Supfina

Precizni Alati za perfektnu obradu

Godina 2015/16
Izdanje 12/12

Promotivni Katalog Standardnog Reznog Alata od Tvrdog Metala

/ www.supfina.ba /

O FIRMI / ABOUT FIRM

Supfina d.o.o je osnovana 2002 godine , kao firma čiji se osnovni strateški cilj zasnivao na polju oštrenja specijalnih reznih alata od tvrdog metala, kao potpora proizvodnim firmama koje egzistiraju u sektoru mehaničke obrade automobilskih komponenti ; te u opštoj mašinskoj branši. Prepoznavajući nove tržišne prilike , Supfina već 2004 godine , djelatnost proširuje na proizvodnju kako standardnih , tako i specijalnih reznih alata od tvrdog metala, nudeći pri tome svojim kupcima inovativna rješenja istih i tehnički suport.

Danas "Supfina" predstavlja modernu i fleksibilnu proizvodnu firmu , koja posjeduje visokokvalitetan inženjerski i proizvodni kadar , koji uz vrhunsku CNC opremu za izradu i oštrenje reznog alata predstavlja okusnicu za finalan proizvod optimalnog dizajna i vrhunske kvalitete.

Fokus našeg proizvodnog djelovanja usmjeravamo na brzo rješavanje potreba kupca , nudeći im pri tome inovativne koncepte reznih alata sa tendencijom neprestalnog poboljšanja ; sa veoma kratkim dobavnim rokovima i kompletnom logističkom podrškom.

Supfina d.o.o. was established in 2002 year as a company whose main strategic goal was based on the field of production special carbide cutting tools and sharpening , as well as support for production companies that exist in the field of mechanical machining of automotive components, and the general mechanical industry.
Recognizing new market opportunities, Supfina in 2004 year , the business expanded to produce as standard, and special cutting tools from carbide, thereby offering its customers innovative solutions and technical suport them.

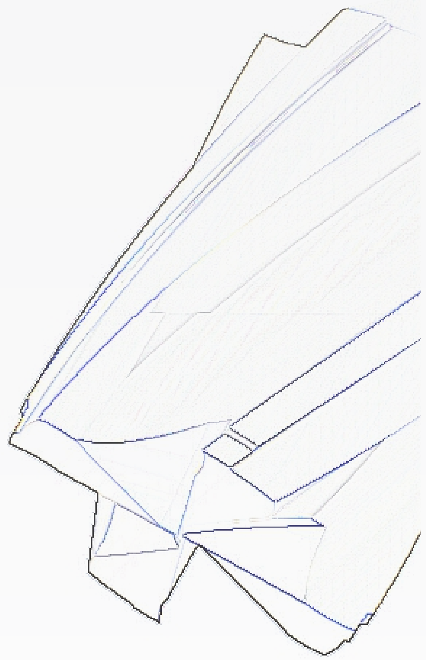
Today "Supfina" is a modern and flexible manufacturing firm, which owns high-quality engineering and manufacturing staff, who along with the the best CNC equipment for making and sharpening of cutting tools do plate for the final product of the optimal design and superior quality.

The focus of our production activities will directed quickly addressing customer needs, providing them with innovative concepts cutting tools with a tendency constantly improvements, with very short deadlines supply and full logistical support.

COMPANY LOCATION

Supfina Ltd. is placed in Bosnia and Herzegovina at the site of Gradačac , which is located in the southeastern part of the state. We are only 25 km from a highway Zagreb-Županja, and 35 km from a highway Zagreb-Belgrade.

Our address/ Naša adresa : Sarajevska 62, 76250 Gradačac, Bosna i Hercegovina



B

ZNACENJE KATALOSKIH IKONA

Materijal alata / Tool material

HM	HSS	C	CBN	PCD
Hard metall	Fast cuting steel	Cermet	Cubic boron nitrid	Poly cristall diamant

Presvlaka / Coating

	TiN	CrN	TiCN	TiAlN
Without coating	Titan Nitrid	Crom Nitrid	Titan Crom nitrid	Titan Al. Nitrid

Rezni ugao / Cutting angle

120° 130° 135° 140° 145° 150°

Rezni ugao
Cuting angle

Precnik jezgra / Core diametar

25% 30% 35% 50% 60% 70%

Precnik jezgra
Core Diametar

Nacin obrade / Way manufacturing

				P9
Radial manufact.	Radial and depth manuf.	Radial,axial and depth manufact.	Profile manufact.	Pocket manufact.

Rezna dubina / Cuting depth

1XD 2,5xD 4xD <7XD

Rezna dubina
Cuting Depth

Broj fluta / Number of flutes

Z2 Z3 Z4 Z5

Z2	Z3
Dvije Flute Two flutes	Tri Flute Three flutes

Standardi / Standards

Supfina Standard

Tip obrade / Manufacturing type

Slot obrada Slot machining	Konturna obrada Conture machining	Busenje Drilling	Interpolacija Interpolation	Aksijalna i rad.obrada Axial and radial mach.
Stranska obr. Side slot machining	Povrs. Obrada Surface machining	Ramp obrada Ramp machining	Aksijalna obrada Axial machining	

Duzina alata / Tool lenght

Kratki alat Short tool	Poludugi alat Medium tool	Dugi alat Long tool

Hladjenje / Coolant

Hladjenje Coolant	Hladjenje Coolant

Oblik alata / Tool shape

Cilindr.oblik Cilindrical Shape	Stepenasti oblik Stairs shape

Smjer rotacije / Direction

Desni smjer Right direct.	Lijevi smjer Left direct.

Ugao ivice / Champfer angle

90°	60°
90 stepeni 90 degrees	60 stepeni 60 degrees

Ugao prelaza / Step angle

60°	90°	180°
60 stepeni 60 degrees	90 stepeni 90 degrees	180 stepeni 180 degrees

SISTEM OZNACAVANJA REZNIH ALATA

C

1 Vrsta alata / Sort tool

D	– Svrdlo (Drill)
DC	– Svrdlo sa hladjenjem (Drill with coolant)
DS	– Svrdlo sa razl. Prihv. (Drill with diff. Blank)
DL	– Svrdlo - dugo. (Drill - Long)
D3	– Svrdlo sa 3 zavojnice (Drill with 3 flute)
DE	– Svrdlo-stepenasto (Step drill)
G	– Ravno svrdlo (Straight drill)
IF	– Fino Glodalo (Fein Shaft Fraeser)
IG	– Grubo vret. Glodalo (Rough Shaft Fraeser)
IC	– Konicno vret.glodalo (Conic Shaft Fraeser)
U	– Upustac (Champfer drill)
N	– Zabusivac (Spot drill)
O	– Loptasto glodalo (Ball nose fraeser)
OZ	– Zaobl. Lopt. glodalo (Spfere Ball nose fraeser)
P	– Upustac (Champfer drill)

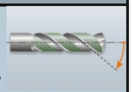
2 Materijal / Material

HSS	– Brzorezni celik (Fast cuting steel)
HM	– Tvrdi metal (Hardmetall)
C	– Cermet (Cermet)
CBN	– Kubicni boron nitrid (Cubic boron nitrid)
PCD	– Polikristalni dijamant (Polycristall diamant)

3 Grupa / Group

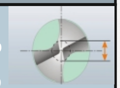
1035
2035
3035
4035
5035
–

4 Ugao spirale / Angle flute



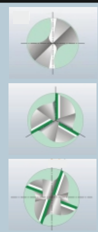
Z	– 0°
N	– 5°
H	– 10°
T	– 20°
C	– 25°
A	– 30°
G	– 38°
B	– 45°
D	– 50°
F	– 55°
E	– 90°

5 Precnik jezgra / Core diametar



25	– 25%
30	– 30%
35	– 35%
50	– 50%
60	– 60%
70	– 70%

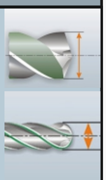
6 Broj fluta / Number flutes



2 –
3 –
4 –

D	HM	2035	–	A	30	–	2	–	19.0	–	55	–	C	–	20h6	–	R0	–	74	–	P
1	2	3		4	5		6		7		8		9		10		11		12		13

7 Rezni diametar / Cuting diametar

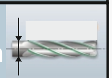


15	– 15mm
20	– 20mm
30	– 30mm
40	– 40mm
–	
–	

9 Tip prihvata / Shaft Type

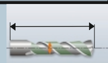
C	– Cilindricall Shaft
W	– Conical Shaft

10 Precnik prihvata / Shaft diametar



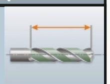
10h6	- 10mm
15h6	- 15mm
20h6	- 20mm
25h6	- 25mm
–	
–	

12 Duzina alata / Tool length



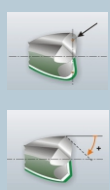
70	- 70mm
80	- 80mm
90	- 90mm
–	
–	

8 Rezna dubina / Cuting depth



55	– 55mm
60	– 60mm
80	– 80mm
90	– 90mm
–	
–	

11 Zaobljenje / Radius / champfer



R3	- 3mm
C4	- 4mm

13 Obradni material / Working material

P	– Celik (Steel)
M	– Legirani Celik (Stainless Steel)
K	– Liveno Gvozdje (Cast Iron)
N	– Al.legure I Nemet. (Al.alloys and nemetals)
S	– Vatrotporni celici (High temp. and Super Alloys)
H	– Otvrdnuti celici (Hardened Steel)

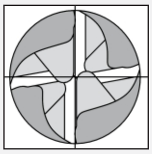
SADRZAJ KATALOGA

SUP - 100

Vretenasto glodalo sa suzenim vratom - 4 flute
Solid Carbide End mill with a narrow neck - 4 flutes

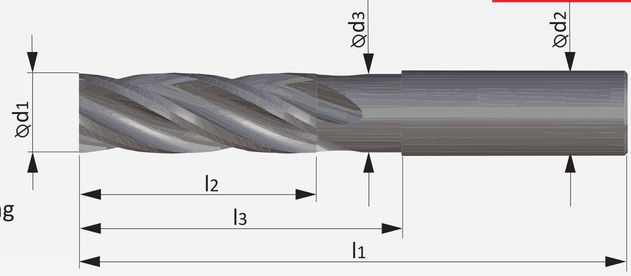
Konstrukcioni Podaci

- 4 rezne ostrice
- 2 ostrice preko centra
- poluduga izvedba
- namijenjen za gr. I finu obradu
- izvedba sa suženim vratom



Engineering data

- 4 cutting edge
- 2 cutting edge to center
- middle version
- for rough and finish machining
- wit a narrow neck



d1(e8)	tolerance	
3 - 6	-0.020	-0.032
6 - 10	-0.025	-0.040
10 - 18	-0.032	-0.050
18 - 30	-0.040	-0.061

HM
Z4
TiAlN

D

Material	Aluminij Alu	Celik Steel < 800 (N/mm2)	Celik Steel < 1200 (N/mm2)	Celik Steel < 1600 (N/mm2)	Celik Steel < 55 HRC	Celik Steel < 60 HRC	Celik Steel < 66 HRC	Inox Inox < 800 (N/mm2)	Inox Inox > 800 (N/mm2)	GG	GGG	Nemetal Nonmetall Cu - Leg.	Hladjenje emulzijom	Hladjenje vodenom maglom	Hladjenje zrakom
	○	●	●	●	●	○	○	○	○	●	●	○	●	○	○

Ød1 (e8)	Oznaka Description	Sifra Code	l2 (mm)	l3 (mm)	Ød3 (mm)	l1 (mm)	Ød2 h6 (mm)	Cijena Price (KM)
3	SUP 100 - 3	A-IFHM 3035-A50-4-3.0-10-C-3h6-R0-38-P	10	15	2.7	38	3	Na upit
4	SUP 100 - 4	A-IFHM 3035-A50-4-4.0-12-C-4h6-R0-50-P	12	18	3.5	50	4	Na upit
5	SUP 100 - 5	A-IFHM 3035-A50-4-5.0-14-C-5h6-R0-50-P	14	20	4.5	50	5	Na upit
5	SUP 100 - 5	A-IFHM 3035-A50-4-5.0-14-C-6h6-R0-50-P	14	20	4.5	50	6	Na upit
6	SUP 100 - 6	A-IFHM 3035-A50-4-6.0-16-C-6h6-R0-54-P	16	24	5.4	54	6	Na upit
8	SUP 100 - 8	A-IFHM 3035-A50-4-8.0-20-C-8h6-R0-63-P	20	28	7.2	63	8	Na upit
10	SUP 100 - 10	A-IFHM 3035-A50-4-10.0-22-C-10h6-R0-72-P	22	32	9.2	72	10	Na upit
12	SUP 100 - 12	A-IFHM 3035-A50-4-12.0-25-C-12h6-R0-82-P	25	35	11	82	12	Na upit
14	SUP 100 - 14	A-IFHM 3035-A50-4-14.0-32-C-14h6-R0-82-P	32	42	13	82	14	Na upit
16	SUP 100 - 16	A-IFHM 3035-A50-4-16.0-32-C-16h6-R0-92-P	32	42	14.8	92	16	Na upit
18	SUP 100 - 18	A-IFHM 3035-A50-4-18.0-32-C-18h6-R0-92-P	32	42	15.6	92	18	Na upit
20	SUP 100 - 20	A-IFHM 3035-A50-4-20.0-38-C-20h6-R0-105-P	38	50	17.4	105	20	Na upit
25	SUP 100 - 25	A-IFHM 3035-A50-4-25.0-45-C-25h6-R0-110-P	45	57	22.2	110	25	Na upit

Primjer narudzbe / SUP 100 - 12 - HB
Order Example / SUP 100 - 12 - HB

SUP - 101

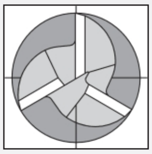
Fino vretenasto glodalo - 3 flute
Solid Carbide End mill - 3 flutes

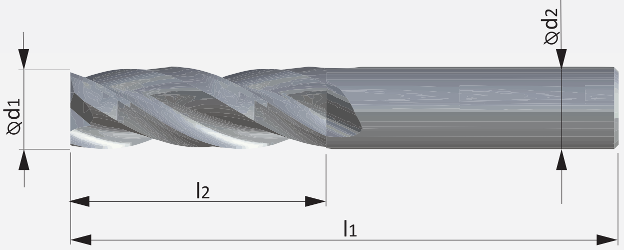
Konstrukcioni Podaci

- 3 rezne ostrice
- 1 ostrica preko centra
- poluduga izvedba
- namijenjen za grubu obradu
- ugao spirale / 30 stepeni

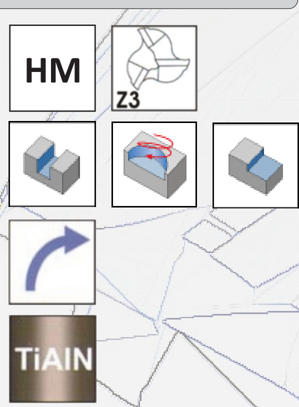
Engineering data

- 3 cutting edge
- 1 cutting edge over center
- middle version
- for rough machining
- helix angle / 38 degrees





d1(e8)	tolerance	
3 - 6	-0.020	-0.032
6 - 10	-0.025	-0.040
10 - 18	-0.032	-0.050
18 - 30	-0.040	-0.061



D

Material	Aluminij Alu	Celik Steel < 800 (N/mm2)	Celik Steel < 1200 (N/mm2)	Celik Steel < 1600 (N/mm2)	Celik Steel < 55 HRC	Celik Steel < 60 HRC	Celik Steel < 66 HRC	Inox Inox < 800 (N/mm2)	Inox Inox > 800 (N/mm2)	GG	GGG	Nemetal Nonmetall Cu - Leg.	Hladjenje emulzijom	Hladjenje vodenom maglom	Hladjenje zrakom
	○	●	●	●	●	○	○	○	○	●	●	○	●	○	○

ød1 (e8)	Oznaka / Description	Sifra / Code	l2 (mm)	l3 (mm)	ød3 (mm)	l1 (mm)	ød2 h6 (mm)	Cijena / Price (KM)
3	SUP 101 - 3	A-IFHM 7035-G50-3-3.0-10-C-3h6-R0-38-P	10			54	3	Na upit
4	SUP 101 - 4	A-IFHM 7035-G50-3-4.0-12-C-4h6-R0-50-P	12			54	4	Na upit
5	SUP 101 - 5	A-IFHM 7035-G50-3-5.0-14-C-5h6-R0-50-P	14			54	5	Na upit
5	SUP 101 - 5	A-IFHM 7035-G50-3-5.0-14-C-6h6-R0-50-P	14			54	6	Na upit
6	SUP 101 - 6	A-IFHM 7035-G50-3-6.0-16-C-6h6-R0-54-P	16			54	6	Na upit
8	SUP 101 - 8	A-IFHM 7035-G50-3-8.0-20-C-8h6-R0-63-P	20			63	8	Na upit
10	SUP 101 - 10	A-IFHM 7035-G50-3-10.0-22-C-10h6-R0-72-P	22			72	10	Na upit
12	SUP 101 - 12	A-IFHM 7035-G50-3-12.0-25-C-12h6-R0-82-P	25			82	12	Na upit
14	SUP 101 - 14	A-IFHM 7035-G50-3-14.0-32-C-14h6-R0-82-P	32			82	14	Na upit
16	SUP 101 - 16	A-IFHM 7035-G50-3-16.0-32-C-16h6-R0-92-P	32			92	16	Na upit
18	SUP 101 - 18	A-IFHM 7035-G50-3-18.0-32-C-18h6-R0-92-P	32			92	18	Na upit
20	SUP 101 - 20	A-IFHM 7035-G50-3-20.0-38-C-20h6-R0-105-P	38			105	20	Na upit
25	SUP 101 - 25	A-IFHM 7035-G50-3-25.0-45-C-25h6-R0-110-P	45			110	25	Na upit

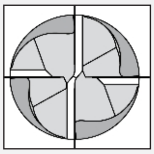
Primjer narudzbe / SUP 101 - 12 - HB - P
Order Example / SUP 101 - 12 - HB - P

SUP - 102

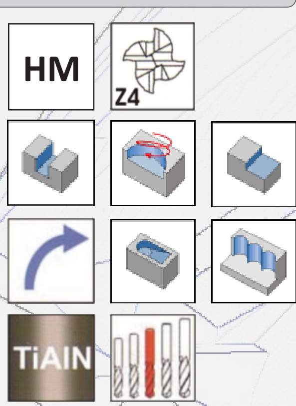
Fina vretenasto glodalo - 4 flute
Solid Carbide Endmills - 4 flutes

Konstrukcioni Podaci

- 4 rezne ostrice
- 2 centralne ostrice
- poluduga izvedba
- namijenjen za grubu obradu

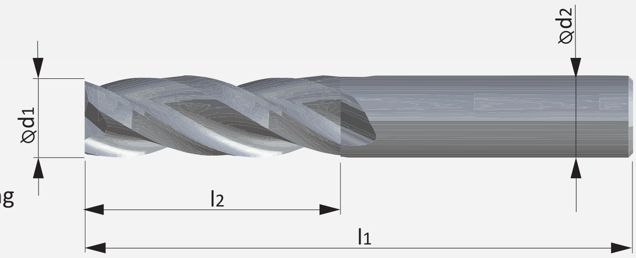


d1 (e8)	tolerance	
3 - 6	-0.020	-0.032
6 - 10	-0.025	-0.040
10 - 18	-0.032	-0.050
18 - 30	-0.040	-0.061



Engineering data

- 4 cutting edge
- 2 cutting edge in center
- middle version
- for rough and finish machining



Material	Aluminij Alu	Celik Steel < 800 (N/mm2)	Celik Steel < 1200 (N/mm2)	Celik Steel < 1600 (N/mm2)	Celik Steel < 55 HRC	Celik Steel < 60 HRC	Celik Steel < 66 HRC	Inox Inox < 800 (N/mm2)	Inox Inox > 800 (N/mm2)	GG	GGG	Nemetal Nonmetall Cu - Leg.	Hladjenje emulzijom	Hladjenje vodenom maglom	Hladjenje zrakom
	○	●	●	●	●	○	○	○	○	●	●	○	●	○	○

I

Ød1 (e 8)	Oznaka Description	Sifra Code	l2 (mm)	l3 (mm)		l1 (mm)	Ød2 h6 (mm)	Cijena Price (KM)
3	SUP 102 - 3	A-IFHM 4035-A50-4-3.0-10-C-3h6-R0-38-P	10			38	3	Na upit
4	SUP 102 - 4	A-IFHM 4035-A50-4-4.0-12-C-4h6-R0-50-P	12			50	4	Na upit
5	SUP 102 - 5	A-IFHM 4035-A50-4-5.0-14-C-5h6-R0-50-P	14			50	5	Na upit
5	SUP 102 - 5	A-IFHM 4035-A50-4-5.0-14-C-6h6-R0-50-P	14			50	6	Na upit
6	SUP 102 - 6	A-IFHM 4035-A50-4-6.0-16-C-6h6-R0-54-P	16			54	6	Na upit
8	SUP 102 - 8	A-IFHM 4035-A50-4-8.0-20-C-8h6-R0-63-P	20			63	8	Na upit
10	SUP 102 - 10	A-IFHM 4035-A50-4-10.0-22-C-10h6-R0-72-P	22			72	10	Na upit
12	SUP 102 - 12	A-IFHM 4035-A50-4-12.0-25-C-12h6-R0-82-P	25			82	12	Na upit
14	SUP 102 - 14	A-IFHM 4035-A50-4-14.0-32-C-14h6-R0-82-P	32			82	14	Na upit
16	SUP 102 - 16	A-IFHM 4035-A50-4-16.0-32-C-16h6-R0-92-P	32			92	16	Na upit
18	SUP 102 - 18	A-IFHM 4035-A50-4-18.0-32-C-18h6-R0-92-P	32			92	18	Na upit
20	SUP 102 - 20	A-IFHM 4035-A50-4-20.0-38-C-20h6-R0-105-P	38			105	20	Na upit
25	SUP 102 - 25	A-IFHM 4035-A50-4-25.0-45-C-25h6-R0-110-P	45			110	25	Na upit

Primjer narudzbe / SUP 102 - 10 - HB
Order Example / SUP 102 - 10 - HB

SUP - 103

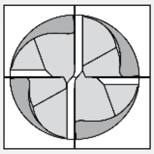
Fino vretenasto glodalo sa bridom - 4 flute
Solid Carbide End mill with champfer - 4 flutes

Konstrukcioni Podaci

- 4 rezne ostrice
- 2 centralne ostrice
- poluduga izvedba
- namijenjen za grubu obradu
- ugao spirale / 30 stepeni

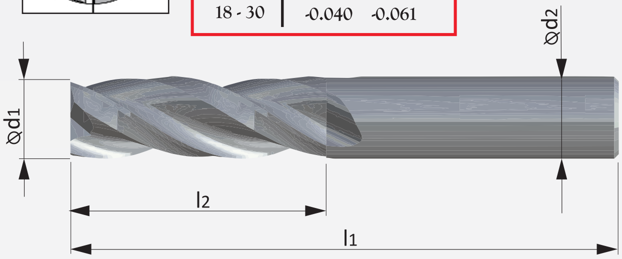
Engineering data

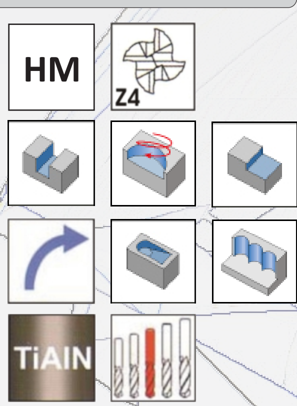
- 4 cutting edge
- 2 cutting edge in center
- middle version
- for rough machining
- helix angle / 30 degrees



d1 (e8)	tolerance	
3 - 6	-0.020	-0.032
6 - 10	-0.025	-0.040
10 - 18	-0.032	-0.050
18 - 30	-0.040	-0.061

	d1	b
45° b	≥ Ø 4	0,02 x d1





D

Material	Aluminij Alu	Celik Steel < 800 (N/mm2)	Celik Steel < 1200 (N/mm2)	Celik Steel < 1600 (N/mm2)	Celik Steel < 55 HRC	Celik Steel < 60 HRC	Celik Steel < 66 HRC	Inox Inox < 800 (N/mm2)	Inox Inox > 800 (N/mm2)	GG	GGG	Nemetal Nonmetall Cu - Leg.	Hladjenje emulzijom	Hladjenje vodenom maglom	Hladjenje zrakom
	○	●	●	●	●	○	○	○	○	●	●	○	●	○	○

⌀d1 (e8)	Oznaka / Description	Sifra / Code	l2 (mm)	l3 (mm)	⌀d3 (mm)	l1 (mm)	⌀d2 h6 (mm)	Cijena / Price (KM)
3	SUP 103 - 3	A-IFHM 1035-A50-4-3.0-10-C-3h6-R0-38-P	10			38	3	Na upit
4	SUP 103 - 4	A-IFHM 1035-A50-4-4.0-12-C-4h6-R0-50-P	12			50	4	Na upit
5	SUP 103 - 5	A-IFHM 1035-A50-4-5.0-14-C-5h6-C0.1-50-P	14			50	5	Na upit
5	SUP 103 - 5	A-IFHM 1035-A50-4-5.0-14-C-6h6-C0.1-50-P	14			50	6	Na upit
6	SUP 103 - 6	A-IFHM 1035-A50-4-6.0-16-C-6h6-C0.12-54-P	16			54	6	Na upit
8	SUP 103 - 8	A-IFHM 1035-A50-4-8.0-20-C-8h6-C0.16-63-P	20			63	8	Na upit
10	SUP 103 - 10	A-IFHM 1035-A50-4-10.0-22-C-10h6-C0.2-72-P	22			72	10	Na upit
12	SUP 103 - 12	A-IFHM 1035-A50-4-12.0-25-C-12h6-C0.24-82-P	25			82	12	Na upit
14	SUP 103 - 14	A-IFHM 1035-A50-4-14.0-32-C-14h6-C0.28-82-P	32			82	14	Na upit
16	SUP 103 - 16	A-IFHM 1035-A50-4-16.0-32-C-16h6-C0.32-92-P	32			92	16	Na upit
18	SUP 103 - 18	A-IFHM 1035-A50-4-18.0-32-C-18h6-C0.36-92-P	32			92	18	Na upit
20	SUP 103 - 20	A-IFHM 1035-A50-4-20.0-38-C-20h6-C0.4-105-P	38			105	20	Na upit
25	SUP 103 - 25	A-IFHM 1035-A50-4-25.0-45-C-25h6-C0.5-110-P	45			110	25	Na upit

Primjer narudzbe / SUP 103 - 12 - HB - P
Order Example / SUP 103 - 12 - HB - P

SUP - 104

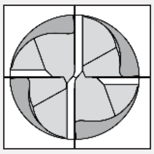
Fina vretenasto glodalo sa radiusom - 4 flute
Solid Carbide Endmills with radius - 4 flutes

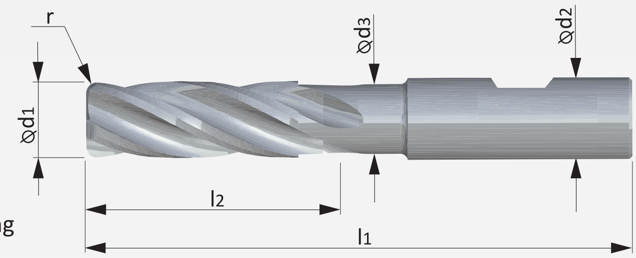
Konstrukcioni Podaci

- 4 rezne ostrice
- 2 centralne ostrice
- poluduga izvedba
- namijenjen za grubu obradu
- ugao spirale 30 stepeni

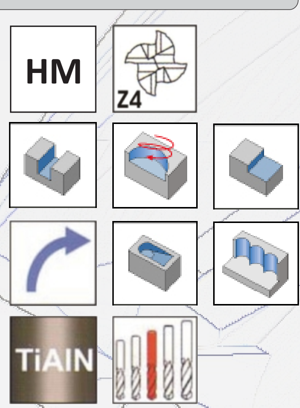
Engineering data

- 4 cutting edge
- 2 cutting edge in center
- middle version
- for rough and finish machining
- helix nagle - 30 degrees





d1 (e8)	tolerance	
3 - 6	-0.020	-0.032
6 - 10	-0.025	-0.040
10 - 18	-0.032	-0.050
18 - 30	-0.040	-0.061



Material	Aluminij Alu	Celik Steel < 800 (N/mm2)	Celik Steel < 1200 (N/mm2)	Celik Steel < 1600 (N/mm2)	Celik Steel < 55 HRC	Celik Steel < 60 HRC	Celik Steel < 66 HRC	Inox Inox < 800 (N/mm2)	Inox Inox > 800 (N/mm2)	GG	GGG	Nemetal Nonmetall Cu - Leg.	Hladjenje emulzijom	Hladjenje vodenom maglom	Hladjenje zrakom
	○	●	●	●	●	○	○	○	○	●	●	○	●	○	○

Ød1/r (e 8)	Oznaka Description	Sifra Code	l2 (mm)	l3 (mm)	Ød3 (mm)	l1 (mm)	Ød2 h6 (mm)	Cijena Price (KM)
3 / 0.3	SUP 104-3/0.3	A-IFHM 8035-A50-3-3.0-10-C-3h6-R0.30-38-P	10	16	2.8	38	3	Na upit
4 / 0.5	SUP 104-4/0.5	A-IFHM 8035-A50-4-4.0-12-C-4h6-R0.5-50-P	12	18	3.75	50	4	Na upit
5 / 0.5	SUP 104-5/0.5	A-IFHM 8035-A50-4-5.0-14-C-5h6-R0.5-50-P	14	20	4.7	50	5	Na upit
6 / 0.5	SUP 104-6/0.5	A-IFHM 8035-A50-4-6.0-14-C-6h6-R0.5-50-P	14	20	5.5	50	6	Na upit
6 / 1	SUP 104-6/1	A-IFHM 8035-A50-4-6.0-16-C-6h6-R1-54-P	16	20	5.5	54	6	Na upit
8 / 0.5	SUP 104-8/0.5	A-IFHM 8035-A50-4-8.0-20-C-8h6-R0.5-63-P	20	28	7.4	63	8	Na upit
8 / 1	SUP 104-8/1	A-IFHM 8035-A50-4-8.0-22-C-8h6-R1-72-P	22	30	7.4	72	8	Na upit
10 / 0.5	SUP 104-10/0.5	A-IFHM 8035-A50-4-10.0-25-C-10h6-R0.5-82-P	25	33	9.1	82	10	Na upit
10 / 1	SUP 104-10/1	A-IFHM 8035-A50-4-10.0-32-C-10h6-R1-82-P	32	40	9.1	82	10	Na upit
12 / 0.5	SUP 104-12/0.5	A-IFHM 8035-A50-4-12.0-32-C-12h6-R0.5-92-P	32	40	11	92	12	Na upit
12 / 1	SUP 104-12/1	A-IFHM 8035-A50-4-12.0-32-C-12h6-R1-92-P	32	40	11	92	12	Na upit
14 / 0.5	SUP 104-14/0.5	A-IFHM 8035-A50-4-14.0-32-C-14h6-R0.5-92-P	32	42	12.8	92	14	Na upit
14 / 1	SUP 104-14/1	A-IFHM 8035-A50-4-14.0-32-C-14h6-R1-92-P	38	42	12.8	92	14	Na upit
16 / 0.5	SUP 104-16/0.5	A-IFHM 8035-A50-4-16.0-38-C-16h6-R0.5-105-P	38	50	15.6	105	16	Na upit
16 / 1	SUP 104-16/1	A-IFHM 8035-A50-4-16.0-38-C-16h6-R1-105-P	38	50	15.6	105	16	Na upit
18 / 1	SUP 104-18/1	A-IFHM 8035-A50-4-18.0-38-C-18h6-R1-105-P	38	50	16.4	105	18	Na upit
20 / 1	SUP 104-20/1	A-IFHM 8035-A50-4-20.0-43-C-20h6-R1-110-P	43	57	18.5	110	20	Na upit
25 / 1.5	SUP 104-25/1.5	A-IFHM 8035-A50-4-25.0-43-C-25h6-R1.5-110-P	43	57	23	110	25	Na upit

Primjer narudzbe / SUP 104 - 10/1 - HB
Order Example / SUP 104 - 10/1 - HB

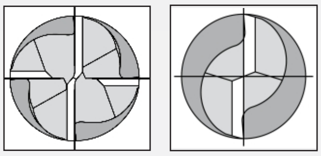
I

SUP - 110

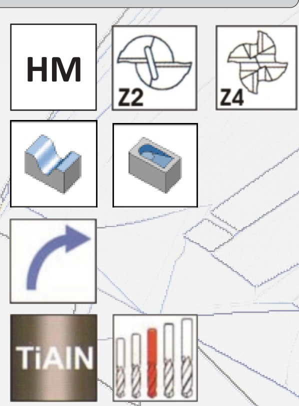
Loptasta glodala - (2-4) flute
Ball Nose Endmills (2 - 4) flutes

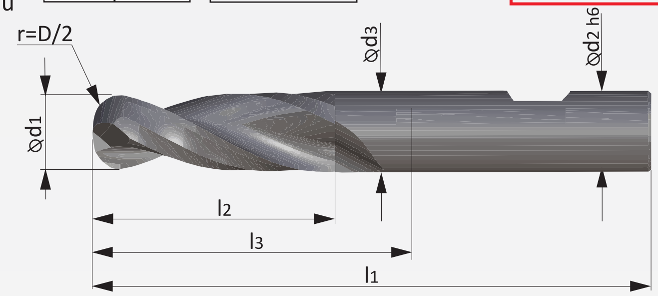
Konstrukcioni Podaci

- (2-4) rezne ostrice
- 2 centralne ostrice
- poluduga izvedba
- namijenjen za kopirnu obradu
- ugao spirale 30 stepeni



d1 (e8)	tolerance	
3 - 6	-0.020	-0.032
6 - 10	-0.025	-0.040
10 - 18	-0.032	-0.050
18 - 30	-0.040	-0.061





Engineering data

- (2-4) cutting edge
- 2 cutting edge in center
- middle version
- for coping machining
- helix nagle - 30 degrees

Material	Aluminij Alu	Celik Steel < 800 (N/mm2)	Celik Steel < 1200 (N/mm2)	Celik Steel < 1600 (N/mm2)	Celik Steel < 55 HRC	Celik Steel < 60 HRC	Celik Steel < 66 HRC	Inox Inox < 800 (N/mm2)	Inox Inox > 800 (N/mm2)	GG	GGG	Nemetal Nonmetall Cu - Leg.	Hladjenje emulzijom	Hladjenje vodenom maglom	Hladjenje zrakom
	○	●	●	●	●	●	●	○	○	○	○	●	○	○	○

E

Ød1/r (e 8)	Oznaka Description	Sifra Code	l2 (mm)	l3 (mm)	Ød3 (mm)	l1 (mm)	Ød2 h6 (mm)	Cijena Price (KM)
3 / 1.5	SUP 110-3/1.5	A-OHM 5035-A30-2-3.0-6-C-3h6-R1.5-54	6			54	3	Na upit
4 / 2	SUP 110-4/2	A-OHM 5035-A30-2-4.0-8-C-4h6-R2-54	8			54	4	Na upit
6 / 3	SUP 110-6/3	A-OHM 5035-A30-2-6.0-10-C-6h6-R3-54	10			54	6	Na upit
8 / 4	SUP 110-8/4	A-OHM 5035-A30-2-8.0-12-C-8h6-R4-62	12			62	8	Na upit
10 / 5	SUP 110-10/5	A-OHM 5035-A30-2-10.0-14-C-10h6-R5-66	14			66	10	Na upit
12 / 6	SUP 110-12/6	A-OHM 5035-A30-2-12.0-16-C-12h6-R6-72	16			72	12	Na upit
14 / 7	SUP 110-14/7	A-OHM 5035-A30-2-14.0-18-C-14h6-R7-82	18			82	14	Na upit
16 / 8	SUP 110-16/8	A-OHM 5035-A30-2-16.0-20-C-16h6-R8-82	20			82	16	Na upit
18 / 9	SUP 110-18/9	A-OHM 5035-A30-2-18.0-25-C-18h6-R9-92	25			92	18	Na upit
20 / 10	SUP 110-20/10	A-OHM 5035-A30-2-20.0-28-C-20h6-R10-92	28			92	20	Na upit

Primjer narudzbe / SUP 110 - 12/6 - HB
Order Example / SUP 110 - 12/6 - HB

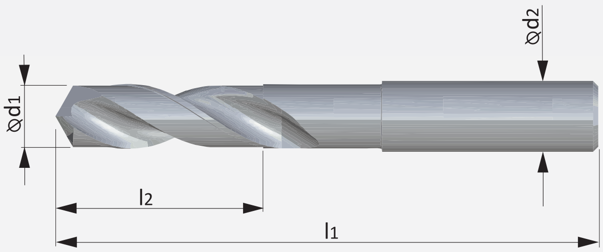
SUP - 120

Zabusivaci
Spot Drills

Konstrukcioni Podaci
- 2 rezne ostrice
- normalna izvedba
- ugao spirale 25 stepeni

Engineering data
- 2 cutting edge
- middle version
- helix angle 25 degrees

d1(h6)	tolerance
3 - 6	0 -0.008
6 - 10	0 -0.009
10 - 18	0 -0.011
18 - 24	0 -0.023



Material	Aluminij Alu	Celik Steel < 800 (N/mm2)	Celik Steel < 1200 (N/mm2)	Celik Steel < 1600 (N/mm2)	Celik Steel < 55 HRC	Celik Steel < 60 HRC	Celik Steel < 66 HRC	Inox Inox < 800 (N/mm2)	Inox Inox > 800 (N/mm2)	GG	GGG	Nemetal Nonmetall Cu - Leg.	Hladjenje emulzijom	Hladjenje vodenom maglom	Hladjenje zrakom
	○	●	●	●	●	○	○	○	○	○	○	○	●	○	○

F

∅d1 (h6)	Oznaka / Description	Sifra / Code	l2 (mm)	l3 (mm)	∅d3 (mm)	l1 (mm)	∅d2 h6 (mm)	Cijena / Price (KM)
4	SUP 120 - 4	A-NHM 2035-C30-2-4.0-16-C-4h6-R0-62	16			62	4	Na upit
6	SUP 120 - 6	A-NHM 2035-C30-2-6.0-17-C-6h6-R0-66	17			66	6	Na upit
8	SUP 120 - 8	A-NHM 2035-C30-2-8.0-22-C-8h6-R0-66	22			66	8	Na upit
10	SUP 120 - 10	A-NHM 2035-C30-2-10.0-26-C-10h6-R0-79	26			79	10	Na upit
12	SUP 120 - 12	A-NHM 2035-C30-2-12.0-30-C-12h6-R0-79	30			79	12	Na upit
14	SUP 120 - 14	A-NHM 2035-C30-2-14.0-32-C-14h6-R0-89	32			89	14	Na upit
16	SUP 120 - 16	A-NHM 2035-C30-2-16.0-34-C-16h6-R0-102	34			102	16	Na upit
18	SUP 120 - 18	A-NHM 2035-C30-2-18.0-38-C-18h6-R0-110	38			110	18	Na upit
20	SUP 120 - 20	A-NHM 2035-C30-2-20.0-40-C-20h6-R0-110	40			110	20	Na upit

Primjer narudzbe / SUP 120 - 12 - HA
Order Example / SUP 120 - 12 - HA

SUP - 130

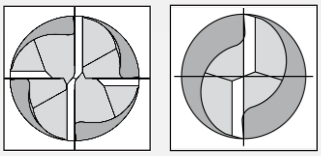
Gruba glodala - (2-4) flute
Rough Endmills (2 - 4) flutes

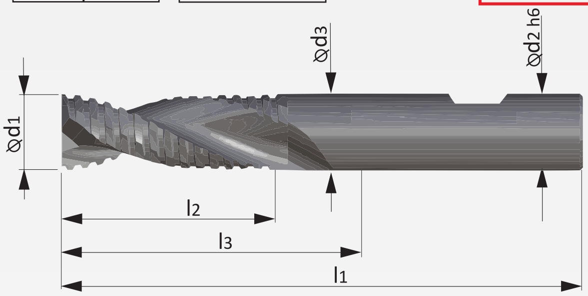
Konstrukcioni Podaci

- (2-4) rezne ostrice
- 2 centralne ostrice
- poluduga izvedba
- namijenjen za Grubu obradu
- ugao spirale 30 stepeni

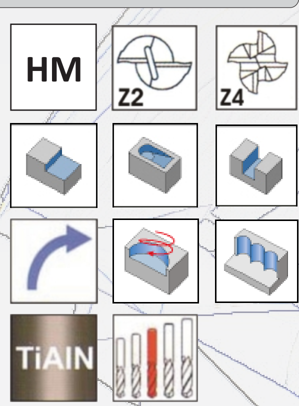
Engineering data

- (2-4) cutting edge
- 2 cutting edge in center
- middle version
- for rough machining
- helix angle - 30 degrees





d1 (e8)	tolerance	
3 - 6	-0.020	-0.032
6 - 10	-0.025	-0.040
10 - 18	-0.032	-0.050
18 - 30	-0.040	-0.061



Material	Aluminij Alu	Celik Steel < 800 (N/mm2)	Celik Steel < 1200 (N/mm2)	Celik Steel < 1600 (N/mm2)	Celik Steel < 55 HRC	Celik Steel < 60 HRC	Celik Steel < 66 HRC	Inox Inox < 800 (N/mm2)	Inox Inox > 800 (N/mm2)	GG	GGG	Nemetal Nonmetall Cu - Leg.	Hladjenje emulzijom	Hladjenje vodenom maglom	Hladjenje zrakom
	●	●	●	●	○	○	○	○	○	○	○	●	○	○	○

⌀d1 (e 8)	Oznaka Description	Sifra Code	l2 (mm)	l3 (mm)	⌀d3 (mm)	l1 (mm)	⌀d2 h6 (mm)	Cijena Price (KM)
6	SUP 130 - 06	A-IGHM-7035-A30-2-6.0-13-C-6h6-C0.2-57	13	19	5.5	57	6	Na upit
8	SUP 130 - 08	A-IGHM-7035-A30-2-8.0-19-C-8h6-C0.2-65	19	25	7.4	65	8	Na upit
10	SUP 130 - 10	A-IGHM-7035-A30-3-10.0-22-C-10h6-C0.2-72	22	30	9.2	72	10	Na upit
12	SUP 130 - 12	A-IGHM-7035-A30-3-12.0-26-C-12h6-C0.3-72	26	32	11	72	12	Na upit
14	SUP 130 - 14	A-IGHM-7035-A30-3-14.0-32-C-14h6-C0.3-83	32	40	12.7	83	14	Na upit
16	SUP 130 - 16	A-IGHM-7035-A30-4-16.0-36-C-16h6-C0.3-92	36	44	14.5	92	16	Na upit
18	SUP 130 - 18	A-IGHM-7035-A30-4-18.0-38-C-18h6-C0.35-92	38	48	16.2	92	18	Na upit
20	SUP 130 - 20	A-IGHM-7035-A30-4-20.0-40-C-20h6-C0.4-105	40	52	18	105	20	Na upit

G

Primjer narudzbe / SUP 130 - 12 - HB
Order Example / SUP 130 - 12 - HB

SUP - 140

Burgije bez hladjenja

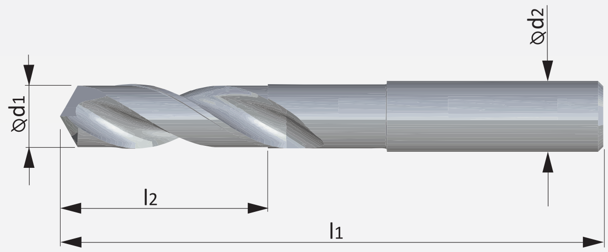
Solid Carbide Drills without coolant - 2 flutes

Konstrukcioni Podaci

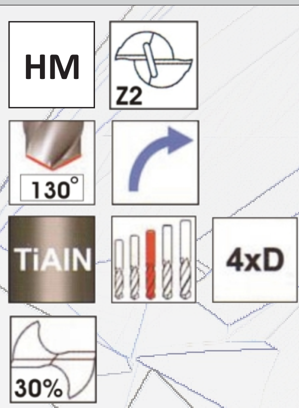
- 2 rezne ostrice
- bez hladjenja
- poluduga izvedba
- ugao spirale 30 stepeni

Engineering data

- 2 cutting edge
- without coolant
- middle version
- helix angle 30 degrees



d1(m7)	tolerance	
3 - 6	0.004	0.016
6 - 10	0.006	0.021
10 - 18	0.007	0.025
18 - 21	0.008	0.029



Material	Aluminij Alu	Celik Steel < 800 (N/mm2)	Celik Steel < 1200 (N/mm2)	Celik Steel < 1600 (N/mm2)	Celik Steel < 55 HRC	Celik Steel < 60 HRC	Celik Steel < 66 HRC	Inox Inox < 800 (N/mm2)	Inox Inox > 800 (N/mm2)	GG	GGG	Nemetal Nonmetall Cu - Leg.	Hladjenje emulzijom	Hladjenje vodenom maglom	Hladjenje zrakom
	○	●	●	●	●	○	○	○	○	●	●	○	●	○	○

⌀d1 (m7)	Oznaka / Description	Sifra / Code	l2 (mm)	l3 (mm)	⌀d3 (mm)	l1 (mm)	⌀d2 h6 (mm)	Cijena / Price (KM)
1.5	SUP 140 - 1.5	A-DHM 2035-A30-2-1.5-9-C-3h6-R0-32-P	9	15		32	3	Na upit
2	SUP 140 - 2	A-DHM 2035-A30-2-2.0-12-C-3h6-R0-38-P	12	17		38	3	Na upit
2.2	SUP 140 - 2.2	A-DHM 2035-A30-2-2.2-13-C-3h6-R0-40-P	13	18		40	3	Na upit
2.5	SUP 140 - 2.5	A-DHM 2035-A30-2-2.5-14-C-3h6-R0-43-P	14	19		43	3	Na upit
3	SUP 140 - 3	A-DHM 2035-A30-2-3.0-16-C-3h6-R0-46-P	16			46	3	Na upit
3.3	SUP 140 - 3.3	A-DHM 2035-A30-2-3.3-18-C-4h6-R0-49-P	18	24		49	4	Na upit
3.5	SUP 140 - 3.5	A-DHM 2035-A30-2-3.5-20-C-4h6-R0-52-P	20	26		52	4	Na upit
4	SUP 140 - 4	A-DHM 2035-A30-2-4.0-22-C-4h6-R0-55-P	22			55	4	Na upit
4.2	SUP 140 - 4.2	A-DHM 2035-A30-2-4.2-22-C-6h6-R0-55-P	22	28		55	6	Na upit
5	SUP 140 - 5	A-DHM 2035-A30-2-5.0-26-C-6h6-R0-62-P	26	32		62	6	Na upit
5.2	SUP 140 - 5.2	A-DHM 2035-A30-2-5.2-26-C-6h6-R0-62-P	26	32		62	6	Na upit
6	SUP 140 - 6	A-DHM 2035-A30-2-6.0-28-C-6h6-R0-66-P	28			66	6	Na upit
6.5	SUP 140 - 6.5	A-DHM 2035-A30-2-6.5-31-C-8h6-R0-70-P	31	37		70	8	Na upit
6.8	SUP 140 - 6.8	A-DHM 2035-A30-2-6.8-43-C-8h6-R0-82-P	43	49		82	8	Na upit
7	SUP 140 - 7	A-DHM 2035-A30-2-7.0-34-C-8h6-R0-74-P	34	40		74	8	Na upit
7.5	SUP 140 - 7.5	A-DHM 2035-A30-2-7.5-37-C-8h6-R0-74-P	37	44		74	8	Na upit
7.8	SUP 140 - 7.8	A-DHM 2035-A30-2-7.8-37-C-8h6-R0-79-P	37	44		79	8	Na upit
8	SUP 140 - 8	A-DHM 2035-A30-2-8.0-43-C-8h6-R0-79-P	43			79	8	Na upit
8.5	SUP 140 - 8.5	A-DHM 2035-A30-2-8.5-40-C-10h6-R0-82-P	40	47		82	10	Na upit
9	SUP 140 - 9	A-DHM 2035-A30-2-9.0-40-C-10h6-R0-82-P	40	47		82	10	Na upit
10	SUP 140 - 10	A-DHM 2035-A30-2-10.0-40-C-10h6-R0-82-P	40			82	10	Na upit
10.2	SUP 140 - 10.2	A-DHM 2035-A30-2-10.2-43-C-12h6-R0-89-P	43	51		89	12	Na upit
10.5	SUP 140 - 10.5	A-DHM 2035-A30-2-10.5-43-C-12h6-R0-89-P	43	51		89	12	Na upit
12	SUP 140 - 12	A-DHM 2035-A30-2-12.0-43-C-12h6-R0-105-P	43			105	12	Na upit
12.5	SUP 140 - 12.5	A-DHM 2035-A30-2-12.5-47-C-14h6-R0-110-P	47	59		110	14	Na upit
14	SUP 140 - 14	A-DHM 2035-A30-2-14.0-47-C-14h6-R0-124-P	47			124	14	Na upit

Primjer narudzbe / SUP 140 - 12 - HE

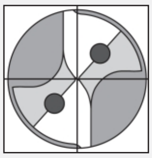
Order Example / SUP 140 - 12 - HE

SUP - 141

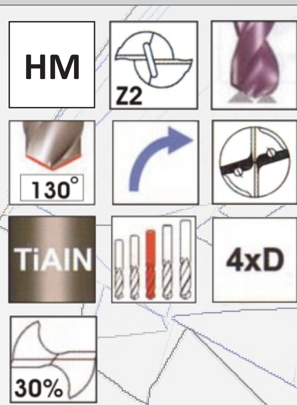
Burgije sa hladjenjem - 2 flute
Solid Carbide Drills with coolant - 2 flutes

Konstrukcioni Podaci

- 2 rezne ostrice
- interno hladjenje
- poluduga izvedba
- ugao spirale 30 stepeni

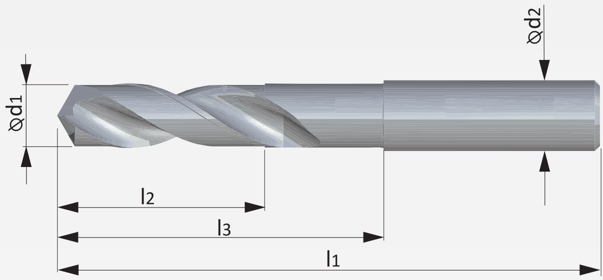


d1(m7)	tolerance	
3 - 6	0.004	0.016
6 - 10	0.006	0.021
10 - 18	0.007	0.025
18 - 21	0.008	0.029



Engineering data

- 2 cutting edge
- internal coolant
- middle version
- helix angle 30 degrees



Material	Aluminij Alu	Celik Steel < 800 (N/mm2)	Celik Steel < 1200 (N/mm2)	Celik Steel < 1600 (N/mm2)	Celik Steel < 55 HRC	Celik Steel < 60 HRC	Celik Steel < 66 HRC	Inox Inox < 800 (N/mm2)	Inox Inox > 800 (N/mm2)	GG	GGG	Nemetal Nonmetall Cu - Leg.	Hladjenje emulzijom	Hladjenje vodenom maglom	Hladjenje zrakom
	○	●	●	●	●	○	○	○	○	●	●	○	●	○	○

Ød1 (m7)	Oznaka / Description	Sifra / Code	l2 (mm)	l3 (mm)	Ød3 (mm)	l1 (mm)	Ød2 h6 (mm)	Cijena / Price (KM)
1.5	SUP 141 - 1.5	A-DCHM 2035-A30-2-1.5-9-C-3h6-R0-32-P	9	15		32	3	Na upit
2	SUP 141 - 2	A-DCHM 2035-A30-2-2.0-12-C-3h6-R0-38-P	12	17		38	3	Na upit
2.2	SUP 141 - 2.2	A-DCHM 2035-A30-2-2.2-13-C-3h6-R0-40-P	13	18		40	3	Na upit
2.5	SUP 141 - 2.5	A-DCHM 2035-A30-2-2.5-14-C-3h6-R0-43-P	14	19		43	3	Na upit
3	SUP 141 - 3	A-DCHM 2035-A30-2-3.0-16-C-3h6-R0-46-P	16			46	3	Na upit
3.3	SUP 141 - 3.3	A-DCHM 2035-A30-2-3.3-18-C-4h6-R0-49-P	18	24		49	4	Na upit
3.5	SUP 141 - 3.5	A-DCHM 2035-A30-2-3.5-20-C-4h6-R0-52-P	20	26		52	4	Na upit
4	SUP 141 - 4	A-DCHM 2035-A30-2-4.0-22-C-4h6-R0-55-P	22			55	4	Na upit
4.2	SUP 141 - 4.2	A-DCHM 2035-A30-2-4.2-22-C-6h6-R0-55-P	22	28		55	6	Na upit
5	SUP 141 - 5	A-DCHM 2035-A30-2-5.0-26-C-6h6-R0-62-P	26	32		62	6	Na upit
5.2	SUP 141 - 5.2	A-DCHM 2035-A30-2-5.2-26-C-6h6-R0-62-P	26	32		62	6	Na upit
6	SUP 141 - 6	A-DCHM 2035-A30-2-6.0-28-C-6h6-R0-66-P	28			66	6	Na upit
6.5	SUP 141 - 6.5	A-DCHM 2035-A30-2-6.5-31-C-8h6-R0-70-P	31	37		70	8	Na upit
6.8	SUP 141 - 6.8	A-DCHM 2035-A30-2-6.8-43-C-8h6-R0-82-P	43	49		82	8	Na upit
7	SUP 141 - 7	A-DCHM 2035-A30-2-7.0-34-C-8h6-R0-74-P	34	40		74	8	Na upit
7.5	SUP 141 - 7.5	A-DCHM 2035-A30-2-7.5-37-C-8h6-R0-74-P	37	44		74	8	Na upit
7.8	SUP 141 - 7.8	A-DCHM 2035-A30-2-7.8-37-C-8h6-R0-79-P	37	44		79	8	Na upit
8	SUP 141 - 8	A-DCHM 2035-A30-2-8.0-43-C-8h6-R0-79-P	43			79	8	Na upit
8.5	SUP 141 - 8.5	A-DCHM 2035-A30-2-8.5-40-C-10h6-R0-82-P	40	47		82	10	Na upit
9	SUP 141 - 9	A-DCHM 2035-A30-2-9.0-40-C-10h6-R0-82-P	40	47		82	10	Na upit
10	SUP 141 - 10	A-DCHM 2035-A30-2-10.0-40-C-10h6-R0-82-P	40			82	10	Na upit
10.2	SUP 141 - 10.2	A-DCHM 2035-A30-2-10.2-43-C-12h6-R0-89-P	43	51		89	12	Na upit
10.5	SUP 141 - 10.5	A-DCHM 2035-A30-2-10.5-43-C-12h6-R0-89-P	43	51		89	12	Na upit
12	SUP 141 - 12	A-DCHM 2035-A30-2-12.0-43-C-12h6-R0-105-P	43			105	12	Na upit
12.5	SUP 141 - 12.5	A-DCHM 2035-A30-2-12.5-47-C-14h6-R0-110-P	47	59		110	14	Na upit
14	SUP 141 - 14	A-DCHM 2035-A30-2-14.0-47-C-14h6-R0-124-P	47			124	14	Na upit

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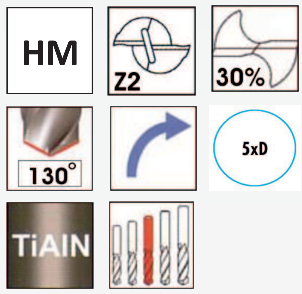
Primjer narudzbe / SUP 141 - 10 - HE
Order Example / SUP 141 - 10 - HE

SUP - 140

BURGIJE BEZ HLADJENJA - PREDMJERA ZA NAVOJ
DRILLS WITHOUT COOLANT - TAP DRILL SIZES

d1(m7)	tolerance	
3 - 6	0.004	0.016
6 - 10	0.006	0.021
10 - 18	0.007	0.025
18 - 21	0.008	0.029

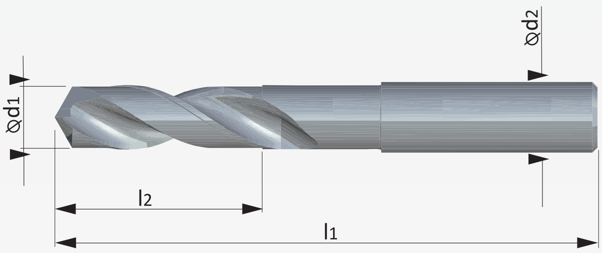


Konstrukcioni Podaci

- 2 rezne ostrice
- bez hladjenja
- poluduga izvedba
- ugao spirale 30 stepeni

Engineering data

- 2 cutting edge
- without coolant
- middle version
- helix angle 30 degrees



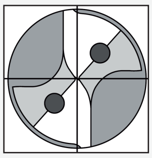
Material	Aluminij Alu	Celik Steel < 800 (N/mm2)	Celik Steel < 1200 (N/mm2)	Celik Steel < 1600 (N/mm2)	Celik Steel < 55 HRC	Celik Steel < 60 HRC	Celik Steel < 66 HRC	Inox Inox < 800 (N/mm2)	Inox Inox > 800 (N/mm2)	GG	GGG	Nemetal Nonmetall Cu - Leg.	Hladjenje emulzijom	Hladjenje vodenom maglom	Hladjenje zrakom
	○	●	●	●	●	○	○	○	○	●	●	○	●	○	○

H

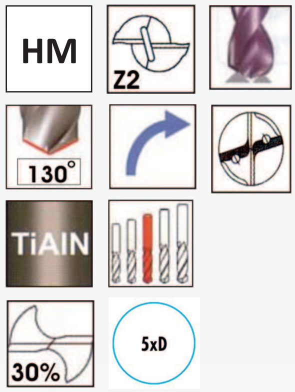
Ød1 (m7)	Oznaka / Description	Sifra / Code	Navoj / Thread	l2 (mm)	l1 (mm)	Ø d3 (mm)	Ø d2 (mm)	Cijena / Price (KM)
2.5	SUP 140-2.5	SUP 140-2.5 (Ap14)	**M3**	14	55		3	Na upit
3.3	SUP 140-3.3	SUP 140-3.3 (Ap18)	**M4**	18	55		4	Na upit
4.2	SUP 140-4.2	SUP 140-4.2 (Ap22)	**M5**	22	65		6	Na upit
5.0	SUP 140-5.0	SUP 140-5.0 (Ap26)	**M6**	26	72		5	Na upit
6.0	SUP 140-6.0	SUP 140-6.0 (Ap30)	**M7**	30	72		6	Na upit
6.8	SUP 140-6.8	SUP 140-6.8 (Ap34)	**M8**	34	82		8	Na upit
7.8	SUP 140-7.8	SUP 140-7.8 (Ap39)	**M9**	39	82		9	Na upit
8.5	SUP 140-8.5	SUP 140-8.5 (Ap43)	**M10**	43	92		10	Na upit
9.5	SUP 140-9.5	SUP 140-9.5 (Ap48)	**M11**	48	110		10	Na upit
10.2	SUP 140-10.2	SUP 140-10.2 (Ap51)	**M12**	51	110		12	Na upit
12.0	SUP 140-12.0	SUP 140-12.0 (Ap60)	**M14**	60	110		12	Na upit
13.0	SUP 140-13.0	SUP 140-13.0 (Ap65)	**M15**	65	120		13	Na upit
14.0	SUP 140-14.0	SUP 140-14.0 (Ap70)	**M16**	70	130		14	Na upit
15.5	SUP 140-15.5	SUP 140-15.5 (Ap78)	**M18**	78	135		16	Na upit
17.5	SUP 140-17.5	SUP 140-17.5 (Ap88)	**M20**	88	145		18	Na upit

SUP - 141

BURGIJE SA HLAĐENJEM - PREDMJERA ZA NAVOJ
DRILLS WITH COOLANT - TAP DRILL SIZES



d1(m7)	tolerance	
3 - 6	0.004	0.016
6 - 10	0.006	0.021
10 - 18	0.007	0.025
18 - 21	0.008	0.029

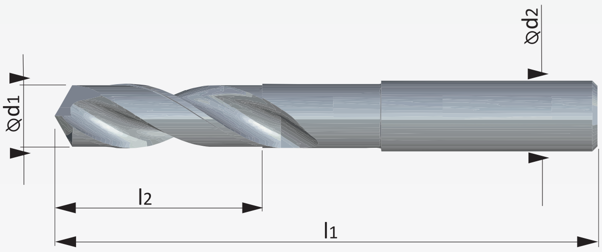


Konstrukcioni Podaci

- 2 rezne ostrice
- interno hladjenje
- izvedba 5D
- ugao spirale 30 stepeni

Engineering data

- 2 cutting edge
- internal coolant
- version 5D
- helix angle 30 degrees



Material	Aluminij Alu	Celik Steel < 800 (N/mm2)	Celik Steel < 1200 (N/mm2)	Celik Steel < 1600 (N/mm2)	Celik Steel < 55 HRC	Celik Steel < 60 HRC	Celik Steel < 66 HRC	Inox Inox < 800 (N/mm2)	Inox Inox > 800 (N/mm2)	GG	GGG	Nemetal Nonmetall Cu - Leg.	Hladjenje emulzijom	Hladjenje vodenom maglom	Hladjenje zrakom
	○	●	●	●	●	○	○	○	○	●	●	○	●	○	○

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Ød1 (m7)	Oznaka / Description	Sifra / Code	Navoj / Thread	l2 (mm)	l1 (mm)	Ød3 (mm)	Ød2 (mm)	Cijena / Price (KM)
2.5	SUP 141-2.5	SUP 141-2.5 (Ap14)	**M3**	14	55		3	Na upit
3.3	SUP 141-3.3	SUP 141-3.3 (Ap18)	**M4**	18	55		4	Na upit
4.2	SUP 141-4.2	SUP 141-4.2 (Ap22)	**M5**	22	65		6	Na upit
5.0	SUP 141-5.0	SUP 141-5.0 (Ap26)	**M6**	26	72		5	Na upit
6.0	SUP 141-6.0	SUP 141-6.0 (Ap30)	**M7**	30	72		6	Na upit
6.8	SUP 141-6.8	SUP 141-6.8 (Ap34)	**M8**	34	82		8	Na upit
7.8	SUP 141-7.8	SUP 141-7.8 (Ap39)	**M9**	39	82		9	Na upit
8.5	SUP 141-8.5	SUP 141-8.5 (Ap43)	**M10**	43	92		10	Na upit
9.5	SUP 141-9.5	SUP 141-9.5 (Ap48)	**M11**	48	110		10	Na upit
10.2	SUP 141-10.2	SUP 141-10.2 (Ap51)	**M12**	51	110		12	Na upit
12.0	SUP 141-12.0	SUP 141-12.0 (Ap60)	**M14**	60	110		12	Na upit
13.0	SUP 141-13.0	SUP 141-13.0 (Ap65)	**M15**	65	120		13	Na upit
14.0	SUP 141-14.0	SUP 141-14.0 (Ap70)	**M16**	70	130		14	Na upit
15.5	SUP 141-15.5	SUP 141-15.5 (Ap78)	**M18**	78	135		16	Na upit
17.5	SUP 141-17.5	SUP 141-17.5 (Ap88)	**M20**	88	145		18	Na upit

SUP - 142

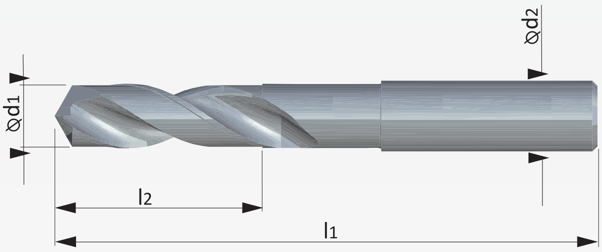
BURGIJE BEZ HLADJENJA - PREDMJERA INBUS VIJKA
DRILLS WITHOUT COOLANT - ALLEN SCREWS

Konstrukcioni Podaci

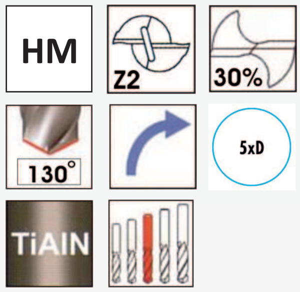
- 2 rezne ostrice
- bez hladjenja
- poluduga izvedba
- ugao spirale 30 stepeni

Engineering data

- 2 cutting edge
- without coolant
- middle version
- helix angle 30 degrees



d1(m7)	tolerance	
3 - 6	0.004	0.016
6 - 10	0.006	0.021
10 - 18	0.007	0.025
18 - 21	0.008	0.029



Material	Aluminij Alu	Celik Steel < 800 (N/mm2)	Celik Steel < 1200 (N/mm2)	Celik Steel < 1600 (N/mm2)	Celik Steel < 55 HRC	Celik Steel < 60 HRC	Celik Steel < 66 HRC	Inox Inox < 800 (N/mm2)	Inox Inox > 800 (N/mm2)	GG	GGG	Nemetal Nonmetall Cu - Leg.	Hladjenje emulzijom	Hladjenje vodenom maglom	Hladjenje zrakom
	○	●	●	●	●	○	○	○	○	●	●	○	●	○	○

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⌀d1 (m7)	Oznaka / Description	Sifra / Code	Radna Dužina / Cutting Lenght	l2 (mm)	l1 (mm)	⌀ d3 (mm)	⌀ d2 (mm)	Cijena / Price (KM)
7.0	SUP 142-7.0	SUP 142-7.0 (Ap35)	**5D**	35	82		8	Na upit
9.0	SUP 142-9.0	SUP 142-9.0 (Ap45)	**5D**	45	95		10	Na upit
11.0	SUP 142-11.0	SUP 142-11.0 (Ap55)	**5D**	55	110		12	Na upit
13.0	SUP 142-13.0	SUP 142-13.0 (Ap65)	**5D**	65	115		14	Na upit
15.0	SUP 142-15.0	SUP 142-15.0 (Ap78)	**5D**	78	135		16	Na upit
17.0	SUP 142-17.0	SUP 142-17.0 (Ap85)	**5D**	85	150		18	Na upit
7.0	SUP 142-7.0	SUP 142-7.0 (Ap56)	**8D**	56	110		8	Na upit
9.0	SUP 142-9.0	SUP 142-9.0 (Ap72)	**8D**	72	130		10	Na upit
11.0	SUP 142-11.0	SUP 142-11.0 (Ap88)	**8D**	88	150		12	Na upit
13.0	SUP 142-13.0	SUP 142-13.0 (Ap104)	**8D**	104	165		14	Na upit
15.0	SUP 142-15.0	SUP 142-15.0 (Ap120)	**8D**	120	175		16	Na upit
17.0	SUP 142-17.0	SUP 142-17.0 (Ap136)	**8D**	136	200		18	Na upit

SUP - 143

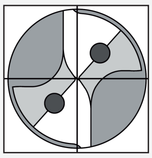
BURGIJE SA HLADJENJEM - PREDMJERA INBUS VIJKA
DRILLS WITH COOLANT - ALLEN SCREWS

Konstrukcioni Podaci

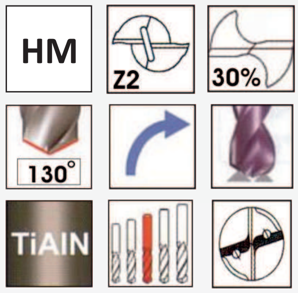
- 2 rezne ostrice
- interno hladjenje
- izvedba 5D i 8D
- ugao spirale 30 stepeni

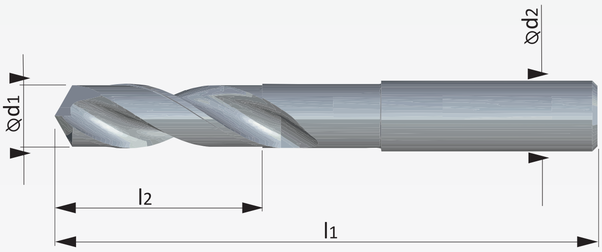
Engineering data

- 2 cutting edge
- internal coolant
- version 5D and 8D
- helix angle 30 degrees



d1(m7)	tolerance	
3 - 6	0.004	0.016
6 - 10	0.006	0.021
10 - 18	0.007	0.025
18 - 21	0.008	0.029





Material	Aluminij Alu	Celik Steel < 800 (N/mm2)	Celik Steel < 1200 (N/mm2)	Celik Steel < 1600 (N/mm2)	Celik Steel < 55 HRC	Celik Steel < 60 HRC	Celik Steel < 66 HRC	Inox Inox < 800 (N/mm2)	Inox Inox > 800 (N/mm2)	GG	GGG	Nemetal Nonmetall Cu - Leg.	Hladjenje emulzijom	Hladjenje vodenom maglom	Hladjenje zrakom
	○	●	●	●	●	○	○	○	○	●	●	○	●	○	○

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⌀d1 (m7)	Oznaka / Description	Sifra / Code	Radna Dužina / Cutting Lenght	l2 (mm)	l1 (mm)	⌀ d3 (mm)	⌀ d2 (mm)	Cijena / Price (KM)
7.0	SUP 143-7.0	SUP 143-7.0 (Ap35)	**5D**	35	82		8	Na upit
9.0	SUP 143-9.0	SUP 143-9.0 (Ap45)	**5D**	45	95		10	Na upit
11.0	SUP 143-11.0	SUP 143-11.0 (Ap55)	**5D**	55	110		12	Na upit
13.0	SUP 143-13.0	SUP 143-13.0 (Ap65)	**5D**	65	115		14	Na upit
15.0	SUP 143-15.0	SUP 143-15.0 (Ap78)	**5D**	78	135		16	Na upit
17.0	SUP 143-17.0	SUP 143-17.0 (Ap85)	**5D**	85	150		18	Na upit
7.0	SUP 143-7.0	SUP 143-7.0 (Ap56)	**8D**	56	110		8	Na upit
9.0	SUP 143-9.0	SUP 143-9.0 (Ap72)	**8D**	72	130		10	Na upit
11.0	SUP 143-11.0	SUP 143-11.0 (Ap88)	**8D**	88	150		12	Na upit
13.0	SUP 143-13.0	SUP 143-13.0 (Ap104)	**8D**	104	165		14	Na upit
15.0	SUP 143-15.0	SUP 143-15.0 (Ap120)	**8D**	120	175		16	Na upit
17.0	SUP 143-17.0	SUP 143-17.0 (Ap136)	**8D**	136	200		18	Na upit

SUP - 150

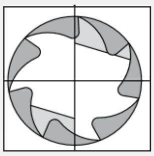
Standardni Razvrtaci
Standard Reamers

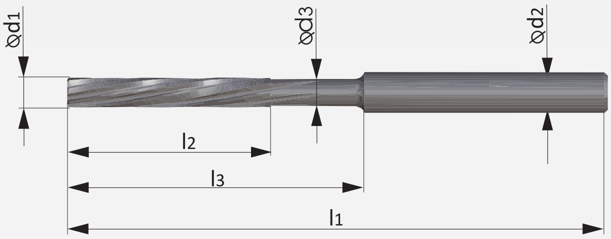
Konstrukcioni Podaci

- Izvedba sa tankom presvlakom
- namijenjen za zavrsnu obradu otvora
- 4-8 reznih ostrica
- h7 tolerancija
- ugao spirale / 10 stepeni

Engineering data

- design with thin coating
- Purpose for finish mashining
- 4 - 8 cutting edges
- h7 tolerance
- helix nagle / 10 degrees





D(h7)	tolerance	
3 - 6	0	-0.016
6 - 10	0	-0.021
10 - 18	0	-0.025
18 - 21	0	-0.029

HM

TiAlN

Material	Aluminij Alu	Celik Steel < 800 (N/mm2)	Celik Steel < 1200 (N/mm2)	Celik Steel < 1600 (N/mm2)	Celik Steel < 55 HRC	Celik Steel < 60 HRC	Celik Steel < 66 HRC	Inox Inox < 800 (N/mm2)	Inox Inox > 800 (N/mm2)	GG	GGG	Nemetal Nonmetall Cu - Leg.	Hladjenje emulzijom	Hladjenje vodenom maglom	Hladjenje zrakom
	○	●	●	●	●	○	○	○	○	●	●	○	●	○	○

Ød1 (h 7)	Oznaka / Description	Sifra / Code	l2 (mm)	l3 (mm)	Ød3 (mm)	l1 (mm)	Ød2 h6 (mm)	Cijena / Price (KM)
3	SUP 150 - 3	A-PHM 3035-H70-4-3.0-14-C-3h6-C0.15-45-P	14	20	2.7	45	3	Na upit
4	SUP 150 - 4	A-PHM 3035-H70-4-4.0-16-C-4h6-C0.15-45-P	16	22	3.5	45	4	Na upit
5	SUP 150 - 5	A-PHM 3035-H70-4-5.0-20-C-5h6-C0.2-55-P	20	26	4.5	55	5	Na upit
5	SUP 150 - 5	A-PHM 3035-H70-4-5.0-20-C-6h6-C0.2-55-P	20	26	4.5	55	6	Na upit
6	SUP 150 - 6	A-PHM 3035-H70-4-6.0-26-C-6h6-C0.25-60-P	26	32	5.4	60	6	Na upit
8	SUP 150 - 8	A-PHM 3035-H70-4-8.0-27-C-8h6-C0.25-63-P	27	33	7.2	63	8	Na upit
10	SUP 150 - 10	A-PHM 3035-H70-4-10.0-30-C-10h6-C0.35-72-P	30	38	9.2	72	10	Na upit
12	SUP 150 - 12	A-PHM 3035-H70-6-12.0-34-C-12h6-C0.4-82-P	34	42	11	82	12	Na upit
14	SUP 150 - 14	A-PHM 3035-H70-6-14.0-36-C-14h6-C0.5-82-P	36	42	13	82	14	Na upit
16	SUP 150 - 16	A-PHM 3035-H70-6-16.0-40-C-16h6-C0.6-92-P	40	48	14.8	92	16	Na upit
18	SUP 150 - 18	A-PHM 3035-H70-6-18.0-40-C-18h6-C0.6-92-P	40	48	15.6	92	18	Na upit
20	SUP 150 - 20	A-PHM 3035-H70-8-20.0-45-C-20h6-C0.8-105-P	45	55	17.4	105	20	Na upit
25	SUP 150 - 25	A-PHM 3035-H70-8-25.0-48-C-25h6-C0.8-110-P	48	58	22.2	110	25	Na upit

I

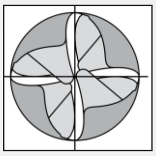
Primjer narudzbe / SUP 150 - 8 - HA - P
Order Example / SUP 150 - 8 - HA - P

SUP - 160

Loptasta Glodala - 4 flute
Solid Carbide Ball nose Endmills - 4 flutes

Konstrukcioni Podaci

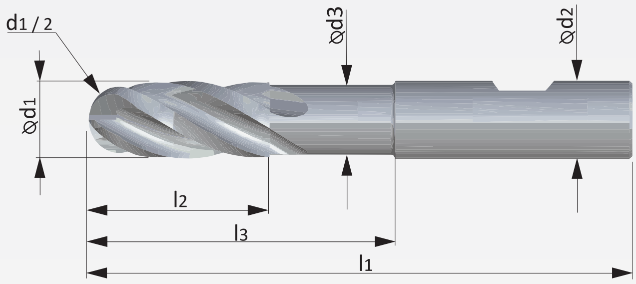
- 4 rezne ostrice
- 2 centralne ostrice
- poluduga izvedba
- namijenjen za profilnu obradu



d1 (e8)	tolerance	
3 - 6	-0.020	-0.032
6 - 10	-0.025	-0.040
10 - 18	-0.032	-0.050
18 - 30	-0.040	-0.061

Engineering data

- 4 cutting edge
- 2 cutting edge in center
- middle version
- for profiling machining



D

Material	Aluminij Alu	Celik Steel < 800 (N/mm2)	Celik Steel < 1200 (N/mm2)	Celik Steel < 1600 (N/mm2)	Celik Steel < 55 HRC	Celik Steel < 60 HRC	Celik Steel < 66 HRC	Inox Inox < 800 (N/mm2)	Inox Inox > 800 (N/mm2)	GG	GGG	Nemetal Nonmetall Cu - Leg.	Hladjenje emulzijom	Hladjenje vodenom maglom	Hladjenje zrakom
	○	●	●	●	●	○	○	○	○	●	●	○	●	○	○

Ød1 (e8)	Oznaka / Description	Sifra / Code	l2 (mm)	l3 (mm)	Ød3 (mm)	l1 (mm)	Ød2 h6 (mm)	Cijena / Price (KM)
3	SUP 160 - 3	A-OHM 5035-A30-2-3.0-5-C-4h6-R1.5-54-P	5	11	2.7	54	4	Na upit
4	SUP 160 - 4	A-OHM 5035-A30-2-4.0-5-C-4h6-R2-54-P	5	11	3.5	54	4	Na upit
5	SUP 160 - 5	A-OHM 5035-A30-2-5.0-9-C-5h6-R2.5-54-P	9	15	4.5	54	5	Na upit
5	SUP 160 - 5	A-OHM 5035-A30-2-5.0-9-C-6h6-R2.5-54-P	9	15	4.5	54	6	Na upit
6	SUP 160 - 6	A-OHM 5035-A30-2-6.0-10-C-6h6-R3-54-P	10	17	5.4	54	6	Na upit
8	SUP 160 - 8	A-OHM 5035-A30-2-8.0-12-C-8h6-R4-62-P	12	20	7.2	62	8	Na upit
10	SUP 160 - 10	A-OHM 5035-A30-2-10.0-14-C-10h6-R5-66-P	14	22	9.2	66	10	Na upit
12	SUP 160 - 12	A-OHM 5035-A30-2-12.0-16-C-12h6-R6-72-P	16	26	11	72	12	Na upit
14	SUP 160 - 14	A-OHM 5035-A30-2-14.0-20-C-14h6-R7-72-P	20	30	13	72	14	Na upit
16	SUP 160 - 16	A-OHM 5035-A30-2-16.0-20-C-16h6-R8-82-P	20	30	14.8	82	16	Na upit
18	SUP 160 - 18	A-OHM 5035-A30-2-18.0-25-C-18h6-R9-82-P	25	37	15.6	82	18	Na upit
20	SUP 160 - 20	A-OHM 5035-A30-2-20.0-26-C-20h6-R10-92-P	26	38	17.4	92	20	Na upit
25	SUP 160 - 25	A-OHM 5035-A30-2-25.0-30-C-25h6-R12.5-105-P	30	45	22.2	105	25	Na upit

Primjer narudzbe / SUP 160 - 10 - HA
Order Example / SUP 160 - 10 - HA

L

PARAMETRI OBRADE - SPIRALNA SVRDLA / Cutting Conditions - Spiral Drills

ISO	Material		Stanje Condition	Zat.cvrstoca Tenz.strenght N/mm^2	Tvrdoca Hardness HB	Mat. No.
P	Nelegirani celici i liveni celici / Non-alloy steel and cast steel , free cuting steel.	< 0.25% C	Annealed	420	125	1
		> 0.25% C	Annealed	650	190	2
		< 0.55% C	Quenched and tempered	850	250	3
		> 0.55% C	Annealed	750	220	4
			Quenched and tempered	1000	300	5
	Nisko legirani celici i liveni celici (manje od 5% legirajucih elemenata / Low-alloy steel and cast steel (less than 5% alloying elements)		Annealed	600	200	6
			Quenched and tempered	930	275	7
				1000	300	8
				1200	350	9
	Visokolegirani celici , liveni celici i alatni celici / High-alloyed steel ,cast steel tool steel.		Annealed	680	200	10
			Quenched and tempered	1100	325	11
M	Nehrdjajuci celici i liveni celici. / Stainless steel and cast steel		Ferritic / martensitic	680	200	12
			Martensitic	820	240	13
			Austenitic	600	180	14
K	Liveno gvozde- Nodular GGG / Cast iron - Nodular (GGG)		Ferritic / pearlitic		180	15
			Pearlitic		260	16
	Sivo liveno gvozdje (GG) / Grey Cast iron (GG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable liveno gvozdje (GG) / Grey Cast iron (GG)		Ferritic		130	19
			Pearlitic		230	20
N	Aluminijum / Aluminium		Non cureable		60	21
			Cured		100	22
	Aluminij livacke legure / Aluminium-cast Aloyed	< 12% Si	Non cureable		75	23
			Cured		90	24
		> 12% Si	High temperature		130	25
		> 1% Pb	Free cutting		110	26
	Bakarne legure / Copper alloys		Brass		90	27
			Electrolitic Copper		100	28
	Nemetali / Non metallic		Duroplastic , fiber plastics			29
			Hard rubber			30
S	Vatrootporne legure / High temp. Alloys	Fe based	Annealed		200	31
			Cured		280	32
	Super legure / Super Alloys	Ni or Co ba.	Annealed		250	33
			Cured		350	34
			Cast		320	35
	Titaniumske legure / Titanium Ti alloys			RM 400		36
			Alpha+beta alloys cured	RM 1050		37
H	Otvrdnuti celici / Hardened steel		Hardened		55 HRC	38
			Hardened		60 HRC	39
	Chilled cast iron		Cast		400	40
	Liveno gvozdje / Cast iron		Hardened		55 HRC	41

Rezna brzina Cuting speed Vc (m/min)	Precnik burgije / Dril diameter F (mm / o)				
	Ø3-5	Ø5-8	Ø8-12	Ø12-16	Ø16-20
70 - 105	0.08 - 0.15	0.12 - 0.19	0.16 - 0.23	0.16 - 0.26	0.2 - 0.3
70 - 95	0.08 - 0.15	0.12 - 0.19	0.16 - 0.23	0.16 - 0.26	0.2 - 0.3
60 - 85	0.08 - 0.16	0.12 - 0.21	0.16 - 0.26	0.16 - 0.28	0.2 - 0.31
60 - 75	0.08 - 0.14	0.12 - 0.19	0.16 - 0.23	0.16 - 0.26	0.2 - 0.32
50 - 70	0.08 - 0.14	0.12 - 0.19	0.16 - 0.23	0.16 - 0.26	0.2 - 0.32
40 - 60	0.08 - 0.16	0.12 - 0.21	0.16 - 0.26	0.2 - 0.28	0.2 - 0.34
50 - 70	0.08 - 0.16	0.12 - 0.21	0.14 - 0.26	0.2 - 0.28	0.2 - 0.34
40 - 60	0.08 - 0.12	0.10 - 0.16	0.11 - 0.19	0.13 - 0.23	0.15 - 0.25
20 - 40	0.04 - 0.07	0.045 - 0.11	0.045 - 0.13	0.06 - 0.15	0.07 - 0.16
70 - 95	0.12 - 0.19	0.16 - 0.27	0.2 - 0.34	0.24 - 0.38	0.28 - 0.42
65 - 80	0.12 - 0.19	0.16 - 0.27	0.2 - 0.34	0.24 - 0.38	0.28 - 0.42
60 - 75	0.09 - 0.16	0.12 - 0.19	0.16 - 0.26	0.2 - 0.31	0.24 - 0.35
60 - 270	0.08 - 0.19	0.12 -0.26	0.2 - 0.34	0.24 - 0.38	0.28 - 42
55 - 165					
60 - 270	0.05 - 0.14	0.09 - 0.18	0.16 - 0.26	0.2 - 0.33	0.24 - 0.38
15 - 40	0.025 - 0.06	0.03 - 0.075	0.05 - 0.095	0.06 - 0.115	0.07 - 0.14
25 - 45	0.04 - 0.08	0.05 - 0.09	0.07 - 0.11	0.09 - 0.12	0.11 - 0.14

REDUKCIJA REZIMA OBRADE / REDUCTION CUTING CONDITIONS

Kp - parametar presvlake
Kp - coating parametar
Kp= 1.0 - without coat
Kp= 1.2 - with coat

Kd - parametar dub.busenja
Kd - dril depth parametar
Kd (1D)= 1.1
Kd (3D)= 0.9
Kd (5D)= 0.8
Kd (8D)= 0.7

Kh - parametar hladjenja
Kh - colant parametar
Kh = 0.9 - without coolant
Kh = 1 - with coolant

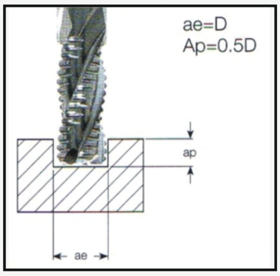
Vc =Vct x Kd x Kp x Kh

PARAMETRI OBRADE - GRUBA GLODALA / Cutting Conditions - Rough Endmills

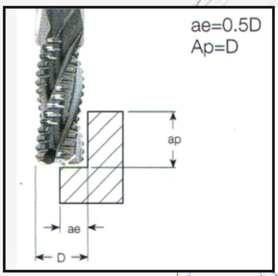
ISO	Material		Stanje Condition	Zat.cvrstoca Tenz.strenght N/mm^2	Tvrdoca Hardness HB	Mat. No.
P	Nelegirani celici i liveni celici Non-alloy steel and cast steel , free cuting steel.	< 0.25% C	Annealed	420	125	1
		> 0.25% C	Annealed	650	190	2
		< 0.55% C	Quenched and tempered	850	250	3
		> 0.55% C	Annealed	750	220	4
			Quenched and tempered	1000	300	5
	Nisko legirani celici i liveni celici (manje od 5% legirajucih elemenata Low-alloy steel and cast steel (less than 5% alloying elements)		Annealed	600	200	6
			Quenched and tempered	930	275	7
				1000	300	8
				1200	350	9
	Visokolegirani celici , liveni celici i alatni celici High-alloyed steel ,cast steel tool steel.		Annealed	680	200	10
			Quenched and tempered	1100	325	11
M	Nehrdjajuci celici i liveni celici. Stainless steel and cast steel		Ferritic / martensitic	680	200	12
			Martensitic	820	240	13
			Austenitic	600	180	14
K	Liveno gvozde- Nodular GGG Cast iron - Nodular (GGG)		Ferritic / pearlitic		180	15
			Pearlitic		260	16
	Sivo liveno gvozdje (GG) Grey Cast iron (GG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable liveno gvozdje (GG) Grey Cast iron (GG)		Ferritic		130	19
			Pearlitic		230	20
N	Aluminijum Aluminium		Non cureable		60	21
			Cured		100	22
	Aluminij livacke legure Aluminium-cast Aloyed	< 12% Si	Non cureable		75	23
			Cured		90	24
		> 12% Si	High temperature		130	25
	Bakarne legure Copper alloys	> 1% Pb	Free cutting		110	26
			Brass		90	27
			Electrolitic Copper		100	28
	Nemetali Non metallic		Duroplastic , fiber plastics			29
			Hard rubber			30
S	Vatrootporne legure High temp. Alloys	Fe based	Annealed		200	31
			Cured		280	32
	Super legure Super Alloys	Ni or Co ba.	Annealed		250	33
			Cured		350	34
			Cast		320	35
	Titaniumske legure Titanium Ti alloys			RM 400		36
			Alpha+beta alloys cured	RM 1050		37
H	Otvrdnuti celici Hardened steel		Hardened		55 HRC	38
			Hardened		60 HRC	39
	Chilled cast iron		Cast		400	40
	Liveno gvozdje Cast iron		Hardened		55 HRC	41

L

Brzina rezanja / Cutting Speed	
Vmin (m/min)	Vmax (m/min)
155	170
120	150
95	115
95	110
85	100
95	115
75	85
75	95
85	100
78	100
50	65
65	120
35	95
48	72
50	155
80	145
90	160
55	165
90	165
85	145
405	420
365	415
400	420
365	415
160	170
200	215
200	215
135	150
20	40
20	30
20	30
20	30
30	70
30	70
30	70
30	50
30	40
50	70
30	50



D(mm)	Fz(min)	Fz(max)
1	0.006	0.01
1.3	0.006	0.02
1.5	0.006	0.04
1.8	0.01	0.05
2	0.01	0.06
2.3	0.01	0.06
2.5	0.01	0.06
2.8	0.02	0.07
3	0.02	0.08
3.3	0.02	0.08
4	0.03	0.09
4.3	0.04	0.09
5	0.05	0.10
6	0.06	0.12
7	0.06	0.14
8	0.06	0.16
9	0.06	0.16
10	0.07	0.18
12	0.08	0.20
14	0.10	0.22
16	0.10	0.24
18	0.10	0.26
20	0.12	0.30



D(mm)	Fz(min)	Fz(max)
1	0.006	0.014
1.3	0.006	0.024
1.5	0.006	0.044
1.8	0.01	0.056
2	0.01	0.066
2.3	0.01	0.066
2.5	0.01	0.066
2.8	0.02	0.076
3	0.02	0.088
3.3	0.02	0.088
4	0.03	0.098
4.3	0.04	0.098
5	0.05	0.110
6	0.06	0.132
7	0.06	0.154
8	0.06	0.176
9	0.06	0.176
10	0.07	0.196
12	0.08	0.216
14	0.10	0.238
16	0.10	0.260
18	0.10	0.280
20	0.12	0.340

L

PARAMETRI OBRADE - SPIRALNA GLODALA / Cutting Conditions - Spiral Endmills

ISO	Material		Stanje Condition	Zat.cvrstoca Tenz.strenght N/mm^2	Tvrdoca Hardness HB	Mat. No.
P	Nelegirani celici i liveni celici Non-alloy steel and cast steel , free cuting steel.	< 0.25% C	Annealed	420	125	1
		> 0.25% C	Annealed	650	190	2
		< 0.55% C	Quenched and tempered	850	250	3
		> 0.55% C	Annealed	750	220	4
			Quenched and tempered	1000	300	5
	Nisko legirani celici i liveni celici (manje od 5% legirajucih elemenata Low-alloy steel and cast steel (less than 5% alloying elements)		Annealed	600	200	6
			Quenched and tempered	930	275	7
				1000	300	8
				1200	350	9
	Visokolegirani celici , liveni celici i alatni celici		Annealed	680	200	10
	High-alloyed steel ,cast steel tool steel.		Quenched and tempered	1100	325	11
M	Nehrdjajuci celici i liveni celici. Stainless steel and cast steel		Ferritic / martensitic	680	200	12
			Martensitic	820	240	13
			Austenitic	600	180	14
K	Liveno gvozde- Nodular GGG Cast iron - Nodular (GGG)		Ferritic / pearlitic		180	15
			Pearlitic		260	16
	Sivo liveno gvozdje (GG) Grey Cast iron (GG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable liveno gvozdje (GG) Grey Cast iron (GG)		Ferritic		130	19
			Pearlitic		230	20
N	Aluminijum Aluminium		Non cureable		60	21
			Cured		100	22
	Aluminij livacke legure Aluminium-cast Aloyed	< 12% Si	Non cureable		75	23
			Cured		90	24
		> 12% Si	High temperature		130	25
	Bakarne legure Copper alloys	> 1% Pb	Free cutting		110	26
			Brass		90	27
			Electrolitic Copper		100	28
L	Nemetali Non metallic		Duroplastic , fiber plastics			29
			Hard rubber			30
S	Vatrootporne legure High temp. Alloys	Fe based	Annealed		200	31
			Cured		280	32
	Super legure Super Alloys	Ni or Co ba.	Annealed		250	33
			Cured		350	34
			Cast		320	35
	Titaniumske legure Titanium Ti alloys			RM 400		36
			Alpha+beta alloys cured	RM 1050		37
H	Otvrdnuti celici Hardened steel		Hardened		55 HRC	38
			Hardened		60 HRC	39
	Chilled cast iron		Cast		400	40
	Liveno gvozdje Cast iron		Hardened		55 HRC	41

Brzina rezanja / Cutting Speed	
Vmin (m/min)	Vmax (m/min)
130	140
100	115
85	95
85	95
70	80
85	95
60	70
65	75
70	80
65	80
35	45
60	100
35	90
40	60
40	130
65	120
75	135
40	135
75	135
65	120
335	350
305	345
335	350
305	345
135	140
165	175
165	175
115	125
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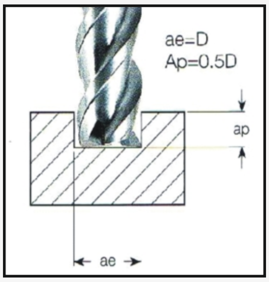
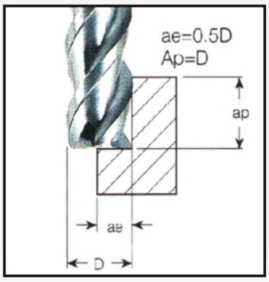
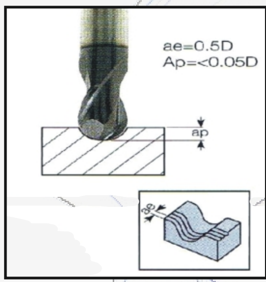
30	40
50	60
30	40







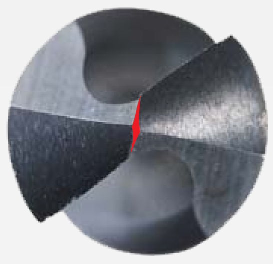
D(mm)	Fz(min)	Fz(max)
1	0.003	0.005
1.3	0.003	0.010
1.5	0.003	0.020
1.8	0.005	0.025
2	0.005	0.030
2.3	0.005	0.030
2.5	0.005	0.030
2.8	0.01	0.035
3	0.01	0.040
3.3	0.015	0.040
4	0.015	0.045
4.3	0.02	0.045
5	0.025	0.050
6	0.03	0.060
7	0.03	0.070
8	0.03	0.080
9	0.03	0.080
10	0.035	0.090
12	0.04	0.10
14	0.05	0.11
16	0.05	0.12
18	0.05	0.13
20	0.06	0.15

D(mm)	Fz(min)	Fz(max)
1	0.006	0.007
1.3	0.006	0.012
1.5	0.006	0.022
1.8	0.01	0.028
2	0.01	0.033
2.3	0.01	0.033
2.5	0.01	0.030
2.8	0.02	0.038
3	0.02	0.044
3.3	0.02	0.044
4	0.03	0.049
4.3	0.04	0.049
5	0.05	0.055
6	0.06	0.066
7	0.06	0.077
8	0.06	0.088
9	0.06	0.088
10	0.07	0.098
12	0.08	0.108
14	0.10	0.119
16	0.10	0.130
18	0.10	0.140
20	0.12	0.170

L

Problemi pri obradi sa reznim alatima i njihovo otklanjanje
Manufactiring problems with cuting tools and their eliminates

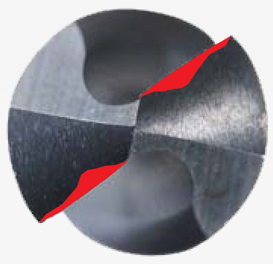
KRZANJE VRHA SVRDLA



Chipping on the chisel edge

Uzrok / Reason	Otklanjanje /Removal
LOŠE STEZANJE ALATA Bad clamping tool	PROVJERITI STEZANJE, KORISTITI HIDRAULICKI PRIHVAT ILI PRIHVAT SA TOPLINSKIM STEZANJEM Check clamping, use hidraulic chuck, power chuck or temperature chuck
BACANJE VRHA ALATA Chisel runout	PROVJERITI STEZANJE I PO POTREBI ZAMIJENITI STEZNU CAHURU Check clamping or replace the clamping adaptation
POMICANJE OBRATKA Workpiece movement	POVEĆATI SILU STEZANJA OBRATKA Increase workpiece chucking force
NEPRIKLADNI UVJETI BUŠENJA Unsuitable conditions	SMANJITI POSMAK Decrease feed rate

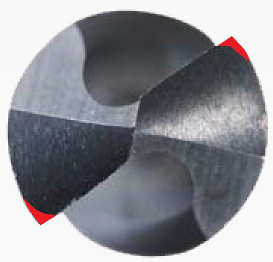
KRZANJE REZNIH RUBOVA



Chipping on the cutting edges

Uzrok / Reason	Otklanjanje /Removal
LOŠE STEZANJE ALATA Bad clamping tool	PROVJERITI STEZANJE, KORISTITI HIDRAULICKI PRIHVAT ILI PRIHVAT SA TOPLINSKIM STEZANJEM Check clamping, use hidraulic chuck, power chuck or temperature chuck
NEPRIKLADNI UVJETI BUŠENJA Unsuitable conditions	POVEĆATI REZNU BRZINU Increase cutting speed
SLABO HLAĐENJE Insuffient coolant	PROVJERITI STANJE SREDSTAVA ZA HLAĐENJE, POVEĆATI PRITISAK.U SLUČAJU VANJSKOG HLADJENJA PODESITI MLAZNICE I PO POTREBI DODATI NOVE Check cooling lubricant. Increase cooling preassure. In the case of external coolant supply, improve jet direction and add cooling jet.

POJAČANO HABANJE VRSNIH RUBOVA

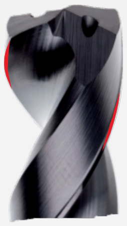


Excessive wear on the cutting corners

Uzrok / Reason	Otklanjanje /Removal
LOŠE STEZANJE ALATA Bad clamping tool	PROVJERITI STEZANJE, KORISTITI HIDRAULICKI PRIHVAT ILI PRIHVAT SA TOPLINSKIM STEZANJEM Check clamping, use hidraulic chuck, power chuck or temperature chuck
NEPRIKLADNI UVJETI BUŠENJA Unsuitable conditions	SMANJITI REZNU BRZINU , POVEĆATI POSMAK Reduce cutting speed, increase feed rate.
SLABO HLAĐENJE Insuffient coolant	PROVJERITI STANJE SREDSTAVA ZA HLAĐENJE, POVEĆATI PRITISAK.U SLUČAJU VANJSKOG HLADJENJA PODESITI MLAZNICE I PO POTREBI DODATI NOVE Check cooling lubricant. Increase cooling preassure. In the case of external coolant supply, improve jet direction and add cooling jet.

Problemi pri obradi sa reznim alatima i njihovo otklanjanje
Manufactiring problems with cuting tools and their eliminates

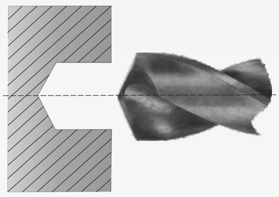
KRZANJE SPIRALE



Chipping on the lands

Uzrok / Reason	Otklanjanje /Removal
LOŠE HLAĐENJE Insufficient coolant	PROVJERITI SRED. ZA HLAĐENJE, POVEĆATI PRITISAK I KOLIČINU SREDSTVA ZA HLAĐENJE NA ALAT Check cooling lubricant. Increase coolant preassure. In the case supply improve yet direction and add cooling yets.
POGREŠAN IZBOR ALATA Wrong drill	PROVJERITI TIP ALATA, DUBINU BUŠENJA, HLAĐENJE I OBRADNI MATERIJAL Check drill type, drill depth, cooling system and material
POMICANJE OBRATKA Workpiece movement	POVEĆATI SILU STEZANJA OBRATKA Increase workpiece chucking force
NEPRIKLADNI UVJETI BUŠENJA Unsuitable conditions	SMANJITI POSMAK Decrease feed rate

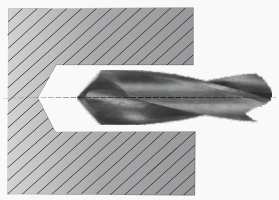
PREČNIK OTVORA PREMALI



Hole size too small

Uzrok / Reason	Otklanjanje /Removal
ISTROŠEN ALAT Wrong out drill	NAOŠTRITI ALAT Regrinding cutting edge,
NEPRIKLADNI UVJETI BUŠENJA Unsuitable conditions	POVEĆATI REZNU BRZINU, SMANJITI POSMAK. PROVJERIT PREČNIK SVRDLA Reduce cutting speed, decrease feed. Check cuting edge dia.
SLABO HLAĐENJE Insuffient coolant	PROVJERITI STANJE SREDSTAVA ZA HLAĐENJE, POVEĆATI PRITISAK.U SLUČAJU VANJSKOG HLADJENJA PODESITI MLAZNICE I PO POTREBI DODATI NOVE Check cooling lubricant. Increase cooling preassure. In the case of external coolant supply, improve jet direction and add cooling jet.

PREČNIK OTVORA PREVELIKI



Hole size too large

Uzrok / Reason	Otklanjanje /Removal
LOŠE STEZANJE ALATA Bad clamping tool	PROVJERITI STEZANJE, KORISTITI HIDRAULICKI PRIHVAT ILI PRIHVAT SA TOPLINSKIM STEZANJEM Check clamping, use hidraulic chuck, power chuck or temperature chuck
NEPRIKLADNI UVJETI BUŠENJA Unsuitable conditions	POVEĆATI REZNU BRZINU ILI SMANJITI POSMAK Reduce cutting speed, decrease feed rate.
ISTROŠEN ALAT Insuffient coolant	NAOŠTRITI ALAT Regrind cutting edge

Supfina

Razvoj , konstrukcija , izrada i oštrenje
reznog alata iz tvrdog metala

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