Par exemple, pour une vitesse de rotation de 15 000 tr./mn d'un attachement avec un poids de 1 kg, G 6,3 représente une valeur de l'intervalle entre le balourd et l'axe de rotation de 4 μm .

En doublant la vitesse de rotation à 30.000 tr./mn, cette valeur serait de 2 μm . Dans le cas où l'attachement ne pèserait que 0,500 kg, cette valeur serait aussi divisée par 2 !

Le but de l'équilibrage est de trouver un compromis entre ce qui est techniquement réalisable et ce qui est significatif, ce qui a du sens. Lors de l'échange d'un attachment HSK en excellent état, la précision de la répétitivité est de 2 à 3 μm et celle du cône SA de 5 à 10 μm , cela signifie une valeur d'équilibrage similaire à G 2,5 voire G 6,3 à 10 000 tr./mn!

Le diagramme d'équilibrage suivant démontre la qualité d'équilibrage selon la Norme DIN ISO 1940 / 1, donc le balourd résiduel admis par rapport à la masse complète à équilibrer, poids de l'attachement pourvu de son outil, pour différentes qualités d'équilibrage G en tenant compte de la vitesse de rotation maximale de l'ensemble lors de l'utilisation.

Effets d'équilibrage sur les broches, les attachements et les outils



Les attachements d'outils Stock sont équilibrés selon G2,5/25.000 tr/mn ou G6,3/15.000 tr/mn. En option, si nécessaire, lorsque le fabricant de la machine le préconise, nous pouvons aussi équilibrer jusqu'au déséquilibre résiduel de 0,3 gmm et fournir un protocole d'équilibrage.

Mandrins de frettage et appareils à fretter

Technique et avantages

Les mandrins de frettage vous assurent une liaison optimale entre le mandrin de serrage et la queue cylindrique de l'outil. Tandis que certains fabricants les réalisent en acier de cémentation quelconque, nous utilisons un acier spécial à outils absolument bien approprié au frettage. Cet acier noble n'a pas seulement un coefficient de dilatation nettement supérieur, il supporte aussi beaucoup mieux les grandes différences de température si bien que vous pouvez fretter et défretter autant de fois que vous le désirez.

Vos avantages :

- Temps de frettage très courts
- Forces de serrage maximales
- Mandrins pour les diamètres d'attache d'outils de 3,00 à 32 mm
- Durée de vie prolongée

Vous profitez encore plus de tous ces avantages lorsque vous pratiquez le fraisage UGV (Fraisage à grande vitesse), lorsque vous réalisez des fraisages difficiles ou fraisages d'ébauche, lorsque vous percez, alésez, usinez le bois ou réalisez des opérations de rectification intérieure.

Propriétés et arguments :

- Excellente coaxialité
- Forces de serrage et rigidité extrêmes
- Durée de vie des outils prolongée
- Balourd amoindri car centre de gravité sur l'axe de rotation
- Rentabilité

Le principe de serrage

Lors du serrage des queues d'outils par frettage, dans les mandrins à fretter, les deux facteurs importants garantissant la liaison optimale de l'outil dans son attachement sont l'échauffement et le refroidissement. Lors de l'échauffement, le mandrin se dilate, ce qui permet d'insérer ou de retirer l'outil afin de le fretter ou de le défretter. Le refroidissement accélère la rétraction du mandrin qui serre l'outil avec des forces de serrage extrêmes. Tandis que l'échauffement des mandrins augmente les risques de brûlures, les outils de coupe à fretter ou à défretter augmentent les risques de blessures. C'est pourquoi, lors du frettage ou défrettage, nous vous recommandons de porter des gants de protection en Kevlar de façon à éliminer tous les risques de brûlures ou autres blessures.

Les rallonges à fretter : Performances accrues!

Les rallonges à fretter augmentent les performances d'un outil et peuvent réduire l'encombrement lors de l'usinage. Les outils se frettent directement sur la rallonge comme ils le sont sur les mandrins de frettage. Les rallonges peuvent être serrées sur mandrins hydrauliques comme elles peuvent aussi l'être sur mandrins de frettage.

Une équipe parfaite : Mandrins de frettage et appareils à fretter

Pour le serrage et le desserrage de vos outils dans nos mandrins à fretter, nous vous proposons différents appareils de frettage pour vos besoins spécifiques.



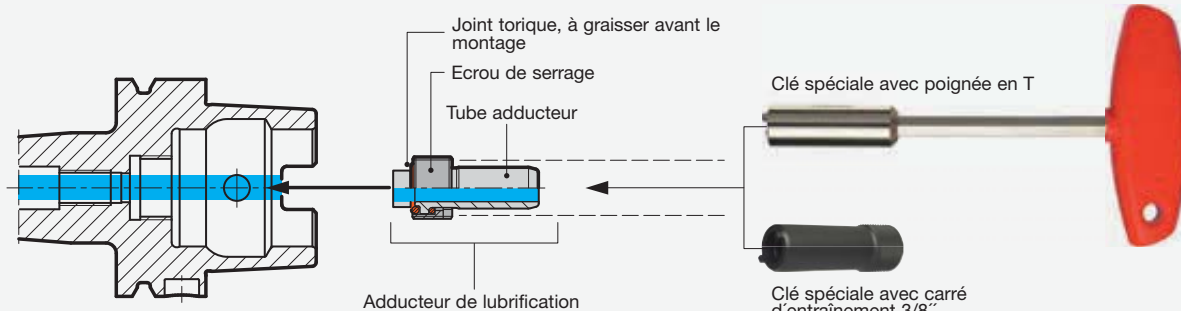
Montage des ensembles adducteur de lubrification / adducteur de lubrification MQL

1. L'attachement HSK doit être propre, sans copeaux et en bon état.
2. Avant le montage, il faut graisser les joints toriques.
3. A l'aide de la clé spéciale, il faut bien centrer et visser l'ensemble adducteur de lubrification (tube adducteur, son écrou de serrage et ses 2 joints toriques) dans l'attachement HSK.
Lors du montage de l'ensemble adducteur MQL, il faut veiller à ce que le tube MQL soit intact et concentriquement inséré dans la vis de réglage axial MQL.
4. Visser et serrer l'adducteur de lubrification / l'ensemble adducteur de lubrification, avec le couple prescrit selon le tableau à droite.
5. Veiller à ce que le tube adducteur puisse légèrement bouger radialement.

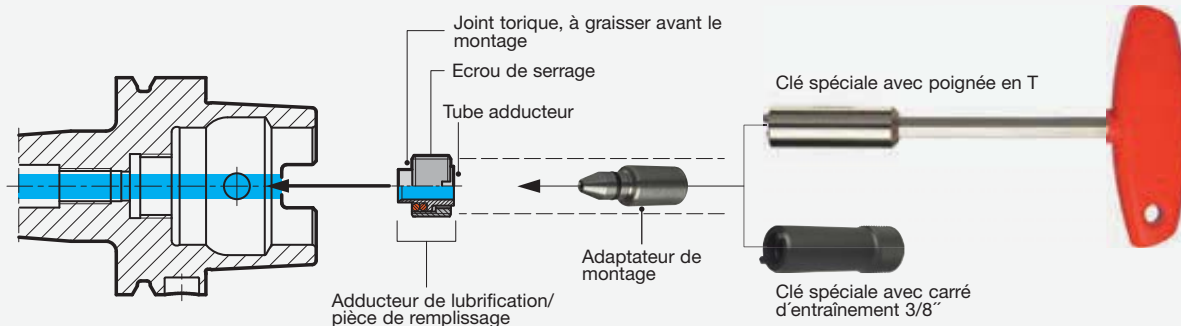
Couple de serrage

pour HSK	MA Nm
32	7
40	11
50	15
63	20
80	25
100	30

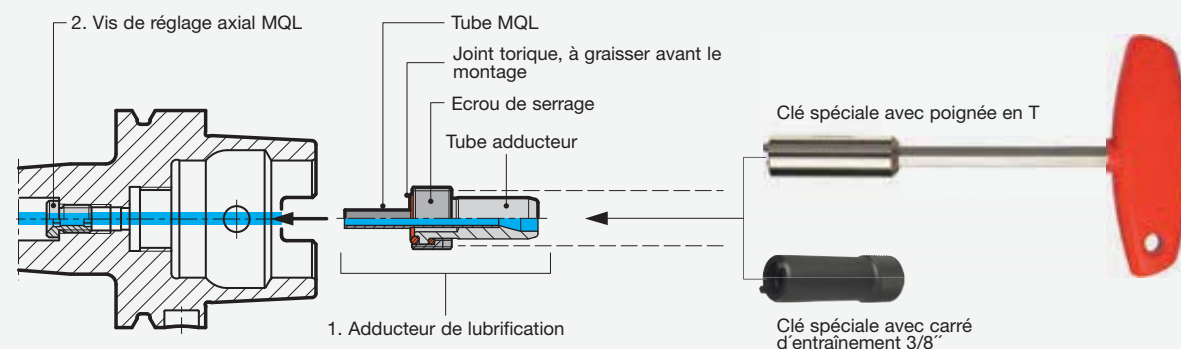
Montage de l'adducteur de lubrification



Montage de l'adducteur de lubrification MQL



Montage de l'ensemble adducteur de lubrification MQL



Mode d'emploi pour mandrins hydrauliques

Technique et avantages

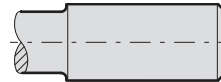
Serrage des queues d'outils selon la norme DIN 6535 dans les mandrins hydrauliques

Queues d'outils
pour serrage direct :
Battement $\leq 0,003$ mm

forme HA $\varnothing 6 \dots 20$ mm



forme HA $\varnothing 25 \dots 32$ mm



forme HB $\varnothing 6 \dots 20$ mm



Queues d'outils
pour serrage dans les
douilles de réduction :
Battement $\leq 0,005$ mm

forme HB $\varnothing 25 \dots 32$ mm



forme HE $\varnothing 6 \dots 20$ mm



forme HE $\varnothing 25 \dots 32$ mm



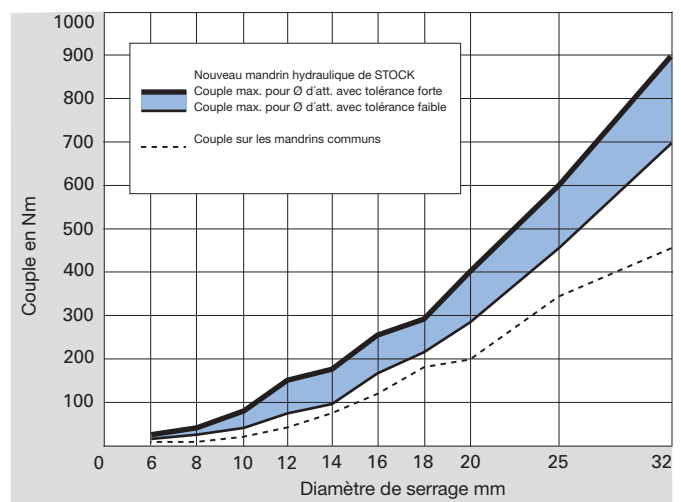
Directives générales :

Nos mandrins hydrauliques ne doivent jamais être serrés par des moyens de serrage automatiques ou motorisés. Afin de ne pas dépasser le couple de serrage prescrit, il ne faut pas utiliser de clés à 6 pans à section renforcée. Nous vous recommandons l'utilisation des clés de serrage courantes, article n° : 4912. Il ne faut pas dépasser le couple de serrage de 10 Nm.

Les mandrins hydrauliques Stock, avec des forces de serrage beaucoup plus élevées, sont prévus pour le serrage des outils rotatifs ou pièces de rotation symétriques à usiner. Les queues d'outils cylindriques lisses jusqu'à 32 mm de \varnothing ou ceux selon la norme DIN 6535 de forme HA ou forme HB jusqu'à 20 mm de \varnothing peuvent être directement serrés dans le mandrin hydraulique. Lors de leur utilisation, il faut s'assurer de ne pas dépasser les valeurs de couple selon le tableau ci-dessous. Ne pas respecter la profondeur minimale de l'enfoncement ou serrer d'autres attachements que ceux énoncés, engendre des pertes de forces de serrage et de précision.

Dès qu'il s'agit d'usiner en UGV ou UTGV, les vitesses de rotation des outils et des mandrins augmentent considérablement. Les mandrins d'usinage sont soumis à d'extrêmes contraintes c'est pourquoi nous avons développé un mandrin hydraulique avec des forces de serrage plus élevées afin de mieux serrer l'outil pour résister à un couple beaucoup plus important.

Le changement d'outils est simple et rapide et la précision de serrage garantit une erreur de battement de maximum 3 μm . Sa construction, au niveau de la membrane de serrage et de son circuit hydraulique, est prévue pour absorber les éventuelles vibrations lors des usinages les plus difficiles à réaliser. De toutes ces qualités résultent la durée de vie optimale des outils, un état de surface d'excellente qualité et la précision d'usinage des pièces à usiner.



Beaucoup plus élevées :
Les forces de serrage du nouveau mandrin hydraulique Stock HSK – A par rapport à celles des mandrins hydrauliques conventionnels

Mandrin hydraulique

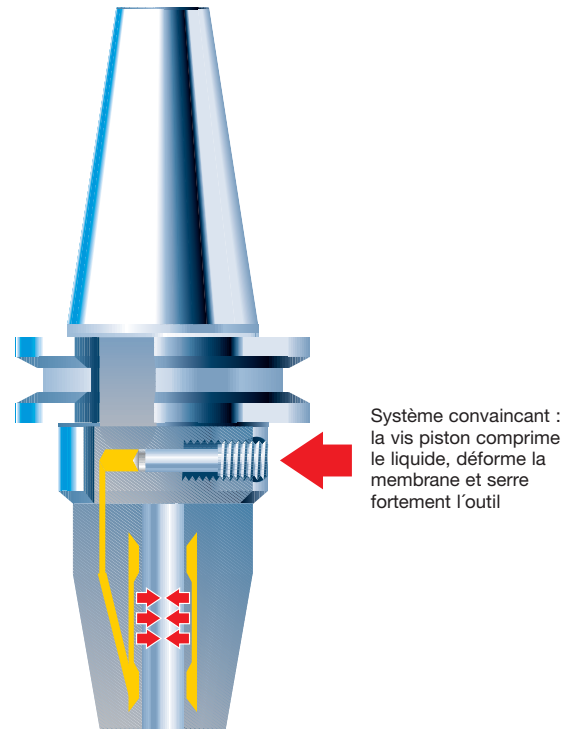
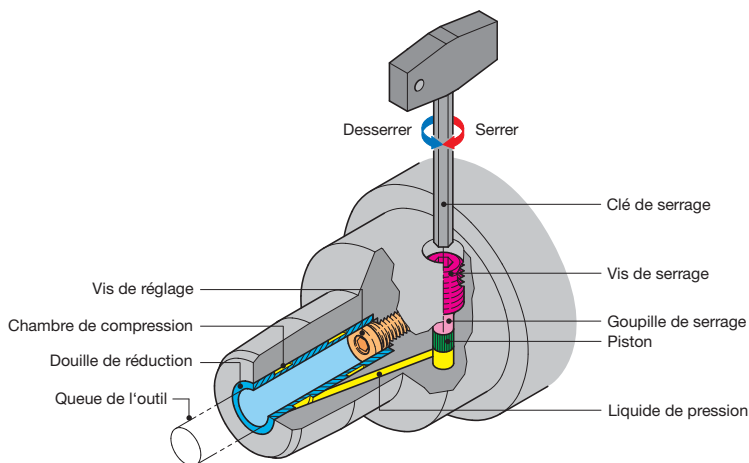
Technique et avantages

Les procédés d'usinages modernes exigent des attachements d'outils extrêmement performants. Les mandrins hydrauliques, rigides et précis, répondent à ces exigences. Un extracteur spécial de douilles de réduction facilite le changement rapide des outils.

Lorsque vous vissez la vis de serrage du mandrin, la pression du circuit hydraulique augmente jusqu'à déformation plastique de la membrane de serrage au niveau de la chambre de compression. Non seulement l'outil est fortement serré mais il est concentrique, pour ainsi dire, sans erreur de battement. La résistance au couple est invraisemblable. Si, pour le serrage de vos outils, vous utilisez des douilles de réduction de différents diamètres, vous profitez encore plus de vos mandrins hydrauliques. Si vous n'utilisez pas de douilles de serrage, il faut veiller à la profondeur minimale d'enfoncement des attachements dans le mandrin!

Résumé des avantages :

- Serrage d'outils très précis avec une erreur de battement de 3 µm max.
- Résistance au couple inégalée, grâce au système optimisé de la membrane de serrage spécialement conçu pour un serrage puissant
- Approprié aux usinages UGV et UTGV puisque sans segments de serrage et sans forces centrifuges
- Très bon état de surface et précision d'usinage grâce aux excellentes propriétés de la concentricité
- Echange d'outils rapide grâce au serrage facile de la vis de serrage
- Durée de vie des outils augmentée
- Eventuelles vibrations absorbées par le circuit hydraulique avec effet d'amortisseur.



pour queue Ø en mm	Nombre de tr. max. en 1/min	Couple en Nm	Prof. min. d'enfonc. en mm	Course max. de réglage l ₃ mm	Forces radiales F adm. à 50 mm à l'ext. en N	Température en °C	Pression max. de lubrification en bars
6 h6	50 000	16	27	10	225	20 - 50	80
8 h6	50 000	26	27	10	370	20 - 50	80
10 h6	50 000	50	31	10	540	20 - 50	80
12 h6	50 000	82	36	10	650	20 - 50	80
14 h6	50 000	125	36	10	900	20 - 50	80
16 h6	50 000	190	39	10	1410	20 - 50	80
18 h6	50 000	275	39	10	1580	20 - 50	80
20 h6	50 000	310	41	10	1860	20 - 50	80
25 h6	25 000	520	47	10	4400	20 - 50	80
32 h6	25 000	770	51	10	6500	20 - 50	80

Comparaison internationale des matières

N° de mat.	Allemagne	Grande Bretagne		Japon	USA
	DIN	BS	EN	JIS	AISI/SAE/ASTM
1.0711	9 S 20	220 M 07	-	SUM 21	1212
1.0715	9 SMn 28	230 M 07	-	SUM 22	1213
1.0718	9 SMnPb 28	-	-	SUM 22 L	12 L 13
1.0721	10 S 20	210 M 15	-	-	1108
1.0722	10 SPb 20	-	-	-	11 L 08
1.0723	15 S 20	210 A 15	-	SUM 32	-
1.0736	9 SMn 36	240 M 07	1B	-	1215
1.0737	9 SMnPb 36	-	-	-	12 L 14
1.0726	35 S 20	212 M 36	8M	-	1140
1.0727	45 S 20	212 M 44	-	-	1146
1.0728	60 S 20	-	-	-	-
1.0037	St 37-2	-	-	STKM 12 C	-
1.0044	St 44-2	4360-43 B	-	SM 41 B	A 570 Gr. 40
1.0116	St 37-3	4360-40 C	-	-	A 573 Gr. 58
1.0144	St 44-3	4360-43 C	-	SM 41 C	A 573 Gr. 70
1.0050	St 50-2	4360-50 B	-	SS 50	A 570 Gr. 50
1.0570	St 52-3	4360-50 B	-	SM 50 YA	-
1.0060	St 60-2	4360-SSE; SS	-	SM 58	-
1.5415	15 Mo 3	1501-240	-	-	A 204 Gr. A
1.5423	16 Mo 5	1503-245-420	-	-	4520
1.5622	14 Ni 6	-	-	-	A 350-LF 5
1.5680	12 Ni 19	-	-	-	2515
1.7335	13 CrMo 4 4	1501-620 Gr.	-	-	A 182-F11; F12
1.7337	16 CrMo 4 4	1501-620 Gr.	-	-	A 387 Gr. 12 C
1.7380	10 CrMo 9 10	1501-622 Gr.	-	-	A 182-F22
1.7709	21 CrMoV 5 7	-	-	-	-
1.7715	14 MoV 6 3	1503-660-440	-	-	-
1.7735	14 CrMoV 6 9	-	-	-	-
1.0904	55 Si 7	250 A 53	45	-	9255
1.0961	60 SiCr 7	-	-	SUP 7	9262
1.1231	CK 67	060 A 67	-	-	1070
1.1248	CK 75	060 A 78	-	-	1078; 1080
1.1274	CK 101	060 A 96	-	SUP 4	1095
1.7103	67 SiCr 5	-	-	-	-
1.7176	55 Cr 3	527 A 60	48	SUP 9 (A)	5155
1.8159	50 CrV 4	735 A 50	47	SUP 10	6150
1.0301	C 10	045 M 10	-	S 10 C	1010
1.0401	C 15	080 M 15	-	-	1015
1.1121	CK 10	045 M 10	-	S 10 C; S 9 CK	1010
1.1141	CK 15	080 M 15	32C	S 15 C; S 15 CK	1015
1.7012	13 Cr 2	-	-	-	-
1.7015	15 Cr 3	523 M 15	-	SCR 415 (H)	5015
1.5732	14 NiCr 10	-	-	SNC 415 (H)	3415
1.5752	14 NiCr 14	655 M 13	36A	SNC 815 (H)	3310; 9314
1.5860	14 NiCr 18	-	-	-	-
1.5919	15 CrNi 6	S 107	-	-	-
1.5920	18 NiCr 8	-	-	-	-
1.6523	21 NiCrMo 2	805 M 20	362	SNCM 220 (H)	8620
1.6587	17 CrNiMo 6	820 A 16	-	-	-
1.7131	16 MnCr 5	527 M 17	-	SCR 415	5115
1.7139	16 MnCrS 5	-	-	-	-
1.7147	20 MnCr 5	-	-	SMnC 420 (H)	5120
1.7149	20 MnCrS 5	-	-	-	-
1.7262	15 CrMo 5	-	-	SCM 415 (H)	-
1.7264	20 CrMo 5	-	-	SCM 421	-
1.7271	23 CrMoB 3 3	-	-	-	-
1.7311	20 CrMo 2	-	-	-	-
1.7321	20 MoCr 4	-	-	-	-
1.7323	20 MoCrS 4	-	-	-	-
1.7325	25 MoCr 4	-	-	-	-
1.7326	25 MoCrS 4	-	-	-	-
1.8504	34 CrAl 6	-	-	-	-
1.8506	34 CrAlS 5	-	-	-	-
1.8507	34 CrAlMo 5	905 M 31	-	-	A 355 Cl. D
1.0038	RS137-2	4360 40C	1A	STKM 12A;C	A570.36

Comparaison internationale des matières

N° de mat.	Allemagne	Grande Bretagne		Japon	USA
	DIN	BS	EN	JIS	AISI/SAE/ASTM
1.0402	C22	050 A 20	2C	-	1020
1.5026	55 Si 7	250 A 53	-	-	9255
1.8509	41 CrAlMo 7	905 M 39	41B	SACM 645	A 355 Cl. A
1.8515	31 CrMo 12	722 M 24	-	-	-
1.8519	31 CrMoV 9	-	-	-	-
1.8521	15 CrMoV 5 9	-	-	-	-
1.8523	39 CrMoV 13 9	897 M 39	40C	-	-
1.8550	34 CrAlNi 7	-	-	-	-
1.0402	C 22	050 A 20	2D	-	1020
1.0406	C 25	070 M 26	-	-	1025
1.0501	C 35	060 A 35	-	-	1035
1.0503	C 45	080 M 46	-	-	1045
1.0511	C 40	-	-	-	1040
1.0528	C 30	-	-	-	-
1.1151	Ck 22	050 A 20	-	S 20 C; S 20 CK	1023
1.1158	Ck 25	070 M 26	-	S 25 C	1025
1.1178	Ck 30	-	-	-	-
1.1181	Ck 35	080 M 36	-	S 35 C	1035
1.1186	Ck 40	080 M 40	-	S 40 C	1040
1.1191	Ck 45	080 M 46	-	S 45 C	1045
1.0535	C 55	070 M 55	-	-	1055
1.0540	C 50	-	-	-	-
1.0601	C 60	080 A 62	43D	-	1060
1.1203	Ck 55	070 M 55	-	S 55 C	1055
1.1206	Ck 50	080 M 50	-	-	1050
1.1221	Ck 60	080 A 62	43D	S 58 C	1060
1.1133	20 Mn 5	120 M 19	-	-	1022; 1518
1.3505	100 Cr 6	534 A 99	31	SUJ 2	52100
1.5120	38 MnSi 4	-	-	-	-
1.5121	46 MnSi 4	-	-	-	-
1.5141	53 MnSi 4	-	-	-	-
1.5710	36 NiCr 6	640 A 35	111A	SNC 236	3135
1.6546	40 NiCrMo	311-Type7	-	SNCM 240	8740
1.6565	40 NiCrMo	311-Type6	-	SNCM 439	4340
1.7003	38 Cr 2	-	-	-	-
1.7006	46 Cr 2	-	-	-	5045
1.7020	32 Cr 2	-	-	-	-
1.7030	28 Cr 4	530 A 30	-	-	5130
1.7033	34 Cr 4	530 A 32	18B	SCr 430 (H)	5132
1.7218	25 CrMo 4	1717 CDS 110	-	SCM 420; SCM	4130
1.7220	34 CrMo 4	708 A 37	19B	SCM 432; SCCrM	4135; 4137
1.7223	41 CrMo 4	708 M 40	19A	SCM 440	4142; 4140
1.7225	42 CrMo 4	708 M 40	19A	SCM 440	4142; 4140
1.7228	50 CrMo 4	708 A 47	-	SCM 445 (H)	4150
1.1157	40 Mn 4	150 M 36	15	-	1039
1.1165	30 Mn 5	120 M 36	-	SMn 433 H; SCMn	1330
1.1167	36 Mn 5	150 M 36	-	SMn 438 H; SCMn	1335
1.1170	28 Mn 5	150 M 28	14A	SCMn 1	1330
1.3561	44 Cr 2	-	-	-	-
1.3563	43 CrMo 4	-	-	-	-
1.3565	48 CrMo 4	817 M 40	-	SNC 836	-
1.5120	38 MnSi 4	-	-	-	-
1.5121	46 MnSi 4	-	-	-	-
1.5122	37 MnSi 4	-	-	-	-
1.5131	50 MnSi4	-	-	-	-
1.5141	53 MnSi 4	-	-	-	-
1.5223	42 MnV 7	-	-	-	-
1.5710	36 NiCr 6	640 A 35	111A	SNC 236	3135
1.5736	36 NiCr 10	-	-	SNC 631 (H)	3435
1.5755	31 NiCr 14	653 M 31	-	SNC 836	-
1.6511	36 CrNiMo	816 M 40	110	SNC 836	9840
1.6513	28 NiCrMo	-	-	-	-
1.7003	38 Cr 2	-	-	-	-
1.7006	46 Cr 2	-	-	-	5045
1.7030	28 Cr 4	530 A 30	-	-	5130

Comparaison internationale des matières

Allemagne		Grande Bretagne		Japon	USA
N° de mat.	DIN	BS	EN	JIS	AISI/SAE/ASTM
1.7033	34 Cr 4	530 A 32	18B	SCr 430 (H)	5132
1.7034	37 Cr 4	530 A 36	-	SCr 435 (H)	5135
1.7035	41 Cr 4	530 M 40	18	SCr 440 (H)	5140
1.7218	25 CrMo 4	1717 CDS 110	-	SCM 420; SCM 430	4130
1.7220	34 CrMo 4	708 A 37	19B	SCM 432; SCCrM 3	4135; 4137
1.7223	41 CrMo 4	708 M 40	19A	SCM 440	4142; 4140
1.7225	42 CrMo 4	708 M 40	19A	SCM 440	4142; 4140
1.7228	50 CrMo 4	708 A 47	-	SCM 445 (H)	4150
1.7561	42 CrV 6	-	-	-	-
1.7735	14 CrMoV 6 9	-	-	-	-
1.8159	50 CrV 4	735 A 50	47	SUP 10	6150
1.3563	43 CrMo 4	-	-	-	-
1.3565	48 CrMo 4	817 M 40	-	SNC 836	-
1.5120	38 MnSi 4	-	-	-	-
1.5121	46 MnSi 4	-	-	-	-
1.5122	37 MnSi 4	-	-	-	-
1.5223	42 MnV 7	-	-	-	-
1.5710	36 NiCr 6	640 A 35	111A	SNC 236	3135
1.5736	36 NiCr 10	-	-	SNC 631 (H)	3435
1.5864	35 NiCr 18	-	-	-	-
1.6511	36 CrNiMo 4	816 M 40	110	SNC 836	9840
1.6580	30 CrNiMo 8	823 M 30	-	SNCM 431	-
1.6582	34 CrNiMo 6	817 M 40	24	SNCM 447	4340
1.7033	34 Cr 4	530 A 32	18B	SCr 430 (H)	5132
1.7034	37 Cr 4	530 A 36	-	SCr 435 (H)	5135
1.7035	41 Cr 4	530 M 40	18	-	5140
1.7045	42 Cr 4	530 A 40	-	2245	5140
1.7218	25 CrMo 4	1717 CDS 110	-	2225	4130
1.7220	34 CrMo 4	708 A 37	19B	2234	4135; 4137
1.7223	41 CrMo 4	708 M 40	19A	2244	4142; 4140
1.7225	42 CrMo 4	708 M 40	19A	2244	4142; 4140
1.7228	50 CrMo 4	708 A 47	-	-	4150
1.7361	32 CrMo 12	722 M 24	40B	2240	-
1.7561	42 CrV 6	-	-	-	-
1.7707	30 CrMoV 9	-	-	-	-
1.7735	14 CrMoV 6 9	-	-	-	-
1.8159	50 CrV 4	735 A 50	47	2230	6150
1.8161	58 CrV 4	-	-	-	-
1.1520	C 70 W1	-	-	-	-
1.1525	C 80 W1	-	-	-	W 108
1.1545	C 105 W1	-	-	-	W 110
1.1620	C 70 W2	-	-	-	-
1.1625	C 80 W2	BW 1B	-	-	W 1
1.1645	C105 W2	-	-	-	-
1.1654	C 110 W	-	-	-	-
1.1663	C 125 W	-	-	-	W 112
1.1673	C 135 W	-	-	-	-
1.1730	C 45 W	-	-	-	-
1.1740	C 60 W	-	-	-	-
1.1744	C 67 W	-	-	-	-
1.1750	C 75 W	BW 1A	-	-	W 1
1.1820	C 55 W	-	-	-	-
1.1830	C 85 W	-	-	-	-
1.2067	100 Cr 6	BL 3	-	-	L 3
1.2101	62 SiMnCr 4	-	-	-	-
1.2103	58 SiCr 8	-	-	-	-
1.2108	90 CrSi 5	-	-	-	-
1.2162	21 MnCr 5	-	-	-	-
1.2210	115 CRV 3	-	-	-	L 2
1.2330	35 CrMo 4	708 A 37	-	2234	4135
1.2332	47 CrMo 4	709 M 40	-	2244	4142
1.2419	105 WCr 6	-	-	-	-
1.2510	100 MnCrW 4	BO 1	-	2140	O 1
1.2516	120 W 4	BF 1	-	-	-
1.2542	45 WCrV 7	BS 1	-	2710	S 1

Comparaison internationale des matières

N° de mat.	Allemagne		Grande Bretagne		Japon	USA
	DIN	BS	EN	JIS	AISI/SAE/ASTM	
1.2550	60 WCrV 7	-	-	-	-	
1.2721	50 NiCr 13	-	-	-	-	
1.2735	15 NiCr 14	-	-	SNC 22	-	
1.2762	75 CrMoNiW 6 7	-	-	-	-	
1.2826	60 MnSiCr 4	-	-	-	-	
1.2833	100 V 1	BW 2	-	SKS 43	W 210	
1.2842	90 MnCrV 8	BO 2	-	-	O 2	
1.2080	X 210 Cr 12	BD 3	-	SKD 1	D 3	
1.2341	X 6 CrMo 4	-	-	-	-	
1.2363	X 100 CrMoV 5 1	BA 2	-	SKD 12	A 2	
1.2379	X 155 CrVMo12 1	BD 2	-	SKD 11	D 2	
1.2436	X 210 CrW 12	-	-	SKD 2	-	
1.2601	X 165 CrMoV 12	-	-	-	-	
1.2311	40 CrMnMo 7	-	-	-	-	
1.2312	40 CrMnMoS 8 6	-	-	-	-	
1.2711	54 NiCrMoV 6	-	-	-	-	
1.2713	55 NiCrMoV 6	-	-	SKT 4	L 6	
1.2738	40 CrMnNiMo 8	-	-	-	-	
1.2744	57 NiCrMoV 77	-	-	-	-	
1.2764	X 19 NiCrMo 4	-	-	-	-	
1.2767	X 45 NiCrMo 4	-	-	-	-	
1.2083	X 42 Cr 13	-	-	SUS 420 J 2	-	
1.2343	X 38 CrMoV 5 1	BH 11	-	SKD 6	H 11	
1.2344	X 40 CrMoV 5 1	BH 13	-	SKD 61	H 13	
1.2365	X 32 CrMoV 3 3	BH 10	-	SKD 7	H 10	
1.2567	X 30 WCrV 5 3	-	-	SKD 4	-	
1.2581	X 30 WCrV 9 3	BH 21	-	SKD 5	H 21	
1.2885	X 32 CrMoV 3 3 3	-	-	-	-	
1.2316	X 36 CrMo 17	-	-	-	-	
1.0420	GS-38	-	-	-	-	
1.1118	GS-24 Mn 6	-	-	-	-	
1.1120	GS-20 Mn 5	-	-	-	-	
1.5419	GS-22 Mo 4	-	-	-	-	
1.5633	GS-24 Ni 8	-	-	-	-	
1.5681	GS-10 Ni 19	-	-	-	-	
1.6309	GS-20 Mn MoNi 5 5	-	-	-	-	
1.6582	GS-34 CrNiMo 6	-	24	-	-	
1.6748	GS-40 NiCrMo 6 5 6	-	-	-	-	
1.4311	X 2 CrNiN 18 10	304 S 62	-	SUS 304 LN	304 LN	
1.4401	X 5 CrNiMo 18 10	316 S 16	58J	SUS 316	316	
1.4404	X 2 CrNiMo 17 13 2	316 S 11	-	SUS 316 L	316 L	
1.4406	X 2 CrNiMoN 17 12 2	316 S 61	58C	SUS 316 LN	316 LN	
1.4429	X 2 CrNiMoN 17 13 3	316 S 62	-	SUS 316 LN	316 LN	
1.4435	X 2 CrNiMo 18 14 3	317 S 12	-	SCS 16; SUS 316	316 L	
1.4436	X 5 CrNiMo 17 13 3	316 S 16	-	SUS 316	316	
1.4438	X 2 CrNiMo 18 16 4	317 S 12	-	SUS 317 L	317 L	
1.4460	X 8 CrNiMo 27 5	-	-	SUS 329 J 1	329	
1.4462	X 2 CrNiMoN 22 5	-	-	-	-	
1.4541	X 6 CrNiTi 18 10	321 S 12	58B	SUS 321	321	
1.4542	X 5 CrNiCuNb 17 14	-	-	SCS 124; SUS 630	630	
1.4546	X 5 CrNiNb 18 10	347 S 18	-	-	348	
1.4550	X 6 CrNiNb 18 10	347 S 17	58F	SUS 347	347	
1.4571	X 6 CrNiMoTi 17 12 2	320 S 31	58J	-	316 Ti	
1.4580	X 6 CrNiMoNb 17 12 2	318 S 17	-	-	316 Nb	
1.4301	X 5 CrNi 18 9	304 S 15	58E	SUS 304	304; 304 H	
1.4303	X 5 CrNi 18 12	305 S 19	-	SUS 305	308; 305	
1.4305	X 10 CrNiS 18 9	303 S 21	58M	SUS 303	303	
1.4306	X 2 CrNi 19 11	304 S 12	-	SCS 19	304 L	
1.4310	X 12 CrNi 17 7	301 S 21	-	SUS 301	301	
1.4350	X 5 CrNi 18 9	304 S 31	58E	SUS 302	304	
1.4573	X 10 CrNiMoTi 18 12	320 S 33	-	-	316 Ti	
1.4583	X 10 CrNiMoNb 18 12	-	-	-	318	
1.4000	X 6 Cr 13	403 S 17	-	SUS 403	403	
1.4002	X 6 CrAl 13	405 S 17	-	SUS 405	405	
1.4016	X 6 Cr 17	430 S 15	960	SUS 430	430	

Comparaison internationale des matières

Allemagne		Grande Bretagne		Japon	USA
N° de mat.	DIN	BS	EN	JIS	AISI/SAE/ASTM
1.4113	X 6 CrMo 17	434 S 17	-	SUS 434	434
1.4313	X 5 CrNi 13 4	425 C 11	-	SCS 5	CA 6-NM
1.4510	X 6 CrTi 17	-	-	SUS 430 LX	XM 8; 430 Ti
1.4512	X 5 CrTi 12	409 S 19	-	SUH 409	409
1.4005	X 12 CrS 13	416 S 21	-	SUS 416	416
1.4006	X 10 Cr 13	410 S 21	56A	SUS 410	410; CA-15
1.4021	X 20 Cr 13	420 S 37	-	SUS 420 J 1	420
1.4028	X 30 Cr 13	420 S 45	-	SUS 420 J 2	-
1.4031	X 38 Cr 13	-	-	SUS 420 J 2	-
1.4034	X 46Cr 13	420 S 45	56D	SUS 420 J 2	-
1.4057	X 20 CrNi 17 2	431 S 29	57	SUS 431	431
1.4104	X 12 CrMoS 17	-	-	SUS 430 F	430 F
1.4125	X 105 CrMo 17	-	-	SUS 440 C	440 C
1.4742	X 10 CrAl 18	430 S 15	60	SUS 430; SUH	430
1.4747	X 80 CrNiSi 20	443 S 65	59	SUH 4	HNv 6
1.4762	X 10 CrAl 24	-	-	-	446
1.4876	X 10 NiCrAlTi 33	NA 15 (H)	-	NCF 800	B 163
0.6010	GG-10	-	-	FC 10	A48-20 B
0.6015	GG-15	Grade 150	-	FC 15	A48-25 B
0.6020	GG-20	Grade 220	-	FC 20	A48-30 B
0.6025	GG-25	Grade 260	-	FC 25	A48-40 B
0.6030	GG-30	Grade 300	-	FC 30	A48-45 B
0.6035	GG-35	Grade 350	-	FC 35	A48-50 B
0.6040	GG-40	Grade 400	-	-	A48-60 B
0.6655	GGL-NiCuCr 15 6	L-NUC 15 6 2	-	-	A-436 Type 1
0.7040	GGG-40	SNG 420/12	-	FCD 40	60-40-18
0.7050	GGG-50	SNG 500/7	-	FCD 50	65-45-12
0.7060	GGG-60	SNG 600/3	-	FCD 60	80-55-06
0.7070	GGG-70	SNG 700/2	-	FCD 70	100-70-03
0.7080	GGG-80	SNG 800/2	-	-	120-90-02
0.7660	GGG-NiCr 20 2	S-NiCr 20 2	-	-	A 439 Type D-2
0.7661	GGG-NiCr 20 3	S-NiCr 20 3	-	-	A 439 Type D-2B
0.7670	GGG-Ni 22	S-Ni 22	-	-	A 439 Type D-2C
0.7673	GGG-NiMn 23 4	S-NiMn 23 4	-	-	A 439 Type D-2M
0.7676	GGG-NiCr 30 3	S-NiCr 30 3	-	-	A 439 Type D-3
0.7677	GGG-NiCr 30 1	S-NiCr 30 1	-	-	A 439 Type D-3A
0.7680	GGG-NiSiCr 30 5	S-NiSiCr 30 5 5	-	-	A 439 Type D-4
0.7683	GGG-Ni 35	S-Ni 35	-	-	A 439 Type D-5
0.7685	GGG-NiCr 35 3	S-NiCr 35 3	-	-	A 439 Type D-5B
0.8135	GTS-35	B340/12	-	-	32510
0.8145	GTS-45	P440/7	-	-	40010
0.8155	GTS-55	P510/4	-	-	50005
0.8165	GTS-65	P570/3	-	-	70003
0.8170	GTS-70	P690/2	-	-	90001
0.8035	GTW-35	W340/3	-	-	-
3.0225	Al99.5	1B	-	A1x1	-
3.0305	Al99.9	-	-	-	-
3.0505	AlMn0.5Mg0.5	N31	-	-	-
3.0515	AlMn1	N3	-	144054	-
3.0525	AlMn1Mg0.5	-	-	-	-
3.3315	AlMg1	N41	-	A2x8	-
3.3535	AlMg3	N5	-	-	-
3.1325	AlCuMg1	H14	-	-	-
3.1355	AlCuMg2	2L97	-	A3x4	-
3.2315	AlMgSi1	H30	-	-	-
3.3206	AlMgSi0.5	H9	-	A2x5	-
3.3211	AlMg1SiCu	-	-	-	-
3.4345	AlZnMgCu0.5	L86	-	-	7050
3.4365	AlZnMgCu1.5	L87	-	-	7175
-	Al1Mg1SiCrTi	-	-	-	6011
-	Al0.3Cu1Mg0.6SiCr	-	-	-	6061
-	Al1Cu1.1Mg1.4Si0.8Mn	-	-	-	6066
3.2134	G-AlSi5Cu1Mg	-	-	-	-
3.3241	G-AlMg3Si	-	-	-	-
3.3292	GD-AlMg9	-	-	-	-

Comparaison internationale des matières

Allemagne		Grande Bretagne		Japon	USA
N° de mat.	DIN	BS	EN	JIS	AISI/SAE/ASTM
3.3541	GD-AlMg3	-	-	-	-
3.2161	G-AISI8Cu3	-	-	-	-
3.2373	G-AISI9Mg	-	-	-	-
3.2381	G-AISI10Mg	LM9	-	-	-
3.2383	G-AISI10Mg(Cu)	LM 9	-	-	A 360.2
3.2581	G-AISI12	LM 6	-	-	A 413.2
2.2583	G-AISI12(Cu)	LM 20	-	-	A 413.1
2.0240	CuZn15	CZ 102	-	-	C23000
2.0265	CuZn30	CZ 106	-	-	C26000
2.0321	CuZn37	CZ 108	-	-	C27200
2.0335	CuZn36	-	-	-	-
2.0360	CuZn40	-	-	-	-
2.0401	CuZn39Pb3	-	-	-	-
2.1016	CuSn4	-	-	-	-
2.1030	CuSn8	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
2.0975	G-CuAl10Ni	-	-	-	-
2.1096.01	G-CuSn5ZnPb	-	-	-	-
2.1090.01	G-CuSn7ZnPb	-	-	-	-
2.1086.01	G-CuSn10Zn	-	-	-	-
2.4360	NiCu30Fe	NA 13	-	-	Monel 400
2.4375	NiCu30Al	NA 18	-	-	Monel K-500
2.4685	G-NiMo28	-	-	-	Hastelloy B
2.4610	NiMo16Cr16Ti	-	-	-	Hastelloy C-4
2.4810	G-NiMo30	-	-	-	Hastelloy C
2.4630, 2.4951	NiCr20Ti	HR 5	-	-	Nimonic 75
2.4631	NiCr20TiAl	HR 401; 601	-	NCF 80 A	Nimonic 80 A
2.4632	NiCr20Co18Ti	-	-	-	Nimonic 90
2.4634	NiCo20Cr15MoAlTi	-	-	-	Nimonic 105
2.4662	NiCr13Mo6Ti3	-	-	-	Nimonic 901
2.4670	-	-	-	-	Nimocast 713
2.4674	-	-	-	-	Nimocast PK 24
2.6554	-	-	-	-	Waspaloy
Hardox 400	-	-	-	-	Hardox 400
Hardox 500	-	-	-	-	Hardox 500
2.4856	NiCr22Mo9Nb	NA 21	-	-	Inconel 625
2.4668	NiCr19FeNbMo	-	-	-	Inconel 718
3.7024	Ti99.5	TA 6	-	-	-
3.7064	Ti99.2	TA 7	-	-	R50400
Ti99.9	Ti99.9	TA 9	-	-	R50700
3.7112	Ti5Al2.5Sn	TA 14/17	-	-	R54520
3.7165	TiAl6V4	TA 28	-	-	R56400
1.4718	X 45 CrSi 9 3	401 S 45	52	SUH 1	HNV 3
1.4828	X 15 CrNiSi 20 12	309 S 24	-	SUH 309	309
1.4841	X 15 CrNiSi 25 20	-	-	SUH 310	314; 310
1.4845	X 12 CrNi 25 21	310 S 24	-	SUH 310; SUS 310 S	310 S
1.4864	X 12 NiCrSi 36 16	NA 17	-	SUH 330	330
1.4871	X 53 CrMnNiN 21 9	349 S 54	-	SUH 35; SUH 36	EV 8
1.4878	X 12 CrNiTi 18 9	321 S 20	-	SUS 321	321

Bases de fraisage

Table de conversion des duretés

(N/mm ²)	HRC	HB30	HV10
240		71	75
255		76	80
270		81	85
285		86	90
305		90	95
320		95	100
335		100	105
350		105	110
370		109	115
385		114	120
400		119	125
415		124	130
430		128	135
450		133	140
465		138	145
480		143	150
495		147	155
510		152	160
530		157	165
545		162	170
560		166	175
575		171	180
595		176	185
610		181	190
625		185	195
640		190	200
660		195	205
675		199	210
690		204	215
705		209	220
720		214	225
740		219	230
755		223	235
770		228	240
785		233	245
800	22	238	250
820	23	242	255
835	24	247	260
860	25	255	268
870	26	258	272
900	27	266	280
920	28	273	287
940	29	278	293
970	30	287	302
995	31	295	310
1020	32	301	317
1050	33	311	327
1080	34	319	336

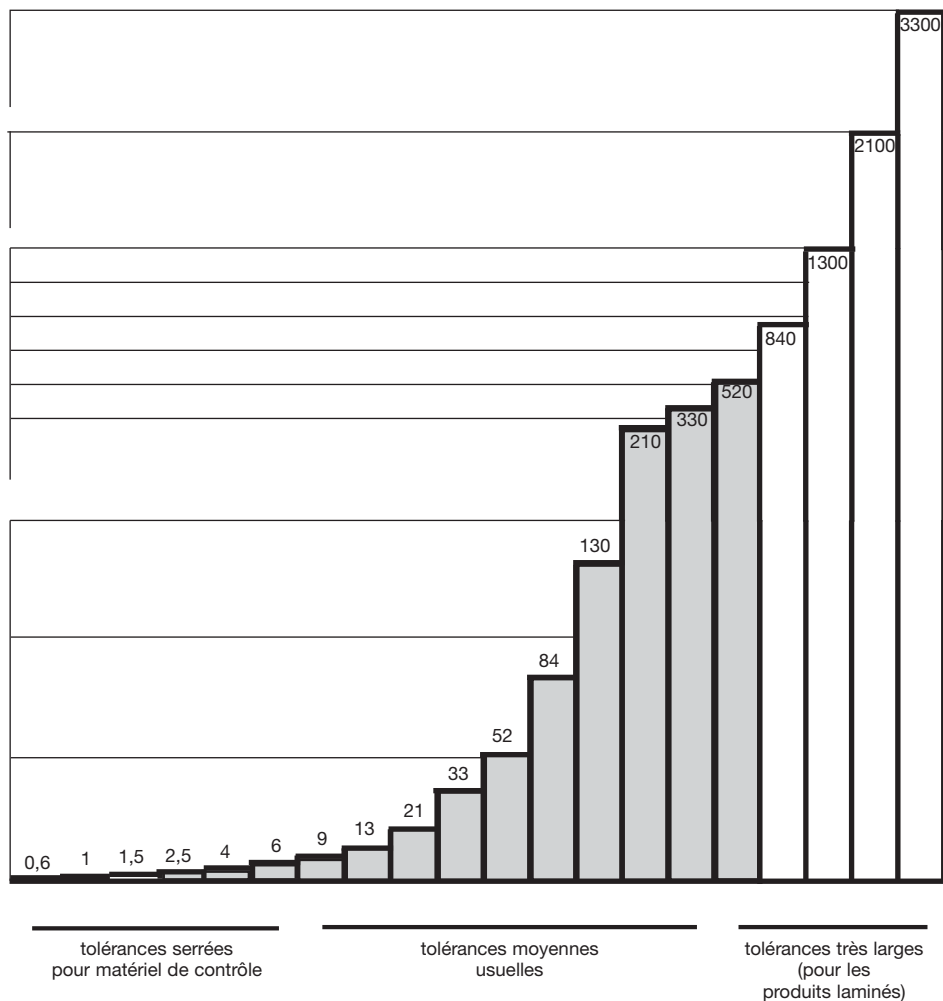
(N/mm ²)	HRC	HB30	HV10
1110	35	328	345
1140	36	337	355
1170	37	346	364
1200	38	354	373
1230	39	363	382
1260	40	372	392
1300	41	383	403
1330	42	393	413
1360	43	402	423
1400	44	413	434
1440	45	424	446
1480	46	435	458
1530	47	449	473
1570	48	460	484
1620	49	472	497
1680	50	488	514
1730	51	501	527
1790	52	517	544
1845	53	532	560
1910	54	549	578
1980	55	567	596
2050	56	584	615
2140	57	607	639
2180	58	622	655
	59		675
	60		698
	61		720
	62		745
	63		773
	64		800
	65		829
	66		864
	67		900
	68		940

Tolérance de fabrication

Tolérances ISO des longueurs nominales 1 à 120 mm DIN ISO 286-1

Dimensions nominales mm		IT en μm											
		3	4	5	6	7	8	9	10	11	12	13	14
de	1	2	3	4	6	10	14	25	40	60	100	140	250
à	3	2	3	4	6	10	14	25	40	60	100	140	250
au-dessus de	3	2.5	4	5	8	12	18	30	48	75	120	180	300
jusqu'à	6	2.5	4	5	8	12	18	30	48	75	120	180	300
au-dessus de	6	2.5	4	6	9	15	22	36	58	90	150	220	360
jusqu'à	10	2.5	4	6	9	15	22	36	58	90	150	220	360
au-dessus de	10	3	5	8	11	18	27	43	70	110	180	270	430
jusqu'à	18	3	5	8	11	18	27	43	70	110	180	270	430
au-dessus de	18	4	6	9	13	21	33	52	84	130	210	330	520
jusqu'à	30	4	6	9	13	21	33	52	84	130	210	330	520
au-dessus de	30	4	7	11	16	25	39	62	100	160	250	390	620
jusqu'à	50	4	7	11	16	25	39	62	100	160	250	390	620
au-dessus de	50	5	8	13	19	30	46	74	120	190	300	460	740
jusqu'à	80	5	8	13	19	30	46	74	120	190	300	460	740
au-dessus de	80	6	10	15	22	35	54	87	140	220	350	540	870
jusqu'à	120	6	10	15	22	35	54	87	140	220	350	540	870

Exemples de tolérances ISO pour dim. nominales de 18 à 30 mm



Tolérances usuelles des alésages, en μm

Diamètre nominal en mm de à		A		B				C			
		9	11	8	9	10	11	8	9	10	11
0	3	+295	+330	+154	+165	+180	+200	+74	+85	+100	+120
		+270	+270	+140	+140	+140	+140	+60	+60	+60	+60
3	6	+300	+345	+158	+170	+188	+215	+88	+100	+118	+145
		+270	+270	+140	+140	+140	+140	+70	+70	+70	+70
6	10	+316	+370	+172	+186	+208	+240	+102	+116	+138	+170
		+280	+280	+150	+150	+150	+150	+80	+80	+80	+80
10	18	+333	+400	+177	+193	+220	+260	+122	+138	+165	+205
		+290	+290	+150	+150	+150	+150	+95	+95	+95	+95
18	30	+352	+430	+193	+212	+244	+290	+143	+162	+194	+240
		+300	+300	+160	+160	+160	+160	+110	+110	+110	+110
30	40	+372	+470	+209	+232	+270	+330	+159	+182	+220	+280
		+310	+310	+170	+170	+170	+170	+120	+120	+120	+120
40	50	+382	+480	+219	+242	+280	+340	+169	+192	+230	+290
		+320	+320	+180	+180	+180	+180	+130	+130	+130	+130
50	65	+414	+530	+236	+264	+310	+380	+186	+214	+260	+330
		+340	+340	+190	+190	+190	+190	+140	+140	+140	+140
65	80	+434	+550	+246	+274	+320	+390	+196	+224	+270	+340
		+360	+360	+200	+200	+200	+200	+150	+150	+150	+150
80	100	+467	+600	+274	+307	+360	+440	+224	+257	+310	+390
		+380	+380	+220	+220	+220	+220	+170	+170	+170	+170
100	120	+497	+630	+294	+327	+380	+460	+234	+267	+320	+400
		+410	+410	+240	+240	+240	+240	+180	+180	+180	+180

Diamètre nominal en mm de à		D					E			F			
		8	9	10	11	12	7	8	9	6	7	8	9
0	3	+34	+45	+60	+80	+120	+24	+28	+39	+12	16	+20	+31
		+20	+20	+20	+20	+20	+14	+14	+14	+6	+6	+6	+6
3	6	+48	+60	+78	+105	+150	+32	+38	+50	+18	+22	+28	+40
		+30	+30	+30	+30	+30	+20	+20	+20	+10	+10	+10	+10
6	10	+62	+76	+98	+130	+190	+40	+47	+61	+22	+28	+35	+49
		+40	+40	+40	+40	+40	+25	+25	+25	+13	+13	+13	+13
10	18	+77	+93	+120	+160	+230	+50	+59	+75	+27	+34	+43	+59
		+50	+50	+50	+50	+50	+32	+32	+32	+16	+16	+16	+16
18	30	+98	+117	+149	+195	+275	+61	+73	+92	+33	+41	+53	+72
		+65	+65	+65	+65	+65	+40	+40	+40	+20	+20	+20	+20
30	50	+119	+142	+180	+240		+75	+89	+112	+41	+50	+64	+87
		+80	+80	+80	+80		+50	+50	+50	+25	+25	+25	+25
50	80	+146	+174	+220	+290		+90	+106	+134	+49	+60	+76	+104
		+100	+100	+100	+100		+60	+60	+60	+30	+30	+30	+30
80	120	+174	+207	+260	+340		+107	+126	+159	+58	+71	+90	+123
		+120	+120	+120	+120		+72	+72	+72	+36	+36	+36	+36
120	180						+148						
							+85						
180	250						+172						
							+100						

Tolérances usuelles des alésages, en μm

Diamètre nominal en mm de à		G		H							J		
		6	7	6	7	8	9	10	11	12	6	7	8
0	3	+8	+12	+6	+10	+14	+25	+40	+60	+100	+2	+4	+6
		+2	+2	0	0	0	0	0	0	0	-4	-6	-8
3	6	+12	+16	+8	+12	+18	+30	+48	+75	+120	+5	+6	+10
		+4	+4	0	0	0	0	0	0	0	-3	-6	-8
6	10	+14	+20	+9	+15	+22	+36	+58	+90	+150	+5	+8	+12
		+5	+5	0	0	0	0	0	0	0	-4	-7	-10
10	18	+17	+24	+11	+18	+27	+43	+70	+110	+180	+6	+10	+15
		+6	+6	0	0	0	0	0	0	0	-5	-8	-12
18	30	+20	+28	+13	+21	+33	+52	+84	+130	+210	+8	+12	+20
		+7	+7	0	0	0	0	0	0	0	-5	-9	-13
30	50	+25	+34	+16	+25	+39	+62	+100	+160	+250	+10	+14	+24
		+9	+9	0	0	0	0	0	0	0	-6	-11	-15
50	80	+29	+40	+19	+30	+46	+74	+120	+190	+300	+13	+18	+28
		+10	+10	0	0	0	0	0	0	0	-6	-12	-18
80	120	+34	+47	+22	+35	+54	+87	+140	+220	+350	+16	+22	+34
		+12	+12	0	0	0	0	0	0	0	-6	-13	-20
120	180		+54	+25	+40	+63	+100	+160	+250		+18	+26	+41
			+14	0	0	0	0	0	0		-7	-14	-22
180	250		+61	+29	+46	+72	+115	+185	+290		+22	+30	+47
			+15	0	0	0	0	0	0		-7	-16	-25

Diamètre nominal en mm de à		JS			K			M			
		6	7	8	9	6	7	8	6	7	8
0	3	+3	+5	+7	+12,5	0	0	0	-2	-2	-4
		-3	-5	-7	-12,5	-6	-10	-14	-8	-12	-18
3	6	+4	+6	+9	+15	+2	+3	+5	-1	0	+2
		-4	-6	-9	-15	-6	-9	-13	-9	-12	-16
6	10	+4,5	+7,5	+11	+18	+2	+5	+6	-3	0	+1
		-4,5	-7,5	-11	-18	-7	-10	-16	-12	-215	-21
10	18	+5,5	+9	+13,5	+21,5	+2	+6	+8	-4	0	+2
		-5,5	-9	-13,5	-21,5	-9	-12	-19	-15	-18	-25
18	30	+6,5	+10,5	+16,5	+26	+2	+6	+10	-4	0	+4
		-6,5	-10,5	-16,5	-26	-11	-15	-23	-17	-21	-29
30	50	+8	+12,5	+19,5	+31	+3	+7	+12	-4	0	+5
		-8	-12,5	-19,5	-31	-13	-18	-27	-20	-25	-34
50	80	+9,5	+15	+23	+37	+4	+9	+14	-5	0	+5
		-9,5	-15	-23	-37	-15	-21	-32	-24	-30	-41
80	120	+11	+17,5	+27	+43,5	+4	+10	+16	-6	0	+6
		-11	-17,5	-27	-43,5	-18	-25	-38	-28	-35	-48
120	180					+4	+12				
						-21	-28				
180	250					+5	+13				
						-24	-33				

Tolérances usuelles des alésages, en μm

Diamètre nominal en mm de à		N						P			R	
		6	7	8	9	10	11	6	7	9	6	7
0	3	-4	-4	-4	-4	-4	-4	-6	-6	-6	-10	-10
		-10	-14	-8	-29	-44	-64	-12	-16	-31	-16	-20
3	6	-5	-4	-2	0	0	0	-9	-8	-12	-12	-11
		-13	-16	-20	-30	-48	-75	-17	-20	-42	-20	-23
6	10	-7	-4	-3	0	0	0	-12	-9	-15	-16	-13
		-16	-19	-25	-36	-58	-90	-21	-24	-51	-25	-28
10	18	-9	-5	-3	0	0	0	-15	-11	-18	-20	-16
		-20	-23	-30	-43	-70	-110	-26	-29	-61	-31	-34
18	30	-11	-7	-3	0	0	0	-18	-14	-22	-24	-20
		-24	-28	-36	-52	-84	-130	-31	-35	-74	-37	-41
30	50	-12	-8	-3	0	0	0	-21	-17	-26	-29	-25
		-28	-33	-42	-62	-100	-160	-37	-42	-88	-45	-50
50	65	-14	-9	-4	0	0	0	-26	-21	-32	-35	-30
		-33	-39	-50	-74	-120	-190	-45	-51	-106	-54	-60
65	80	-14	-9	-4	0	0	0	-26	-21	-32	-37	-32
		-33	-39	-50	-74	-120	-190	-45	-51	-106	-56	-62
80	100	-16	-10	-4	0	0	0	-30	-24	-37	-44	-38
		-38	-45	-58	-87	-140	-220	-52	-59	-124	-66	-73
100	120	-16	-10	-4	0	0	0	-30	-24		-47	-41
		-38	-45	-58	-87	-140	-220	-52	-59		-69	-76

Diamètre nominal en mm de à		S		T	U			X		Z	
		6	7	6	6	7	10	10	11	10	11
0	3	-14	-14	-18	-18	-18	-18	-20	-20	-26	-26
		-20	-24	-24	-24	-28	-58	-60	-80	-66	-86
3	6	-16	-15	-20	-20	-19	-23	-28	-28	-35	-35
		-24	-27	-28	-28	-31	-71	-76	-103	-83	-110
6	10	-20	-17	-25	-25	-22	-28	-34	-34	-42	-42
		-29	-32	-34	-34	-37	-86	-92	-124	-100	-132
10	14	-25	-21	-30	-30	-26	-33	-40	-40	-50	-50
		-36	-39	-41	-41	-44	-103	-110	-150	-120	-160
14	18	-25	-21	-30	-30	-26	-33	-45	-45	-60	-60
		-36	-39	-41	-41	-44	-103	-115	-155	-130	-170
18	24	-31	-27	-37	-37	-33	-41	-54	-54	-73	-73
		-44	-48	-50	-50	-54	-125	-138	-184	-157	-203
24	30	-31	-27	-37	-44	-40	-48	-64	-64	-88	-88
		-44	-48	-50	-57	-61	-132	-148	-194	-172	-218
30	40	-38	-34	-43	-55	-51	-60	-80	-80	-112	-112
		-54	-59	-59	-71	-76	-160	-180	-240	-212	-272
40	50	-38	-34	-49	-65	-61	-70	-97	-97	-136	-136
		-54	-59	-65	-81	-86	-170	-197	-257	-236	-296
50	65	-47	-42	-60	-81	-76	-87	-122	-122	-172	-172
		-66	-72	-79	-100	-106	-207	-242	-312	-292	-362
65	80	-53	-48	-69	-96	-91	-102	-146	-146	-210	-210
		-72	-78	-88	-115	-121	-222	-266	-336	-330	-400
80	100	-64	-58	-84	-117	-111	-124	-178	-178	-258	-258
		-86	-93	-106	-139	-146	-264	-318	-398	-398	-478
100	120	-72	-66	-97	-137	-131	-144	-210	-210	-310	-310
		-94	-101	-119	-159	-166	-284	-350	-430	-450	-530

FILETAGE

Questionnaire solutions spéciaux

Quantité _____

Nombre de perçages _____

Matière à usiner _____

Résistance/
Dureté _____ N/mm²
HRC

Pièce à usiner

Profondeur _____ mm

Désignation _____
par Ex. M18x0,5 ISO3/6H

Matière de coupe



CW
mono



HSS-E-PM



HSS-E

Lubrification



int.



ext.

sim.
outil standard



Forme d'attachement

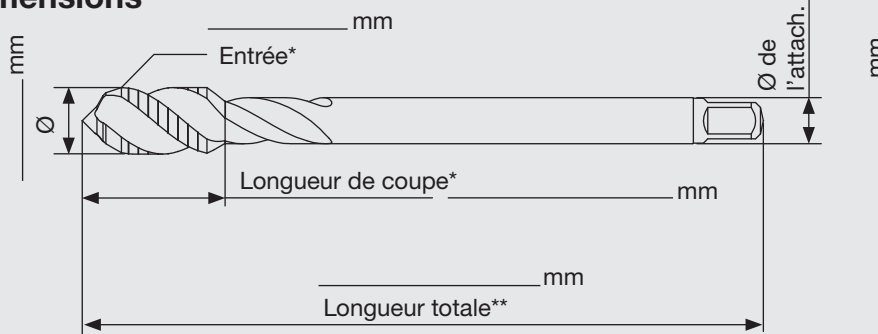


DIN 371
attachem. renforcé



DIN 374/DIN 376

Dimensions



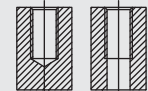
Particularité _____

*(diff. du standard)

Type de filetage



trou débouchant



trou borgne

Outil



taraud pour
filetage



taraud à
refouler

Revêtement



poli



traité vapeur



TiN



TiCN



TiAlN



AlCrN

Contact

Société _____

Cachet de la société

Contact _____

Tél./Télocopieur _____

Date _____

E-Mail _____

Signature _____

FRAISAGE

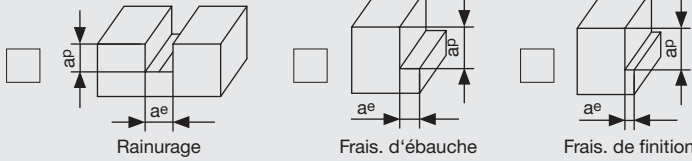
Questionnaire solutions spéciaux

Quantité 5 10 >10 _____ pcs.

Matière à usiner _____

Résistance/ Dureté _____ N/mm² HRC

Valeur de passe



Prof. de passe ap : _____ mm

Larg de coupe ae : _____ mm

Matière de coupe

CW mono HSS-E-PM HSCO M 42

Chanfrein de protection

Bout hémisph. Chanfr. de protect. Bec rayonné

sim. outil standard

Dimensions

Dégagement oui non

Particularité _____

*(diff. du standard)

Forme d'attachement

HA lisse HB Weldon

Nbre de dents

Coupe au centre

Revêtement

poli TiN TiAlN AlTiN nano TiAlSiN _____ (autres)

Forme de profil

Contact

Société _____

Contact _____

Tél./Télécopieur _____

E-Mail _____

Cachet de la société _____

Date _____

Signature _____

ALESAGE

Questionnaire solutions spéciaux

Quantité _____
(min. 5 pcs.)

sim. outil standard _____

Matière à usiner _____

Résistance/ Dureté _____ N/mm² HRC

Pièce à usiner

Prof. d'alésage _____ mm

Dia. de l'alésoir _____ mm

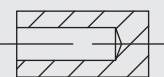
Tolérance _____

Type de perçages

trou débouchant



trou borgne



Lubrification

 ext.

 int.

Pression en bar _____

Description de l'outil

CW mono

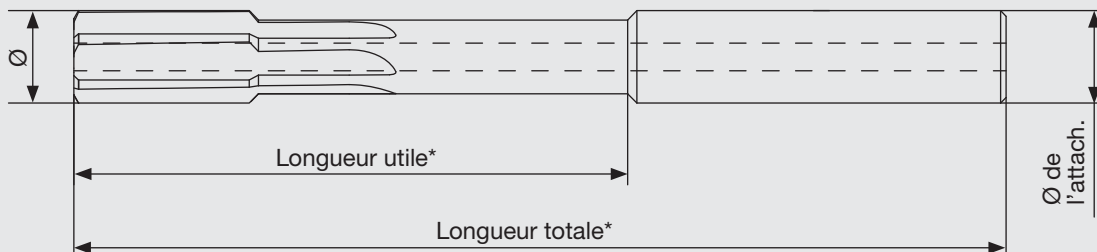
CW rapporté

HSS-E

Cermet rapporté

Super R-HS

Dimensions



Revêtement

non

oui

Particularité _____

*(diff. du standard)

Contact

Société _____

Cachet de la société

Contact _____

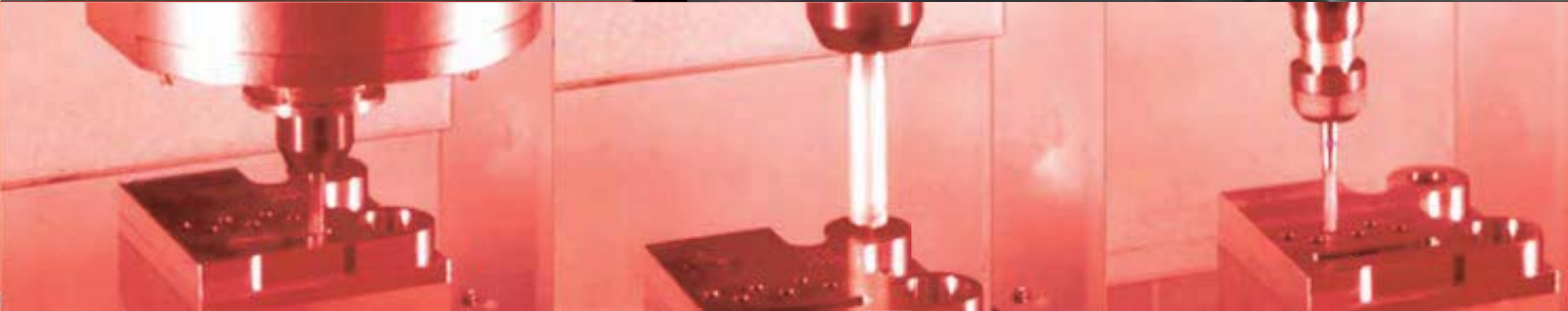
Tél./Télécopieur _____

Date _____

E-Mail _____

Signature _____





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