SOLID CARBIDE
METALL DUR INTEGRAL

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G

HIGH PERFORMANCE / ALTES PRESTACIONS

Suitable
Adequat

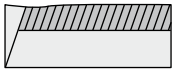
Especially suitable
Especialment adequat

Reference / Referència	6230	6240	6440	6054	6064	6164	6022
Norm / Norma	WN	WN	DIN 6527L	DIN 6527L	DIN 6527L	DIN 6527L	WN
Type / Tipus	N	N	N	N	N	N	H
Length / Llargada	Short / Curt	Short / Curt	Short / Curt	Short / Curt	Short / Curt	Long / Llarg	Short / Curt
Number of flutes / Nº de talls	3	4	4	5	4-6	4-6	2
Spiral angle / Angle hèlix	45º	30º	39º-42º	45º	45º	45º	30º
Ø mm	3-20	3-20	3-20	6-20	3-25	3-25	1-4
Page / Pàgina	G10	G13	G15	G17	G20	G23	G26
Steels / Acers <850 N/mm²	➤➤	➤›	➤➤	➤➤	➤➤	➤➤	➤›
Steels / Acers >850 N/mm²	➤›		➤➤	➤➤	➤➤	➤➤	
INOX / Acer inoxidable <850 N/mm²	➤➤	➤›	➤➤	➤➤	➤➤	➤➤	➤›
INOX / Acer inoxidable >850 N/mm²	➤›		➤➤	➤➤	➤➤	➤➤	
CAST IRON / Fosa Cast iron, malleable cast iron / Fosa grisa i mal·leable	➤➤	➤➤		➤➤	➤➤	➤➤	
Ti Titanium and titanium alloys / Titani i aliatges de titani			➤›	➤›	➤›	➤›	
Cu, Ms Copper, brass / Coure, llautó					➤➤	➤➤	
Al Aluminium / Alumini	➤›	➤›	➤›		➤➤	➤➤	➤›
Plastics / Plàstics							

Type / Tipus N

For materials with normal tensile strength and hardness, up to approx. 1.100 N/mm².

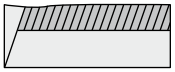
Per materials amb resistència normal a la tracció i duresa fins aprox. 1.100 N/mm².



Type / Tipus H

For hard and short chipping materials, up to approx. 1.400 N/mm² tensile strength.

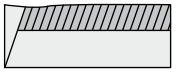
Per materials durs i de ferritja curta, amb resistència a la tracció fins aprox. 1.400 N/mm².



Type / Tipus W

For soft, tough and long chipping materials.

Per materials tous, tenaços i de ferritja llarga.



HIGH PERFORMANCE / ALTES PRESTACIONS

6023	6043	6143	6243	6342	6343	6322	6323	6324	6325
DIN 6527L	DIN 6527L	DIN 6527L	DIN 6527L	DIN 6527L	DIN 6527L			WN	WN
N	N	N	N	N	N	H	H	H	H
Long / Llarg	Long / Llarg	Short / Curt	Long / Llarg	Short / Curt	Short / Curt	Short / Curt	Long / Llarg		Short / Curt
2	4	4	4	4	4	2	2	2	2
35º-38º	35º-38º	35º-38º	35º-38º	35º-38º	35º-38º	30º	30º	30º	30º
1-12	2-12	3-12	3-12	6-12	6-8	2-5	2-12	0,4-1,2	1-5
G28-29	G30-31	G32	G32	G34	G34	G36	G38	G40	G41

G

SOLID CARBIDE / METALL DUR INTEGRAL

Suitable
Adequat

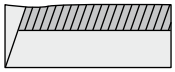
Especially suitable
Especialment adequat

Reference / Referència		6510	6610	6520	6530	6640
Norm / Norma		WN	WN	WN	WN	DIN 6527L
Type / Tipus		W	W	W	W	HR
Length / Llargada		Short / Curt	Long / Llarg	Short / Curt	Short / Curt	Short / Curt
Number of flutes / Nº de talls		1	1	2	3	4
Spiral angle / Angle hèlix		30º	30º	45º	45º	45º
Ø mm		3-12	6-12	3-16	3-16	6-20
Page / Pàgina		G44	G45	G46	G47	G48
Steels Acers	<850 N/mm²					››
	>850 N/mm²					›››
INOX Acer inoxidable	<850 N/mm²					››
	>850 N/mm²					›››
CAST IRON Fosa	Cast iron, malleable cast iron Fosa grisa i mal·leable					›››
Ti	Titanium and titanium alloys Titani i aliatges de titani					
Cu, Ms	Copper, brass Coure, llautó			›››	›››	
Al	Aluminium Alumini	›››	›››	›››	›››	››
	Plastics Plàstics	›››	›››	››	››	

Type / Tipus N

For materials with normal tensile strength and hardness, up to approx. 1.100 N/mm².

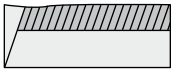
Per materials amb resistència normal a la tracció i duresa fins aprox. 1.100 N/mm².



Type / Tipus H

For hard and short chipping materials, up to approx. 1.400 N/mm² tensile strength.

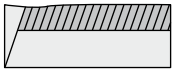
Per materials durs i de ferritja curta, amb resistència a la tracció fins aprox. 1.400 N/mm².



Type / Tipus W

For soft, tough and long chipping materials.

Per materials tous, tenaços i de ferritja llarga.



SOLID CARBIDE / METALL DUR INTEGRAL

6020	6021	6030	6031	6040	6041	6320	6321
WN	WN	WN	WN	WN	WN	WN	WN
N	N	N	N	N	N	N	N
Short / Curt	Long / Llarg	Short / Curt	Long / Llarg	Short / Curt	Long / Llarg	Short / Curt	Long / Llarg
2	2	3	3	4	4	2	2
30º	30º	45º	45º	30º	30º	30º	30º
1-20	1-20	1-20	1-20	1-20	1-20	2-20	2-20
G50	G52	G54	G57	G60	G62	G64	G66
●●●	●●●	●●●	●●●	●●○	●●○	●●●	●●●
●●○	●●○	●●○	●●○			●●○	●●○
●●●	●●●	●●●	●●●	●●○	●●○	●●●	●●●
●●○	●●○	●●○	●●○			●●○	●●○
●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●
●●○		●●○	●●○	●●○	●●○	●●○	●●○

G

OTHERS / ALTRES

Suitable
Adequat

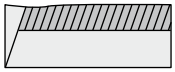
Especially suitable
Especialment adequat

Reference / Referència		84	86	87	88
Norm / Norma		WN	DIN 6527	DIN 6527	WN
Type / Tipus		N	N	N	N
Length / Llargada					
Number of flutes / Nº de talls		4	4-6	4-6	4
Spiral angle / Angle hèlix					90º
Ø mm		8-16	4-16	4-16	4-12
Page / Pàgina		G68	G69	G70	G71
Steels Acers	<850 N/mm²	❯❯	❯❯	❯❯	❯❯
	>850 N/mm²	❯❯	❯❯	❯❯	❯❯
INOX Acer inoxidable	<850 N/mm²	❯❯	❯❯	❯❯	❯❯
	>850 N/mm²	❯❯	❯❯	❯❯	❯❯
CAST IRON Fosa	Cast iron, malleable cast iron Fosa grisa i mal·leable	❯❯	❯❯	❯❯	❯❯
Ti	Titanium and titanium alloys Titani i aliatges de titani				
Cu, Ms	Copper, brass Coure, llautó	❯❯	❯❯	❯❯	❯❯
Al	Aluminium Alumini	❯❯	❯❯	❯❯	❯❯
	Plastics Plàstics	❯❯	❯❯	❯❯	❯❯

Type / Tipus N

For materials with normal tensile strength and hardness, up to approx. 1.100 N/mm².

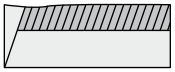
Per materials amb resistència normal a la tracció i duresa fins aprox. 1.100 N/mm².



Type / Tipus H

For hard and short chipping materials, up to approx. 1.400 N/mm² tensile strength.

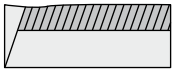
Per materials durs i de ferritja curta, amb resistència a la tracció fins aprox. 1.400 N/mm².



Type / Tipus W

For soft, tough and long chipping materials.

Per materials tous, tenaços i de ferritja llarga.



DRILLS / BROQUES

Suitable
Adequat

Especially suitable
Especialment adequat

Reference / Referència	7320	7520	7323	7523
Norm / Norma	DIN 6537K	DIN 6537L	DIN 6537L	DIN 6537L
Type / Tipus	N	N	N	N
Depth of drilling / Profunditat foradat	**3xd**	**5xd**	**3xd**	**5xd**
Number of flutes / Nº de talls	2	2	2	2
Coolant supply / Refrigeració	No / No	No / No	Yes / Sí	Yes / Sí
Spiral angle /Angle hèlix	140º	140º	140º	140º
Ø mm	3-20	3-20	3-20	3-20
Page / Pàgina	G73-75	G77-79	G81-83	G85-87

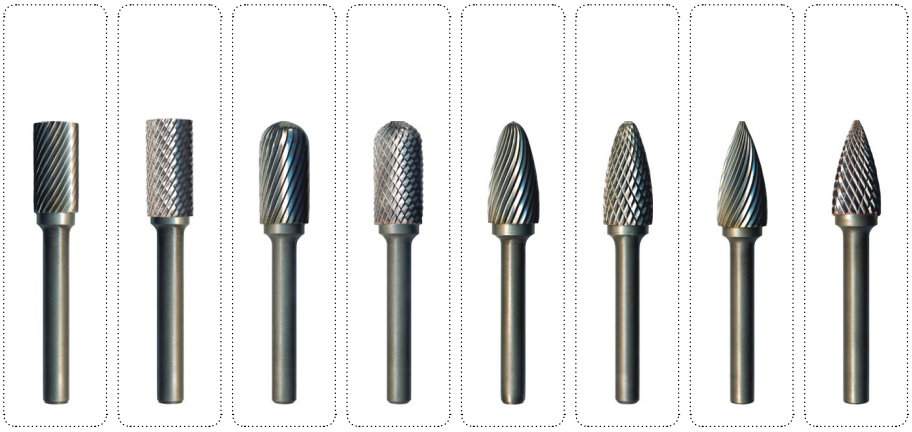
Steels Acers	<850 N/mm²	››	››	››	››
	>850 N/mm²	››	››	››	››
INOX Acer inoxidable	<850 N/mm²	››	››	››	››
	>850 N/mm²	››	››	››	››
CAST IRON Fosa	Cast iron, malleable cast iron Fosa grisa i mal·leable	››	››	››	››
Ti	Titanium and titanium alloys Titani i aliatges de titani	››	››	››	››
Cu, Ms	Copper, brass Coure, llautó	››	››	›››	›››
Al	Aluminium Alumini	››	››	››	››
	Plastics Plàstics	››	››	››	››

G

TUNGSTEN CARBIDE BURRS / LLIMES ROTATIVES DE METALL DUR

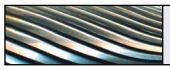
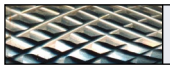
Suitable
Adequat

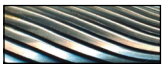
Especially suitable
Especialment adequat



Reference / Referència	900	901	910	911	920	921	930	931
Ø mm	3-16	3-16	3-16	3-16	3-16	3-16	3-16	3-16
Page / Pàgina	G89	G89	G89	G89	G90	G90	G90	G90

Cutting profile
Perfil de tall

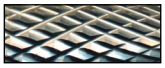
	**A** Straight Recte	➧	➧	➧	➧	➧	➧	➧	➧
	**B** Crossed Creuat	➧	➧	➧	➧	➧	➧	➧	➧



Straight
Recte

For general purposes such as deburring, chamfering and smoothing edges with clean surface.
Suitable for steels with high tensile strength and welding seams.

Per usos generals com desbarbar, aixamfranar i allisar cantells amb una superfície neta.
Adequat per acers amb alta resistència a la tracció i per costures de soldadura.



Crossed
Creuat

Suitable for hardened steels with excellent surface quality and welding seams with high tensile strength.

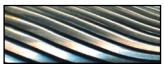
Adequat per acers trempats amb un excel·lent acabat de superfície i per costures de soldadura amb alta resistència a la tracció.

TUNGSTEN CARBIDE BURRS / LLIMES ROTATIVES DE METALL DUR

940	941	950	951	960	961	970	971	98	99
3-16	3-16	3-16	3-16	3-16	3-16	3-16	3-16	6-16	6-16
G91	G91	G91	G91	G92	G92	G92	G92	G93	G93

Cutting profile
Perfil de tall

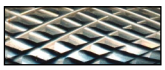
A Straight / Recte									
B Crossed / Creuat									



Straight
Recte

For general purposes such as deburring, chamfering and smoothing edges with clean surface.
Suitable for steels with high tensile strength and welding seams.

Per usos generals com desbarbar, aixamfranar i allisar cantells amb una superfície neta.
Adequat per acers amb alta resistència a la tracció i per costures de soldadura.



Crossed
Creuat

Suitable for hardened steels with excellent surface quality and welding seams with high tensile strength.

Adequat per acers trempats amb un excel·lent acabat de superfície i per costures de soldadura amb alta resistència a la tracció.

High performance solid carbide End Mills - Helix (Hyperlink)

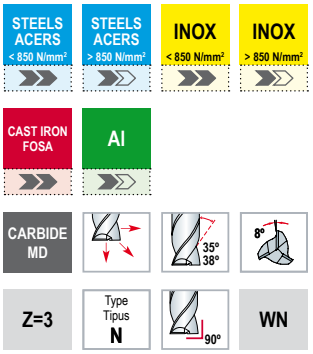
Short series, three flutes

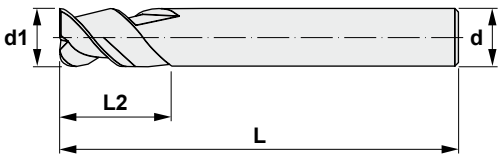
Freses de metall dur d'altes prestacions - Helix (Hyperlink)

Sèrie curta, tres talls

Characteristics:
3 Fluted cutting to centre high performance solid carbide end mills with TiAlN coating. Spiral angle 35º/38º. Especially designed for slotting, contouring and finishing exotic materials. Due to the double helix angle we avoid the vibrations and get extremely high performance. The special geometry together with this coating will help you to get a soft cutting with a very long tool life. Also for universal purpose. For materials up to 55 HRC.

Característiques:
Freses de tres talls de metall dur integral d'altes prestacions amb tall al centre recobertes en TiAlN. Angle d'hèlix 35º/38º. Dissenyades especialment per el ranurat, el contornejat i l'acabat de materials exòtics. Gràcies al doble angle d'hèlix s'eviten les vibracions i s'obtenen prestacions extremament altes. La geometria especial, junt amb el recobriment, ajuden a obtenir un tall suau i una duració molt llarga de l'eina. Adequades també per usos generals. Per materials fins a 55 HRC.



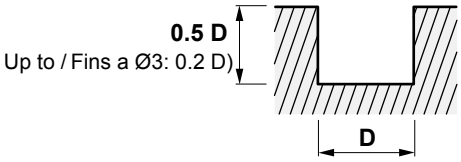


6230

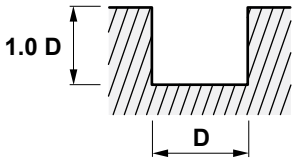
Reference Referència		d1	d	L2	L
623003	3	3	6	8	50
623004	3	4	6	11	50
623005	3	5	6	13	50
623006	3	6	6	16	50
623008	3	8	8	19	60
623010	3	10	10	22	73
623012	3	12	12	26	75
623014	3	14	14	30	85
623016	3	16	16	32	92
623020	3	20	20	38	100

6230 *High performance solid carbide End Mills - Helix (Hyperlink). Freses de metall dur integral d'altes prestacions Helix (Hyperlink).*

Diameter / Diàmetre (Ø d1) mm	Material											
	Unalloyed steels / Acer no aliat Alloyed steels / Acer aliat Tool steels / Acer per eines ~ HRC30 / 1000 N/mm²				Alloyed steels / Acer aliat Heat resistant steels / Acer resistent a la calor ~ HRC30 ~ HRC45 / 1000 ~ 1500 N/mm²				Stainless steels / Acer inoxidable			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
3.0	6100	125	55	0.007	3800	85	35	0.007	3150	70	30	0.007
4.0	5150	180	65	0.012	3150	110	40	0.012	2650	90	35	0.011
5.0	4300	190	70	0.015	2550	110	40	0.014	2150	95	35	0.015
6.0	3800	210	70	0.018	2300	135	45	0.020	1950	110	35	0.019
8.0	2850	230	70	0.027	1700	120	45	0.024	1450	110	35	0.025
10.0	2200	195	70	0.030	1350	95	40	0.023	1150	95	35	0.028
12.0	1850	170	70	0.031	1150	75	45	0.022	950	75	35	0.026
14.0	1700	150	75	0.029	1050	70	45	0.022	850	70	35	0.027
16.0	1500	130	75	0.029	950	65	50	0.023	700	65	35	0.031
20.0	1150	100	70	0.029	700	50	45	0.024	550	50	35	0.030



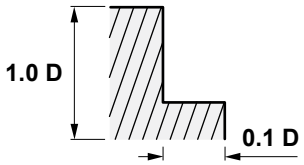
Diameter / Diàmetre (Ø d1) mm	Material											
	Cast iron / Fosa				Aluminium alloys / Aliatges d'alumini				Copper, brass / Coure, llautó Non-ferrous metals / Metalls no ferrosos			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
3.0	6050	200	55	0.011	15400	430	145	0.009	11000	310	105	0.009
4.0	4600	185	60	0.013	11000	420	140	0.013	8800	310	110	0.012
5.0	3650	200	55	0.018	9150	420	145	0.015	6800	310	105	0.015
6.0	2950	230	55	0.026	7600	440	145	0.019	5700	340	105	0.020
8.0	2200	240	55	0.036	5700	440	145	0.026	4400	330	110	0.025
10.0	1850	255	60	0.046	4600	440	145	0.032	3400	330	105	0.032
12.0	1450	275	55	0.063	3750	430	140	0.038	2850	330	105	0.039
14.0	1300	285	55	0.073	3300	430	145	0.043	2400	330	105	0.046
16.0	1100	285	55	0.086	2850	430	145	0.050	2200	330	110	0.050
20.0	900	310	55	0.115	2200	430	140	0.065	1700	330	105	0.065



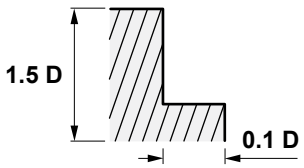
* FEED, in long and extra long types, should be reduced by around 50%.
* En els models llargs i extrallargs s'hauria de reduir l'avanç aproximadament un 50%.

6230 *High performance solid carbide End Mills - Helix (Hyperlink). Freses de metall dur integral d'altes prestacions Helix (Hyperlink).*

Diameter / Diàmetre (Ø d1) mm	Material											
	Unalloyed steels / Acer no aliat Alloyed steels / Acer aliat Tool steels / Acer per eines ~ HRC30 / 1000 N/mm²				Alloyed steels / Acer aliat Heat resistant steels / Acer resistent a la calor ~ HRC30 ~ HRC45 / 1000 ~ 1500 N/mm²				Stainless steels / Acer inoxidable			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
3.0	7600	205	70	0.009	4750	130	45	0.009	3950	105	35	0.009
4.0	6450	365	80	0.019	3950	220	50	0.019	3300	180	40	0.018
5.0	5350	385	85	0.024	3200	230	50	0.024	2700	195	40	0.024
6.0	4750	425	90	0.030	2850	265	55	0.031	2400	215	45	0.030
8.0	3550	450	90	0.042	2150	245	55	0.038	1800	225	45	0.042
10.0	2750	390	85	0.047	1700	195	55	0.038	1450	195	45	0.045
12.0	2350	330	90	0.047	1450	160	55	0.037	1150	155	45	0.045
14.0	2100	465	90	0.074	1300	145	55	0.037	1050	140	45	0.044
16.0	1850	265	95	0.048	1150	130	60	0.038	900	130	45	0.048
20.0	1450	205	90	0.047	900	100	55	0.037	700	100	45	0.048



Diameter / Diàmetre (Ø d1) mm	Material											
	Cast iron / Fosa				Aluminium alloys / Aliatges d'alumini				Copper, brass / Coure, llautó Non-ferrous metals / Metalls no ferrosos			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
3.0	6050	475	55	0.026	15400	990	145	0.021	11000	760	105	0.023
4.0	4600	485	60	0.035	11000	1035	140	0.031	8800	770	110	0.029
5.0	3650	485	55	0.044	9150	1010	145	0.037	6800	760	105	0.037
6.0	2950	570	55	0.064	7600	1100	145	0.048	5700	825	105	0.048
8.0	2200	615	55	0.093	5700	1100	145	0.064	4400	825	110	0.063
10.0	1850	640	60	0.115	4600	1100	145	0.080	3400	825	105	0.081
12.0	1450	670	55	0.154	3750	1100	140	0.098	2850	825	105	0.096
14.0	1300	705	55	0.181	3300	1100	145	0.111	2400	825	105	0.115
16.0	1100	725	55	0.220	2850	1100	145	0.129	2200	825	110	0.125
20.0	900	770	55	0.285	2200	1100	140	0.167	1700	825	105	0.162



* FEED, in long and extra long types, should be reduced by around 50%.
* En els models llargs i extrallargs s'hauria de reduir l'avanç aproximadament un 50%.

High performance solid carbide End Mills - Helix (Hyperlink)

Short series, four flutes

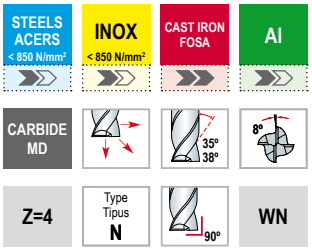
Freses de metall dur integral d'altes prestacions - Helix (Hyperlink)

Sèrie curta, quatre talls

Characteristics:

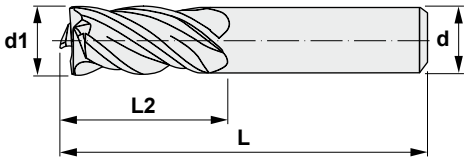
4 Fluted cutting to centre high performance solid carbide end mills plus TiAlN coating. Spiral angle 35º/38º. Tool specially designed for slotting, contouring and finishing exotic materials.

Due to the double helix angle we avoid the vibrations and get extremely high performance. The special geometry together with this coating will help you to get a soft cutting with a very long tool life. Also for universal purpose. For materials up to 55 HRC.



Característiques:

Freses de quatre talls de metall dur integral d'altes prestacions amb tall al centre recobertes en TiAlN. Angle d'hèlix 35º/38º. Dissenyades especialment per el ranurat, el contornejat i l'acabat de materials exòtics. Gràcies al doble angle d'hèlix s'eviten les vibracions i s'obtenen prestacions extremament altes. La geometria especial, junt amb el recobriment, ajuden a obtenir un tall suau i una duració molt llarga de l'eina. Adequades també per usos generals. Per materials fins a 55 HRC.



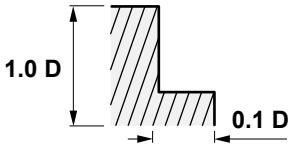
G

6240

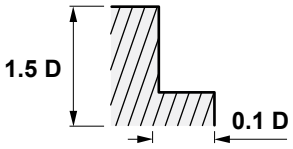
Reference Referència		d1	d	L2	L
624003	4	3	6	8	50
624004	4	4	6	11	50
624005	4	5	6	13	50
624006	4	6	6	16	50
624008	4	8	8	19	60
624010	4	10	10	22	73
624012	4	12	12	26	75
624014	4	14	14	30	85
624016	4	16	16	32	92
624020	4	20	20	38	100

6240 *High performance solid carbide End Mills - Helix (Hyperlink). Freses de metall dur integral d'altes prestacions Helix (Hyperlink).*

Diameter / Diàmetre (Ø d1) mm	Material											
	Unalloyed steels / Acer no aliat Alloyed steels / Acer aliat Tool steels / Acer per eines ~ HRC30 / 1000 N/mm²				Alloyed steels / Acer aliat Heat resistant steels / Acer resistent a la calor ~ HRC30 ~ HRC45 / 1000 ~ 1500 N/mm²				Stainless steels / Acer inoxidable			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
3.0	7600	270	70	0.009	4750	170	45	0.009	3950	145	35	0.009
4.0	6450	485	80	0.019	3950	300	50	0.019	3300	240	40	0.018
5.0	5350	510	85	0.024	3200	305	50	0.024	2700	255	40	0.024
6.0	4750	560	90	0.029	2850	350	55	0.031	2400	280	45	0.029
8.0	3550	605	90	0.043	2150	325	55	0.038	1800	300	45	0.042
10.0	2750	520	85	0.047	1700	255	55	0.038	1450	255	45	0.044
12.0	2350	440	90	0.047	1450	215	55	0.037	1150	205	45	0.045
14.0	2100	395	90	0.047	1300	195	55	0.038	1050	190	45	0.045
16.0	1850	350	95	0.047	1150	170	60	0.037	950	170	50	0.045
20.0	1450	270	90	0.047	900	135	55	0.038	700	130	45	0.046



Diameter / Diàmetre (Ø d1) mm	Material											
	Cast iron / Fosa				Aluminium alloys / Aliatges d'alumini				Copper, brass / Coure, llautó Non-ferrous metals / Metalls no ferrosos			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
3.0	6050	640	55	0.026	15400	1320	145	0.021	11000	1035	105	0.024
4.0	4600	640	60	0.035	11000	1320	140	0.030	8800	1035	110	0.029
5.0	3650	640	55	0.044	9150	1320	145	0.036	6800	1035	105	0.038
6.0	2950	770	55	0.065	7600	1430	145	0.047	5700	1100	105	0.048
8.0	2200	815	55	0.093	5700	1430	145	0.063	4400	1100	110	0.063
10.0	1850	860	60	0.116	4600	1430	145	0.078	3400	1100	105	0.081
12.0	1450	900	55	0.155	3750	1430	140	0.095	2850	1100	105	0.096
14.0	1300	945	55	0.182	3300	1430	145	0.108	2400	1100	105	0.115
16.0	1100	970	55	0.220	2850	1430	145	0.125	2200	1100	110	0.125
20.0	900	1035	55	0.288	2200	1430	140	0.163	1700	1100	105	0.162



* FEED, in long and extra long types, should be reduced by around 50%.
* En els models llargs i extrallargs s'hauria de reduir l'avanç aproximadament un 50%.

Solid carbide End Mill - Inox.

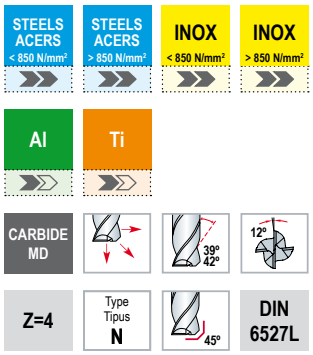
Four flutes

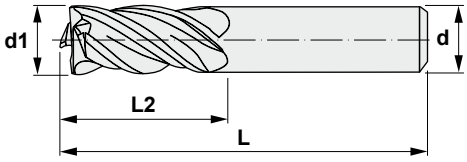
Freses de metall dur integral - Inox.

Quatre talls

Characteristics:
High performance carbide end mill especially suitable for cutting in austenitic stainless steels: Finishing, semi-finishing and roughing with the same tool.
Spiral angle 39º/42º. Different spiral angles effect smooth, vibrationless running and excellent surface.
High cutting performance.

Característiques:
Freses de metall dur integral d'altes prestacions, especialment adequades per el mecanitzat d'acer inoxidable austenític: Acabat, semiacabat i desbast amb la mateixa eina. Angle d'hèlix 39º/42º. Els diferents angles d'hèlix produeixen un tall suau i sense vibracions, i un excel·lent acabat de superfície. Altes prestacions de tall.



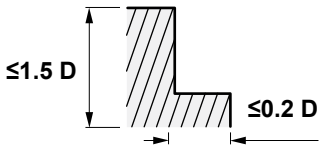


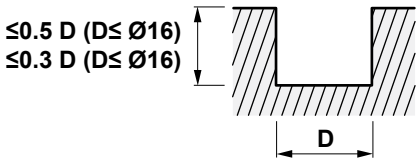
6440

Reference Referència		d1	d	L2	L
644003	4	3	6	8	50
644004	4	4	6	11	50
644005	4	5	6	13	50
644006	4	6	6	16	50
644008	4	8	8	19	60
644010	4	10	10	22	73
644012	4	12	12	26	75
644016	4	16	16	32	92
644020	4	20	20	38	100

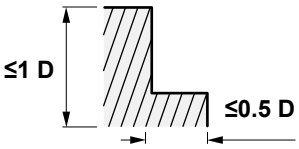
6440 *High performance solid carbide End Mills - Helix (Hyperlink). Freses de metall dur integral d'altes prestacions Helix (Hyperlink).*

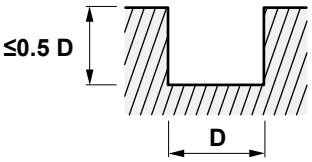
Diameter / Diàmetre (Ø d1) mm	Material			
	Carbon steels / Acer al carboni Alloyed steels / Acer aliat < HRC45		Stainless steels / Acer inoxidable Ti alloys / Aliatges de titani	
	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.
3	5280	220	4400	100
4	4400	220	3630	155
5	3520	255	2970	185
6	3190	275	2640	200
8	2420	300	1980	210
10	1870	285	1540	210
12	1540	250	1320	165
16	1100	175	990	130
20	990	185	770	145





Diameter / Diàmetre (Ø d1) mm	Material			
	Hardened steels / Acer trempat HRC45 - HRC55		Inconel	
	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.
3	2420	50	1540	30
4	1980	45	1320	40
5	1650	100	1100	50
6	1540	100	990	50
8	1100	110	792	45
10	990	120	660	45
12	770	100	550	40
16	605	65	396	35
20	440	75	330	30





* In slotting operations use 80-100% of speed and 60-80% of feed rates.
* En operacions de ranurat s'ha d'utilitzar el 80-100% de la velocitat i el 60-80% de l'avanç.

Solid carbide End Mills - Helix with radius

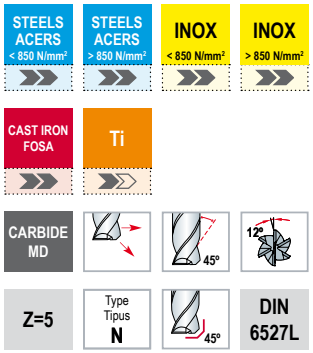
Short series, five flutes

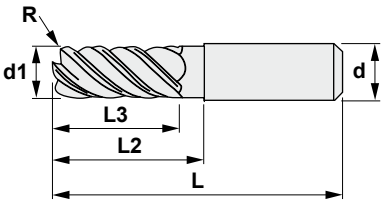
Freses de metall dur integral - Helix amb radi

Sèrie curta, cinc talls

Characteristics:
High performance carbide finishing end mill for universal applications into structural steels, tool steels, treatable steels but also for stainless steels and titanium alloys up to 50 HRC.

Característiques:
Freses de metall dur integral d'altes prestacions per diverses aplicacions en acers estructurals, acers per eines, acers tractables i també en acers inoxidables i aliatges de titani fins a 50 HRC.





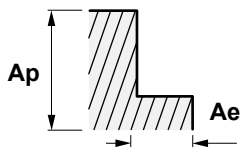
6054

Reference Referència		d1	R	d	D	L3	L2	Ø Dmin	Ø Dmax	L
6054106	5	6	0,5	6	1º	14	32	5,4	5,8	65
6054206	5	6	0,5	6	1º	14	42	5,0	5,8	65
6054306	5	6	0,5	6	1º	14	51	4,7	5,8	81
6054108	5	8	0,5	8	1º	18	42	7,2	7,8	65
6054208	5	8	0,5	8	1º	18	58	6,6	7,8	81
6054308	5	8	0,5	8	1º	18	71	6,1	7,8	109
6054110	5	10	0,5	10	1º	22	51	9,0	9,8	81
6054210	5	10	0,5	10	1º	22	71	8,3	9,8	109
6054310	5	10	0,5	10	1º	22	82	7,9	9,8	109
6054112	5	12	1,0	12	1º	26	51	11,1	11,8	81
6054212	5	12	1,0	12	1º	26	71	10,4	11,8	109
6054312	5	12	1,0	12	1º	26	86	9,9	11,8	109
6054116	5	16	2,0	16	1º	38	61	15,2	15,8	109
6054216	5	16	2,0	16	1º	38	76	14,7	15,8	109
6054316	5	16	2,0	16	1º	38	101	13,8	15,8	150
6054120	5	20	2,0	20	1º	45	71	19,1	19,8	109
6054220	5	20	2,0	20	1º	45	86	18,6	19,8	130
6054320	5	20	2,0	20	1º	45	101	18,0	19,8	150

6054 *Solid carbide End Mills - Helix with radius.*
Freses de metall dur integral - Helix amb radi.

Ø d1 mm	L2 mm	Material					
		Hardened steels Acer trempat > HRC45		Alloyed steels / Acer aliat Cast iron GG / Fosa grisa GG < HRC28		Alloyed steels / Acer aliat Cast iron GGG / Fosa grisa GGG HRC28 - HRC45	
		R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.
6	32	7960	895	14590	5105	9945	3480
6	42	6630	415	9285	1045	8620	970
6	51	5440	340	7960	500	6630	415
8	42	5970	1195	10940	4375	7460	2985
8	58	4975	620	6965	1395	6465	1295
8	71	4080	510	5970	745	4975	620
10	51	4775	1435	8755	4160	5970	2835
10	71	3980	695	5570	1670	5175	1555
10	82	3265	570	4775	835	3980	695
12	51	3980	1195	7295	4010	4975	2735
12	71	3315	580	4640	1390	4310	1295
12	86	2720	475	3980	695	3315	580
16	61	2985	1195	5470	3555	3730	2425
16	76	2485	560	3480	1390	3235	1295
16	101	2040	460	2985	670	2485	560
20	71	2385	1195	4375	3720	2985	2535
20	86	1990	595	2785	1395	2585	1295
20	101	1630	490	2385	715	1990	595

Depth of cut
Profunditat de tall



Roughing
Desbast

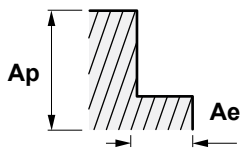
	Ap	Ae
short / curt	2xd	%5 to / a %10 x d
medium / mig	2xd	%5 to / a %7 x d
long / llarg	1,5xd	%4 to / a %6 x d
extra long / extrallarg	1,5xd	%2 to / a %4 x d

G

6054 *Solid carbide End Mills - Helix with radius.*
Freses de metall dur integral - Helix amb radi.

Ø d1 mm	L2 mm	Material					
		Stainless steels / Acer inoxidable		Inconel		Ti alloys / Aliatges de titani	
		R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.
6	32	9945	1120	3980	250	9285	580
6	42	7960	500	3980	170	9285	580
6	51	6630	415	3980	170	9285	580
8	42	7460	1490	2985	375	6965	1395
8	58	5970	745	2985	240	6965	870
8	71	4975	620	2985	240	6965	870
10	51	5970	1790	2385	415	5570	1670
10	71	4775	835	2385	300	5570	975
10	82	3980	695	2385	300	5570	975
12	51	4975	1495	1990	400	4640	1390
12	71	3980	695	1990	350	4640	810
12	86	3315	580	1990	350	4640	810
16	61	3730	1490	1490	335	3480	1390
16	76	2985	670	1490	355	3480	785
16	101	2485	560	1490	355	3480	785
20	71	2985	1495	1195	360	2785	1395
20	86	2385	715	1195	300	2785	835
20	101	1990	595	1195	300	2785	835

Depth of cut
Profunditat de tall



Finishing
Acabat

	Ap	Ae
short / curt	2xd	%3 x d
medium / mig	2xd	%2 x d
long / llarg	2xd	%1 x d
extra long / extrallarg	2xd	%1 x d

G

Solid carbide End Mills. Hard cutting.

For high speed cutting (HSC) <56HRC

Short series, four-six flutes

Freses de metall dur integral. Tall dur.

Per tall a alta velocitat (HSC) <56HRC

Sèrie curta, quatre-sis talls

Characteristics:

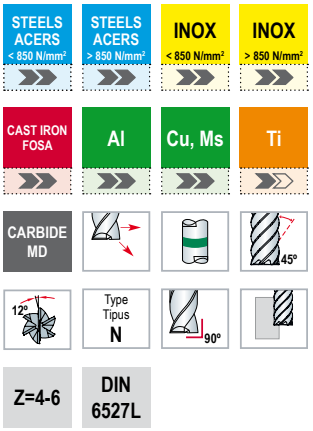
High performance carbide finishing end mill for universal applications into structural steels, tool steels, treatable steels but also for stainless steels and titanium alloys up to 50 HRC.

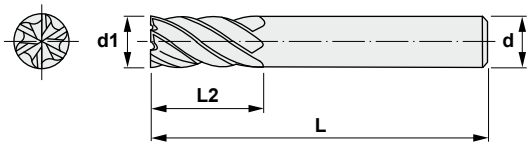
Due to a very strong core and an improved face grinding with a small cutting edge chamfer, very high cutting performances with excellent surface quality will be achieved.

Característiques:

Freses de metall dur integral d'altes prestacions per diverses aplicacions d'acabat en acers estructurals, acers per eines, acers tractables i també en acers inoxidables i aliatges de titani fins a 50 HRC.

Gràcies al seu nucli molt resistent i al rectificat frontal millorat amb un petit xamfrà a l'aresta de tall s'obtenen altes prestacions de tall i un acabat de superfície excel·lent.





6064

Reference Referència		d1	d	L2	L
606403	4	3	3	8	38
606404	4	4	4	11	50
606405	4	5	5	13	50
606406	6	6	6	16	50
606408	6	8	8	19	60
606410	6	10	10	22	75
606412	6	12	12	26	75
606414	6	14	14	32	90
606416	6	16	16	32	100
606418	6	18	18	38	100
606420	6	20	20	38	100
606425	6	25	25	38	100

6064 *Solid carbide End Mills. Hard cutting. Roughing. Freses de metall dur integral. Tall dur. Desbast.*

Diameter / Diàmetre (Ø d1) mm	Material							
	Steels Acers <1000 N/mm²		Steels Acers 1000 ~ 1600 N/mm²		Cast iron GG Fosa grisa GG <200 HB		Cast iron GGG Fosa grisa GGG 200 ~ 300 HB	
	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.
3	16975	4075	10610	2100	16660	4000	11670	2240
4	12730	3055	7960	1575	12495	3000	8755	1680
5	10185	2445	6365	1260	9995	2400	7000	1345
6	8490	2035	5305	1050	8330	2000	5835	1120
8	6365	2290	3980	1240	6245	2250	4375	1260
10	5095	2445	3185	1300	4995	2400	3500	1345
12	4245	2545	2655	1355	4165	2500	2920	1400
14	3640	2185	2275	1160	3570	2140	2500	1200
16	3185	1910	1990	1015	3125	1875	2190	1050
18	2830	1865	1770	955	2775	1830	1945	1015
20	2545	1835	1590	955	2500	1800	1750	1010
25	2035	1590	1270	840	2000	1560	1400	840

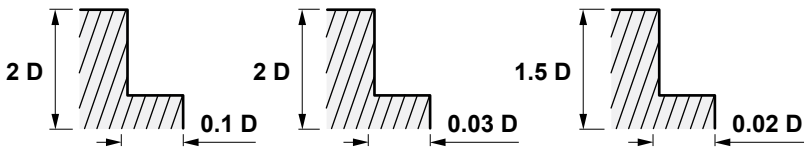
Diameter / Diàmetre (Ø d1) mm	Material			
	Stainless steels / Acer inoxidable		Titanium alloys / Aliatges de titani	
	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.
3	9975	1496	7850	1180
4	7480	1122	5890	880
5	5985	898	4710	705
6	4985	748	3925	590
8	3740	561	2945	440
10	2990	898	2355	705
12	2495	897	1965	705
14	2135	769	1680	605
16	1870	673	1470	530
18	1660	698	1310	550
20	1495	718	1180	565
25	1195	575	940	450

6064 *Solid carbide End Mills. Hard cutting. Finishing.*
Freses de metall dur integral. Tall dur. Desbast.

Diameter / Diàmetre (Ø d1) mm	Material							
	Steels Acers				Cast iron GG Fosa grisa GG		Cast iron GGG Fosa grisa GGG	
	<1000 N/mm²		1000 ~ 1600 N/mm²		<200 HB		200 ~ 300 HB	
	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.
3	19945	4785	13790	2730	19945	4785	14110	2710
4	14960	3590	10345	2050	14960	3590	10585	2030
5	11970	2870	8275	1640	11970	2870	8465	1625
6	9975	2395	6895	1365	9975	2395	7055	1355
8	7480	2695	5170	1615	7480	2695	5290	1525
10	5985	2870	4140	1690	5985	2870	4235	1625
12	4985	2990	3450	1760	4985	2990	3530	1695
14	4275	2565	2955	1510	4275	2565	3025	1450
16	3740	2245	2585	1320	3740	2245	2645	1270
18	3325	2195	2300	1240	3325	2195	2350	1230
20	2990	2155	2070	1240	2990	2155	2115	1220
25	2395	1865	1655	1090	2395	1865	1695	1015

Diameter / Diàmetre (Ø d1) mm	Material			
	Stainless steels / Acer inoxidable		Titanium alloys / Aliatges de titani	
	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.
3	11990	1800	9335	1400
4	8990	1350	7000	1050
5	7195	1080	5600	840
6	5995	900	4670	700
8	4495	675	3500	525
10	3595	1080	2800	840
12	2995	1080	2335	840
14	2570	925	2000	720
16	2250	810	1750	630
18	2000	840	1555	655
20	1800	860	1400	670
25	1440	690	1120	540

Diameter / Diàmetre (Ø d1) mm	Material									
	Prehardened steels Acer pretrempat				Hardened steels Acer trempat				Hardened steels Acer trempat	
	<35 HRC		35 - 45 HRC		46 -55 HRC		56 - 65 HRC		66 - 70 HRC	
	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Vc (M/Min.)
3	28115	6750	27585	6620	22810	5475	17505	4200	12730	3055
4	21090	5060	20690	4965	17110	4105	13130	3150	9550	2290
5	16870	4050	16550	3970	13685	3285	10505	2520	7640	1835
6	14060	3375	13790	3310	11405	2735	8755	2100	6365	1530
8	10545	3795	10345	3725	8555	3080	6565	2365	4775	1720
10	8435	4050	8275	3970	6845	3285	5250	2520	3820	1835
12	7030	4215	6895	4140	5700	3420	4375	2625	3185	1910
14	6025	3615	5910	3545	4890	2935	3750	2250	2730	1635
16	5270	3165	5170	3105	4275	2565	3285	1970	2385	1430
18	4685	3095	4600	3035	3800	2510	2920	1925	2120	1400
20	4220	3035	4140	2980	3420	2465	2625	1890	1910	1375
25	3375	2630	3310	2580	2735	2135	2100	1640	1530	1190



G

Solid carbide End Mills. Hard cutting.

For high speed cutting (HSC) <56HRC

Long series, four-six flutes

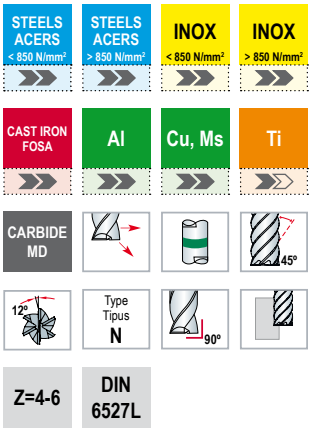
Freses de metall dur integral. Tall dur.

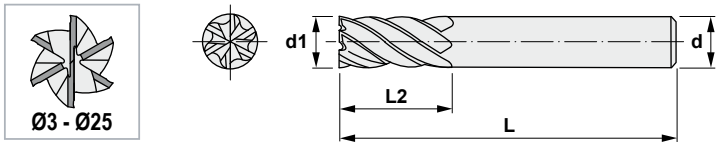
Per tall a alta velocitat (HSC) <56HRC

Sèrie llarga, quatre-sis talls

Characteristics:
High performance carbide finishing end mill for universal applications into structural steels, tool steels, treatable steels but also for stainless steels and titanium alloys up to 50 HRC.
Due to a very strong core and an improved face grinding with a small cutting edge chamfer, very high cutting performances with an excellent surface quality will be achieved.

Característiques:
Freses de metall dur integral d'altes prestacions per diverses aplicacions d'acabat en acers estructurals, acers per eines, acers tractables i també en acers inoxidables i aliatges de titani fins a 50 HRC.
Gràcies al seu nucli molt resistent i al rectificat frontal millorat amb un petit xamfrà a l'aresta de tall s'obtenen altes prestacions de tall i un acabat de superfície excel·lent.





6164

Reference Referència		d1	d	L2	L
6164003	4	3	3	15	60
6164004	4	4	4	20	80
6164005	4	5	5	25	80
6164006	6	6	6	25	80
6164008	6	8	8	35	90
6164010	6	10	10	45	100
6164012	6	12	12	50	100
6164112	6	12	12	70	125
6164014	6	14	14	65	150
6164016	6	16	16	65	150
6164116	6	16	16	100	165
6164020	6	20	20	70	150
6164120	6	20	20	100	165
6164220	6	20	20	135	200
6164025	6	25	25	75	150
6164125	6	25	25	100	165
6164225	6	25	25	140	200

6164 *Solid carbide End Mills. Hard cutting. Roughing.*
Freses de metall dur integral. Tall dur. Desbast.

Diameter / Diàmetre (Ø d1) mm	Material							
	Steels Acers				Cast iron GG Fosa grisa GG		Cast iron GGG Fosa grisa GGG	
	<1000 N/mm²		1000 ~ 1600 N/mm²		<200 HB		200 ~ 300 HB	
	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.
3	16975	4075	10610	2100	16660	4000	11670	2240
4	12730	3055	7960	1575	12495	3000	8755	1680
5	10185	2445	6365	1260	9995	2400	7000	1345
6	8490	2035	5305	1050	8330	2000	5835	1120
8	6365	2290	3980	1240	6245	2250	4375	1260
10	5095	2445	3185	1300	4995	2400	3500	1345
12	4245	2545	2655	1355	4165	2500	2920	1400
14	3640	2185	2275	1160	3570	2140	2500	1200
16	3185	1910	1990	1015	3125	1875	2190	1050
20	2545	1835	1590	955	2500	1800	1750	1010
25	2035	1590	1270	840	2000	1560	1400	840

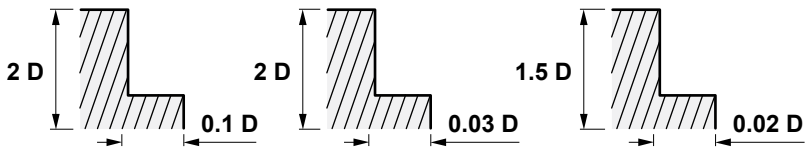
Diameter / Diàmetre (Ø d1) mm	Material			
	Stainless steels / Acer inoxidable		Titanium alloys / Aliatges de titani	
	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.
3	9975	1496	7850	1180
4	7480	1122	5890	880
5	5985	898	4710	705
6	4985	748	3925	590
8	3740	561	2945	440
10	2990	898	2355	705
12	2495	897	1965	705
14	2135	769	1680	605
16	1870	673	1470	530
20	1495	718	1180	565
25	1195	575	940	450

6164 *Solid carbide End Mills. Hard cutting. Finishing.*
Freses de metall dur integral. Tall dur. Acabat.

Diameter / Diàmetre (Ø d1) mm	Material							
	Steels / Acers				Cast iron GG / Fosa grisa GG		Cast iron GGG / Fosa grisa GGG	
	<1000 N/mm²		1000 ~ 1600 N/mm²		<200 HB		200 ~ 300 HB	
	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.
3	19945	4785	13790	2730	19945	4785	14110	2710
4	14960	3590	10345	2050	14960	3590	10585	2030
5	11970	2870	8275	1640	11970	2870	8465	1625
6	9975	2395	6895	1365	9975	2395	7055	1355
8	7480	2695	5170	1615	7480	2695	5290	1525
10	5985	2870	4140	1690	5985	2870	4235	1625
12	4985	2990	3450	1760	4985	2990	3530	1695
14	4275	2565	2955	1510	4275	2565	3025	1450
16	3740	2245	2585	1320	3740	2245	2645	1270
20	2990	2155	2070	1240	2990	2155	2115	1220
25	2395	1865	1655	1090	2395	1865	1695	1015

Diameter / Diàmetre (Ø d1) mm	Material			
	Stainless steels / Acer inoxidable		Titanium alloys / Aliatges de titani	
	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.
3	11990	1800	9335	1400
4	8990	1350	7000	1050
5	7195	1080	5600	840
6	5995	900	4670	700
8	4495	675	3500	525
10	3595	1080	2800	840
12	2995	1080	2335	840
14	2570	925	2000	720
16	2250	810	1750	630
20	1800	860	1400	670
25	1440	690	1120	540

Diameter / Diàmetre (Ø d1) mm	Material									
	Prehardened steels / Acer pretrempat				Hardened steels / Acer trempat				Hardened steels / Acer trempat	
	<35 HRC		35 - 45 HRC		46 -55 HRC		56 - 65 HRC		66 - 70 HRC	
	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Vc (M/Min.)
3	28115	6750	27585	6620	22810	5475	17505	4200	12730	3055
4	21090	5060	20690	4965	17110	4105	13130	3150	9550	2290
5	16870	4050	16550	3970	13685	3285	10505	2520	7640	1835
6	14060	3375	13790	3310	11405	2735	8755	2100	6365	1530
8	10545	3795	10345	3725	8555	3080	6565	2365	4775	1720
10	8435	4050	8275	3970	6845	3285	5250	2520	3820	1835
12	7030	4215	6895	4140	5700	3420	4375	2625	3185	1910
14	6025	3615	5910	3545	4890	2935	3750	2250	2730	1635
16	5270	3165	5170	3105	4275	2565	3285	1970	2385	1430
20	4220	3035	4140	2980	3420	2465	2625	1890	1910	1375
25	3375	2630	3310	2580	2735	2135	2100	1640	1530	1190



G

Reinforced solid carbide End Mills. Shank D6

For high speed cutting (HSC) <56HRC

Short series, two flutes

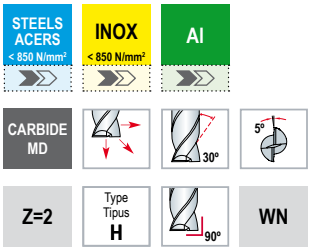
Freses reforçades de metall dur. Mànec D6

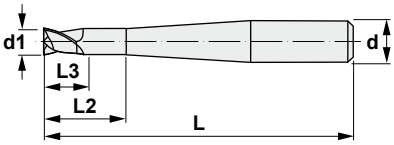
Per tall d'alta velocitat (HSC) <56HRC

Sèrie curta, dos talls

Characteristics:
Recommended for milling materials with medium and high tensile strength and for HSC milling.

Característiques:
Recomanades per el fresat de materials de mitja i alta resistència a la tracció i per el fresat HSC.





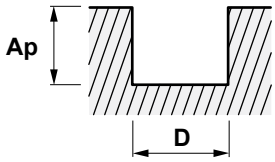
G

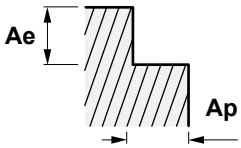
6022

Reference Referència		d1	d	L3	L2	L
6022010	2	1,0	6	1,5	5	55
6022110	2	1,0	6	1,5	12	65
6022015	2	1,5	6	1,8	5	55
6022115	2	1,5	6	1,8	12	65
6022020	2	2,0	6	2,0	10	55
6022120	2	2,0	6	2,0	16	65
6022030	2	3,0	6	2,0	9	65
6022130	2	3,0	6	2,0	15	65
6022040	2	4,0	6	2,0	12	65
6022140	2	4,0	6	2,0	20	65

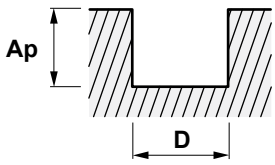
6022 *Reinforced solid carbide End Mills. Freses de metall dur integral reforçades.*

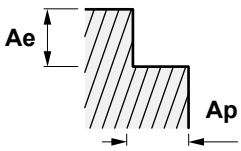
Diameter / Diàmetre (Ø d1) mm	Material							
	Carbon steels / Copper Acer al carboni / Coure 180 - 250 HB				Alloyed steels Acer aliat 25 - 35 HRC			
	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.
1.0	0.300	0.100	36000	3240	0.270	0.090	32400	2915
1.5	0.180	0.060	25200	2070	0.162	0.054	22680	1860
2.0	0.420	0.140	21000	3150	0.378	0.126	17010	2550
3.0	0.630	0.210	16000	2400	0.567	0.189	12960	1945
4.0	0.840	0.280	11500	2300	0.756	0.252	9315	1865





Diameter / Diàmetre (Ø d1) mm	Material							
	Alloyed steels Acer aliat 35 - 45 HRC				Hardened steels Acer trempat 45 - 55 HRC			
	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.
1.0	0.240	0.080	30600	2510	0.195	0.065	27000	1945
1.5	0.144	0.048	21420	1750	0.117	0.039	18900	1360
2.0	0.336	0.112	17850	2680	0.273	0.091	15750	1890
3.0	0.504	0.168	13600	2040	0.410	0.137	12000	1440
4.0	0.672	0.224	9775	1955	0.546	0.182	8625	1380





Toric-corner radius End Mills.

For high speed cutting (HSC) <62HRC

Long series, two flutes

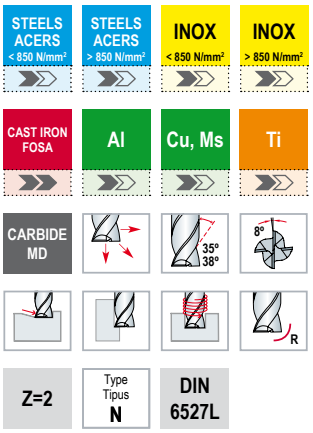
Freses tòriques de metall dur integral amb radi.

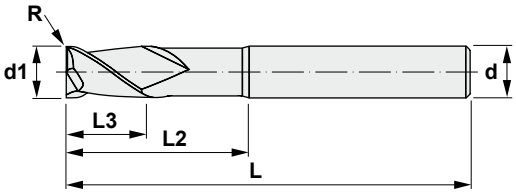
Per tall a alta velocitat (HSC) <62HRC

Sèrie llarga, dos talls

Characteristics:
High performance carbide end mill for universal applications. Finishing, semi-finishing and roughing with the same tool. Different spiral angles effect smooth, vibrationless running and excellent surface. High cutting performance.

Característiques:
Freses de metall dur integral d'altes prestacions per aplicacions generals. Acabat, semiacabat i desbast amb la mateixa eina. Els diferents angles d'hèlix produeixen un tall suau i sense vibracions i un excel·lent acabat de superfície. Altes prestacions de tall.





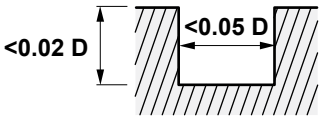
6023

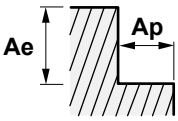
Reference Referència		d1	d	L2	L3	R	L
6023001	2	1	6	5	1,5	0,25	55
6023101	2	1	6	12	1,5	0,25	65
6023002	2	2	6	10	2,0	0,2	80
6023102	2	2	6	10	2,0	0,5	80
6023202	2	2	6	10	10,0	0,2	80
6023302	2	2	6	10	10,0	0,5	80
6023003	2	3	6	15	3,0	0,2	80
6023103	2	3	6	15	3,0	0,5	80
6023203	2	3	6	15	15,0	0,2	80
6023303	2	3	6	15	15,0	0,5	80
6023004	2	4	6	20	4,0	0,2	80
6023104	2	4	6	20	4,0	0,5	80
6023204	2	4	6	20	4,0	1,0	80
6023304	2	4	6	20	20,0	0,2	80
6023404	2	4	6	20	20,0	0,5	80
6023504	2	4	6	20	20,0	1,0	80
6023005	2	5	6	25	7,0	0,2	80
6023105	2	5	6	25	7,0	0,5	80
6023205	2	5	6	25	7,0	1,0	80
6023305	2	5	6	25	25,0	0,2	80
6023405	2	5	6	25	25,0	0,5	80
6023505	2	5	6	25	25,0	1,0	80
6023006	2	6	6	13	13,0	0,2	80

6023

Reference Referència		d1	d	L2	L3	R	L
6023106	2	6	6	13	13	0,5	80
6023206	2	6	6	13	13	1,0	80
6023306	2	6	6	13	13	1,5	80
6023406	2	6	6	13	13	2,0	80
6023506	2	6	6	25	25	0,2	80
6023606	2	6	6	25	25	0,5	80
6023706	2	6	6	25	25	1,0	80
6023806	2	6	6	25	25	2,0	80
6023008	2	8	8	19	19	0,5	90
6023108	2	8	8	19	19	1,0	90
6023208	2	8	8	19	19	1,5	90
6023308	2	8	8	19	19	2,0	90
6023408	2	8	8	35	35	0,5	90
6023508	2	8	8	35	35	1,0	90
6023608	2	8	8	35	35	2,0	90
6023010	2	10	10	22	22	0,5	100
6023110	2	10	10	22	22	1,0	100
6023210	2	10	10	22	22	1,5	100
6023310	2	10	10	22	22	2,0	100
6023410	2	10	10	22	22	3,0	100
6023510	2	10	10	45	45	0,5	100
6023610	2	10	10	45	45	1,0	100
6023710	2	10	10	45	45	2,0	100
6023810	2	10	10	45	45	3,0	100
6023012	2	12	12	26	26	0,5	100
6023112	2	12	12	26	26	1,0	100
6023212	2	12	12	26	26	1,5	100
6023312	2	12	12	26	26	2,0	100
6023412	2	12	12	26	26	3,0	100
6023512	2	12	12	50	50	0,5	100
6023612	2	12	12	50	50	1,0	100
6023712	2	12	12	50	50	2,0	100
6023812	2	12	12	50	50	3,0	100

Diameter / Diàmetre (Ø d1) mm	Material											
	Steels Acers				Hardened steels Acer trempat				Cr-Ni alloys Aliatges Cr-Ni		Ti alloys Aliatges de titani	
	<1200 N/mm²		1200 - 1600 N/mm²		54 HRC		<68 HRC		<900 N/mm²		<850 N/mm²	
	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.
1	37500	3200	35000	3000	26500	2200	13600	1200	56000	4650	48000	3950
2	37500	3100	35000	2900	26500	2100	13500	1100	56000	4550	48000	3850
3	37500	3000	35000	2800	26500	2000	13400	1000	56000	4450	48000	3700
4	28000	2550	27000	2350	19500	1800	10000	900	42000	3750	36000	3250
5	22500	2250	21000	2100	16000	1600	7500	800	33500	3300	29000	2900
6	19000	1900	17500	1900	13000	1400	6500	700	28000	3050	24000	2600
8	14000	1400	11000	1750	10000	1300	5000	650	21000	2700	18000	2350
10	11000	1750	10500	1500	8000	1100	4000	550	17000	2350	14500	2000
12	9500	1500	8500	1400	6500	1050	3500	500	14000	2250	12000	1900





G

Toric-corner radius End Mills.

For high speed cutting (HSC) <62HRC

Long series, four flutes

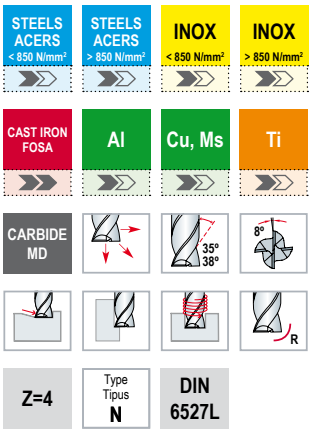
Freses tòriques de metall dur integral amb radi.

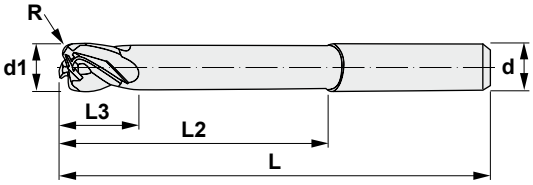
Per tall a alta velocitat (HSC) <62HRC

Sèrie llarga, quatre talls

Characteristics:
High performance carbide end mill for universal applications. Finishing, semi-finishing and roughing with the same tool. Different spiral angles effect smooth, vibrationless running and excellent surface. High cutting performance.

Característiques:
Freses de metall dur integral d'altes prestacions per aplicacions generals. Acabat, semiacabat i desbast amb la mateixa eina. Els diferents angles d'hèlix produeixen un tall suau i sense vibracions i un excel·lent acabat de superfície. Altes prestacions de tall.





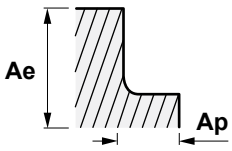
6043

Reference Referència		d1	d	L3	L2	R	L
6043002	4	2	6	2	10	0,2	80
6043102	4	2	6	2	10	0,5	80
6043202	4	2	6	10	10	0,2	80
6043302	4	2	6	10	10	0,5	80
6043003	4	3	6	3	15	0,2	80
6043103	4	3	6	3	15	0,5	80
6043203	4	3	6	15	15	0,2	80
6043303	4	3	6	15	15	0,5	80
6043004	4	4	6	4	20	0,2	80
6043104	4	4	6	4	20	0,5	80
6043204	4	4	6	4	20	1,0	80
6043304	4	4	6	20	20	0,2	80
6043404	4	4	6	20	20	0,5	80
6043504	4	4	6	20	20	1,0	80
6043006	4	6	6	13	13	0,2	80
6043106	4	6	6	13	13	0,5	80
6043206	4	6	6	13	13	1,0	80
6043306	4	6	6	13	13	1,5	80
6043406	4	6	6	13	13	2,0	80
6043506	4	6	6	25	25	0,2	80
6043606	4	6	6	25	25	0,5	80
6043706	4	6	6	25	25	1,0	80
6043806	4	6	6	25	25	2,0	80

6043

Reference Referència		d1	d	L3	L2	R	L
6043008	4	8	8	19	19	0,5	90
6043108	4	8	8	19	19	1,0	90
6043208	4	8	8	19	19	1,5	90
6043308	4	8	8	19	19	2,0	90
6043408	4	8	8	35	35	0,5	90
6043508	4	8	8	35	35	1,0	90
6043608	4	8	8	35	35	2,0	90
6043010	4	10	10	22	22	0,5	100
6043110	4	10	10	22	22	1,0	100
6043210	4	10	10	22	22	1,5	100
6043310	4	10	10	22	22	2,0	100
6043410	4	10	10	22	22	3,0	100
6043510	4	10	10	45	45	0,5	100
6043610	4	10	10	45	45	1,0	100
6043710	4	10	10	45	45	2,0	100
6043810	4	10	10	45	45	3,0	100
6043012	4	12	12	26	26	0,5	100
6043112	4	12	12	26	26	1,0	100
6043212	4	12	12	26	26	1,5	100
6043312	4	12	12	26	26	2,0	100
6043412	4	12	12	26	26	3,0	100
6043512	4	12	12	50	50	0,5	100
6043612	4	12	12	50	50	1,0	100
6043712	4	12	12	50	50	2,0	100
6043812	4	12	12	50	50	3,0	100

Diameter / Diàmetre (Ø d1) mm	Material											
	Prehardened and hardened steels Acer pretrempat i acer trempat <45 HRC				Hardened steels Acer trempat <55 HRC				Copper / Aluminium Coure / Alumini			
	Ae mm.	Ap mm.	R.P.M Min.	Feed / Avanç mm/min.	Ae mm.	Ap mm.	R.P.M Min.	Feed / Avanç mm/min.	Ae mm.	Ap mm.	R.P.M Min.	Feed / Avanç mm/min.
2	0.344	0.039	7800	880	0.344	0.037	7200	820	0.153	0.015	5900	360
3	0.493	0.049	7100	1300	0.493	0.031	6700	1300	0.271	0.019	5400	470
4	0.800	0.060	6200	1200	0.800	0.047	5200	1120	0.560	0.022	4500	630
6	1.148	0.085	2500	680	0.638	0.085	1400	400	0.468	0.034	1200	300
8	2.540	0.184	4000	1600	1.320	0.184	2400	680	1.320	0.087	2000	650
10	2.730	0.210	3200	1750	1.430	0.220	1900	540	1.450	0.094	1600	460
12	2.700	0.230	2500	1800	1.490	0.240	1500	430	1.500	0.110	1300	450



Turbo Torus End Mills.

For high speed cutting (HSC) <45HRC

Short series, four flutes

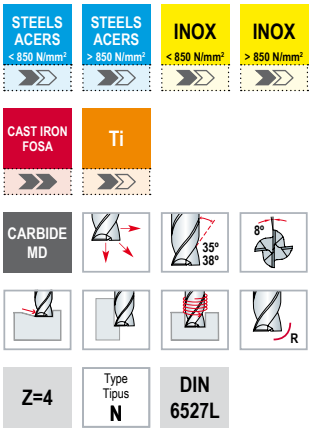
Freses tòriques Turbo de metall dur integral.

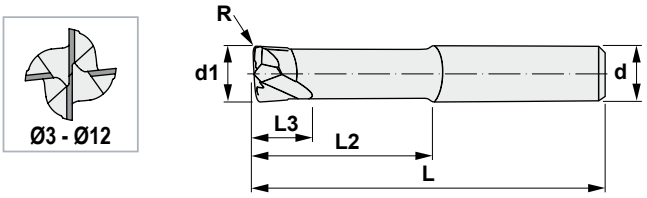
Per tall a alta velocitat (HSC) <45HRC

Sèrie curta, quatre talls

Characteristics:
High performance carbide end mill for universal applications. Finishing, semi-finishing and roughing with the same tool. Different spiral angles effect smooth, vibrationless running and excellent surface. High cutting performance.

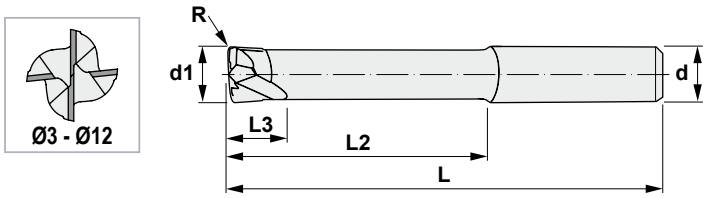
Característiques:
Freses de metall dur integral d'altes prestacions per aplicacions generals. Acabat, semiacabat i desbast amb la mateixa eina. Els diferents angles d'hèlix produeixen un tall suau i sense vibracions i un excel·lent acabat de superfície. Altes prestacions de tall.





6143

Reference Referència		d1	d	L3	L2	R	L
614303	4	3	6	1,5	8	0,5	60
614304	4	4	6	2,0	8	0,5	60
614306	4	6	6	3,0	14	1,0	60
614308	4	8	8	4,0	18	2,0	63
614310	4	10	10	5,0	20	2,0	72
614312	4	12	12	6,0	22	2,0	83



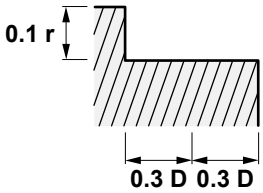
6243 *Long series, four flutes* *Sèrie llarga, quatre talls*

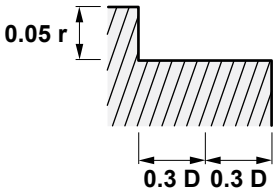
Reference Referència		d1	d	L3	L2	R	L
624303	4	3	6	1,5	20	0,5	80
624304	4	4	6	2,0	20	0,5	80
624306	4	6	6	3,0	30	1,0	80
624308	4	8	8	4,0	40	2,0	80
624310	4	10	10	5,0	50	2,0	100
624312	4	12	12	6,0	50	2,0	110

6143 / 6243 *Turbo Torus End Mills. Freses tòriques Turbo.*

Conventional milling
Fresat convencional

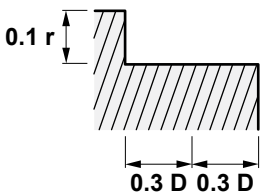
Diameter / Diàmetre (Ø d1) mm	Material									
	Prehardened steels Acer pretrempat <40 HRC		Hardened steels Acer trempat 40 - 50 HRC		Hardened steels Acer trempat 50 - 55 HRC		Hardened steels Acer trempat 55 - 60 HRC		Hardened steels Acer trempat 60 - 65 HRC	
	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.
3	9550	6500	6900	4150	4550	2750	2850	1150	1900	610
4	7950	7000	5750	4600	4000	3200	2550	1350	1750	700
6	5800	7650	4100	4900	2900	3500	1850	1850	1350	795
8	4350	7650	3050	4900	2200	3500	1400	1850	995	795
10	3500	7650	2450	4900	1750	3500	1100	1850	795	795
12	2900	7650	2050	4900	1450	3500	925	1850	665	795

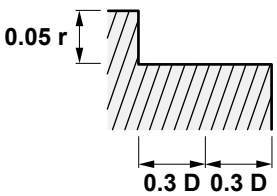




HSC milling
Fresat HSC

Diameter / Diàmetre (Ø d1) mm	Material									
	Prehardened steels Acer pretrempat <40 HRC		Hardened steels Acer trempat 40 - 50 HRC		Hardened steels Acer trempat 50 - 55 HRC		Hardened steels Acer trempat 55 - 60 HRC		Hardened steels Acer trempat 60 - 65 HRC	
	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.
3	22000	16000	17000	10000	12500	8000	9500	4600	6900	2500
4	17000	17500	13000	12000	11000	9200	8000	5500	5600	2900
6	13500	18500	10500	13800	9000	11000	6400	6400	4500	3600
8	10000	18500	8000	14000	6800	11000	4800	6700	3400	4100
10	8000	18500	6400	14000	5400	11000	3800	6800	2700	2800
12	6600	18500	5300	14000	4500	11000	3200	7000	2250	3600





Solid carbide End Mills. HyperBall form.

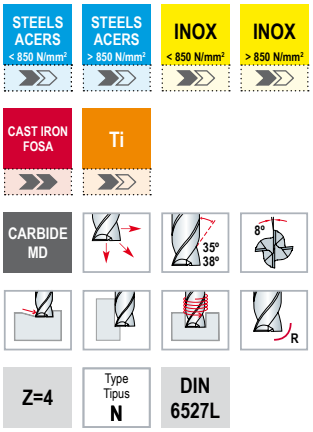
Short series, four flutes

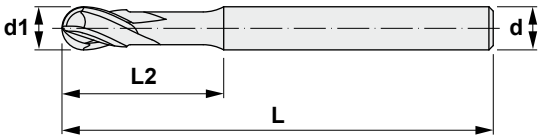
Freses de metall dur integral. Forma HyperBall.

Sèrie curta, quatre talls

Characteristics:
High performance carbide end mill for universal applications. Finishing, semi-finishing and roughing with the same tool. Different spiral angles effect smooth, vibrationless running and excellent surface. High cutting performance.

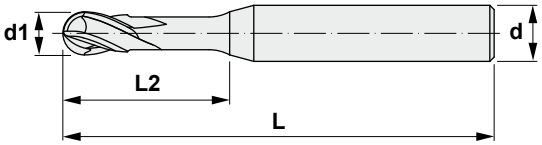
Característiques:
Freses de metall dur integral d'altes prestacions per aplicacions generals. Acabat, semiacabat i desbast amb la mateixa eina. Els diferents angles d'hèlix produeixen un tall suau i sense vibracions i un excel·lent acabat de superfície. Altes prestacions de tall.





6342

Reference Referència		d1	d	L2	L
6342006	4	6	6	8	50
6342106	4	6	6	8	80
6342206	4	6	6	8	100
6342306	4	6	6	8	150
6342008	4	8	8	10	60
6342108	4	8	8	10	100
6342208	4	8	8	10	150
6342010	4	10	10	13	75
6342110	4	10	10	13	100
6342210	4	10	10	13	150
6342310	4	10	10	13	200
6342012	4	12	12	15	75
6342112	4	12	12	15	100
6342212	4	12	12	15	150
6342312	4	12	12	15	200



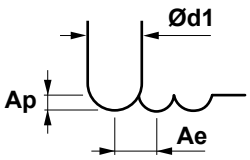
6343

Reference Referència		d1	d	L2	L
6343006	4	6	8	32	80
6343106	4	6	8	45	108
6343008	4	8	10	32	80
6343108	4	8	10	48	108

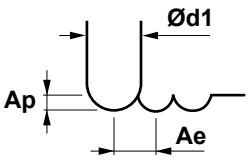
6342 / 6343 *Solid carbide End Mills. HyperBall form. Freses de metall dur integral. Forma HyperBall.*

For finishing
Per acabat

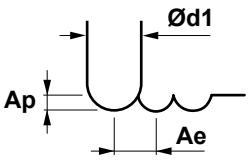
Diameter / Diàmetre		Material							
		Tool & die steel / Mold steel Acer per eines i matrius < 45 HRC		Hardened steels Acer trempat 45 ~ 55 HRC		Hardened steels Acer trempat 55 ~ 62 HRC		Hardened steels Acer trempat 62 ~ 72 HRC	
R mm	(Ø d1) mm	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.
3	6	12700	4000	10600	3000	8500	2000	6400	1000
4	8	9500	4000	8000	3000	6400	2000	4800	1000
5	10	7600	4000	6400	3000	5100	2000	3800	1000
6	12	6400	4000	5300	3000	4200	2000	3200	1000



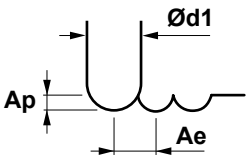
Ap ≤0.03 d1
Ae ≤0.03 d1



Ap ≤0.03 d1
Ae ≤0.03 d1



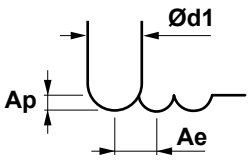
Ap ≤0.03 d1
Ae ≤0.03 d1



Ap ≤0.03 d1
Ae ≤0.03 d1

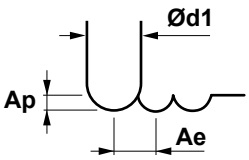
For roughing and semi-finishing
Per desbast i semiacabat

Diameter / Diàmetre		Material											
		Tool & die steel / Mold steel Acer per eines i matrius < 45 HRC			Hardened steels Acer trempat 45 ~ 55 HRC			Hardened steels Acer trempat 55 ~ 62 HRC			Hardened steels Acer trempat 62 ~ 72 HRC		
R mm	(Ø d1) mm	R.P.M Min.	Feed / Avanç mm/min.	ap x Ae	R.P.M Min.	Feed / Avanç mm/min.	ap x Ae	R.P.M Min.	Feed / Avanç mm/min.	ap x Ae	R.P.M Min.	Feed / Avanç mm/min.	ap x Ae
3	6	9500	3000	0.86	8000	2250	0.86	6400	1500	0.72	4800	750	0.22
4	8	7200	3000	1.54	6000	2250	1.54	4800	1500	1.28	3600	750	0.38
5	10	5700	3000	2.40	4800	2250	2.40	3800	1500	2.00	2900	750	0.60
6	12	4800	3000	3.46	4000	2250	3.46	3200	1500	2.88	2400	750	0.86



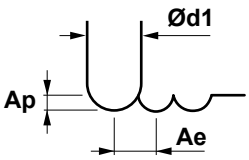
Ap ≤1.2 d1
Ae ≤0.2 d1

Ap=2.2 / Ae=0.1
(Ap x Ae ≤0.22)



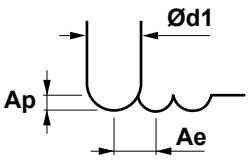
Ap ≤1.2 d1
Ae ≤0.2 d1

Ap=2.2 / Ae=0.1
(Ap x Ae ≤0.22)



Ap ≤1.2 d1
Ae ≤0.2 d1

Ap=2.2 / Ae=0.1
(Ap x Ae ≤0.22)



Ap ≤1.2 d1
Ae ≤0.2 d1

Ap=2.2 / Ae=0.1
(Ap x Ae ≤0.22)

Solid carbide End Mills. Ball form. Reinforced

For high speed cutting (HSC) <62HRC

Short series (Conical form), two flutes

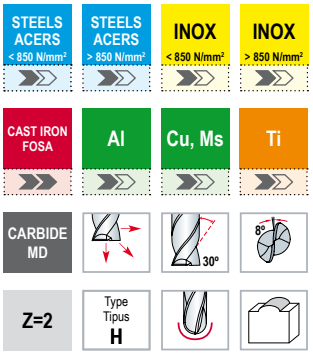
Freses de metall dur integral reforçades de punta esfèrica.

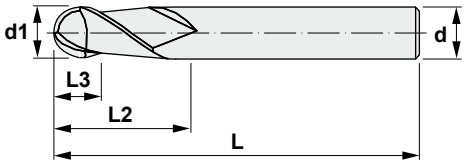
Per tall d'alta velocitat (HSC) <62HRC

Sèrie curta (forma cònica), dos talls

Characteristics:
HSC high-performance tools for mould and die making. For high-alloyed and hardened materials.

Característiques:
Freses HSC d'altes prestacions per la construcció de motlles i matrius. Per materials d'alt aliatge i materials tractats.





G

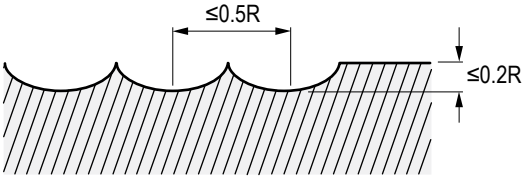
6322

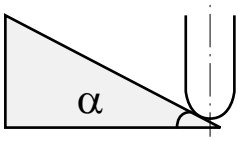
Reference Referència		d1	d	L3	L2	L
632202	2	2	6	3	20	60
632212	2	2	6	6	25	60
632203	2	3	6	7	20	60
632204	2	4	6	8	25	60
632205	2	5	6	9	25	60

6322 *Solid carbide End Mills. Ball form. Reinforced.*
Freses de metall dur integral reforçades de punta esfèrica.

For roughing
Per desbast

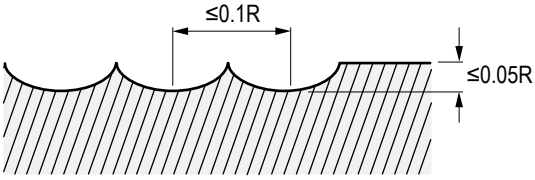
Diameter / Diàmetre (Ø d1) mm	Material							
	Prehardened steels Acer pretrempat <45 HRC				Hardened steels / Stainless steels Acer trempat / Acer inoxidable 45 - 55 HRC			
	α≤15º		α>15º		α≤15º		α>15º	
	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.
2	28800	2700	22500	1100	16200	1300	14400	580
3	22800	3000	18000	1200	13100	1500	11400	630
4	16700	3300	13000	1300	10000	1600	8300	670
5	14200	3500	11000	1300	8500	1700	7100	700

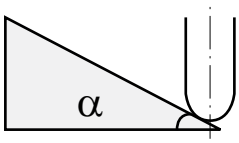




For finishing
Per acabat

Diameter / Diàmetre (Ø d1) mm	Material							
	Hardened steels Acer trempat <45 HRC				Hardened steels / Stainless steels Acer trempat / Acer inoxidable 45 - 55 HRC			
	α≤15º		α>15º		α≤15º		α>15º	
	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.
2	28800	2900	28800	1400	22500	1800	18000	700
3	22900	3700	23400	1600	18900	2100	14900	800
4	23000	4500	18000	1800	15300	2400	11700	900
5	21000	5000	15800	1900	13500	2500	10400	1000





Solid carbide End Mills. Ball form. Reinforced

For high speed cutting (HSC) <62HRC

Long series (Conical form), two flutes

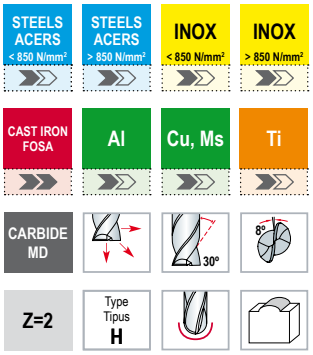
Freses de metall dur integral reforçades de punta esfèrica.

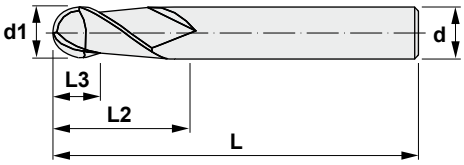
Per tall a alta velocitat (HSC) <62HRC

Sèrie llarga (forma cònica), dos talls

Characteristics:
HSC high-performance tools for mould and die making. For high-alloyed and hardened materials.

Característiques:
Freses HSC d'altes prestacions per la construcció de motlles i matrius. Per materials d'alt aliatge i materials tractats.





G

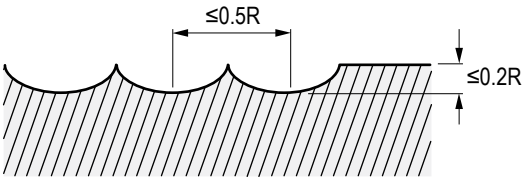
6323

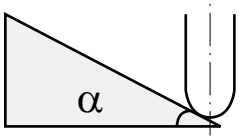
Reference Referència		d1	d	L3	L2	L
6323002	2	2	6	3	40	80
6323003	2	3	6	4	50	100
6323004	2	4	6	5	50	100
6323104	2	4	8	8	50	100
6323005	2	5	8	12	41	90
6323105	2	5	6	6	50	100
6323006	2	6	8	14	33	90
6323106	2	6	8	8	50	100
6323206	2	6	10	12	50	100
6323008	2	8	10	15	40	100
6323108	2	8	12	15	50	100
6323208	2	8	10	10	70	150
6323010	2	10	12	20	50	100
6323110	2	10	16	20	60	150
6323210	2	10	12	15	65	130
6323012	2	12	16	20	60	150

6323 *Solid carbide End Mills. Ball form. Reinforced.*
Freses de metall dur integral reforçades de punta esfèrica.

For roughing
Per desbast

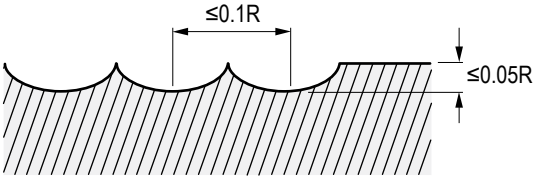
Diameter / Diàmetre (Ø d1) mm	Material							
	Prehardened steels Acer pretrempat <45 HRC				Hardened steels / Stainless steels Acer trempat / Acer inoxidable 45 - 55 HRC			
	α≤15º		α>15º		α≤15º		α>15º	
	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.
2	28800	2700	22500	1100	16200	1300	14400	580
3	22800	3000	18000	1200	13100	1500	11400	630
4	16700	3300	13000	1300	10000	1600	8300	670
5	14200	3500	11000	1300	8500	1700	7100	700
6	11700	3600	9000	1400	6900	1700	5800	720
8	9000	4500	7000	1800	5400	2100	4300	830
10	7200	4500	5900	1800	4300	2000	3400	780
12	5900	4100	4800	1600	3600	1900	2900	760

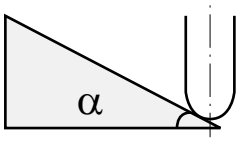




For finishing
Per acabat

Diameter / Diàmetre (Ø d1) mm	Material							
	Hardened steels Acer trempat <45 HRC				Hardened steels / Stainless steels Acer trempat / Acer inoxidable 45 - 55 HRC			
	α≤15º		α>15º		α≤15º		α>15º	
	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.
2	28800	2900	28800	1400	22500	1800	18000	700
3	22900	3700	23400	1600	18900	2100	14900	800
4	23000	4500	18000	1800	15300	2400	11700	900
5	21000	5000	15800	1900	13500	2500	10400	1000
6	18000	5500	13500	2000	11700	2900	9000	1100
8	13500	6800	10000	2400	9000	3400	6800	1300
10	10800	6800	8100	2400	7200	3400	5400	1300
12	9000	6300	6800	2300	6000	3200	4500	1200





Ball form carbide End Mills. Shank D4.

For high speed cutting (HSC) <62HRC

Two flutes

Freses de metall dur integral de punta esfèrica.

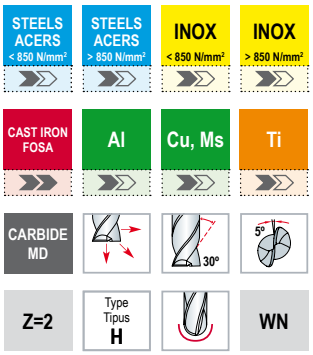
Mànec D4.

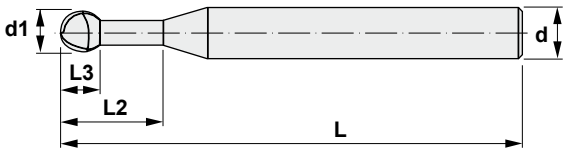
Per tall a alta velocitat (HSC) <62HRC

Dos talls

Characteristics:
For milling materials with medium/high tensile strength. Especially suited for HSC-copy milling.

Característiques:
Per mecanitzar materials amb una resistència mitja/alta a la tracció. Especialment adequades per el copiat HSC.

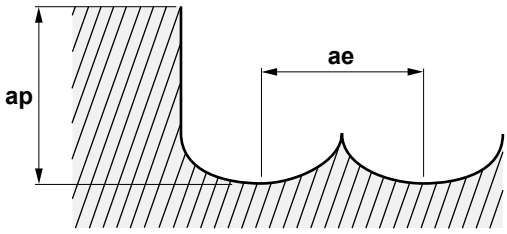




6324

Reference Referència		d1	d	L3	L2	L
632404	2	0,4	4	0,6	4	45
632405	2	0,5	4	0,7	4	45
632406	2	0,6	4	0,9	6	45
632408	2	0,8	4	1,2	8	45
632412	2	1,2	4	1,8	8	45

Diameter / Diàmetre (Ø d1) mm	Material											
	Prehardened and hardened steels Acer pretrempat i acer trempat <45 HRC				Hardened steels Acer trempat <55 HRC				Copper Coure			
	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.
0.4	0.100	0.035	50000	720	0.080	0.028	41300	540	0.014	0.010	50000	710
0.5	0.120	0.040	46000	855	0.080	0.030	38300	630	0.017	0.018	52000	945
0.6	0.145	0.050	45500	830	0.110	0.040	37500	650	0.020	0.020	54000	1090
0.8	0.150	0.060	42000	880	0.150	0.050	33500	720	0.025	0.030	48000	1415
1.2	0.141	0.077	25600	575	0.112	0.061	20160	470	0.032	0.014	21760	1010



Solid carbide End Mills. Ball form with neck.

For high speed cutting (HSC) <62HRC

Short series (long neck), two flutes

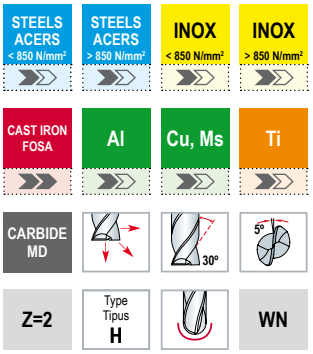
Freses de metall dur integral de punta esfèrica amb coll.

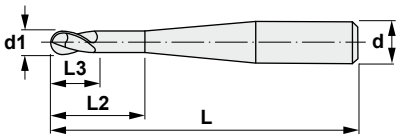
Per tall a alta velocitat (HSC) <62HRC

Sèrie curta (coll llarg), dos talls

Characteristics:
For milling materials with medium/high tensile strength. Especially suited for HSC-copy milling.

Característiques:
Per mecanitzar materials amb una resistència mitja/alta a la tracció. Especialment adequades per el copiat HSC.





G

6325

Reference Referència		d1	d	L3	L2	L
632501	2	1	6	1,5	5	55
632511	2	1	6	1,5	12	65
632502	2	2	6	2,0	10	55
632512	2	2	6	3,0	14	55
632522	2	2	6	2,0	16	60
632532	2	2	6	2,0	35	75
632503	2	3	6	2,0	9	65
632513	2	3	6	2,0	15	65
632523	2	3	6	4,0	20	60
632533	2	3	6	2,0	40	80
632504	2	4	6	2,0	12	65
632514	2	4	6	5,0	20	60
632505	2	5	6	6,0	20	60

6325 *Solid carbide End Mills. Ball form with neck. Freses de metall dur integral de punta esfèrica amb coll.*

Conventional roughing / Desbast convencional

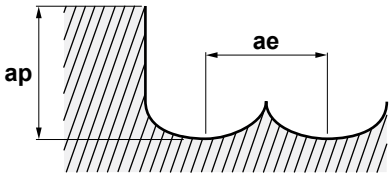
Diameter / Diàmetre (Ø d1) mm	Material											
	Alloyed steels Acer aliat <1200 N/mm²				Alloyed steels Acer aliat 1200 - 1450 N/mm²				Hardened steels Acer trempat 45 - 55 HRC			
	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.
1	0.300	0.070	38195	750	0.300	0.070	38195	750	0.250	0.055	33420	400
2	0.600	0.140	19100	1200	0.600	0.140	19100	1200	0.500	0.110	16710	600
3	0.900	0.210	12730	1600	0.900	0.210	12730	1600	0.750	0.165	11140	1000
4	1.200	0.280	9550	1700	1.200	0.280	9550	1400	1.000	0.220	8355	900
5	1.500	0.350	7640	1900	1.500	0.350	7640	1600	1.250	0.275	6685	1000

Diameter / Diàmetre (Ø d1) mm	Material							
	Hardened steels Acer trempat 55 - 65 HRC				Hardened steels Acer trempat 65 - 70 HRC			
	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.
1	0.250	0.035	28645	400	0.200	0.025	20690	330
2	0.500	0.070	14325	500	0.400	0.050	10345	330
3	0.750	0.105	9550	650	0.600	0.075	6895	340
4	1.000	0.140	7160	800	0.800	0.100	5170	400
5	1.250	0.175	5730	800	1.000	0.125	4140	500

HSC roughing / Desbast HSC

Diameter / Diàmetre (Ø d1) mm	Material											
	Alloyed steels Acer aliat <1200 N/mm²				Alloyed steels Acer aliat 1200 - 1450 N/mm²				Hardened steels Acer trempat 45 - 55 HRC			
	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.
1	0.300	0.070	79575	3200	0.300	0.070	95490	3200	0.250	0.055	68435	3000
2	0.600	0.140	39790	2800	0.600	0.140	47745	2800	0.500	0.110	34220	2300
3	0.900	0.210	26525	3200	0.900	0.210	31830	3200	0.750	0.165	22810	2200
4	1.200	0.280	19895	3400	1.200	0.280	23875	2900	1.000	0.220	17110	2500
5	1.500	0.350	15915	3600	1.500	0.350	19100	3000	1.250	0.275	13685	2600

Diameter / Diàmetre (Ø d1) mm	Material							
	Hardened steels Acer trempat 55 - 65 HRC				Hardened steels Acer trempat 65 - 70 HRC			
	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.
1	0.250	0.035	66845	1100	0.200	0.025	44565	800
2	0.500	0.070	33420	1000	0.400	0.050	22280	800
3	0.750	0.105	22280	1700	0.600	0.075	14855	1000
4	1.000	0.140	16710	1600	0.800	0.100	11140	900
5	1.250	0.175	13370	1800	1.000	0.125	8910	1200



G

6325 *Solid carbide End Mills. Ball form with neck. Freses de metall dur integral de punta esfèrica amb coll.*

Conventional finishing / Acabat convencional

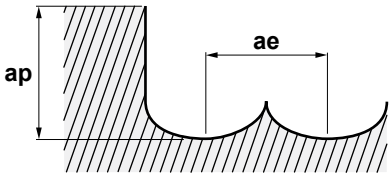
Diameter / Diàmetre (Ø d1) mm	Material											
	Alloyed steels Acer aliat <1200 N/mm²				Alloyed steels Acer aliat 1200 - 1450 N/mm²				Hardened steels Acer trempat 45 - 55 HRC			
	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.
1	0.035	0.075	41380	1900	0.035	0.075	41380	1900	0.030	0.065	33420	1500
2	0.070	0.150	20690	2300	0.070	0.150	20690	2300	0.060	0.130	16710	1900
3	0.105	0.225	13790	2700	0.105	0.225	13790	2700	0.090	0.195	11140	1700
4	0.140	0.300	10345	2600	0.140	0.300	10345	2600	0.120	0.260	8355	1600
5	0.175	0.375	8275	2400	0.175	0.375	8275	2400	0.150	0.325	6685	1700

Diameter / Diàmetre (Ø d1) mm	Material							
	Hardened steels Acer trempat 55 - 65 HRC				Hardened steels Acer trempat 65 - 70 HRC			
	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.
1	0.030	0.050	33420	1100	0.025	0.030	28995	1200
2	0.060	0.100	16710	2000	0.050	0.060	14480	1400
3	0.090	0.150	11140	1500	0.075	0.090	9655	1200
4	0.120	0.200	8355	1500	0.100	0.120	7240	1100
5	0.150	0.250	6685	1600	0.125	0.150	5790	1200

HSC finishing / Acabat HSC

Diameter / Diàmetre (Ø d1) mm	Material											
	Alloyed steels Acer aliat <1200 N/mm²				Alloyed steels Acer aliat 1200 - 1450 N/mm²				Hardened steels Acer trempat 45 - 55 HRC			
	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.
1	0.035	0.075	95490	1900	0.035	0.075	95490	1900	0.030	0.065	84350	1500
2	0.070	0.150	47745	2300	0.070	0.150	47745	2300	0.060	0.130	42175	1900
3	0.105	0.225	31830	2700	0.105	0.225	31830	2700	0.090	0.195	28115	1700
4	0.140	0.300	23875	2600	0.140	0.300	23875	2600	0.120	0.260	21090	1600
5	0.175	0.375	19100	2400	0.175	0.375	19100	2400	0.150	0.325	16870	1700

Diameter / Diàmetre (Ø d1) mm	Material							
	Hardened steels Acer trempat 55 - 65 HRC				Hardened steels Acer trempat 65 - 70 HRC			
	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.	Ae mm	Ap mm	R.P.M Min.	Feed / Avanç mm/min.
1	0.030	0.050	71620	1100	0.025	0.030	55705	1200
2	0.060	0.100	35810	2000	0.050	0.060	27850	1400
3	0.090	0.150	23875	1500	0.075	0.090	18570	1200
4	0.120	0.200	17905	1500	0.100	0.120	13925	1100
5	0.150	0.250	14325	1600	0.125	0.150	11140	1200



Single flute End Mills.

For aluminium and plastic materials

Short series, one flute

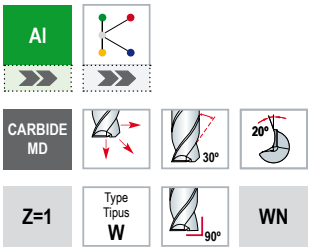
Freses de metall dur integral d'un tall.

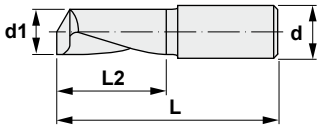
Per alumini i materials plàstics

Sèrie curta, un tall

Characteristics:
Right-hand cutting with right-hand spiral.
Especially suited for cutting aluminium and aluminium-alloys.

Característiques:
Tall a dretes amb espiral a dretes.
Especialment adequades per mecanitzar alumini i aliatges d'alumini.

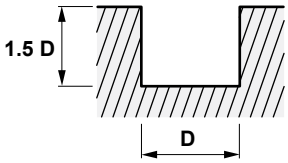




6510

Reference Referència		d1	d	L2	L
651003	1	3	3	8	38
651004	1	4	4	11	50
651005	1	5	5	13	50
651006	1	6	6	16	50
651008	1	8	8	19	60
651010	1	10	10	22	75
651012	1	12	12	26	75

Diameter / Diàmetre (Ø d1) mm	Material							
	Acrylic / Acrílic				Aluminium / Alumini Aluminium alloys / Aliatges d'alumini			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) fz (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) fz (mm/dent)
3	25000	2400	235	0.096	18000	1700	170	0.094
4	20000	2400	250	0.120	15000	1800	190	0.120
5	15000	2200	235	0.147	12000	1800	190	0.150
6	13500	2300	255	0.170	10000	1800	190	0.180
8	10000	2400	250	0.240	7800	1900	195	0.244
10	8000	2400	250	0.300	6000	2000	190	0.333
12	6700	2300	255	0.343	5000	2200	190	0.440



Single flute End Mills.

For aluminium and plastic materials

Long series, one flute

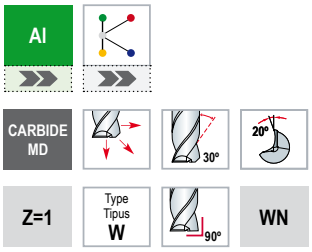
Freses de metall dur integral d'un tall.

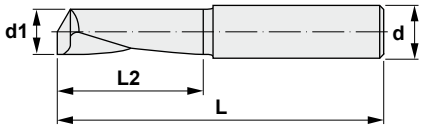
Per alumini i materials plàstics

Sèrie llarga, un tall

Characteristics:
Right-hand cutting with right-hand spiral.
Especially suited for cutting aluminium and aluminium-alloys.

Característiques:
Tall a dretes amb espiral a dretes.
Especialment adequades per mecanitzar alumini i aliatges d'alumini.

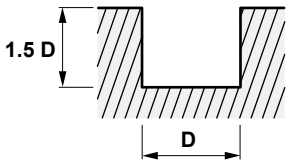




6610

Reference Referència		d1	d	L2	L
661006	1	6	6	25	80
661008	1	8	8	35	90
661010	1	10	10	45	100
661012	1	12	12	50	100

Diameter / Diàmetre (Ø d1) mm	Material							
	Acrylic / Acrílic				Aluminium / Alumini Aluminium alloys / Aliatges d'alumini			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) fz (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) fz (mm/dent)
6	13500	2300	255	0.170	10000	1800	190	0.180
8	10000	2400	250	0.240	7800	1900	195	0.244
10	8000	2400	250	0.300	6000	2000	190	0.333
12	6700	2300	255	0.343	5000	2200	190	0.440



Solid carbide End Mills.

For aluminium and plastic materials

Short series, two flutes

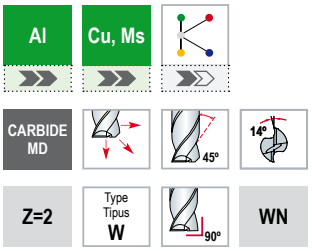
Freses de metall dur integral.

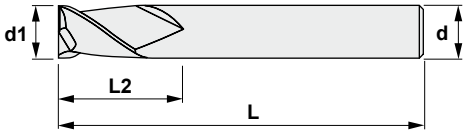
Per alumini i materials plàstics

Sèrie curta, dos talls

Characteristics:
Recommended for milling aluminium and aluminium-alloys, plastics, copper-alloys and non-ferrous metals.

Característiques:
Recomanades per fresar alumini i aliatges d'alumini, plàstics, aliatges de coure i materials no ferrosos.

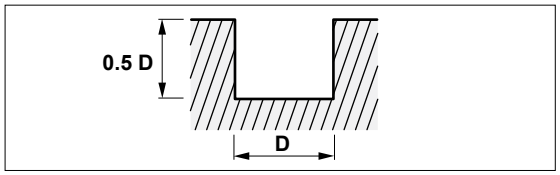




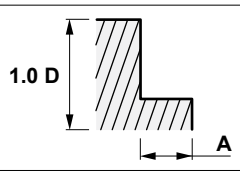
6520

Reference Referència		d1	d	L2	L
652003	2	3	6	8	50
652004	2	4	6	11	50
652005	2	5	6	13	50
652006	2	6	6	16	50
652008	2	8	8	19	60
652010	2	10	10	25	72
652012	2	12	12	30	75
652014	2	14	14	35	84
652016	2	16	16	40	92

Diameter / Diàmetre (Ø d1) mm	Material: Aluminium / Alumini, Aluminium alloys / Aliatges d'alumini							
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) fz (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) fz (mm/dent)
3	10000	700	95	0.035	10000	900	95	0.045
4	10000	900	125	0.045	10000	1100	125	0.055
5	10000	1000	155	0.050	10000	1300	155	0.065
6	10000	1200	190	0.060	10000	1500	190	0.075
8	8000	1400	200	0.088	8000	1800	200	0.113
10	8000	1700	250	0.106	8000	2100	250	0.131
12	8000	2100	300	0.131	8000	2600	300	0.163
14	6000	1800	265	0.150	6000	2200	265	0.183
16	6000	1900	300	0.158	6000	2400	300	0.200



A= Ø3 ~ Ø10 = 0.25 x D
Ø12 ~ Ø16 = 0.5 x D



Solid carbide End Mills.

For aluminium and plastic materials

Short series, three flutes

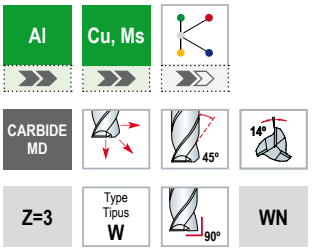
Freses de metall dur integral.

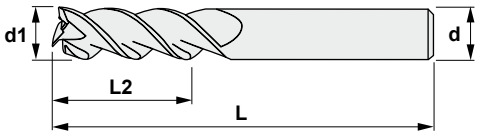
Per alumini i materials plàstics

Sèrie curta, tres talls

Characteristics:
Recommended for milling aluminium and aluminium-alloys, plastics, copper-alloys and non-ferrous metals.

Característiques:
Recomanades per fresar alumini i aliatges d'alumini, plàstics, aliatges de coure i materials no ferrosos.

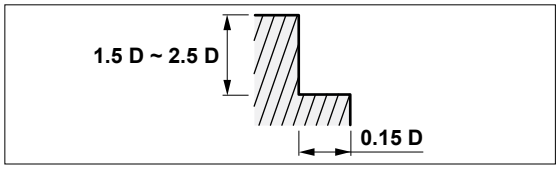


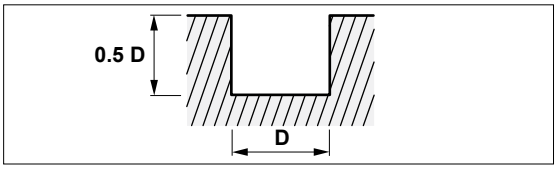


6530

Reference Referència		d1	d	L2	L
653003	3	3	6	8	50
653004	3	4	6	11	50
653005	3	5	6	13	50
653006	3	6	6	16	50
653008	3	8	8	19	60
653010	3	10	10	25	72
653012	3	12	12	30	75
653016	3	16	16	40	92

Diameter / Diàmetre (Ø d1) mm	Material							
	Aluminium / Alumini Low silicon aluminium / Alumini amb baix contingut de silici							
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) fz (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) fz (mm/dent)
3	7000	940	65	0.045	7000	730	65	0.035
4	7000	1150	90	0.055	7000	940	90	0.045
5	7000	1360	110	0.065	7000	1050	110	0.050
6	7000	1580	130	0.075	7000	1250	130	0.060
8	5600	1900	140	0.113	5600	1470	140	0.088
10	5600	2200	175	0.131	5600	1780	175	0.106
12	5600	2740	210	0.163	5600	2200	210	0.131
16	4200	2520	210	0.200	4200	1990	210	0.158





Solid carbide End Mills. For roughing.

For high speed cutting (HSC) <56HRC

Short series, four flutes

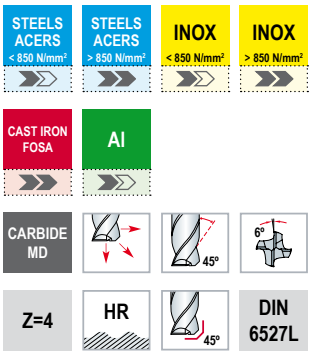
Freses de metall dur integral per desbast.

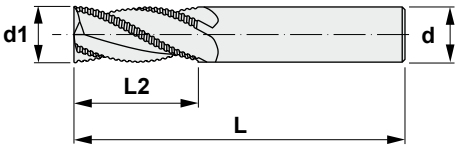
Per tall d'alta velocitat (HSC) <56HRC

Sèrie curta, quatre talls

Characteristics:
Solid carbide high performance roughing cutter, especially suitable for all kind of steels up to 1.400 N/mm², higher tensile stainless steels, grey cast iron as well as short chipping aluminium and aluminium cast. High cutting performance.

Característiques:
Freses de metall dur integral d'altes prestacions per desbast, especialment adequades per tot tipus d'acers fins a 1.400 N/mm², acers inoxidables d'alta resistència a la tracció, fosa grisa, i també per alumini de ferritja curta i fosa d'alumini. Altes prestacions de tall.



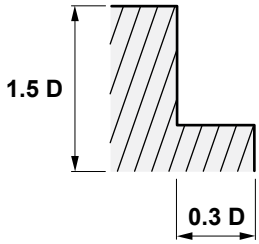


6640

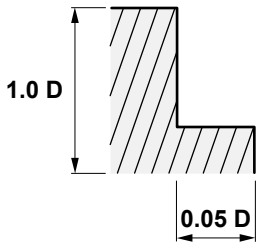
Reference Referència		d1	d	L2	L
664006	4	6	6	16	50
664008	4	8	8	19	60
664010	4	10	10	22	75
664012	4	12	12	26	75
664014	4	14	14	30	90
664016	4	16	16	32	100
664020	4	20	20	38	100

6640 *Solid carbide End Mills. For roughing.*
Freses de metall dur integral per desbast.

Diameter / Diàmetre (Ø d1) mm	Material							
	Unalloyed steels / Acer no aliat Alloyed steels / Acer aliat Tool steels / Acer per eines ~ HRC30 / 1000 N/mm²				Alloyed steels / Acer aliat Heat resistant steels / Acer resistent a la calor ~ HRC30 ~ HRC38 / 1000 ~ 1200 N/mm²			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) fz (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) fz (mm/dent)
6	13250	1970	250	0.050	10550	710	200	0.022
8	9850	1970	250	0.067	7800	710	195	0.023
10	7800	1970	245	0.063	6450	710	205	0.028
12	6800	2040	255	0.075	5100	680	190	0.033
14	5800	2040	255	0.088	4400	710	195	0.040
16	5100	2040	255	0.100	4100	650	205	0.040
20	4100	1840	260	0.112	3050	480	190	0.039



Diameter / Diàmetre (Ø d1) mm	Material							
	Stainless steels / Acer inoxidable HRC38 ~ HRC45 / 1200 ~ 1400 N/mm²				Inconel			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) fz (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) fz (mm/dent)
6	7150	480	135	0.022	2050	160	40	0.026
8	5350	480	135	0.022	1550	150	40	0.024
10	4350	480	135	0.028	1100	160	35	0.036
12	3550	480	135	0.034	1000	160	40	0.040
14	3050	480	135	0.039	750	110	35	0.037
16	2800	430	140	0.038	700	90	35	0.032
20	2050	310	130	0.038	550	90	35	0.041



Solid carbide square End Mills.

For high speed cutting (HSC) <56HRC

Short series, two flutes

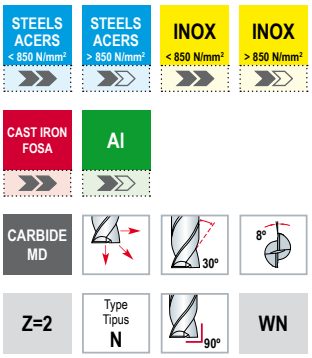
Freses de metall dur integral quadrades.

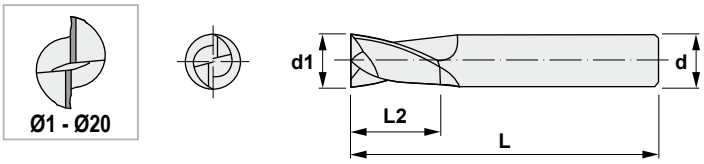
Per tall a alta velocitat (HSC) <56HRC

Sèrie curta, dos talls

Characteristics:
Recommended for milling in materials with medium and high tensile strength up to 1.300 N/mm².
For drilling continued by horizontal milling with exact tolerances.

Característiques:
Recomanades per fresar materials de mitja/alta resistència a la tracció fins a 1.300 N/mm².
Per foradat seguit de fresat horitzontal amb toleràncies exactes.





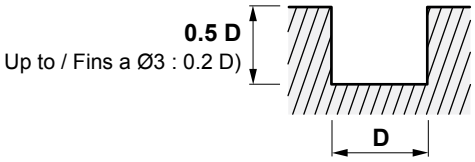
G

6020

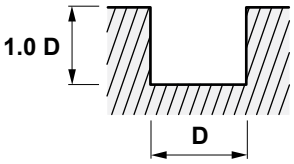
Reference Referència		d1	d	L2	L
6020010	2	1,0	3	3	38
6020015	2	1,5	3	4	38
6020020	2	2,0	3	6	38
6020030	2	3,0	3	8	38
6020040	2	4,0	4	11	50
6020050	2	5,0	5	13	50
6020060	2	6,0	6	16	50
6020080	2	8,0	8	19	60
6020100	2	10,0	10	22	72
6020120	2	12,0	12	26	75
6020140	2	14,0	14	30	84
6020160	2	16,0	16	32	92
6020200	2	20,0	20	38	100

6020 *Solid carbide square End Mills. Freses de metall dur integral quadrades.*

Diameter / Diàmetre (Ø d1) mm	Material											
	Unalloyed steels / Acer no aliat Alloyed steels / Acer aliat Tool steels / Acer per eines ~ HRC30 / 1000 N/mm²				Alloyed steels / Acer aliat Heat resistant steels / Acer resistent a la calor ~ HRC30 ~ HRC45 / 1000 ~ 1500 N/mm²				Stainless steels / Acer inoxidable			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
1.0	14300	105	45	0.004	8500	65	25	0.004	7150	50	20	0.003
1.5	9350	150	45	0.008	5550	85	25	0.008	5600	80	25	0.007
2.0	7850	160	50	0.010	5150	100	30	0.010	4300	80	25	0.009
3.0	6100	180	55	0.015	3800	120	35	0.016	3150	100	30	0.016
4.0	5150	255	65	0.025	3150	155	40	0.025	2650	130	35	0.025
5.0	4300	270	70	0.031	2550	160	40	0.031	2150	135	35	0.031
6.0	3800	300	70	0.039	2300	190	45	0.041	1950	155	35	0.040
8.0	2850	325	70	0.057	1700	170	45	0.050	1450	155	35	0.053
10.0	2200	280	70	0.064	1350	135	40	0.050	1150	135	35	0.059
12.0	1850	240	70	0.065	1150	110	45	0.048	950	110	35	0.058
14.0	1700	215	75	0.063	1050	100	45	0.048	850	100	35	0.059
16.0	1500	185	75	0.062	950	95	50	0.050	700	95	35	0.068
20.0	1150	145	70	0.063	700	70	45	0.050	550	70	35	0.064



Diameter / Diàmetre (Ø d1) mm	Material											
	Cast iron / Fosa				Aluminium alloys / Aliatges d'alumini				Copper, brass / Coure, llautó Non-ferrous metals / Metalls no ferrosos			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
1.0	18700	205	60	0.005	44000	330	140	0.004	24700	200	80	0.004
1.5	12100	205	55	0.008	27500	385	130	0.007	20300	300	95	0.007
2.0	9350	220	60	0.012	22000	460	140	0.010	16500	340	105	0.010
3.0	6050	220	55	0.018	15400	460	145	0.015	11000	340	105	0.015
4.0	4600	220	60	0.024	11000	460	140	0.021	8800	340	110	0.019
5.0	3650	220	55	0.030	9150	460	145	0.025	6800	340	105	0.025
6.0	2950	255	55	0.043	7600	485	145	0.032	5700	375	105	0.033
8.0	2200	275	55	0.063	5700	485	145	0.043	4400	375	110	0.043
10.0	1850	285	60	0.077	4600	485	145	0.053	3400	375	105	0.055
12.0	1450	295	55	0.102	3750	485	140	0.065	2850	375	105	0.066
14.0	1300	310	55	0.119	3300	485	145	0.073	2400	375	105	0.078
16.0	1100	320	55	0.145	2850	485	145	0.085	2200	375	110	0.085
20.0	900	340	55	0.189	2200	485	140	0.110	1700	375	105	0.110



Solid carbide square End Mills.

For high speed cutting (HSC) <56HRC

Long series, two flutes

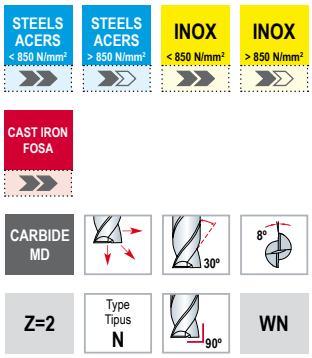
Freses de metall dur integral quadrades.

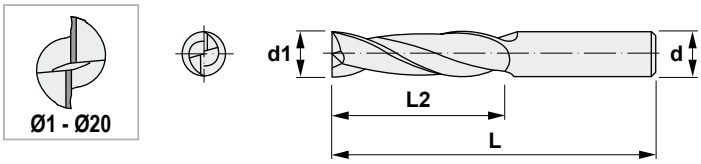
Per tall a alta velocitat (HSC) <56HRC

Sèrie llarga, dos talls

Characteristics:
Recommended for milling in materials with medium and high tensile strength up to 1.300 N/mm².
For drilling continued by horizontal milling with exact tolerances.

Característiques:
Recomanades per fresar materials de mitja/alta resistència a la tracció fins a 1.300 N/mm².
Per foradat seguit de fresat horitzontal amb toleràncies exactes.





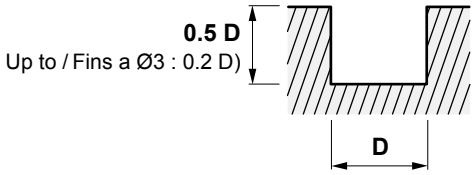
G

6021

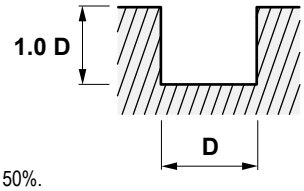
Reference Referència		d1	d	L2	L
602101	2	1	3	5	60
602102	2	2	3	10	60
602103	2	3	3	15	60
602104	2	4	4	20	80
602105	2	5	5	25	80
602106	2	6	6	25	80
602108	2	8	8	35	90
602110	2	10	10	45	100
602112	2	12	12	50	100
602114	2	14	14	65	150
602116	2	16	16	65	150
602120	2	20	20	70	150

6021 *Solid carbide square End Mills. Freses de metall dur integral quadrades.*

Diameter / Diàmetre (Ø d1) mm	Material											
	Unalloyed steels / Acer no aliat Alloyed steels / Acer aliat Tool steels / Acer per eines ~ HRC30 / 1000 N/mm²				Alloyed steels / Acer aliat Heat resistant steels / Acer resistent a la calor ~ HRC30 ~ HRC45 / 1000 ~ 1500 N/mm²				Stainless steels / Acer inoxidable			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
1	14300	105	45	0.004	8500	65	25	0.004	7150	50	20	0.003
2	7850	160	50	0.010	5150	100	30	0.010	4300	80	25	0.009
3	6100	180	55	0.015	3800	120	35	0.016	3150	100	30	0.016
4	5150	255	65	0.025	3150	155	40	0.025	2650	130	35	0.025
5	4300	270	70	0.031	2550	160	40	0.031	2150	135	35	0.031
6	3800	300	70	0.039	2300	190	45	0.041	1950	155	35	0.040
8	2850	325	70	0.057	1700	170	45	0.050	1450	155	35	0.053
10	2200	280	70	0.064	1350	135	40	0.050	1150	135	35	0.059
12	1850	240	70	0.065	1150	110	45	0.048	950	110	35	0.058
14	1700	215	75	0.063	1050	100	45	0.048	850	100	35	0.059
16	1500	185	75	0.062	950	95	50	0.050	700	95	35	0.068
20	1150	145	70	0.063	700	70	45	0.050	550	70	35	0.064



Diameter / Diàmetre (Ø d1) mm	Material											
	Cast iron / Fosa				Aluminium alloys / Aliatges d'alumini				Copper, brass / Coure, llautó Non-ferrous metals / Metalls no ferrosos			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
1	18700	205	60	0.005	44000	330	140	0.004	24700	200	80	0.004
2	9350	220	60	0.012	22000	460	140	0.010	16500	340	105	0.010
3	6050	220	55	0.018	15400	460	145	0.015	11000	340	105	0.015
4	4600	220	60	0.024	11000	460	140	0.021	8800	340	110	0.019
5	3650	220	55	0.030	9150	460	145	0.025	6800	340	105	0.025
6	2950	255	55	0.043	7600	485	145	0.032	5700	375	105	0.033
8	2200	275	55	0.063	5700	485	145	0.043	4400	375	110	0.043
10	1850	285	60	0.077	4600	485	145	0.053	3400	375	105	0.055
12	1450	295	55	0.102	3750	485	140	0.065	2850	375	105	0.066
14	1300	310	55	0.119	3300	485	145	0.073	2400	375	105	0.078
16	1100	320	55	0.145	2850	485	145	0.085	2200	375	110	0.085
20	900	340	55	0.189	2200	485	140	0.110	1700	375	105	0.110



* FEED, in long and extra long types, should be reduced by around 50%.
* En els models llargs i extrallargs s'hauria de reduir l'avanç aproximadament un 50%.

Solid carbide square End Mills.

For high speed cutting (HSC) <56HRC

Short series, three flutes

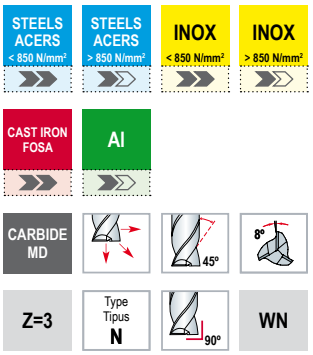
Freses de metall dur integral quadrades.

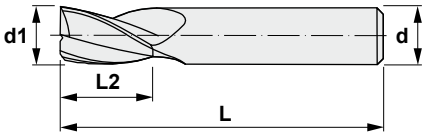
Per tall a alta velocitat (HSC) <56HRC

Sèrie curta, tres talls

Characteristics:
Recommended for milling in materials with medium and high tensile strength up to 1.300 N/mm².
For drilling continued by horizontal milling with exact tolerances.

Característiques:
Recomanades per fresar materials de mitja/alta resistència a la tracció fins a 1.300 N/mm².
Per foradat seguit de fresat horitzontal amb toleràncies exactes.





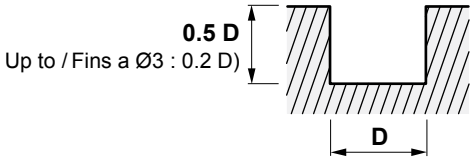
G

6030

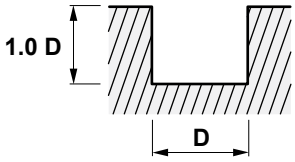
Reference Referència		d1	d	L2	L
6030010	3	1,0	3	3	38
6030015	3	1,5	3	4	38
6030020	3	2,0	3	6	38
6030030	3	3,0	3	8	38
6030040	3	4,0	4	11	50
6030050	3	5,0	5	13	50
6030060	3	6,0	6	16	50
6030080	3	8,0	8	19	60
6030100	3	10,0	10	22	72
6030120	3	12,0	12	26	75
6030140	3	14,0	14	30	84
6030160	3	16,0	16	32	92
6030200	3	20,0	20	38	100

6030 *Solid carbide square End Mills. Finish slotting.*
Freses de metall dur integral quadrades. Per acabat de ranures.

Diameter / Diàmetre (Ø d1) mm	Material											
	Unalloyed steels / Acer no aliat Alloyed steels / Acer aliat Tool steels / Acer per eines ~ HRC30 / 1000 N/mm²				Alloyed steels / Acer aliat Heat resistant steels / Acer resistent a la calor ~ HRC30 ~ HRC45 / 1000 ~ 1500 N/mm²				Stainless steels / Acer inoxidable			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
1.0	14300	75	45	0.002	8500	45	25	0.002	7150	35	20	0.002
1.5	12750	105	60	0.003	5550	60	25	0.004	5600	55	25	0.003
2.0	7850	110	50	0.005	5150	70	30	0.005	4300	55	25	0.004
3.0	6100	125	55	0.007	3800	85	35	0.007	3150	70	30	0.007
4.0	5150	180	65	0.012	3150	110	40	0.012	2650	90	35	0.011
5.0	4300	190	70	0.015	2550	110	40	0.014	2150	95	35	0.015
6.0	3800	210	70	0.018	2300	135	45	0.020	1950	110	35	0.019
8.0	2850	230	70	0.027	1700	120	45	0.024	1450	110	35	0.025
10.0	2200	195	70	0.030	1350	95	40	0.023	1150	95	35	0.028
12.0	1850	170	70	0.031	1150	75	45	0.022	950	75	35	0.026
14.0	1700	150	75	0.029	1050	70	45	0.022	850	70	35	0.027
16.0	1500	130	75	0.029	950	65	50	0.023	700	65	35	0.031
20.0	1150	100	70	0.029	700	50	45	0.024	550	50	35	0.030



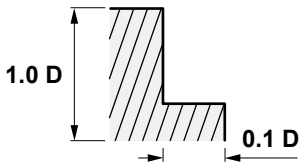
Diameter / Diàmetre (Ø d1) mm	Material											
	Cast iron / Fosa				Aluminium alloys / Aliatges d'alumini				Copper, brass / Coure, llautó Non-ferrous metals / Metalls no ferrosos			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
1.0	18700	185	60	0.003	44000	300	140	0.002	24700	180	80	0.002
1.5	12100	185	55	0.005	27500	345	130	0.004	20300	270	95	0.004
2.0	9350	200	60	0.007	22000	420	140	0.006	16500	310	105	0.006
3.0	6050	200	55	0.011	15400	430	145	0.009	11000	310	105	0.009
4.0	4600	185	60	0.013	11000	420	140	0.013	8800	310	110	0.012
5.0	3650	200	55	0.018	9150	420	145	0.015	6800	310	105	0.015
6.0	2950	230	55	0.026	7600	440	145	0.019	5700	340	105	0.020
8.0	2200	240	55	0.036	5700	440	145	0.026	4400	330	110	0.025
10.0	1850	255	60	0.046	4600	440	145	0.032	3400	330	105	0.032
12.0	1450	275	55	0.063	3750	430	140	0.038	2850	330	105	0.039
14.0	1300	285	55	0.073	3300	430	145	0.043	2400	330	105	0.046
16.0	1100	285	55	0.086	2850	430	145	0.050	2200	330	110	0.050
20.0	900	310	55	0.115	2200	430	140	0.065	1700	330	105	0.065



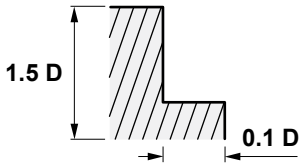
* FEED, in long and extra long types, should be reduced by around 50%.
* En els models llargs i extrallargs s'hauria de reduir l'avanç aproximadament un 50%.

6030 *Solid carbide square End Mills. Finish side cutting.*
Freses de metall dur integral quadrades per acabat lateral.

Diameter / Diàmetre (Ø d1) mm	Material											
	Unalloyed steels / Acer no aliat Alloyed steels / Acer aliat Tool steels / Acer per eines ~ HRC30 / 1000 N/mm²				Alloyed steels / Acer aliat Heat resistant steels / Acer resistent a la calor ~ HRC30 ~ HRC45 / 1000 ~ 1500 N/mm²				Stainless steels / Acer inoxidable			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
1.0	17600	110	55	0.002	10250	65	30	0.002	8650	55	25	0.002
1.5	11800	160	55	0.005	7050	85	35	0.004	7050	90	35	0.004
2.0	9850	180	60	0.006	6450	120	40	0.006	5350	100	35	0.006
3.0	7600	205	70	0.009	4750	130	45	0.009	3950	105	35	0.009
4.0	6450	365	80	0.019	3950	220	50	0.019	3300	180	40	0.018
5.0	5350	385	85	0.024	3200	230	50	0.024	2700	195	40	0.024
6.0	4750	425	90	0.030	2850	265	55	0.031	2400	215	45	0.030
8.0	3550	450	90	0.042	2150	245	55	0.038	1800	225	45	0.042
10.0	2750	390	85	0.047	1700	195	55	0.038	1450	195	45	0.045
12.0	2350	330	90	0.047	1450	160	55	0.037	1150	155	45	0.045
14.0	2100	465	90	0.074	1300	145	55	0.037	1050	140	45	0.044
16.0	1850	265	95	0.048	1150	130	60	0.038	900	130	45	0.048
20.0	1450	205	90	0.047	900	100	55	0.037	700	100	45	0.048



Diameter / Diàmetre (Ø d1) mm	Material											
	Cast iron / Fosa				Aluminium alloys / Aliatges d'alumini				Copper, brass / Coure, llautó Non-ferrous metals / Metalls no ferrosos			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
1.0	18700	460	60	0.008	44000	750	140	0.006	24700	450	80	0.006
1.5	12100	460	55	0.013	27500	860	130	0.010	20300	675	95	0.011
2.0	9350	475	60	0.017	22000	1035	140	0.016	16500	770	105	0.016
3.0	6050	475	55	0.026	15400	990	145	0.021	11000	760	105	0.023
4.0	4600	485	60	0.035	11000	1035	140	0.031	8800	770	110	0.029
5.0	3650	485	55	0.044	9150	1010	145	0.037	6800	760	105	0.037
6.0	2950	570	55	0.064	7600	1100	145	0.048	5700	825	105	0.048
8.0	2200	615	55	0.093	5700	1100	145	0.064	4400	825	110	0.063
10.0	1850	640	60	0.115	4600	1100	145	0.080	3400	825	105	0.081
12.0	1450	670	55	0.154	3750	1100	140	0.098	2850	825	105	0.096
14.0	1300	705	55	0.181	3300	1100	145	0.111	2400	825	105	0.115
16.0	1100	725	55	0.220	2850	1100	145	0.129	2200	825	110	0.125
20.0	900	770	55	0.285	2200	1100	140	0.167	1700	825	105	0.162



* FEED, in long and extra long types, should be reduced by around 50%.
* En els models llargs i extrallargs s'hauria de reduir l'avanç aproximadament un 50%.

Solid carbide square End Mills.

For high speed cutting (HSC) <56HRC

Long series, three flutes

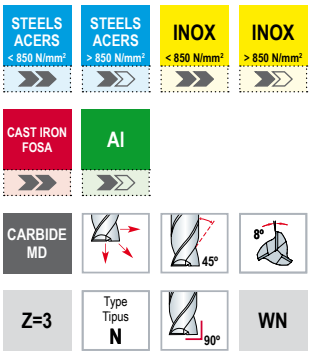
Freses de metall dur integral quadrades.

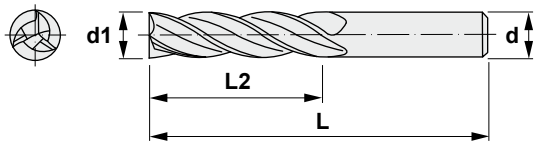
Per tall a alta velocitat (HSC) <56HRC

Sèrie llarga, tres talls

Characteristics:
Recommended for milling in materials with medium and high tensile strength up to 1.300 N/mm².
For drilling continued by horizontal milling with exact tolerances.

Característiques:
Recomanades per fresar materials de mitja/alta resistència a la tracció fins a 1.300 N/mm².
Per foradat seguit de fresat horitzontal amb toleràncies exactes.





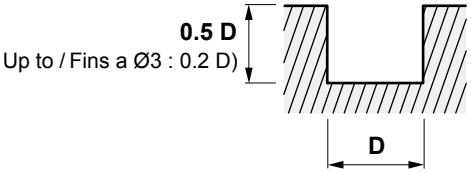
G

6031

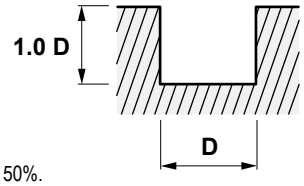
Reference Referència		d1	d	L2	L
603101	3	1	3	5	60
603102	3	2	3	10	60
603103	3	3	3	15	60
603104	3	4	4	20	80
603105	3	5	5	25	80
603106	3	6	6	25	80
603108	3	8	8	35	90
603110	3	10	10	45	100
603112	3	12	12	50	100
603114	3	14	14	65	150
603116	3	16	16	65	150
603120	3	20	20	70	150

6031 *Solid carbide square End Mills. Finish slotting.*
Freses de metall dur integral quadrades. Per acabat de ranures.

Diameter / Diàmetre (Ø d1) mm	Material											
	Unalloyed steels / Acer no aliat Alloyed steels / Acer aliat Tool steels / Acer per eines ~ HRC30 / 1000 N/mm²				Alloyed steels / Acer aliat Heat resistant steels / Acer resistent a la calor ~ HRC30 ~ HRC45 / 1000 ~ 1500 N/mm²				Stainless steels / Acer inoxidable			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
1	14300	75	45	0.002	8500	45	25	0.002	7150	35	20	0.002
2	7850	110	50	0.005	5150	70	30	0.005	4300	55	25	0.004
3	6100	125	55	0.007	3800	85	35	0.007	3150	70	30	0.007
4	5150	180	65	0.012	3150	110	40	0.012	2650	90	35	0.011
5	4300	190	70	0.015	2550	110	40	0.014	2150	95	35	0.015
6	3800	210	70	0.018	2300	135	45	0.020	1950	110	35	0.019
8	2850	230	70	0.027	1700	120	45	0.024	1450	110	35	0.025
10	2200	195	70	0.030	1350	95	40	0.023	1150	95	35	0.028
12	1850	170	70	0.031	1150	75	45	0.022	950	75	35	0.026
14	1700	150	75	0.029	1050	70	45	0.022	850	70	35	0.027
16	1500	130	75	0.029	950	65	50	0.023	700	65	35	0.031
20	1150	100	70	0.029	700	50	45	0.024	550	50	35	0.030



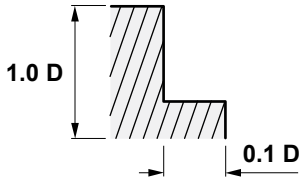
Diameter / Diàmetre (Ø d1) mm	Material											
	Cast iron / Fosa				Aluminium alloys / Aliatges d'alumini				Copper, brass / Coure, llautó Non-ferrous metals / Metalls no ferrosos			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
1	18700	185	60	0.003	44000	300	140	0.002	24700	180	80	0.002
2	9350	200	60	0.007	22000	420	140	0.006	16500	310	105	0.006
3	6050	200	55	0.011	15400	430	145	0.009	11000	310	105	0.009
4	4600	185	60	0.013	11000	420	140	0.013	8800	310	110	0.012
5	3650	200	55	0.018	9150	420	145	0.015	6800	310	105	0.015
6	2950	230	55	0.026	7600	440	145	0.019	5700	340	105	0.020
8	2200	240	55	0.036	5700	440	145	0.026	4400	330	110	0.025
10	1850	255	60	0.046	4600	440	145	0.032	3400	330	105	0.032
12	1450	275	55	0.063	3750	430	140	0.038	2850	330	105	0.039
14	1300	285	55	0.073	3300	430	145	0.043	2400	330	105	0.046
16	1100	285	55	0.086	2850	430	145	0.050	2200	330	110	0.050
20	900	310	55	0.115	2200	430	140	0.065	1700	330	105	0.065



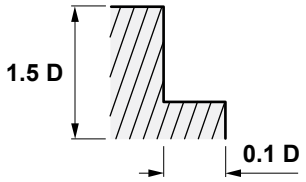
* FEED, in long and extra long types, should be reduced by around 50%.
* En els models llargs i extrallargs s'hauria de reduir l'avanç aproximadamant un 50%.

6031 *Solid carbide square End Mills. Finish side cutting.*
Freses de metall dur integral quadrades per acabat lateral.

Diameter / Diàmetre (Ø d1) mm	Material											
	Unalloyed steels / Acer no aliat Alloyed steels / Acer aliat Tool steels / Acer per eines ~ HRC30 / 1000 N/mm²				Alloyed steels / Acer aliat Heat resistant steels / Acer resistent a la calor ~ HRC30 ~ HRC45 / 1000 ~ 1500 N/mm²				Stainless steels / Acer inoxidable			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
1	17600	110	55	0.002	10250	65	30	0.002	8650	55	25	0.002
2	9850	180	60	0.006	6450	120	40	0.006	5350	100	35	0.006
3	7600	205	70	0.009	4750	130	45	0.009	3950	105	35	0.009
4	6450	365	80	0.019	3950	220	50	0.019	3300	180	40	0.018
5	5350	385	85	0.024	3200	230	50	0.024	2700	195	40	0.024
6	4750	425	90	0.030	2850	265	55	0.031	2400	215	45	0.030
8	3550	450	90	0.042	2150	245	55	0.038	1800	225	45	0.042
10	2750	390	85	0.047	1700	195	55	0.038	1450	195	45	0.045
12	2350	330	90	0.047	1450	160	55	0.037	1150	155	45	0.045
14	2100	465	90	0.074	1300	145	55	0.037	1050	140	45	0.044
16	1850	265	95	0.048	1150	130	60	0.038	900	130	45	0.048
20	1450	205	90	0.047	900	100	55	0.037	700	100	45	0.048



Diameter / Diàmetre (Ø d1) mm	Material											
	Cast iron / Fosa				Aluminium alloys / Aliatges d'alumini				Copper, brass / Coure, llautó Non-ferrous metals / Metalls no ferrosos			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
1	18700	460	60	0.008	44000	750	140	0.006	24700	450	80	0.006
2	9350	475	60	0.017	22000	1035	140	0.016	16500	770	105	0.016
3	6050	475	55	0.026	15400	990	145	0.021	11000	760	105	0.023
4	4600	485	60	0.035	11000	1035	140	0.031	8800	770	110	0.029
5	3650	485	55	0.044	9150	1010	145	0.037	6800	760	105	0.037
6	2950	570	55	0.064	7600	1100	145	0.048	5700	825	105	0.048
8	2200	615	55	0.093	5700	1100	145	0.064	4400	825	110	0.063
10	1850	640	60	0.115	4600	1100	145	0.080	3400	825	105	0.081
12	1450	670	55	0.154	3750	1100	140	0.098	2850	825	105	0.096
14	1300	705	55	0.181	3300	1100	145	0.111	2400	825	105	0.115
16	1100	725	55	0.220	2850	1100	145	0.129	2200	825	110	0.125
20	900	770	55	0.285	2200	1100	140	0.167	1700	825	105	0.162



* FEED, in long and extra long types, should be reduced by around 50%.
* En els models llargs i extrallargs s'hauria de reduir l'avanç aproximadament un 50%.

Solid carbide square End Mills.

For high speed cutting (HSC) <56HRC

Short series, four flutes

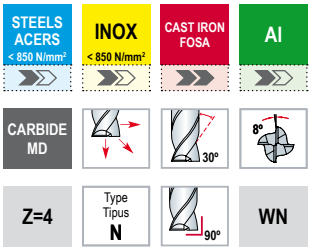
Freses de metall dur integral quadrades.

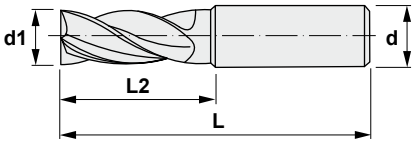
Per tall a alta velocitat (HSC) <56HRC

Sèrie curta, quatre talls

Characteristics:
Recommended for milling in materials with medium and high tensile strength. For milling of slots with large depth and accurate fits, as well as face and surface milling. High cutting performance in chipping and a smooth run result an excellent surface.

Característiques:
Recomanades per el fresat de materials de mitja/ alta resistència a la tracció. Per fresar ranures de gran profunditat i precisió, així com per el planejat i el fresat de superfícies. Les seves altes prestacions en evacuació de ferritja i la seva estabilitat donen com a resultat un excel·lent acabat de superfície.



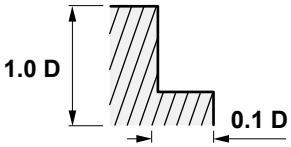


6040

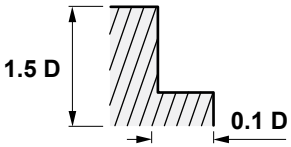
Reference Referència		d1	d	L2	L
6040010	4	1,0	3	3	38
6040015	4	1,5	3	4	38
6040020	4	2,0	3	6	38
6040030	4	3,0	3	8	38
6040040	4	4,0	4	11	50
6040050	4	5,0	5	13	50
6040060	4	6,0	6	16	50
6040080	4	8,0	8	19	60
6040100	4	10,0	10	22	72
6040120	4	12,0	12	26	75
6040140	4	14,0	14	30	84
6040160	4	16,0	16	32	92
6040200	4	20,0	20	38	100

6040 *Solid carbide square End Mills. Freses de metall dur integral quadrades.*

Diameter / Diàmetre (Ø d1) mm	Material											
	Unalloyed steels / Acer no aliat Alloyed steels / Acer aliat Tool steels / Acer per eines ~ HRC30 / 1000 N/mm²				Alloyed steels / Acer aliat Heat resistant steels / Acer resistent a la calor ~ HRC30 ~ HRC45 / 1000 ~ 1500 N/mm²				Stainless steels / Acer inoxidable			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
1.0	17600	150	55	0.002	10250	85	30	0.002	8650	75	25	0.002
1.5	11800	215	55	0.005	7050	115	35	0.004	7050	120	35	0.004
2.0	9850	240	60	0.006	6450	145	40	0.006	5350	120	35	0.006
3.0	7600	270	70	0.009	4750	170	45	0.009	3950	145	35	0.009
4.0	6450	485	80	0.019	3950	300	50	0.019	3300	240	40	0.018
5.0	5350	510	85	0.024	3200	305	50	0.024	2700	255	40	0.024
6.0	4750	560	90	0.029	2850	350	55	0.031	2400	280	45	0.029
8.0	3550	605	90	0.043	2150	325	55	0.038	1800	300	45	0.042
10.0	2750	520	85	0.047	1700	255	55	0.038	1450	255	45	0.044
12.0	2350	440	90	0.047	1450	215	55	0.037	1150	205	45	0.045
14.0	2100	395	90	0.047	1300	195	55	0.038	1050	190	45	0.045
16.0	1850	350	95	0.047	1150	170	60	0.037	950	170	50	0.045
20.0	1450	270	90	0.047	900	135	55	0.038	700	130	45	0.046



Diameter / Diàmetre (Ø d1) mm	Material											
	Cast iron / Fosa				Aluminium alloys / Aliatges d'alumini				Copper, brass / Coure, llautó Non-ferrous metals / Metalls no ferrosos			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
1.0	18700	620	60	0.008	44000	1050	140	0.006	24700	605	80	0.006
1.5	12100	620	55	0.013	27500	1160	130	0.011	20300	910	95	0.011
2.0	9350	640	60	0.017	22000	1320	140	0.015	16500	1035	105	0.016
3.0	6050	640	55	0.026	15400	1320	145	0.021	11000	1035	105	0.024
4.0	4600	640	60	0.035	11000	1320	140	0.030	8800	1035	110	0.029
5.0	3650	640	55	0.044	9150	1320	145	0.036	6800	1035	105	0.038
6.0	2950	770	55	0.065	7600	1430	145	0.047	5700	1100	105	0.048
8.0	2200	815	55	0.093	5700	1430	145	0.063	4400	1100	110	0.063
10.0	1850	860	60	0.116	4600	1430	145	0.078	3400	1100	105	0.081
12.0	1450	900	55	0.155	3750	1430	140	0.095	2850	1100	105	0.096
14.0	1300	945	55	0.182	3300	1430	145	0.108	2400	1100	105	0.115
16.0	1100	970	55	0.220	2850	1430	145	0.125	2200	1100	110	0.125
20.0	900	1035	55	0.288	2200	1430	140	0.163	1700	1100	105	0.162



* FEED, in long and extra long types, should be reduced by around 50%.
* En els models llargs i extrallargs s'hauria de reduir l'avanç aproximadament un 50%.

Solid carbide square End Mills.

For high speed cutting (HSC) <56HRC

Long series, four flutes

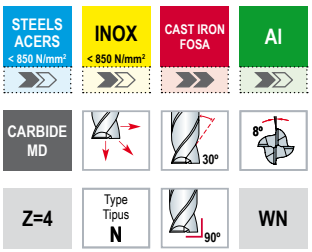
Freses de metall dur integral quadrades.

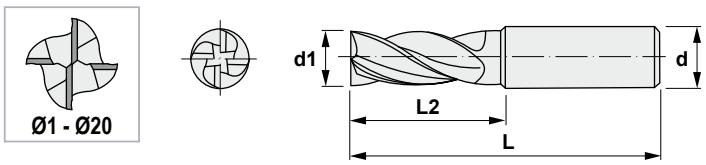
Per tall a alta velocitat (HSC) <56HRC

Sèrie llarga, quatre talls

Characteristics:
Recommended for milling in materials with medium and high tensile strength. For milling of slots with large depth and accurate fits, as well as face and surface milling. High cutting performance in chipping and a smooth run result an excellent surface.

Característiques:
Recomanades per el fresat de materials de mitja/ alta resistència a la tracció. Per fresar ranures de gran profunditat i precisió, així com per el planejat i el fresat de superfícies. Les seves altes prestacions en evacuació de ferritja i la seva estabilitat donen com a resultat un excel·lent acabat de superfície.





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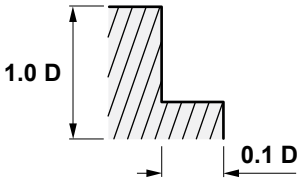
6041

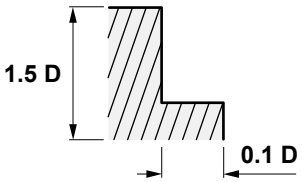
Reference Referència		d1	d	L2	L
604101	4	1	3	5	60
604102	4	2	3	10	60
604103	4	3	3	15	60
604104	4	4	4	20	80
604105	4	5	5	25	80
604106	4	6	6	25	80
604108	4	8	8	35	90
604110	4	10	10	45	100
604112	4	12	12	50	100
604114	4	14	14	65	150
604116	4	16	16	65	150
604120	4	20	20	70	150

6041 *Solid carbide square End Mills. Freses de metall dur integral quadrades.*

Diameter / Diàmetre (Ø d1) mm	Material											
	Unalloyed steels / Acer no aliat Alloyed steels / Acer aliat Tool steels / Acer per eines ~ HRC30 / 1000 N/mm²				Alloyed steels / Acer aliat Heat resistant steels / Acer resistent a la calor ~ HRC30 ~ HRC45 / 1000 ~ 1500 N/mm²				Stainless steels / Acer inoxidable			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
1	17600	150	55	0.002	10250	85	30	0.002	8650	75	25	0.002
2	9850	240	60	0.006	6450	145	40	0.006	5350	120	35	0.006
3	7600	270	70	0.009	4750	170	45	0.009	3950	145	35	0.009
4	6450	485	80	0.019	3950	300	50	0.019	3300	240	40	0.018
5	5350	510	85	0.024	3200	305	50	0.024	2700	255	40	0.024
6	4750	560	90	0.029	2850	350	55	0.031	2400	280	45	0.029
8	3550	605	90	0.043	2150	325	55	0.038	1800	300	45	0.042
10	2750	520	85	0.047	1700	255	55	0.038	1450	255	45	0.044
12	2350	440	90	0.047	1450	215	55	0.037	1150	205	45	0.045
14	2100	395	90	0.047	1300	195	55	0.038	1050	190	45	0.045
16	1850	350	95	0.047	1150	170	60	0.037	950	170	50	0.045
20	1450	270	90	0.047	900	135	55	0.038	700	130	45	0.046



Diameter / Diàmetre (Ø d1) mm	Material											
	Cast iron / Fosa				Aluminium alloys / Aliatges d'alumini				Copper, brass / Coure, llautó Non-ferrous metals / Metalls no ferrosos			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
1	18700	620	60	0.008	44000	1050	140	0.006	24700	605	80	0.006
2	9350	640	60	0.017	22000	1320	140	0.015	16500	1035	105	0.016
3	6050	640	55	0.026	15400	1320	145	0.021	11000	1035	105	0.024
4	4600	640	60	0.035	11000	1320	140	0.030	8800	1035	110	0.029
5	3650	640	55	0.044	9150	1320	145	0.036	6800	1035	105	0.038
6	2950	770	55	0.065	7600	1430	145	0.047	5700	1100	105	0.048
8	2200	815	55	0.093	5700	1430	145	0.063	4400	1100	110	0.063
10	1850	860	60	0.116	4600	1430	145	0.078	3400	1100	105	0.081
12	1450	900	55	0.155	3750	1430	140	0.095	2850	1100	105	0.096
14	1300	945	55	0.182	3300	1430	145	0.108	2400	1100	105	0.115
16	1100	970	55	0.220	2850	1430	145	0.125	2200	1100	110	0.125
20	900	1035	55	0.288	2200	1430	140	0.163	1700	1100	105	0.162



* FEED, in long and extra long types, should be reduced by around 50%.
* En els models llargs i extrallargs s'hauria de reduir l'avanç aproximadament un 50%.

Solid carbide End Mills. Ball form.

For high speed cutting (HSC) <56HRC

Short series, two flutes

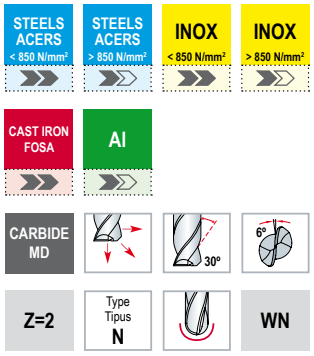
Freses de metall dur integral de punta esfèrica.

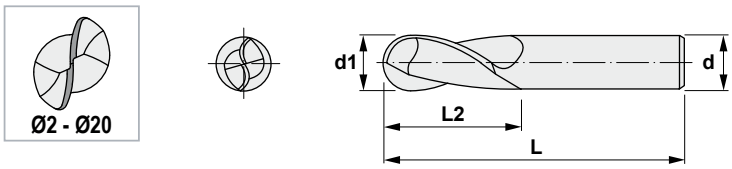
Per tall a alta velocitat (HSC) <56HRC

Sèrie curta, dos talls

Characteristics:
Recommended for milling materials with medium/ high tensile strength. Especially suited for copy milling.

Característiques:
Recomanades per el fresat de materials de mitja/ alta resistència a la tracció. Especialment adequades per el copiat.





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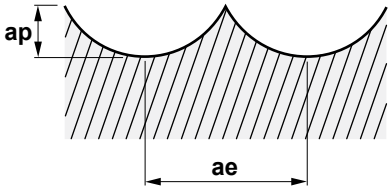
6320

Reference Referència		d1	d	L2	L
632002	2	2	3	4	38
632003	2	3	3	6	38
632004	2	4	4	8	50
632005	2	5	5	10	50
632006	2	6	6	12	50
632008	2	8	8	15	60
632010	2	10	10	20	75
632012	2	12	12	20	75
632014	2	14	14	25	90
632016	2	16	16	25	100
632018	2	18	18	30	100
632020	2	20	20	30	100

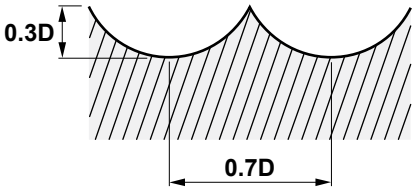
6320 *Solid carbide End Mills. Ball form. Freses de metall dur integral. Forma esfèrica.*

Diameter / Diàmetre (Ø d1) mm	Material											
	Unalloyed steels / Acer no aliat Alloyed steels / Acer aliat Tool steels / Acer per eines ~ HRC30 / ~ 1000 N/mm²				Alloyed steels / Acer aliat Heat resistant steels / Acer resistent a la calor HRC30 ~ HRC45 / 1000 ~ 1500 N/mm²				Hardened steels / Acer trempat HRC30 ~ HRC45 / 1000 ~ 1500 N/mm²			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
R1 x 2D	12350	640	80	0.026	9150	415	55	0.023	4000	125	25	0.016
R1.5 x 3D	11400	575	105	0.025	8550	390	80	0.023	3800	125	35	0.016
R2 x 4D	8950	630	110	0.035	7150	450	90	0.031	3600	150	45	0.021
R2.5 x 5D	7800	700	125	0.045	6200	490	95	0.040	3100	150	50	0.024
R3 x 6D	7250	870	135	0.060	5900	705	110	0.060	2700	160	50	0.030
R4 x 8D	6100	1090	155	0.089	4900	785	125	0.080	2050	190	50	0.046
R5 x 10D	5450	1330	170	0.122	4350	870	135	0.100	1750	190	55	0.054
R6 x 12D	4990	1500	190	0.150	3950	950	150	0.120	1500	210	55	0.070
R7 x 14D	4530	1495	200	0.165	3600	925	160	0.128	1300	210	55	0.081
R8 x 16D	4085	1470	205	0.180	3200	905	160	0.141	1150	210	60	0.091
R9 x 18D	3800	1425	215	0.188	3000	890	170	0.148	1050	210	60	0.100
R10 x 20D	3550	1425	225	0.201	2800	885	175	0.158	950	210	60	0.111

ap : D1~D6=0.2 mm
D8~D20=0.3 mm
ae : 0.2D



Diameter / Diàmetre (Ø d1) mm	Material							
	Cast iron / Fosa				Aluminium alloys / Aliatges d'alumini			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
R1 x 2D	10500	220	65	0.010	30800	395	195	0.006
R1.5 x 3D	7050	230	65	0.016	20500	395	195	0.010
R2 x 4D	5150	285	65	0.028	15400	395	195	0.013
R2.5 x 5D	4150	330	65	0.040	12100	470	190	0.019
R3 x 6D	3400	360	65	0.053	10300	470	195	0.023
R4 x 8D	2500	460	65	0.092	7900	540	200	0.034
R5 x 10D	2050	460	65	0.112	6150	540	195	0.044
R6 x 12D	1750	460	65	0.131	5150	630	195	0.061
R7 x 14D	1400	460	60	0.164	4300	630	190	0.073
R8 x 16D	1300	460	65	0.177	3850	540	195	0.070
R9 x 18D	1100	460	60	0.209	3400	540	190	0.079
R10 x 20D	1050	420	65	0.200	2950	540	185	0.092



Solid carbide End Mills. Ball form.

For high speed cutting (HSC) <56HRC

Long series, two flutes

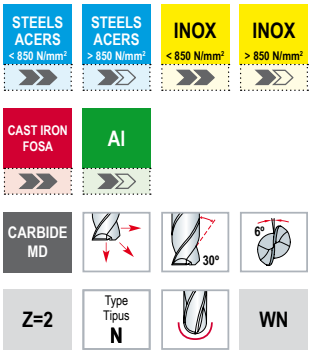
Freses de metall dur integral de punta esfèrica.

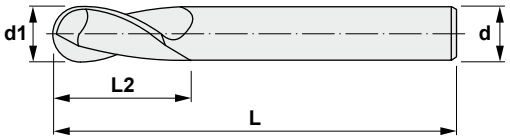
Per tall a alta velocitat (HSC) <56HRC

Sèrie llarga, dos talls

Characteristics:
Recommended for milling materials with medium/ high tensile strength. Especially suited for copy milling.

Característiques:
Recomanades per el fresat de materials de mitja/ alta resistència a la tracció. Especialment adequades per el copiat.





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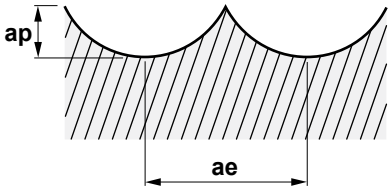
6321

Reference Referència		d1	d	L2	L
632102	2	2	3	3	60
632103	2	3	3	4	60
632104	2	4	4	5	80
632105	2	5	5	6	80
632106	2	6	6	8	80
632108	2	8	8	12	100
632110	2	10	10	15	100
632112	2	12	12	15	100
632116	2	16	16	20	150
632120	2	20	20	25	150

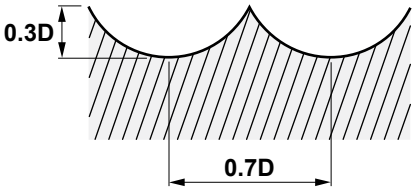
6321 *Solid carbide End Mills. Ball form. Freses de metall dur integral. Forma esfèrica.*

Diameter / Diàmetre (Ø d1) mm	Material											
	Unalloyed steels / Acer no aliat Alloyed steels / Acer aliat Tool steels / Acer per eines ~ HRC30 / ~ 1000 N/mm²				Alloyed steels / Acer aliat Heat resistant steels / Acer resistent a la calor HRC30 ~ HRC45 / 1000 ~ 1500 N/mm²				Hardened steels / Acer trempat HRC30 ~ HRC45 / 1000 ~ 1500 N/mm²			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
R1 x 2D	12350	640	80	0.026	9150	415	55	0.023	4000	125	25	0.016
R1.5 x 3D	11400	575	105	0.025	8550	390	80	0.023	3800	125	35	0.016
R2 x 4D	8950	630	110	0.035	7150	450	90	0.031	3600	150	45	0.021
R2.5 x 5D	7800	700	125	0.045	6200	490	95	0.040	3100	150	50	0.024
R3 x 6D	7250	870	135	0.060	5900	705	110	0.060	2700	160	50	0.030
R4 x 8D	6100	1090	155	0.089	4900	785	125	0.080	2050	190	50	0.046
R5 x 10D	5450	1330	170	0.122	4350	870	135	0.100	1750	190	55	0.054
R6 x 12D	4990	1500	190	0.150	3950	950	150	0.120	1500	210	55	0.070
R8 x 16D	4085	1470	205	0.180	3200	905	160	0.141	1150	210	60	0.091
R10 x 20D	3550	1425	225	0.201	2800	885	175	0.158	950	210	60	0.111

ap : D1~D6=0.2 mm
D8~D20=0.3 mm
ae : 0.2D



Diameter / Diàmetre (Ø d1) mm	Material							
	Cast iron / Fosa				Aluminium alloys / Aliatges d'alumini			
	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)	R.P.M Min.	Feed / Avanç mm/min.	Vc (M/Min.)	fz (mm/tooth) (mm/dent)
R1 x 2D	10500	220	65	0.010	30800	395	195	0.006
R1.5 x 3D	7050	230	65	0.016	20500	395	195	0.010
R2 x 4D	5150	285	65	0.028	15400	395	195	0.013
R2.5 x 5D	4150	330	65	0.040	12100	470	190	0.019
R3 x 6D	3400	360	65	0.053	10300	470	195	0.023
R4 x 8D	2500	460	65	0.092	7900	540	200	0.034
R5 x 10D	2050	460	65	0.112	6150	540	195	0.044
R6 x 12D	1750	460	65	0.131	5150	630	195	0.061
R8 x 16D	1300	460	65	0.177	3850	540	195	0.070
R10 x 20D	1050	420	65	0.200	2950	540	185	0.092



Solid carbide quarter circle cutters

DIN 6535-HA

Four flutes

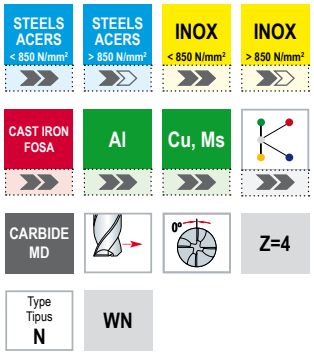
Freses de metall dur integral de quart de cercle

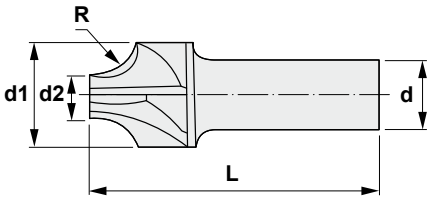
DIN 6535-HA

Quatre talls

Characteristics:
Recommended for milling in construction steels, tempered steels and cementation steels with standard tensile strength up to 1.100 N/mm² and short-chipping of non-ferrous metals.

Característiques:
Recomanades per el fresat d'acers de construcció, acers revinguts i acers de cementació amb una resistència estàndard a la tracció de fins a 1.100 N/mm² i per metalls no ferrosos de ferritja curta.





G

84

Reference Referència		d1	d2	d	R	L
8441.0	4	8,0	6,0	8	1,0	64
8441.5	4	8,0	5,0	8	1,5	64
8442.0	4	8,0	4,0	8	2,0	64
8442.5	4	10,0	5,0	10	2,5	67
8443.0	4	10,0	4,0	10	3,0	67
8443.5	4	12,0	5,0	12	3,5	74
8444.0	4	12,0	4,0	12	4,0	74
8445.0	4	16,0	6,0	16	5,0	83
8446.0	4	16,0	4,0	16	6,0	83

Solid carbide deburring mills 60º

DIN 6535-HB

Four-six flutes

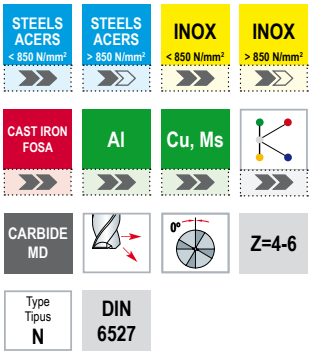
Freses de metall dur integral per desbarbar 60º

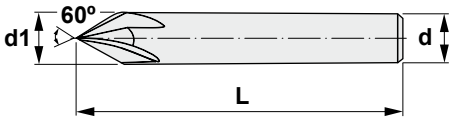
DIN 6535-HB

Quatre-sis talls

Characteristics:
Universal range of application, especially suited for chamfering and deburring as well as contouring.

Característiques:
Camp d'aplicació universal, adequades especialment per aixamfranar i desbarbar, així com per contornejar.





86

Reference Referència		d1	d	L
86404	4	4	4	54
86406	4	6	6	57
86408	4	8	8	63
86410	4	10	10	72
86412	4	12	12	83
86416	6	16	16	92

G

Solid carbide deburring mills 90º

DIN 6535-HB

Four-six flutes

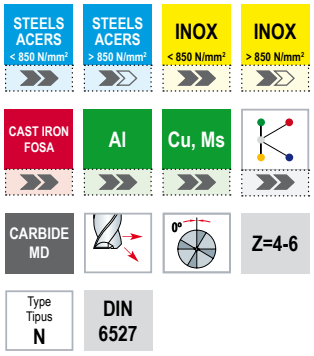
Freses de metall dur per desbarbar 90º

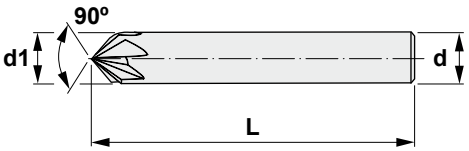
DIN 6535-HB

Quatre-sis talls

Characteristics:
Universal range of application, especially suited for chamfering and deburring as well as contouring.

Característiques:
Camp d'aplicació universal, adequades especialment per aixamfranar i desbarbar, així com per contornejar.





G

87

Reference Referència		d1	d	L
87404	4	4	4	54
87406	4	6	6	57
87408	4	8	8	63
87410	4	10	10	72
87412	4	12	12	83
87416	6	16	16	92

Solid carbide forward and reverse deburring mills.

2 x 90º DIN 6535-HA

Four flutes

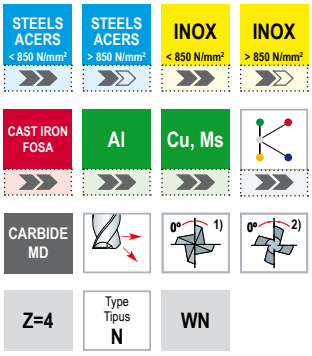
Freses de metall dur integral per desbarbar cap endavant i cap enrere.

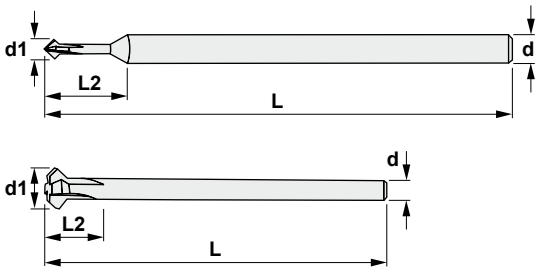
2 x 90º DIN 6535-HA

Quatre talls

Characteristics:
Universal range of application, especially suited for chamfering, forward and reverse deburring as well as contouring.

Característiques:
Camp d'aplicació universal, especialment adequades per aixamfranar, desbarbar cap endavant i cap enrere, així com per contornejar.





G

88

Reference Referència		d1	d	L2	L
88404	4	4	6	14	100
88406	4	6	6	21	100
88408	4	8	6	37	100
88410	4	10	6	38	100
88412	4	12	6	40	100

Cutting data for solid carbide (References 84, 86, 87 and 88)
Condicions de tall per el metall dur integral (Ref. 84, 86, 87 i 88)

Diameter / Diàmetre (Ø d1) mm	Material									
	Unalloyed steels Acer no aliat <500 N/mm²		Unalloyed steels Acer no aliat 500-700 N/mm²		Unalloyed steels Acer no aliat >700 N/mm²		Alloyed steels Acer aliat <1400 N/mm²		Alloyed steels Acer aliat >1400 N/mm²	
	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.
4	11935	955	9550	570	5970	360	4775	190	3185	125
6	7955	795	6365	510	3980	240	3185	125	2120	85
8	5965	595	4775	380	2985	180	2385	95	1590	65
10	4775	670	3820	460	2385	240	1910	115	1270	75
12	3980	555	3185	380	1990	200	1590	95	1060	65
16	2985	420	2385	285	1490	150	1195	95	795	65

Diameter / Diàmetre (Ø d1) mm	Material									
	Stainless steels Acer inoxidable		Cast iron Fosa <500 N/mm²		Cast iron Fosa >500 N/mm²		Cast iron Fosa <200 N/mm²		Cast iron Fosa >200 N/mm²	
	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.
4	4060	160	8755	700	7160	430	5970	595	5170	415
6	2705	110	5835	585	4775	285	3980	475	3450	275
8	2030	80	4375	440	3580	215	2985	360	2585	205
10	1625	95	3500	420	2865	230	2385	380	2070	250
12	1355	80	2920	350	2385	190	1990	320	1725	205
16	1015	80	2190	305	1790	180	1490	270	1295	205

Diameter / Diàmetre (Ø d1) mm	Material			
	Copper Coure		Aluminium alloys Aliatges d'alumini	
	R.P.M Min.	Feed / Avanç mm/min.	R.P.M Min.	Feed / Avanç mm/min.
4	13925	1115	35810	3580
6	9285	740	23875	2865
8	6960	555	17905	2150
10	5570	670	14325	2865
12	4640	555	11935	2385
16	3480	555	8950	2505

Solid carbide reinforced drills.

DIN 6537K (TIALN COATING) 3xD

Diameters from 3 to 20 mm

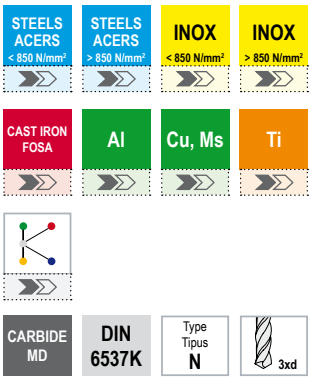
Broques reforçades de metall dur integral.

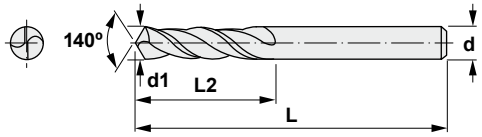
DIN 6537K (RECOBRIMENT TIALN) 3xD

Diàmetres de 3 a 20 mm

Characteristics:
Especially suitable for drilling heat resistant steels, Cr-Ni steels, high carbon steel castings, grey cast iron, cast steels, manganese steels, bronze, aluminium with high percentage of silicium and other difficult-to-machine materials.

Característiques:
Especialment adequades per foradar acers resistents a la calor, acers Cr-Ni, fosa d'acer amb alt contingut de carboni, fosa grisa, fosa d'acer, acers al manganès, bronze, alumini amb alt contingut de silici i altres materials difícils de mecanitzar.





7320

Reference Referència		d1	d	L2	L
732003.0	2	3,0	6	20	62
732003.1	2	3,1	6	20	62
732003.2	2	3,2	6	20	62
732003.3	2	3,3	6	20	62
732003.4	2	3,4	6	20	62
732003.5	2	3,5	6	20	62
732003.6	2	3,6	6	20	62
732003.7	2	3,7	6	20	62
732003.8	2	3,8	6	24	66
732003.9	2	3,9	6	24	66
732004.0	2	4,0	6	24	66
732004.1	2	4,1	6	24	66
732004.2	2	4,2	6	24	66
732004.3	2	4,3	6	24	66
732004.4	2	4,4	6	24	66
732004.5	2	4,5	6	24	66
732004.6	2	4,6	6	24	66
732004.7	2	4,7	6	24	66
732004.8	2	4,8	6	28	66
732004.9	2	4,9	6	28	66
732005.0	2	5,0	6	28	66
732005.1	2	5,1	6	28	66
732005.2	2	5,2	6	28	66
732005.3	2	5,3	6	28	66

7320

Reference Referència		d1	d	L2	L
732005.4	2	5,4	6	28	66
732005.5	2	5,5	6	28	66
732005.6	2	5,6	6	28	66
732005.7	2	5,7	6	28	66
732005.8	2	5,8	6	28	66
732005.9	2	5,9	6	28	66
732006.0	2	6,0	6	28	66
732006.1	2	6,1	8	34	79
732006.2	2	6,2	8	34	79
732006.3	2	6,3	8	34	79
732006.4	2	6,4	8	34	79
732006.5	2	6,5	8	34	79
732006.6	2	6,6	8	34	79
732006.7	2	6,7	8	34	79
732006.8	2	6,8	8	34	79
732006.9	2	6,9	8	34	79
732007.0	2	7,0	8	34	79
732007.1	2	7,1	8	41	79
732007.2	2	7,2	8	41	79
732007.3	2	7,3	8	41	79
732007.4	2	7,4	8	41	79
732007.5	2	7,5	8	41	79
732007.6	2	7,6	8	41	79
732007.7	2	7,7	8	41	79
732007.8	2	7,8	8	41	79
732007.9	2	7,9	8	41	79
732008.0	2	8,0	8	41	79
732008.1	2	8,1	10	47	89
732008.2	2	8,2	10	47	89
732008.3	2	8,3	10	47	89
732008.4	2	8,4	10	47	89
732008.5	2	8,5	10	47	89
732008.6	2	8,6	10	47	89
732008.7	2	8,7	10	47	89
732008.8	2	8,8	10	47	89
732008.9	2	8,9	10	47	89
732009.0	2	9,0	10	47	89
732009.1	2	9,1	10	47	89
732009.2	2	9,2	10	47	89
732009.3	2	9,3	10	47	89
732009.4	2	9,4	10	47	89
732009.5	2	9,5	10	47	89
732009.6	2	9,6	10	47	89
732009.7	2	9,7	10	47	89
732009.8	2	9,8	10	47	89
732009.9	2	9,9	10	47	89
732010.0	2	10,0	10	47	89
732010.1	2	10,1	12	55	102
732010.2	2	10,2	12	55	102
732010.3	2	10,3	12	55	102
732010.4	2	10,4	12	55	102
732010.5	2	10,5	12	55	102
732010.6	2	10,6	12	55	102

7320

Reference Referència		d1	d	L2	L
732010.7	2	10,7	12	55	102
732010.8	2	10,8	12	55	102
732010.9	2	10,9	12	55	102
732011.0	2	11,0	12	55	102
732011.1	2	11,1	12	55	102
732011.2	2	11,2	12	55	102
732011.3	2	11,3	12	55	102
732011.4	2	11,4	12	55	102
732011.5	2	11,5	12	55	102
732011.6	2	11,6	12	55	102
732011.7	2	11,7	12	55	102
732011.8	2	11,8	12	55	102
732011.9	2	11,9	12	55	102
732012.0	2	12,0	12	55	102
732012.2	2	12,2	14	60	107
732012.5	2	12,5	14	60	107
732012.7	2	12,7	14	60	107
732012.8	2	12,8	14	60	107
732013.0	2	13,0	14	60	107
732013.1	2	13,1	14	60	107
732013.5	2	13,5	14	60	107
732013.8	2	13,8	14	60	107
732014.0	2	14,0	14	60	107
732014.5	2	14,5	16	65	115
732014.8	2	14,8	16	65	115
732016.0	2	16,0	16	65	115
732016.5	2	16,5	18	73	123
732018.0	2	18,0	18	73	123
732018.5	2	18,5	20	79	131
732020.0	2	20,0	20	79	131

7320 *Solid carbide reinforced drills. Broques reforçades de metall dur integral.*

Diameter / Diàmetre (Ø d1) mm	Material											
	Unalloyed steels Acer no aliat < 700 N/mm² Ø1.0 ~ Ø2.9 : 40 ~ 80 m/min Ø3.0 ~ : 100 m/min			Alloyed steels Acer aliat < 1000 N/mm² Ø1.0 ~ Ø2.9 : 35 ~ 70 m/min Ø3.0 ~ : 75 m/min			Soft grey cast iron Fosa grisa tova < HB240, GG25 Ø1.0 ~ Ø2.9 : 60 ~ 130 m/min Ø3.0 ~ : 100 m/min			Hard grey cast iron Fosa grisa tova < HB300, GG40 Ø1.0 ~ Ø2.9 : 40 ~ 90 m/min Ø3.0 ~ : 80 m/min		
	R.P.M Min.	Feed / Avanç		R.P.M Min.	Feed / Avanç		R.P.M Min.	Feed / Avanç		R.P.M Min.	Feed / Avanç	
		Min.	Max.		Min.	Max.		Min.	Max.		Min.	Max.
3	10500	0.06	0.12	7890	0.06	0.12	10500	0.06	0.12	8410	0.06	0.12
4	7920	0.08	0.16	5920	0.08	0.16	7920	0.08	0.16	6310	0.08	0.16
5	6310	0.10	0.20	4740	0.10	0.20	6310	0.10	0.20	5050	0.10	0.20
6	5270	0.12	0.24	3950	0.12	0.24	5270	0.12	0.24	4220	0.12	0.24
7	4510	0.14	0.26	3400	0.14	0.26	4510	0.14	0.26	3610	0.14	0.26
8	3950	0.16	0.28	2970	0.16	0.28	3950	0.16	0.28	3160	0.16	0.28
9	3510	0.18	0.30	2640	0.18	0.30	3510	0.18	0.30	2820	0.18	0.30
10	3160	0.20	0.30	2370	0.20	0.30	3160	0.20	0.30	2530	0.20	0.30
11	2880	0.20	0.30	2160	0.20	0.30	2880	0.20	0.30	2310	0.20	0.30
12	2640	0.21	0.30	1980	0.21	0.30	2640	0.21	0.30	2120	0.21	0.30
13	2430	0.21	0.33	1830	0.21	0.33	2430	0.21	0.33	1950	0.21	0.33
14	2260	0.22	0.35	1710	0.22	0.35	2260	0.22	0.35	1810	0.22	0.35
16	1980	0.25	0.36	1490	0.25	0.36	1980	0.25	0.36	1590	0.25	0.36
18	1760	0.28	0.38	1330	0.28	0.38	1760	0.28	0.38	1420	0.28	0.38
20	1590	0.30	0.40	1180	0.30	0.40	1590	0.30	0.40	1270	0.30	0.40

Solid carbide reinforced drills.

DIN 6537L (TIALN COATING) 5xD

Diameters from 3 to 20 mm

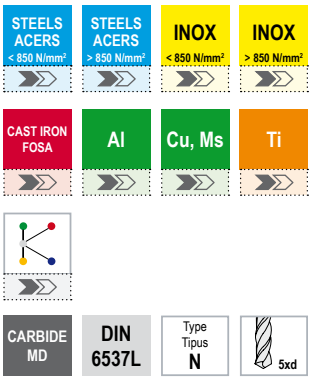
Broques reforçades de metall dur integral.

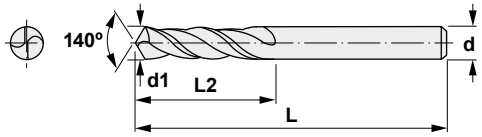
DIN 6537L (RECOBRIMENT TIALN) 5xD

Diàmetres de 3 a 20 mm

Characteristics:
Especially suitable for drilling heat resistant steels, Cr-Ni steels, high carbon steel castings, grey cast iron, cast steels, manganese steels, bronze, aluminium with high percentage of silicium and other difficult-to-machine materials.

Característiques:
Especialment adequades per foradar acers resistents a la calor, acers Cr-Ni, fosa d'acer amb alt contingut de carboni, fosa grisa, fosa d'acer, acers al manganès, bronze, alumini amb alt contingut de silici i altres materials difícils de mecanitzar.





7520

Reference Referència		d1	d	L2	L
752003.0	2	3,0	6	28	66
752003.1	2	3,1	6	28	66
752003.2	2	3,2	6	28	66
752003.3	2	3,3	6	28	66
752003.4	2	3,4	6	28	66
752003.5	2	3,5	6	28	66
752003.6	2	3,6	6	28	66
752003.7	2	3,7	6	28	66
752003.8	2	3,8	6	36	74
752003.9	2	3,9	6	36	74
752004.0	2	4,0	6	36	74
752004.1	2	4,1	6	36	74
752004.2	2	4,2	6	36	74
752004.3	2	4,3	6	36	74
752004.4	2	4,4	6	36	74
752004.5	2	4,5	6	36	74
752004.6	2	4,6	6	36	74
752004.7	2	4,7	6	44	74
752004.8	2	4,8	6	44	82
752004.9	2	4,9	6	44	82
752005.0	2	5,0	6	44	82
752005.1	2	5,1	6	44	82
752005.2	2	5,2	6	44	82
752005.3	2	5,3	6	44	82

7520

Reference Referència		d1	d	L2	L
752005.4	2	5,4	6	44	82
752005.5	2	5,5	6	44	82
752005.6	2	5,6	6	44	82
752005.7	2	5,7	6	44	82
752005.8	2	5,8	6	44	82
752005.9	2	5,9	6	44	82
752006.0	2	6,0	6	44	82
752006.1	2	6,1	8	53	91
752006.2	2	6,2	8	53	91
752006.3	2	6,3	8	53	91
752006.4	2	6,4	8	53	91
752006.5	2	6,5	8	53	91
752006.6	2	6,6	8	53	91
752006.7	2	6,7	8	53	91
752006.8	2	6,8	8	53	91
752006.9	2	6,9	8	53	91
752007.0	2	7,0	8	53	91
752007.1	2	7,1	8	53	91
752007.2	2	7,2	8	53	91
752007.3	2	7,3	8	53	91
752007.4	2	7,4	8	53	91
752007.5	2	7,5	8	53	91
752007.6	2	7,6	8	53	91
752007.7	2	7,7	8	53	91
752007.8	2	7,8	8	53	91
752007.9	2	7,9	8	53	91
752008.0	2	8,0	8	53	91
752008.1	2	8,1	10	61	103
752008.2	2	8,2	10	61	103
752008.3	2	8,3	10	61	103
752008.4	2	8,4	10	61	103
752008.5	2	8,5	10	61	103
752008.6	2	8,6	10	61	103
752008.7	2	8,7	10	61	103
752008.8	2	8,8	10	61	103
752008.9	2	8,9	10	61	103
752009.0	2	9,0	10	61	103
752009.1	2	9,1	10	61	103
752009.2	2	9,2	10	61	103
752009.3	2	9,3	10	61	103
752009.4	2	9,4	10	61	103
752009.5	2	9,5	10	61	103
752009.6	2	9,6	10	61	103
752009.7	2	9,7	10	61	103
752009.8	2	9,8	10	61	103
752009.9	2	9,9	10	61	103
752010.0	2	10,0	10	61	103
752010.1	2	10,1	10	61	103
752010.2	2	10,2	12	71	118
752010.3	2	10,3	12	71	118
752010.4	2	10,4	12	71	118
752010.5	2	10,5	12	71	118

7520

Reference Referència		d1	d	L2	L
752010.6	2	10,6	12	71	118
752010.7	2	10,7	12	71	118
752010.8	2	10,8	12	71	118
752010.9	2	10,9	12	71	118
752011.0	2	11,0	12	71	118
752011.1	2	11,1	12	71	118
752011.2	2	11,2	12	71	118
752011.3	2	11,3	12	71	118
752011.4	2	11,4	12	71	118
752011.5	2	11,5	12	71	118
752011.6	2	11,6	12	71	118
752011.7	2	11,7	12	71	118
752011.8	2	11,8	12	71	118
752011.9	2	11,9	12	71	118
752012.0	2	12,0	12	71	118
752012.2	2	12,2	14	77	124
752012.5	2	12,5	14	77	124
752012.7	2	12,7	14	77	124
752012.8	2	12,8	14	77	124
752013.0	2	13,0	14	77	124
752013.1	2	13,1	14	77	124
752013.5	2	13,5	14	77	124
752013.8	2	13,8	14	77	124
752014.0	2	14,0	14	77	124
752014.5	2	14,5	16	83	133
752014.8	2	14,8	16	83	133
752016.0	2	16,0	16	83	133
752016.5	2	16,5	18	93	143
752018.0	2	18,0	18	93	143
752018.5	2	18,5	20	101	153
752020.0	2	20,0	20	101	153

7520 *Solid carbide reinforced drills. Broques reforçades de metall dur integral.*

Diameter / Diàmetre (Ø d1) mm	Material											
	Unalloyed steels Acer no aliat < 700 N/mm² Ø1.0 ~ Ø2.9 : 40 ~ 80 m/min Ø3.0 ~ : 100 m/min			Alloyed steels Acer aliat < 1000 N/mm² Ø1.0 ~ Ø2.9 : 35 ~ 70 m/min Ø3.0 ~ : 75 m/min			Soft grey cast iron Fosa grisa tova < HB240, GG25 Ø1.0 ~ Ø2.9 : 60 ~ 130 m/min Ø3.0 ~ : 100 m/min			Hard grey cast iron Fosa grisa tova < HB300, GG40 Ø1.0 ~ Ø2.9 : 40 ~ 90 m/min Ø3.0 ~ : 80 m/min		
	R.P.M Min.	Feed / Avanç		R.P.M Min.	Feed / Avanç		R.P.M Min.	Feed / Avanç		R.P.M Min.	Feed / Avanç	
		Min.	Max.		Min.	Max.		Min.	Max.		Min.	Max.
3	10500	0.06	0.12	7890	0.06	0.12	10500	0.06	0.12	8410	0.06	0.12
4	7920	0.08	0.16	5920	0.08	0.16	7920	0.08	0.16	6310	0.08	0.16
5	6310	0.10	0.20	4740	0.10	0.20	6310	0.10	0.20	5050	0.10	0.20
6	5270	0.12	0.24	3950	0.12	0.24	5270	0.12	0.24	4220	0.12	0.24
7	4510	0.14	0.26	3400	0.14	0.26	4510	0.14	0.26	3610	0.14	0.26
8	3950	0.16	0.28	2970	0.16	0.28	3950	0.16	0.28	3160	0.16	0.28
9	3510	0.18	0.30	2640	0.18	0.30	3510	0.18	0.30	2820	0.18	0.30
10	3160	0.20	0.30	2370	0.20	0.30	3160	0.20	0.30	2530	0.20	0.30
11	2880	0.20	0.30	2160	0.20	0.30	2880	0.20	0.30	2310	0.20	0.30
12	2640	0.21	0.30	1980	0.21	0.30	2640	0.21	0.30	2120	0.21	0.30
13	2430	0.21	0.33	1830	0.21	0.33	2430	0.21	0.33	1950	0.21	0.33
14	2260	0.22	0.35	1710	0.22	0.35	2260	0.22	0.35	1810	0.22	0.35
16	1980	0.25	0.36	1490	0.25	0.36	1980	0.25	0.36	1590	0.25	0.36
18	1760	0.28	0.38	1330	0.28	0.38	1760	0.28	0.38	1420	0.28	0.38
20	1590	0.30	0.40	1180	0.30	0.40	1590	0.30	0.40	1270	0.30	0.40

Solid carbide reinforced drills.

DIN 6537L (TIALN COATING) 3xD
WITH COOLANT SYSTEM

Diameters from 3 to 20 mm

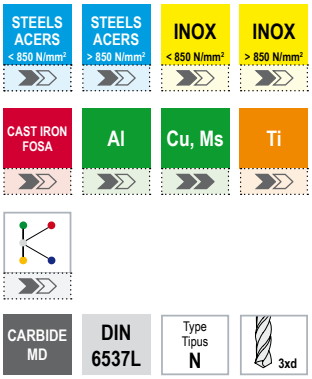
Broques reforçades de metall dur integral.

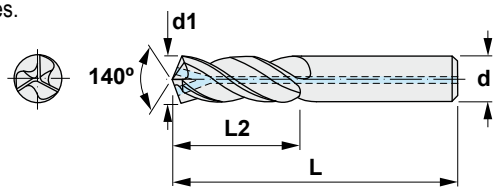
DIN 6537L (RECOBRIMENT TIALN) 3xD
AMB SISTEMA DE REFRIGERACIÓ

Diàmetres de 3 a 20 mm

Characteristics:
Solid carbide high performance drill with internal coolant supply for universal applications. High stability as well as universal usability due to the straight main cutting edge. The special point shape effects optimum chip breakage, high centering accuracy and less cutting forces.

Característiques:
Broques de metall dur integral d'altes prestacions amb sistema de refrigeració interna per aplicacions universals. Gràcies a l'aresta de tall principal recta s'obté una alta estabilitat i una aplicabilitat universal. La forma especial de la punta aconsegueix un trencament òptim de la ferritja, una alta precisió de centrat i forces de tall més baixes.





7323

Reference Referència		d1	d	L2	L
732303.0	2	3,0	6	20	62
732303.1	2	3,1	6	20	62
732303.2	2	3,2	6	20	62
732303.3	2	3,3	6	20	62
732303.4	2	3,4	6	20	62
732303.5	2	3,5	6	20	62
732303.6	2	3,6	6	20	62
732303.7	2	3,7	6	20	62
732303.8	2	3,8	6	24	66
732303.9	2	3,9	6	24	66
732304.0	2	4,0	6	24	66
732304.1	2	4,1	6	24	66
732304.2	2	4,2	6	24	66
732304.3	2	4,3	6	24	66
732304.4	2	4,4	6	24	66
732304.5	2	4,5	6	24	66
732304.6	2	4,6	6	24	66
732304.7	2	4,7	6	24	66
732304.8	2	4,8	6	28	66
732304.9	2	4,9	6	28	66
732305.0	2	5,0	6	28	66

7323

Reference Referència		d1	d	L2	L
732305.1	2	5,1	6	28	66
732305.2	2	5,2	6	28	66
732305.3	2	5,3	6	28	66
732305.4	2	5,4	6	28	66
732305.5	2	5,5	6	28	66
732305.6	2	5,6	6	28	66
732305.7	2	5,7	6	28	66
732305.8	2	5,8	6	28	66
732305.9	2	5,9	6	28	66
732306.0	2	6,0	6	28	66
732306.1	2	6,1	8	34	91
732306.2	2	6,2	8	34	91
732306.3	2	6,3	8	34	91
732306.4	2	6,4	8	34	91
732306.5	2	6,5	8	34	91
732306.6	2	6,6	8	34	91
732306.7	2	6,7	8	34	91
732306.8	2	6,8	8	34	91
732306.9	2	6,9	8	34	91
732307.0	2	7,0	8	34	91
732307.1	2	7,1	8	53	91
732307.2	2	7,2	8	53	91
732307.3	2	7,3	8	53	91
732307.4	2	7,4	8	53	91
732307.5	2	7,5	8	53	91
732307.6	2	7,6	8	53	91
732307.7	2	7,7	8	53	91
732307.8	2	7,8	8	53	91
732307.9	2	7,9	8	53	91
732308.0	2	8,0	8	53	91
732308.1	2	8,1	10	61	103
732308.2	2	8,2	10	61	103
732308.3	2	8,3	10	61	103
732308.4	2	8,4	10	61	103
732308.5	2	8,5	10	61	103
732308.6	2	8,6	10	61	103
732308.7	2	8,7	10	61	103
732308.8	2	8,8	10	61	103
732308.9	2	8,9	10	61	103
732309.0	2	9,0	10	61	103
732309.1	2	9,1	10	61	103
732309.2	2	9,2	10	61	103
732309.3	2	9,3	10	61	103
732309.4	2	9,4	10	61	103
732309.5	2	9,5	10	61	103
732309.6	2	9,6	10	61	103
732309.7	2	9,7	10	61	103
732309.8	2	9,8	10	61	103
732309.9	2	9,9	10	61	103
732310.0	2	10,0	10	61	103
732310.1	2	10,1	10	61	103
732310.2	2	10,2	12	71	118

7323

Reference Referència		d1	d	L2	L
732310.3	2	10,30	12	71	118
732310.4	2	10,40	12	71	118
732310.5	2	10,50	12	71	118
732310.6	2	10,60	12	71	118
732310.7	2	10,70	12	71	118
732310.8	2	10,80	12	71	118
732310.9	2	10,90	12	71	118
732311.0	2	11,00	12	71	118
732311.1	2	11,10	12	71	118
732311.2	2	11,20	12	71	118
732311.3	2	11,30	12	71	118
732311.4	2	11,40	12	71	118
732311.5	2	11,50	12	71	118
732311.6	2	11,60	12	71	118
732311.7	2	11,70	12	71	118
732311.8	2	11,80	12	71	118
732311.9	2	11,90	12	71	118
732312.0	2	12,00	12	71	118
732312.25	2	12,25	14	77	124
732312.5	2	12,50	14	77	124
732313.8	2	13,80	14	77	124
732314.0	2	14,00	14	77	124
732314.5	2	14,50	16	83	133
732314.8	2	14,80	16	83	133
732316.0	2	16,00	16	83	133
732316.5	2	16,50	18	93	143
732318.0	2	18,00	18	93	143
732318.5	2	18,50	20	101	153
732320.0	2	20,00	20	101	153

7323 *Solid carbide reinforced drills. Broques reforçades de metall dur integral.*

Diameter / Diàmetre (Ø d1) mm	Material											
	Unalloyed steels Acer no aliat < 700 N/mm² Ø1.0 ~ Ø2.9 : 50 ~ 100 m/min Ø3.0 ~ : 110 m/min			Alloyed steels Acer aliat < 1000 N/mm² Ø1.0 ~ Ø2.9 : 40 ~ 90 m/min Ø3.0 ~ : 83 m/min			Soft grey cast iron Fosa grisa tova < HB240, GG25 Ø1.0 ~ Ø2.9 : 80 ~ 160 m/min Ø3.0 ~ : 110 m/min			Hard grey cast iron Fosa grisa dura < HB300, GG40 Ø1.0 ~ Ø2.9 : 50 ~ 100 m/min Ø3.0 ~ : 88 m/min		
	R.P.M Min.	Feed / Avanç		R.P.M Min.	Feed / Avanç		R.P.M Min.	Feed / Avanç		R.P.M Min.	Feed / Avanç	
		Min.	Max.		Min.	Max.		Min.	Max.		Min.	Max.
3	11660	0.06	0.12	8760	0.06	0.12	11660	0.06	0.12	9340	0.06	0.12
4	8800	0.08	0.16	6570	0.08	0.16	8800	0.08	0.16	7010	0.08	0.16
5	7010	0.10	0.20	5260	0.10	0.20	7010	0.10	0.20	5610	0.10	0.20
6	5850	0.12	0.24	4380	0.12	0.24	5850	0.12	0.24	4680	0.12	0.24
7	5010	0.14	0.26	3770	0.14	0.26	5010	0.14	0.26	4010	0.14	0.26
8	4380	0.16	0.28	2390	0.16	0.28	4380	0.16	0.28	3510	0.16	0.28
9	3900	0.18	0.30	2930	0.18	0.30	3900	0.18	0.30	3130	0.18	0.30
10	3510	0.20	0.30	2630	0.20	0.30	3510	0.20	0.30	2810	0.20	0.30
11	3190	0.20	0.30	2400	0.20	0.30	3190	0.20	0.30	2560	0.20	0.30
12	2930	0.21	0.30	2200	0.21	0.30	2930	0.21	0.30	2350	0.21	0.30
13	2700	0.21	0.33	2030	0.21	0.33	2700	0.21	0.33	2160	0.21	0.33
14	2510	0.22	0.35	1890	0.22	0.35	2510	0.22	0.35	2010	0.22	0.35
16	2190	0.25	0.36	1650	0.25	0.36	2190	0.25	0.36	1760	0.25	0.36
18	1950	0.28	0.38	1470	0.28	0.38	1950	0.28	0.38	1570	0.28	0.38
20	1760	0.30	0.40	1310	0.30	0.40	1760	0.30	0.40	1410	0.30	0.40

Solid carbide reinforced drills.

DIN 6537L (TIALN COATING) 5xD
WITH COOLANT SYSTEM

Diameters from 3 to 20 mm

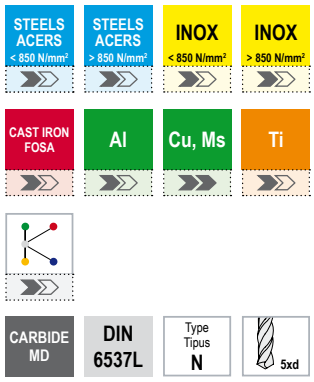
Broques reforçades de metall dur integral.

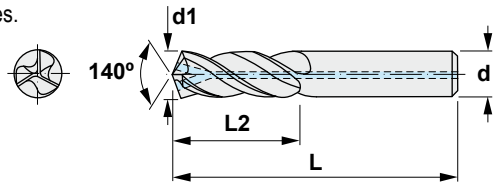
DIN 6537L (RECOBRIMENT TIALN) 5xD
AMB SISTEMA DE REFRIGERACIÓ

Diàmetres de 3 a 20 mm

Characteristics:
Solid carbide high performance drill with internal coolant supply for universal applications. High stability as well as universal usability due to the straight main cutting edge. The special point shape effects optimum chip breakage, high centering accuracy and less cutting forces.

Característiques:
Broques de metall dur integral d'altes prestacions amb sistema de refrigeració interna per aplicacions universals. Gràcies a l'aresta de tall principal recta s'obté una alta estabilitat i una aplicabilitat universal. La forma especial de la punta aconsegueix un trencament òptim de la ferritja, una alta precisió de centrat i forces de tall més baixes.





7523

Reference Referència		d1	d	L2	L
752303.0	2	3,0	6	28	66
752303.1	2	3,1	6	28	66
752303.2	2	3,2	6	28	66
752303.3	2	3,3	6	28	66
752303.4	2	3,4	6	28	66
752303.5	2	3,5	6	28	66
752303.6	2	3,6	6	28	66
752303.7	2	3,7	6	28	66
752303.8	2	3,8	6	36	74
752303.9	2	3,9	6	36	74
752304.0	2	4,0	6	36	74
752304.1	2	4,1	6	36	74
752304.2	2	4,2	6	36	74
752304.3	2	4,3	6	36	74
752304.4	2	4,4	6	36	74
752304.5	2	4,5	6	36	74
752304.6	2	4,6	6	36	74
752304.7	2	4,7	6	44	74
752304.8	2	4,8	6	44	82
752304.9	2	4,9	6	44	82
752305.0	2	5,0	6	44	82

7523

Reference Referència		d1	d	L2	L
752305.1	2	5,1	6	44	82
752305.2	2	5,2	6	44	82
752305.3	2	5,3	6	44	82
752305.4	2	5,4	6	44	82
752305.5	2	5,5	6	44	82
752305.6	2	5,6	6	44	82
752305.7	2	5,7	6	44	82
752305.8	2	5,8	6	44	82
752305.9	2	5,9	6	44	82
752306.0	2	6,0	6	44	82
752306.1	2	6,1	8	53	91
752306.2	2	6,2	8	53	91
752306.3	2	6,3	8	53	91
752306.4	2	6,4	8	53	91
752306.5	2	6,5	8	53	91
752306.6	2	6,6	8	53	91
752306.7	2	6,7	8	53	91
752306.8	2	6,8	8	53	91
752306.9	2	6,9	8	53	91
752307.0	2	7,0	8	53	91
752307.1	2	7,1	8	53	91
752307.2	2	7,2	8	53	91
752307.3	2	7,3	8	53	91
752307.4	2	7,4	8	53	91
752307.5	2	7,5	8	53	91
752307.6	2	7,6	8	53	91
752307.7	2	7,7	8	53	91
752307.8	2	7,8	8	53	91
752307.9	2	7,9	8	53	91
752308.0	2	8,0	8	53	91
752308.1	2	8,1	10	61	103
752308.2	2	8,2	10	61	103
752308.3	2	8,3	10	61	103
752308.4	2	8,4	10	61	103
752308.5	2	8,5	10	61	103
752308.6	2	8,6	10	61	103
752308.7	2	8,7	10	61	103
752308.8	2	8,8	10	61	103
752308.9	2	8,9	10	61	103
752309.0	2	9,0	10	61	103
752309.1	2	9,1	10	61	103
752309.2	2	9,2	10	61	103
752309.3	2	9,3	10	61	103
752309.4	2	9,4	10	61	103
752309.5	2	9,5	10	61	103
752309.6	2	9,6	10	61	103
752309.7	2	9,7	10	61	103
752309.8	2	9,8	10	61	103
752309.9	2	9,9	10	61	103
752310.0	2	10,0	10	61	103
752310.1	2	10,1	10	61	103
752310.2	2	10,2	12	71	118

7523

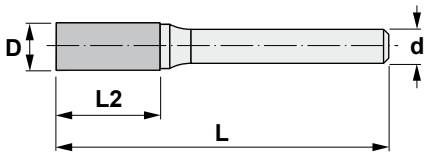
Reference Referència		d1	d	L2	L
752310.3	2	10,30	12	71	118
752310.4	2	10,40	12	71	118
752310.5	2	10,50	12	71	118
752310.6	2	10,60	12	71	118
752310.7	2	10,70	12	71	118
752310.8	2	10,80	12	71	118
752310.9	2	10,90	12	71	118
752311.0	2	11,00	12	71	118
752311.1	2	11,10	12	71	118
752311.2	2	11,20	12	71	118
752311.3	2	11,30	12	71	118
752311.4	2	11,40	12	71	118
752311.5	2	11,50	12	71	118
752311.6	2	11,60	12	71	118
752311.7	2	11,70	12	71	118
752311.8	2	11,80	12	71	118
752311.9	2	11,90	12	71	118
752312.0	2	12,00	12	71	118
752312.25	2	12,25	14	77	124
752312.5	2	12,50	14	77	124
752313.8	2	13,80	14	77	124
752314.0	2	14,00	14	77	124
752314.5	2	14,50	16	83	133
752314.8	2	14,80	16	83	133
752316.0	2	16,00	16	83	133
752316.5	2	16,50	18	93	143
752318.0	2	18,00	18	93	143
752318.5	2	18,50	20	101	153
752320.0	2	20,00	20	101	153

7523 *Solid carbide reinforced drills. Broques reforçades de metall dur integral.*

Diameter / Diàmetre (Ø d1) mm	Material											
	Unalloyed steels Acer no aliat < 700 N/mm² Ø1.0 ~ Ø2.9 : 50 ~ 100 m/min Ø3.0 ~ : 110 m/min			Alloyed steels Acer aliat < 1000 N/mm² Ø1.0 ~ Ø2.9 : 40 ~ 90 m/min Ø3.0 ~ : 83 m/min			Soft grey cast iron Fosa grisa tova < HB240, GG25 Ø1.0 ~ Ø2.9 : 80 ~ 160 m/min Ø3.0 ~ : 110 m/min			Hard grey cast iron Fosa grisa dura < HB300, GG40 Ø1.0 ~ Ø2.9 : 50 ~ 100 m/min Ø3.0 ~ : 88 m/min		
	R.P.M Min.	Feed / Avanç		R.P.M Min.	Feed / Avanç		R.P.M Min.	Feed / Avanç		R.P.M Min.	Feed / Avanç	
		Min.	Max.		Min.	Max.		Min.	Max.		Min.	Max.
3	11660	0.06	0.12	8760	0.06	0.12	11660	0.06	0.12	9340	0.06	0.12
4	8800	0.08	0.16	6570	0.08	0.16	8800	0.08	0.16	7010	0.08	0.16
5	7010	0.10	0.20	5260	0.10	0.20	7010	0.10	0.20	5610	0.10	0.20
6	5850	0.12	0.24	4380	0.12	0.24	5850	0.12	0.24	4680	0.12	0.24
7	5010	0.14	0.26	3770	0.14	0.26	5010	0.14	0.26	4010	0.14	0.26
8	4380	0.16	0.28	2390	0.16	0.28	4380	0.16	0.28	3510	0.16	0.28
9	3900	0.18	0.30	2930	0.18	0.30	3900	0.18	0.30	3130	0.18	0.30
10	3510	0.20	0.30	2630	0.20	0.30	3510	0.20	0.30	2810	0.20	0.30
11	3190	0.20	0.30	2400	0.20	0.30	3190	0.20	0.30	2560	0.20	0.30
12	2930	0.21	0.30	2200	0.21	0.30	2930	0.21	0.30	2350	0.21	0.30
13	2700	0.21	0.33	2030	0.21	0.33	2700	0.21	0.33	2160	0.21	0.33
14	2510	0.22	0.35	1890	0.22	0.35	2510	0.22	0.35	2010	0.22	0.35
16	2190	0.25	0.36	1650	0.25	0.36	2190	0.25	0.36	1760	0.25	0.36
18	1950	0.28	0.38	1470	0.28	0.38	1950	0.28	0.38	1570	0.28	0.38
20	1760	0.30	0.40	1310	0.30	0.40	1760	0.30	0.40	1410	0.30	0.40

Characteristics:
900: Cylindrical - Straight.
901: Cylindrical - Crossed.

Característiques:
900: Cilindrica - Dentat llis.
901: Cilindrica - Dentat creuat.



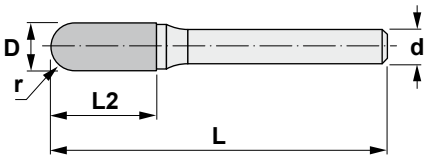
Availability / Disponibilitat
● Standard item / Article estàndard
○ Check availability / Consulteu disponibilitat

900 - 901

Reference Referència	D	d	L	L2	K10
90003	3	3	38	14	●
90006	6	3	43	13	●
90008	8	6	65	20	●
90010	10	6	65	20	●
90012	12	6	70	25	●
90016	16	6	70	25	●
90106	6	3	43	13	●
90108	8	6	65	20	●
90110	10	6	65	20	●
90112	12	6	70	25	●
90116	16	6	70	25	●

Characteristics:
910: Cylindrical round top - Straight.
911: Cylindrical round top - Crossed.

Característiques:
910: Cilíndrica amb punta esfèrica - Dentat llis.
911: Cilíndrica amb punta esfèrica - Dentat creuat.



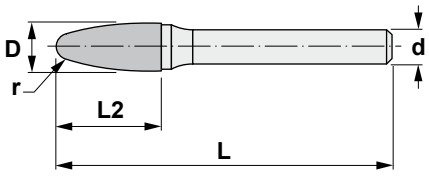
Availability / Disponibilitat
● Standard item / Article estàndard
○ Check availability / Consulteu disponibilitat

910 - 911

Reference Referència	D	d	L	L2	r	K10
91003	3	3	38	14	1,5	●
91006	6	3	43	14	3,0	●
91008	8	6	65	20	4,0	●
91010	10	6	65	20	5,0	●
91012	12	6	70	25	6,0	●
91016	16	6	70	25	8,0	●
91106	6	3	43	14	3,0	●
91108	8	6	65	20	4,0	●
91110	10	6	65	20	5,0	●
91112	12	6	70	25	6,0	●
91116	16	6	70	25	8,0	●

Characteristics:
920: Tree radius nose - Straight.
921: Tree radius nose - Crossed.

Características:
920: Cap ogival - Dentat llis.
921: Cap ogival - Dentat creuat.



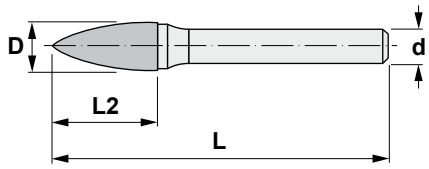
Availability / Disponibilitat
● Standard item / Article estàndard
○ Check availability / Consulteu disponibilitat

920 - 921

Reference Referència	D	d	L	L2	r	K10
92003	3	3	38	12	0,8	●
92006	6	3	43	13	1,5	●
92008	8	6	63	18	2,0	●
92010	10	6	65	20	2,5	●
92012	12	6	70	25	3,0	●
92016	16	6	75	30	5,0	●
92106	6	3	43	13	1,5	●
92108	8	6	63	18	2,0	●
92110	10	6	65	20	2,5	●
92112	12	6	70	25	3,0	●
92116	16	6	75	30	5,0	●

Characteristics:
930: Cylindrical round top - Straight.
931: Cylindrical round top - Crossed.

Características:
930: Cap en forma de flama - Dentat llis.
931: Cap en forma de flama - Dentat creuat.



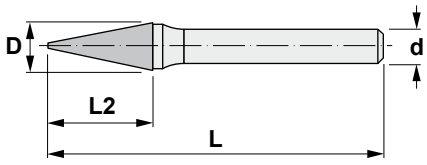
Availability / Disponibilitat
● Standard item / Article estàndard
○ Check availability / Consulteu disponibilitat

930 - 931

Reference Referència	D	d	L	L2	K10
93003	3	3	38	12	●
93006	6	3	43	13	●
93008	8	6	65	20	●
93010	10	6	65	20	●
93012	12	6	70	25	●
93016	16	6	75	30	●
93106	6	3	43	13	●
93108	8	6	65	20	●
93110	10	6	65	20	●
93112	12	6	70	25	●
93116	16	8	75	30	●

Characteristics:
940: Cone - Straight.
941: Cone - Crossed.

Característiques:
940: Cònica - Dentat llis.
941: Cònica - Dentat creuat.



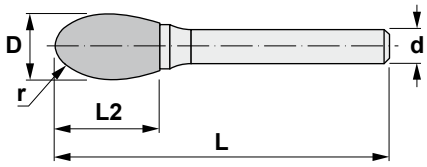
Availability / Disponibilitat
● Standard item / Article estàndard
○ Check availability / Consulteu disponibilitat

940 - 941

Reference Referència	D	d	L	L2	K10
94003	3	3	50	12	●
94006	6	3	43	13	●
94008	8	6	63	18	●
94010	10	6	66	20	●
94012	12	6	70	25	●
94016	16	6	70	25	●
94106	6	3	43	13	●
94108	8	6	63	18	●
94110	10	6	66	20	●
94112	12	6	70	25	●
94116	16	6	70	25	●

Characteristics:
950: Olive (Egg) - Straight.
951: Olive (Egg) - Crossed.

Característiques:
950: Oval - Dentat llis.
951: Oval - Dentat creuat.



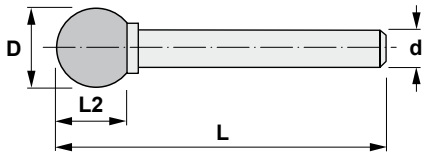
Availability / Disponibilitat
● Standard item / Article estàndard
○ Check availability / Consulteu disponibilitat

950 - 951

Reference Referència	D	d	L	L2	r	K10
95003	3	3	38	6	1,2	●
95006	6	3	40	10	2,5	●
95008	8	6	58	13	3,7	●
95010	10	6	61	16	4,0	●
95012	12	6	65	20	5,0	●
95016	16	6	70	25	6,5	●
95106	6	3	40	10	2,5	●
95108	8	6	58	13	3,7	●
95110	10	6	61	16	4,0	●
95112	12	6	65	20	5,0	●
95116	16	6	70	25	6,5	●

Characteristics:
960: Ball - Straight.
961: Ball - Crossed.

Característiques:
960: Esfèrica - Dentat llis.
961: Esfèrica - Dentat creuat.



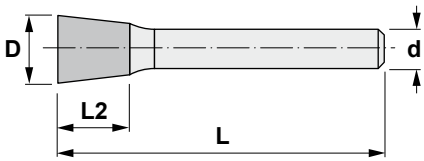
Availability / Disponibilitat
● Standard item / Article estàndard
○ Check availability / Consulteu disponibilitat

960 - 961

Reference Referència	D	d	L	L2	K10
96003	3	3	38	2,5	●
96006	6	3	35	5,0	●
96008	8	6	52	7,0	●
96010	10	6	54	9,0	●
96012	12	6	55	10,0	●
96016	16	8	59	14,0	●
96106	6	3	35	5,0	●
96108	8	6	52	7,0	●
96110	10	6	54	9,0	●
96112	12	6	55	10,0	●
96116	16	6	59	14,0	●

Characteristics:
970: Inverted cone - Straight.
971: Inverted cone - Crossed.

Característiques:
970: Con invertit - Dentat llis.
971: Con invertit - Dentat creuat.



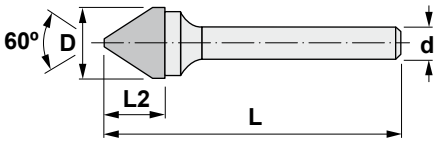
Availability / Disponibilitat
● Standard item / Article estàndard
○ Check availability / Consulteu disponibilitat

970 - 971

Reference Referència	D	d	L	L2	K10
97003	3	3	38	3	●
97006	6	3	36	6	●
97008	8	6	53	8	●
97012	12	6	57	12	●
97106	6	3	36	6	●
97108	8	6	53	8	●
97110	10	6	55	10	●
97112	12	6	57	12	●

Characteristics:
Deburring 60°.

Característiques:
Llima rotativa cònica per aixamfranar, 60º.



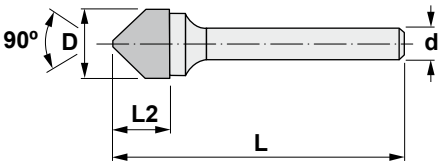
Availability / Disponibilitat
● Standard item / Article estàndard
○ Check availability / Consulteu disponibilitat

98

Reference Referència	D	d	L	L2	K10
98006	6	6	50	6	●
98010	10	6	55	10	●
98012	12	6	57	12	●
98016	16	6	61	16	●

Characteristics:
Deburring 90°.

Característiques:
Llima rotativa cònica per aixamfranar, 90°.



Availability / Disponibilitat
● Standard item / Article estàndard
○ Check availability / Consulteu disponibilitat

99

Reference Referència	D	d	L	L2	K10
99006	6	6	50	6	●
99008	8	6	53	8	●
99010	10	6	55	10	●
99012	12	6	57	12	●
99016	16	6	61	16	●

Cutting data for tungsten carbide burrs

Material	Condition	HB	Kind of teeth		Cutting speed m/min
			Straight cut	Crossed cut	
Unalloyed steel	C<0,25% C<1<0,80% C,40%	110-310	● ● ●	● ● ●	800-1200 800-1200 800-1200
Low alloyed steel	Annealed Hardened	125-225 220-450	●	● ●	700-1000 600-800
High alloyed steel	Annealed Hardened	150-250 250-500	●	● ●	600-800 600-800
High alloyed steel	Annealed high speed steel (HSS) Hardened tool steel	150-250 250-350	●	● ●	600-800 600-800
Stainless steel	Ferritic-martensitic	150-270	●	●	600-800
Steel casting	Unalloyed Low alloyed High alloyed	150-250	● ● ●	● ● ●	600-800 600-800 600-800
Stainless steel	Austenitic	150-270	●	●	600-800
Stainless steel castings	Ferritic-martensitic Austenitic Manganese steel	200 200 250	● ● ●	● ● ●	400 300 160
Malleable cast iron	Ferritic - short chip Pearlitic - long chip	110-145 200-230	● ●	● ●	750 650
Grey cast iron	High traction resistant Low traction resistant	180 260	● ●	● ●	950 700
Nodular cast iron	Ferritic Pearlitic	160 250	● ●	● ●	650 550
Shell cast iron		400	●	●	160

Practical advice

- The indicated data are recommended for manual applications with a strength of 5-25N.
- Increase the cutting speed for light deburring.
- For heavy operations, for instance by a robot, the cutting speed must be reduced.

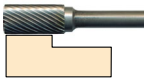
Straight cutting flutes burrs

- Best surface finishing.
- Maximum chip removal in soft materials.
- Excellent tool life.
- Produce needle chips.

Crossed cutting flutes burrs

- Allow a lower spindle speed.
- Smoother operation, even at low speeds.
- High chip removal in hard and soft materials.
- Produce short and rounded chips.

Type 90



Surfaces and smooth edges

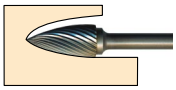
Type 91

Radius and surfaces

Type 92

General shapes

Type 93

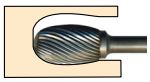


Curved shapes with narrow spaces

Type 94

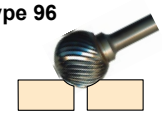
Narrow spaces

Type 95



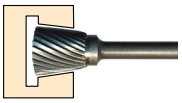
Complicated shapes

Type 96



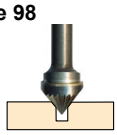
Welded shapes and holes in curved surfaces

Type 97



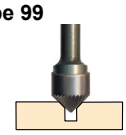
Inverted cone shape

Type 98



30º Degrees chamfering

Type 99



45º Degrees chamfering

Condicions de tall per llimes rotatives

Material	Condició	HB	Tipus de dentat		Velocitat de tall m/min
			Dentat llis	Dentat creuat	
Acer no aliat	C<0,25% C<1<0,80% C,40%	110-310	● ● ●	● ● ●	800-1200 800-1200 800-1200
Acer de baix aliatge	Recuit Trempat	125-225 220-450	●	● ●	700-1000 600-800
Acer d'alt aliatge	Recuit Trempat	150-250 250-500	●	● ●	600-800 600-800
Acer d'alt aliatge	Acer ràpid (HSS) recuit Acer per eines trempat	150-250 250-350	●	● ●	600-800 600-800
Acer inoxidable	Ferrític/martensític	150-270	●	●	600-800
Acer fos	No aliat De baix aliatge D'alt aliatge	150-250	● ● ●	● ● ●	600-800 600-800 600-800
Acer inoxidable	Austenític	150-270	●	●	600-800
Acer inoxidable fos	Ferrític/martensític Austenític Acer al manganès	200 200 250	● ● ●	● ● ●	400 300 160
Fosa mal·leable	Ferrític - ferritja curta Perlític - ferritja llarga	110-145 200-230	● ●	● ●	750 650
Fosa grisa	Alta resistència a la tracció Baixa resistència a la tracció	180 260	● ●	● ●	950 700
Fosa nodular	Ferrític Perlític	160 250	● ●	● ●	650 550
Fosa de coquilla		400	●	●	160

Consells pràctics

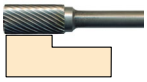
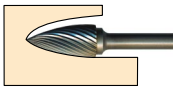
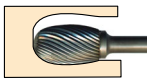
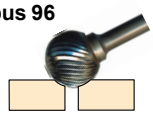
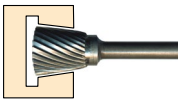
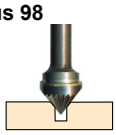
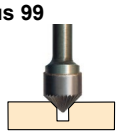
- Les dades indicades es recomanen per aplicacions manuals amb una força de 5-25N.
- Incrementar la velocitat de tall per el desbarbat lleuger.
- Per operacions pesants, per exemple, mitjançant un robot, s'ha de reduir la velocitat de tall.

Llimes rotatives amb dentat llis

- Excel·lent acabat de superfície.
- Màxima evacuació de ferritja en materials tous.
- Excel·lent durabilitat de l'eina.
- Produeixen ferritges allargades.

Llimes rotatives amb dentat creuat

- Permeten una velocitat de l'eix més baixa.
- Operacions més suaus, fins i tot a baixes velocitats.
- Gran evacuació de ferritja en materials durs i tous.
- Produeixen ferritges curtes i arrodonides.

Tipus 90	Tipus 91	Tipus 92	Tipus 93	Tipus 94
				
Superfícies i arestes llises	Radis i superfícies	Formes generals	Formes corves en espais estrets	Espais estrets
Tipus 95	**Tipus 96**	**Tipus 97**	**Tipus 98**	**Tipus 99**
				
Formes complicades	Formes soldades i forats en superfícies corves	Forma de con invertit	Aixamfranat 30º	Aixamfranat 45º