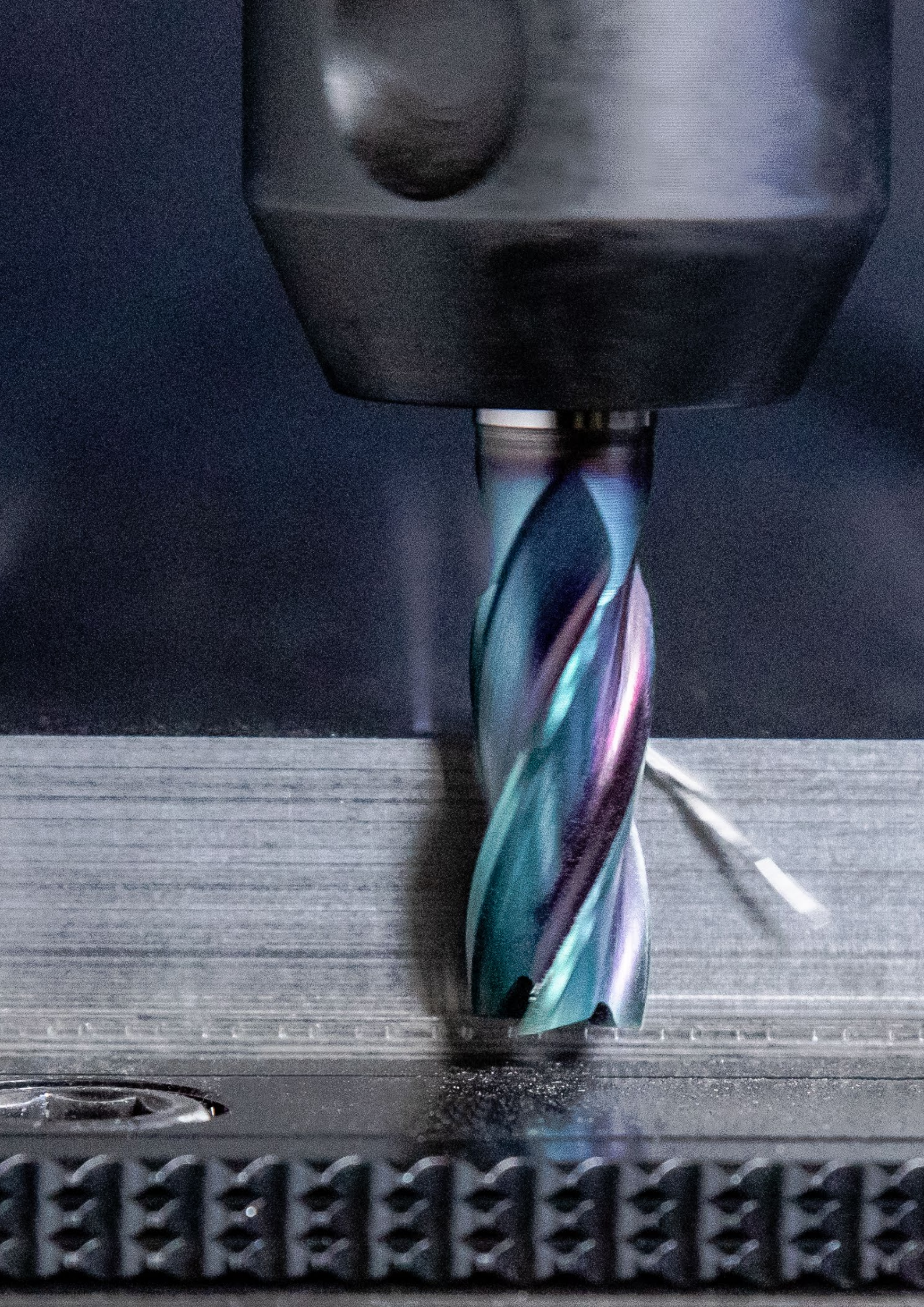




Găurire în plin şi prelucrare alezaje

1 Burghie HSS

2 Burghie monobloc din carburi metalice

3 Burghie cu plăcuțe amovibile

4 Alezoare şi şanfrenoare

5 Scule pentru strunjire interioară

Prelucrare filete

6 Tarozi și formatori filet

7 Freze circulare şi de filetare

8 Scule de filetare

Prelucrare prin strunjire

9 Scule de strung cu plăcuțe amovibile

10 Scule multifuncționale – EcoCut și FreeTurn

11 Scule pentru debitare şi canelare

12 Scule de strung miniaturale

Prelucrare prin frezare

13 Freze HSS

14 Freze din carbură solidă

15 Freze cu plăcuțe amovibile

Catalog pentru tehnologii de prindere

16 Portscule și accesorii

17 Prindere piese

18 Exemple de materiale şi numere de articol

Cuprins

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Toolfinder	3
Prezentare cuprins	4+5
Program de produse	6–38
Informații tehnice:	
Date de așchiere	39–47
Formule de calcul pentru parametrii de așchiere	47
Descrierea tipurilor	48
Acoperire	48

WNT \ Performance

Scule de calitate premium pentru cea mai bună performanță.

Sculele de calitate premium din linia de produse **WNT Performance** au fost concepute pentru aplicații speciale și se disting prin performanța lor remarcabilă. Dacă în producția Dumneavoastră aveți cerințe superioare cu privire la performanță și doriți să obțineți cele mai bune rezultate, atunci vă recomandăm sculele premium din această linie de produse.

Legendă

Coadă



Forma coadă



Lungime:
extra scurt / scurt / medie / lung / extra lung



Teșire



Ascuțit



Teșirea muchiei (CHW = lățimrea teșirii în mm)



Rază plină



Utilizare



Exemplu de prelucrare



Săgețile roșii arată direcția avansurilor posibile



Număr dinți



Geometrie tăiș
λ_s = unghiul elicei
γ_s = unghiul de degajare

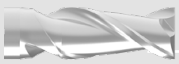
● = **Utilizare principală**
○ = Utilizare secundară

Toolfinder

mai tenace — Materialul de prelucrat: — mai dur

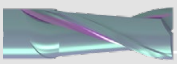
Frezare de finisare

W


6+7


37

N


8–15


25

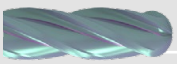

28+29


31


33+34


37

H

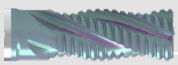

26


32

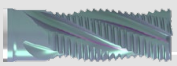

35+36

Degroșare finisare

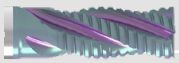
NTI


16

HS


18

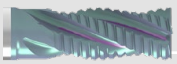
NF


17


30

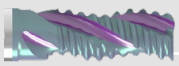

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HF

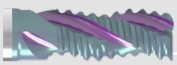

19

Degroșare

WR

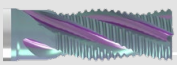

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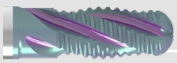
NR


21+22


38

HR

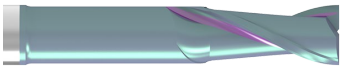
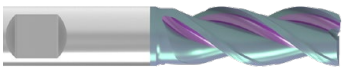
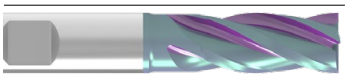
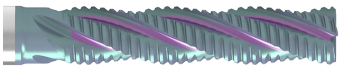
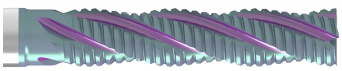
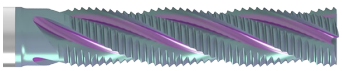
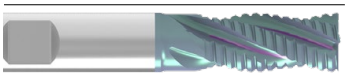
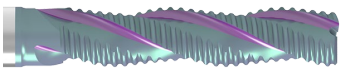
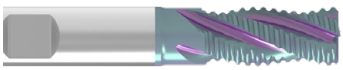
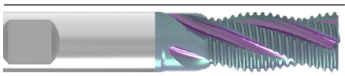

23+24


27

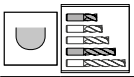
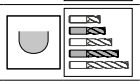
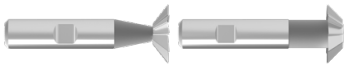
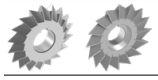
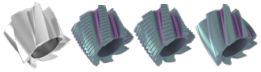

38

13

Prezentare freze HSS

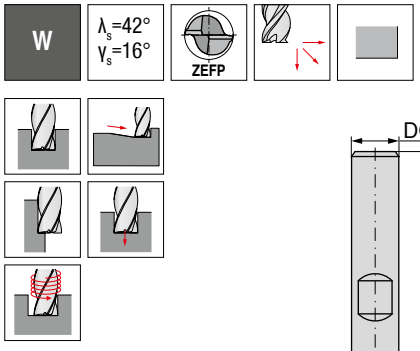
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Freze de finisare																			
	W	2	2–22				●			●	■				■	HSS-E		□	6
	W	3–4	2–40				●			●	■				■	HSS-E		□	7
	N	2	1–26	●	●	●	○	○		○	■				■	HSS-E	■	□	8+9
	N	3	1–10	●	●	●	○	●		○	■				■	HSS-E	■	□	10
	N	3	1,8–24,7	●	●	●	○	○		○	■				■	HSS-E	■	□	11+12
	N	4–5	4–25	○	●	○	●	●		●	■				■	HSS-E	■	□	13
	N	4–8	2–50	●	●	●	○	○		○	■				■	HSS-E	■	□	14+15
Freze deget de degroșare-finisare																			
	NTI	4–6	6–40	●	●	○	○	●		○		■			■	PM	■		16
	NF	4–5	6–28	●	○	●	○	○		○	■				■	HSS-E	■		17
	HS	4–6	6–40	○		●		●		○		■			■	PM	■		18
	HF	4	6–25	●	○	●	○	○		○	■				■	PM	■		19
Freze de degroșare																			
	WR	3	6–32				●			●	■				■	HSS-E	■		20
	NR	3	6–25	●	○	●	○	○		○		■			■	HSS-E	■	□	21
	NR	4–6	6–40	●	○	●	○	○		○		■			■	HSS-E	■	□	22
	HR	4–6	6–32	●	●	●	○	○		○		■			■	PM	■		23
	HR	3–6	4–32	●	●	●	○	○		○		■			■	HSS-E	■	□	24

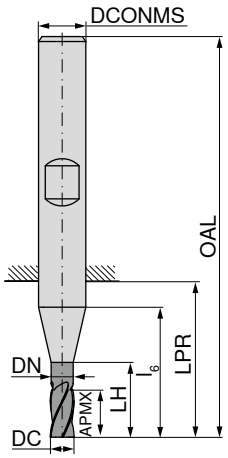
Prezentare freze HSS

	Tip sculă	Număr dinți ZEFP	Diametru în mm Ø DC	Oțel P	Inoxidabil M	Fontă K	Metale neferoase N	Termorezistent S	Oțel călit H	Materiale nemetalice O	Ascuțit	Teșire	Rază la colț	Rază plină	Lungime	Material, ex. PM = oțel sinterizat	acoperit	neacoperit	
Freze cu frontal sferic																			
	N	2	2–30	●	○	●	○	○		○						HSS-E	■	□	25
	H	4–5	6–25	●	○	●	○	○		○						HSS-E	■	□	26
	HR	4	6–20	●	○	●	○	○		○						HSS-E	■		27
Freze de profil / disc / cilindro-frontale																			
	N	6–10	11–60	●	○	●	○	○		○						HSS-E		□	28
	N	6–12	10,5–45,5	●	○	●	○	○		○						HSS-E		□	29
	NF	6–8	21–45	●	○	●	○	○		○						HSS-E		□	30
	N	4–6	6–16	●	○	●	○	○		○						HSS-E		□	31
	H	10	16–25	●	○	●	○	○		○						HSS-E		□	32
	N	14–28	40–125	●	○	●	○	○		○						HSS-E		□	33
		12–52	50–160	●	●	●	●	●		●						HSS-E		□	34–36
		6–12	40–100	●	●	●	●	○		●						HSS-E	■	□	37+38

13

Freză deget, HSS-E Co 8









DIN 844

B

50 144 ...

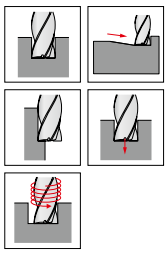
DC e8 mm	APMX mm	DN mm	LH mm	l6 mm	LPR mm	OAL mm	DCONMS h6 mm	ZEFP	EUR U6	
2,0	7		7	13	15	51	6	2	21,94	**020**
2,5	8		8	14	16	52	6	2	21,94	**025**
3,0	8		8	14	16	52	6	2	21,94	**030**
3,5	10		10	16	18	54	6	2	21,94	**035**
4,0	11		11	17	19	55	6	2	21,94	**040**
4,5	11		11	17	19	55	6	2	21,94	**045**
5,0	13		13	19	21	57	6	2	21,94	**050**
5,5	13		13	19	21	57	6	2	21,94	**055**
6,0	13		13	19	21	57	6	2	21,94	**060**
6,5	16	6,0	22	24	26	66	10	2	29,57	**065**
7,0	16	6,5	22	24	26	66	10	2	29,57	**070**
8,0	19	7,5	25	27	29	69	10	2	29,57	**080**
9,0	19	8,5	26	27	29	69	10	2	29,57	**090**
10,0	22	9,5	30	30	32	72	10	2	29,57	**100**
12,0	26	11,5	36	36	38	83	12	2	39,08	**120**
14,0	26	11,5	36	36	38	83	12	2	43,45	**140**
16,0	32	15,0	42	42	44	92	16	2	52,50	**160**
18,0	32	15,0	42	42	44	92	16	2	64,61	**180**
20,0	38	19,0	52	52	54	104	20	2	77,94	**200**
22,0	38	19,0	52	52	54	104	20	2	124,50	**220**

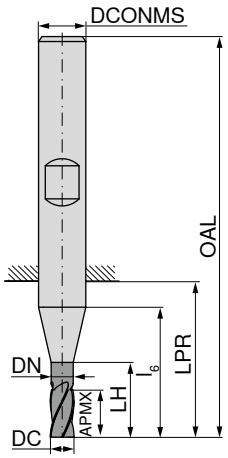
P	
M	
K	
N	●
S	
H	
O	●

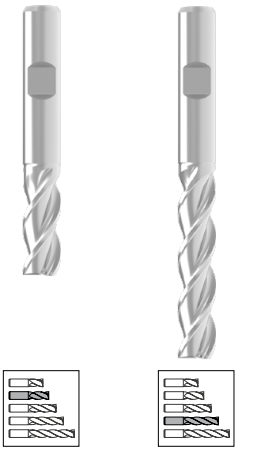
→ v_c/f_z pagina: 40–42

Freză deget, HSS-E Co 8







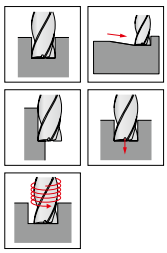


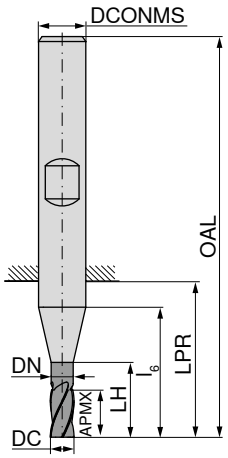
									DIN 69844		DIN 844	
									B		B	
									50 120 ...		50 121 ...	
DC k10 mm	APMX mm	DN mm	LH mm	l_6 mm	LPR mm	OAL mm	DCONMS h6 mm	ZEFP	EUR U8		EUR U8	
2	7		7	13	15	51	6	3	37,99	020		
3	8		8	14	16	52	6	3	36,45	030		
3	12		12	18	20	56	6	3			41,58	030
4	11		11	17	19	55	6	3	30,79	040		
4	19		19	25	27	63	6	3			42,67	040
5	13		13	19	21	57	6	3	30,79	050		
5	24		24	30	32	68	6	3			42,67	050
6	13	5,5	19	19	21	57	6	3	32,64	060		
6	24	5,5	30	30	32	68	6	3			40,49	060
7	16	6,5	22	24	26	66	10	3	43,12	070		
7	30	6,5	36	38	40	80	10	3			60,80	070
8	19	7,5	25	27	29	69	10	3	38,53	080		
8	38	7,5	44	46	48	88	10	3			48,69	080
9	19	8,5	26	27	29	69	10	3	50,00	090		
9	38	8,5	45	46	48	88	10	3			67,90	090
10	22	9,5	30	30	32	72	10	3	44,10	100		
10	45	9,5	53	53	55	95	10	3			54,91	100
12	26	11,5	36	36	38	83	12	3	51,85	120		
12	53	11,5	63	63	65	110	12	3			60,80	120
14	26	11,5	36	36	38	83	12	3	65,60	140		
14	53	11,5	63	63	65	110	12	3			70,96	140
16	32	15,0	42	42	44	92	16	3	61,56	160		
16	63	15,0	73	73	75	123	16	3			74,99	160
18	32	15,0	42	42	44	92	16	3	102,00	180		
18	63	15,0	73	73	75	123	16	3			125,60	180
20	38	19,0	52	52	54	104	20	3	99,98	200		
20	75	19,0	89	89	91	141	20	3			120,10	200
22	38	19,0	52	52	54	104	20	3	145,10	220		
22	75	19,0	89	89	91	141	20	3			180,00	220
24	90	23,0	106	108	110	166	25	3			230,30	240
25	45	24,0	63	45	65	121	25	4	159,40	250		
25	90	24,0	108	108	110	166	25	4			218,40	250
28	90	24,0	108	108	110	166	25	4			246,70	280
30	90	24,0	108	108	110	166	25	4			311,10	300
32	106	31,0	123	123	126	186	32	4			321,00	320
36	106	31,0	123	123	126	186	32	4			444,20	360
40	125	38,0	142	142	147	217	40	4			566,60	400
P												
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K												
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S												
H												
O										●		●

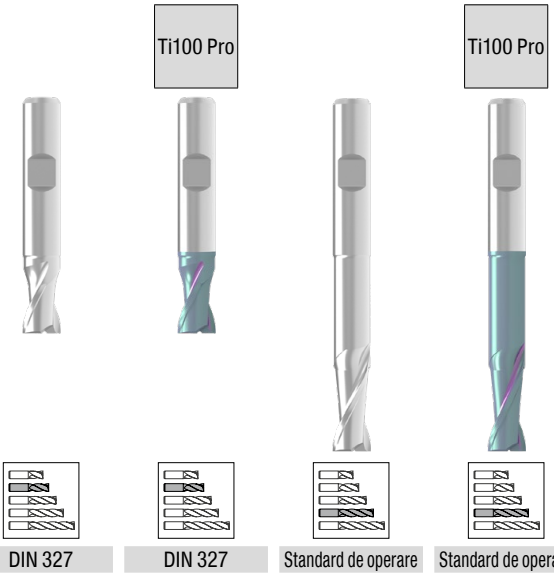
→ v_c/f_z pagina: 40–42

Freză deget, HSS-E Co 8









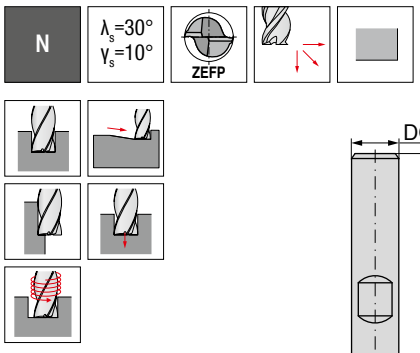
										50 100 ...		54 025 ...		50 122 ...		54 020 ...	
										DIN 327		DIN 327		Standard de operare		Standard de operare	
										B		B		B		B	
DC mm	Tole-ranța	APMX mm	DN mm	LH mm	l_6 mm	LPR mm	OAL mm	DCONMS $_{h6}$ mm	ZEFP	EUR U8		EUR U8		EUR U8		EUR U8	
1,00	h10	2,5		2,5	9	11	47	6	2	32,09	010 [1]	36,68	010 [1]				
1,50	h10	3,0		3,0	9	11	47	6	2	30,01	015 [1]	36,68	015 [1]				
1,80	h10	4,0		4,0	10	12	48	6	2	14,74	018	37,44	018				
2,00	e8	4,0		4,0	10	12	48	6	2	17,58	020	30,89	020				
2,50	e8	5,0		5,0	11	13	49	6	2	17,58	025	30,89	025				
2,80	h10	5,0		5,0	11	13	49	6	2	17,58	028	32,31	028				
3,00	e8	5,0		5,0	11	13	49	6	2	16,05	030	30,89	030				
3,00	e8	8,0		8,0	18	20	56	6	2					25,76	030	45,52	030
3,50	h10	6,0		6,0	12	14	50	6	2	17,46	035	32,31	035				
3,50	h10	10,0		10,0	21	23	59	6	2					31,98	035	49,88	035
3,80	h10	7,0		7,0	13	15	51	6	2	18,23	038	36,03	038				
4,00	e8	7,0		7,0	13	15	51	6	2	16,05	040	27,17	040				
4,00	e8	11,0		11,0	25	27	63	6	2					27,61	040	45,52	040
4,50	h10	7,0		7,0	13	15	51	6	2	19,98	045	32,31	045				
4,50	h10	11,0		11,0	25	27	63	6	2					35,04	045	49,88	045
4,80	h10	8,0		8,0	14	16	52	6	2	19,98	048	36,03	048				
5,00	e8	8,0		8,0	14	16	52	6	2	16,05	050	30,89	050				
5,00	e8	13,0		13,0	30	32	68	6	2					26,75	050	45,52	050
5,50	h10	8,0		8,0	14	16	52	6	2	19,98	055	32,31	055				
5,50	h10	13,0		13,0	30	32	68	6	2					35,04	055	49,88	055
5,75	h10	8,0		8,0	14	16	52	6	2	20,09	057	36,03	057				
6,00	e8	8,0	5,50	14,0	14	16	52	6	2	16,05	060	30,89	060				
6,00	e8	13,0	5,50	30,0	30	32	68	6	2					29,25	060	44,10	060
6,50	h10	10,0	6,00	16,0	18	20	60	10	2	22,04	065	38,09	065				
6,50	h10	16,0	6,35	36,0	38	40	80	10	2					41,92	065	61,56	065
6,75	h10	10,0	6,50	16,0	18	20	60	10	2	24,67	067	40,49	067				
7,00	e8	10,0	6,50	16,0	18	20	60	10	2	23,47	070	36,68	070				
7,00	e8	16,0	6,35	36,0	38	40	80	10	2					36,78	070	57,21	070
7,50	h10	10,0	7,00	16,0	18	20	60	10	2	25,00	075	38,09	075				
7,50	h10	16,0	7,35	36,0	38	40	80	10	2					43,01	075	61,56	075
7,75	h10	11,0	7,50	17,0	19	21	61	10	2	24,67	077	40,49	077				
8,00	e8	11,0	7,50	17,0	19	21	61	10	2	21,28	080	36,68	080				
8,00	e8	19,0	7,35	44,0	46	48	88	10	2					31,98	080	56,54	080
8,50	h10	11,0	8,00	18,0	19	21	61	10	2	25,00	085	47,70	085				
8,50	h10	19,0	8,35	45,0	46	48	88	10	2					46,16	085	65,28	085
8,70	h10	11,0	8,50	18,0	19	21	61	10	2	30,67	087	51,41	087				
9,00	h10	11,0	8,50	18,0	19	21	61	10	2	24,45	090	47,05	090				
9,00	h10	19,0	8,35	45,0	46	48	88	10	2					41,92	090	66,04	090
9,50	h10	11,0	9,00	18,0	19	21	61	10	2	30,67	095	47,70	095				
9,50	h10	19,0	9,35	45,0	46	48	88	10	2					47,48	095	68,99	095
9,70	h10	13,0	9,50	21,0	21	23	63	10	2	29,91	097	51,41	097				
10,00	e8	13,0	9,50	21,0	21	23	63	10	2	23,36	100	41,16	100				
10,00	e8	22,0	9,35	53,0	53	55	95	10	2					34,71	100	58,72	100
10,50	h10	13,0	10,00	21,0	23	25	70	12	2	43,88	105	55,77	105				
10,70	h10	13,0	10,50	21,0	23	25	70	12	2	40,72	107	60,90	107				
11,00	h10	13,0	10,50	21,0	23	25	70	12	2	37,99	110	50,76	110				
11,00	h10	22,0	10,50	53,0	55	57	102	12	2					48,46	110	70,41	110
P											●		●		●		●
M											○		●		○		●
K											●		●		●		●
N											○		○		○		○
S											○		○		○		○
H																	
O											○		○		○		○

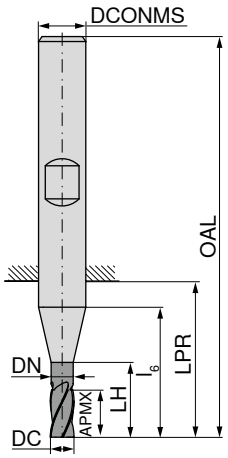
1) Standard de operare

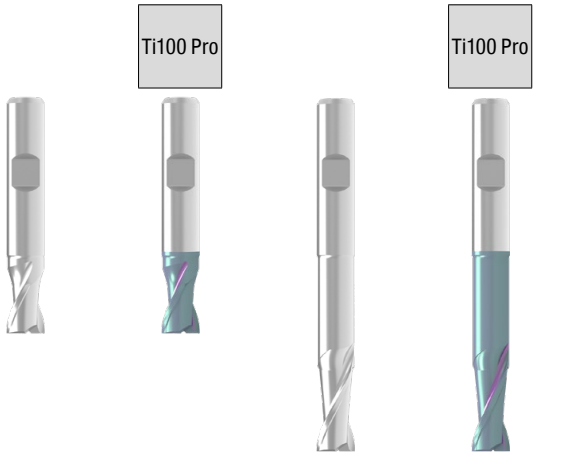
→ v_c/f_z pagina: 40–42

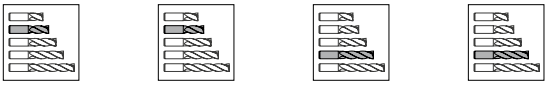
continuarea pe pagina următoare

Freză deget, HSS-E Co 8









	DIN 327	DIN 327	Standard de operare	Standard de operare
	B	B	B	B
	50 100 ...	**54 025 ...**	**50 122 ...**	**54 020 ...**

DC mm	Tole-ranța	APMX mm	DN mm	LH mm	l_6 mm	LPR mm	OAL mm	DCONMS $_{h6}$ mm	ZEFP	EUR U8		EUR U8		EUR U8		EUR U8	
11,50	h10	13,0	11,00	21,0	23	25	70	12	2	43,66	**115**	56,54	**115**				
11,70	h10	16,0	11,50	26,0	26	28	73	12	2	43,66	**117**	60,15	**117**				
12,00	e8	16,0	11,50	26,0	26	28	73	12	2	31,87	**120**	50,76	**120**				
12,00	e8	26,0	11,50	63,0	63	65	110	12	2					39,95	**120**	66,91	**120**
12,70	h10	16,0	11,50	26,0	26	28	73	12	2	49,01	**127**	83,62	**127**				
13,00	h10	16,0	11,50	26,0	26	28	73	12	2	43,66	**130**	74,88	**130**				
13,00	h10	26,0	11,50	63,0	63	65	110	12	2					65,83	**130**	96,83	**130**
13,70	h10	16,0	11,50	26,0	26	28	73	12	2	60,70	**137**	79,25	**137**				
14,00	e8	16,0	11,50	26,0	26	28	73	12	2	41,58	**140**	68,99	**140**				
14,00	e8	26,0	11,50	63,0	63	65	110	12	2					50,65	**140**	92,45	**140**
14,70	h10	16,0	11,50	26,0	26	28	73	12	2	67,02	**147**						
15,00	h10	16,0	11,50	26,0	26	28	73	12	2	50,65	**150**	74,88	**150**				
15,00	h10	26,0	11,50	63,0	63	65	110	12	2					62,33	**150**	104,30	**150**
15,70	h10	19,0	15,00	29,0	29	31	79	16	2	66,25	**157**	86,67	**157**				
16,00	e8	19,0	15,00	29,0	29	31	79	16	2	46,39	**160**	74,88	**160**				
16,00	e8	32,0	15,00	73,0	73	75	123	16	2					60,47	**160**	101,40	**160**
16,70	h10	19,0	15,00	29,0	29	31	79	16	2	76,95	**167**						
17,00	h10	19,0	15,00	29,0	29	31	79	16	2	59,71	**170**	107,20	**170**				
17,00	h10	32,0	15,00	73,0	73	75	123	16	2					78,81	**170**	151,70	**170**
17,70	h10	19,0	15,00	29,0	29	31	79	16	2	80,66	**177**	107,20	**177**				
18,00	e8	19,0	15,00	29,0	29	31	79	16	2	63,53	**180**	95,51	**180**				
18,00	e8	32,0	15,00	73,0	73	75	123	16	2					79,35	**180**	136,50	**180**
19,00	h10	19,0	15,00	29,0	29	31	79	16	2	77,06	**190**	119,00	**190**				
19,00	h10	32,0	15,00	73,0	73	75	123	16	2					86,23	**190**	158,30	**190**
19,70	h10	22,0	19,00	36,0	36	38	88	20	2	92,12	**197**	119,00	**197**				
20,00	e8	22,0	19,00	36,0	36	38	88	20	2	71,94	**200**	102,70	**200**				
20,00	e8	38,0	19,00	89,0	89	91	141	20	2					79,69	**200**	139,70	**200**
21,70	h10	22,0	19,00	36,0	36	38	88	20	2	127,70	**217**	171,40	**217**				
22,00	e8	22,0	19,00	36,0	36	38	88	20	2	87,98	**220**	146,40	**220**				
22,00	e8	38,0	19,00	89,0	89	91	141	20	2					137,50	**220**	182,30	**220**
23,70	h10	26,0	23,00	42,0	44	46	102	25	2	135,50	**237**	197,60	**237**				
24,00	e8	26,0	23,00	42,0	44	46	102	25	2	114,60	**240**	177,90	**240**				
24,00	e8	45,0	23,00	106,0	108	110	166	25	2					170,40	**240**	254,30	**240**
24,70	h10	26,0	24,00	44,0	44	46	102	25	2	134,20	**247**	203,00	**247**				
25,00	e8	26,0	24,00	44,0	44	46	102	25	2	108,70	**250**	176,90	**250**				
25,00	e8	45,0	24,00	108,0	108	110	166	25	2					170,40	**250**	210,70	**250**
26,00	h10	26,0	24,00	44,0	44	46	102	25	2	132,10	**260**	229,30	**260**				

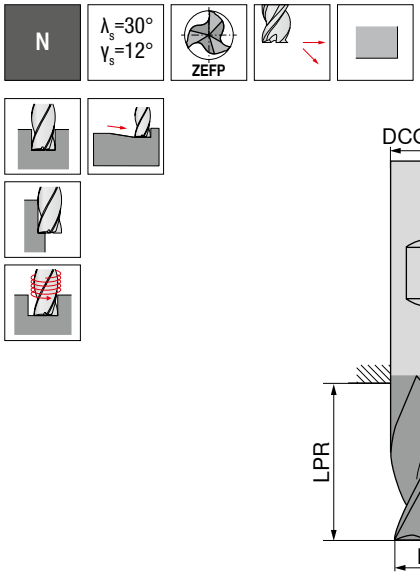
P	●	●	●	●
M	○	●	○	●
K	●	●	●	●
N	○	○	○	○
S	○	○	○	○
H				
O	○	○	○	○

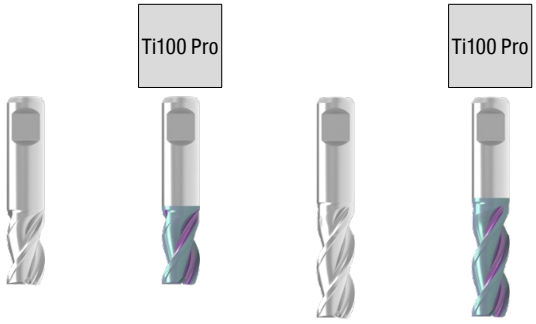
1) Standard de operare

→ v_c/f_z pagina: 40–42

Freză neascuțibilă, HSS-E Co 8

▲ coadă asemănătoare cu DIN 1835 B





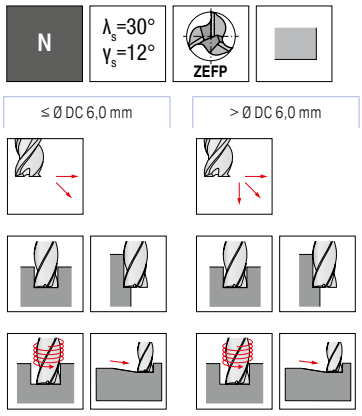
DC e8 mm	APMX mm	LPR mm	OAL mm	DCONMS h6 mm	ZEFP	Standard de operare B	50 092 ... EUR U6		Standard de operare B	54 014 ... EUR U8		Standard de operare B	50 093 ... EUR U6		Standard de operare B	54 042 ... EUR U8	
1,00	2	8	34	6	3		11,68	010		23,13	010						
1,50	3	8	34	6	3		11,68	015		23,13	015						
1,50	4	10	35	6	3								13,65	015 1)		25,87	015 1)
1,80	3	8	34	6	3		11,68	018		23,13	018						
2,00	4	9	35	6	3		11,68	020		23,13	020						
2,00	7	12	38	6	3								13,65	020 1)		25,87	020
2,30	4	9	35	6	3		11,68	023		23,13	023						
2,50	5	10	36	6	3		11,68	025		23,13	025						
2,50	8	13	39	6	3								13,65	025 1)		25,87	025
2,80	5	10	36	6	3		11,68	028		23,13	028						
3,00	5	10	36	6	3		11,68	030		23,13	030						
3,00	8	13	39	6	3								13,65	030 1)		25,87	030
3,30	6	11	37	6	3		11,68	033		23,13	033						
3,50	6	11	37	6	3		11,68	035		23,13	035						
3,50	10	15	41	6	3								13,65	035 1)		25,87	035
3,80	7	12	38	6	3		11,68	038		23,13	038						
4,00	7	12	38	6	3		11,68	040		23,13	040						
4,00	11	16	42	6	3								13,65	040 1)		25,87	040
4,30	7	12	38	6	3		11,68	043		23,13	043						
4,50	7	12	38	6	3		11,68	045		23,13	045						
4,50	11	16	42	6	3								13,65	045 1)		25,87	045
4,80	8	13	39	6	3		11,68	048		23,13	048						
5,00	8	13	39	6	3		11,68	050		23,13	050						
5,00	13	18	44	6	3								13,65	050 1)		25,87	050
5,30	8	13	39	6	3		11,68	053		23,13	053						
5,50	8	13	39	6	3		11,68	055		23,13	055						
5,50	13	18	44	6	3								13,65	055 1)		25,87	055
5,75	8	13	39	6	3		11,68	057		23,13	057						
6,00	8	13	39	6	3		11,68	060		23,13	060						
6,00	13	18	44	6	3								13,65	060 1)		25,87	060
6,50	10	14	42	8	3		13,54	065		31,55	065						
6,50	16	20	48	8	3								16,15	065 1)		34,49	065
7,00	10	14	42	8	3		13,54	070		31,55	070						
7,00	16	20	48	8	3								16,15	070 1)		34,49	070
7,50	10	14	42	8	3		13,54	075		31,55	075						
7,50	16	20	48	8	3								16,15	075 1)		34,49	075
8,00	11	15	43	8	3		13,54	080		31,55	080						
8,00	19	23	51	8	3								16,15	080 1)		34,49	080
8,50	11	16	48	10	3		17,58	085		36,03	085						
8,50	19	24	56	10	3								20,19	085 1)		38,64	085
9,00	11	16	48	10	3		17,58	090		36,03	090						
9,00	19	24	56	10	3								20,19	090 1)		38,64	090
9,50	11	16	48	10	3		17,58	095		36,03	095						
9,50	19	24	56	10	3								20,19	095 1)		38,64	095
10,00	13	18	50	10	3		17,58	100		36,03	100						
10,00	22	27	59	10	3								20,19	100 1)		38,64	100
P							●			●			●			●	
M							○			●			○			●	
K							●			●			●			●	
N							○			○			○			○	
S							○			○			○			○	
H																	
O							○			○			○			○	

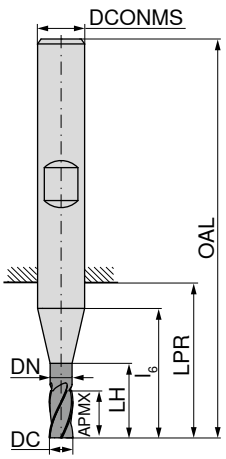
1) Toleranța cozii: -0,025 / -0,0323

→ v_c/f_z pagina: 40–42

Freză deget, HSS-E Co 8

▲ Ø ≤ 6 mm, așchiere triplă în centru







										DIN 327		DIN 327		DIN 844 K		DIN 844 K	
										B		B		B		B	
										50 105 ...		54 021 ...		50 106 ...		54 016 ...	
DC mm	Tole-ranța	APMX mm	DN mm	LH mm	l_6 mm	LPR mm	OAL mm	DCONMS $_{h6}$ mm	ZEFP	EUR U8		EUR U8		EUR U8		EUR U8	
1,80	h10	4		4	10	12	48	6	3	26,75	018	38,09	018				
2,00	e8	4		4	10	12	48	6	3	21,84	020	31,55	020				
2,50	e8	5		5	11	13	49	6	3	23,79	025	31,55	025				
2,80	h10	5		5	11	13	49	6	3	26,75	028	38,09	028				
2,80	h10	8		8	18	20	56	6	3					33,08	028 1)	44,10	028 1)
3,00	e8	5		5	11	13	49	6	3	21,07	030	31,55	030				
3,00	e8	8		8	14	16	52	6	3					25,33	030	28,71	030
3,50	h10	6		6	12	14	50	6	3	26,20	035	34,49	035				
3,50	h10	10		10	16	18	54	6	3					27,40	035	28,71	035
3,80	h10	7		7	13	15	51	6	3	26,20	038	38,09	038				
3,80	h10	11		11	25	27	63	6	3					33,08	038 1)	44,10	038 1)
4,00	e8	7		7	13	15	51	6	3	21,07	040	31,55	040				
4,00	e8	11		11	17	19	55	6	3					24,67	040	28,71	040
4,50	h10	7		7	13	15	51	6	3	23,79	045	34,49	045				
4,50	h10	11		11	17	19	55	6	3					27,40	045	28,71	045
4,80	h10	8		8	14	16	52	6	3	23,79	048	38,09	048				
5,00	e8	8		8	14	16	52	6	3	21,50	050	31,55	050				
5,00	e8	13		13	19	21	57	6	3					25,33	050	28,71	050
5,50	h10	8		8	14	16	52	6	3	26,20	055	34,49	055				
5,50	h10	13		13	19	21	57	6	3					29,47	055	28,71	055
5,75	h10	8		8	14	16	52	6	3	26,20	057	38,09	057				
6,00	e8	8	5,5	14	14	16	52	6	3	21,50	060	31,55	060				
6,00	e8	13	5,5	19	19	21	57	6	3					24,67	060	28,71	060
6,50	h10	10	6,0	16	18	20	60	10	3	34,71	065	47,70	065				
6,50	h10	16	6,0	22	24	26	66	10	3					33,40	065	41,16	065
6,75	h10	10	6,5	16	18	20	60	10	3	34,71	067	55,77	067				
7,00	e8	10	6,5	16	18	20	60	10	3	34,05	070	47,05	070				
7,00	e8	16	6,5	22	24	26	66	10	3					33,63	070	41,16	070
7,50	h10	10	7,0	16	18	20	60	10	3	34,71	075	47,70	075				
7,50	h10	16	7,0	22	24	26	66	10	3					39,73	075	41,16	075
7,75	h10	11	7,5	17	19	21	61	10	3	34,71	077	49,88	077				
8,00	e8	11	7,5	17	19	21	61	10	3	30,34	080	44,10	080				
8,00	e8	19	7,5	25	27	29	69	10	3					35,14	080	41,16	080
8,50	h10	11	8,0	18	19	21	61	10	3	35,69	085	48,46	085				
8,50	h10	19	8,0	26	27	29	69	10	3					46,16	085	41,16	085
8,70	h10	11	8,5	18	19	21	61	10	3	35,69	087	55,77	087				
9,00	h10	11	8,5	18	19	21	61	10	3	37,99	090	47,05	090				
9,00	h10	19	8,5	26	27	29	69	10	3					38,75	090	41,16	090
9,50	h10	11	9,0	18	19	21	61	10	3	38,32	095	49,88	095				
9,50	h10	19	9,0	26	27	29	69	10	3					43,76	095	63,20	095
9,70	h10	13	9,5	21	21	23	63	10	3	38,32	097	52,94	097				
10,00	e8	13	9,5	21	21	23	63	10	3	29,04	100	46,29	100				
10,00	e8	22	9,5	30	30	32	72	10	3					34,82	100	41,16	100
10,50	h10	13	10,0	21	23	25	70	12	3	49,88	105	57,21	105				
10,70	h10	13	10,5	21	23	25	70	12	3	49,88	107	63,20	107				
11,00	h10	13	10,5	21	23	25	70	12	3	42,67	110	53,59	110				

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O	○	○	○	○

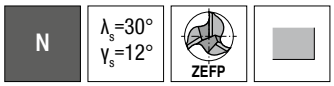
1) Standard de operare

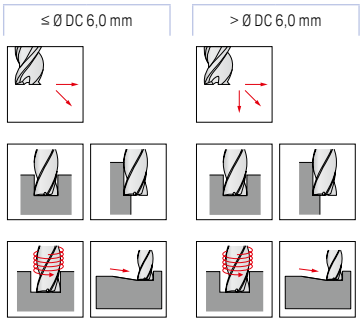
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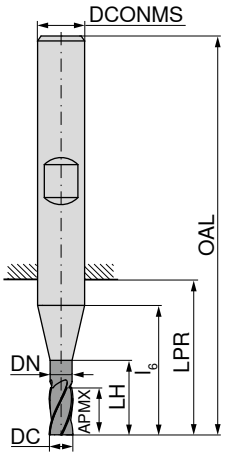
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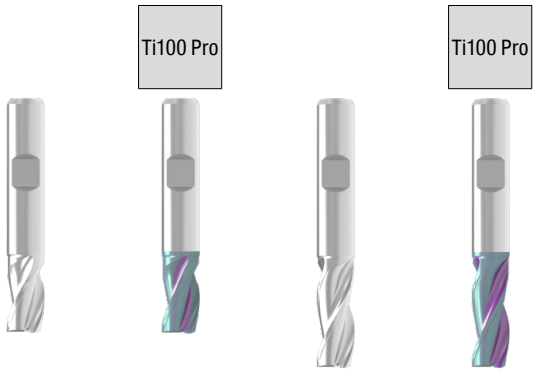
Freză deget, HSS-E Co 8

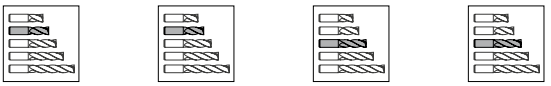
▲ Ø ≤ 6 mm, aşchiere triplă în centru









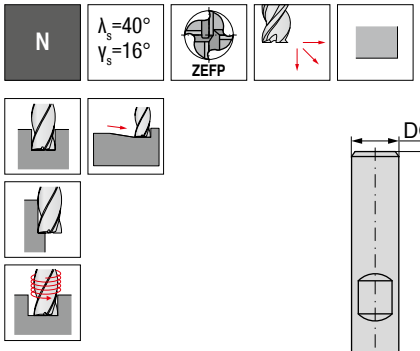


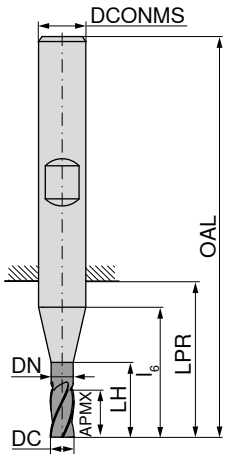
										DIN 327		DIN 327		DIN 844 K		DIN 844 K	
										B		B		B		B	
										50 105 ...		54 021 ...		50 106 ...		54 016 ...	
DC mm	Tole-ranţa	APMX mm	DN mm	LH mm	l_6 mm	LPR mm	OAL mm	DCONMS $_{h6}$ mm	ZEFP	EUR U8		EUR U8		EUR U8		EUR U8	
11,00	h10	22	10,5	30	32	34	79	12	3					43,76	110	42,47	110
11,50	h10	13	11,0	21	23	25	70	12	3	44,21	115	57,21	115				
11,50	h10	22	11,0	30	32	34	79	12	3					56,11	115	72,70	115
11,70	h10	16	11,5	26	26	28	73	12	3	44,21	117	63,85	117				
12,00	e8	16	11,5	26	26	28	73	12	3	37,99	120	52,94	120				
12,00	e8	26	11,5	36	36	38	83	12	3					41,48	120	49,88	120
12,70	h10	16	11,5	26	26	28	73	12	3	55,56	127	89,51	127				
13,00	h10	16	11,5	26	26	28	73	12	3	55,56	130	77,83	130				
13,00	h10	26	11,5	36	36	38	83	12	3					60,36	130	61,56	130
13,70	h10	16	11,5	26	26	28	73	12	3	59,06	137	83,62	137				
14,00	e8	16	11,5	26	26	28	73	12	3	54,25	140	73,46	140				
14,00	e8	26	11,5	36	36	38	83	12	3					53,59	140	65,28	140
15,00	h10	16	11,5	26	26	28	73	12	3	57,53	150	77,83	150				
15,00	h10	26	11,5	36	36	38	83	12	3					75,10	150	98,24	150
15,50	h10	32	15,0	42	42	44	92	16	3					94,31	155	117,90	155
15,70	h10	19	15,0	29	29	31	79	16	3	60,47	157	93,87	157				
16,00	e8	19	15,0	29	29	31	79	16	3	51,95	160	80,78	160				
16,00	e8	32	15,0	42	42	44	92	16	3					62,21	160	65,28	160
17,00	h10	19	15,0	29	29	31	79	16	3	74,99	170	114,60	170				
17,00	h10	32	15,0	42	42	44	92	16	3					74,01	170	86,67	170
17,70	h10	19	15,0	29	29	31	79	16	3	86,56	177	119,00	177				
18,00	e8	19	15,0	29	29	31	79	16	3	72,81	180	104,30	180				
18,00	e8	32	15,0	42	42	44	92	16	3					68,99	180	95,51	180
19,00	h10	19	15,0	29	29	31	79	16	3	83,62	190	126,60	190				
19,00	h10	32	15,0	42	42	44	92	16	3					89,95	190	95,51	190
19,50	h10	38	19,0	52	52	54	104	20	3					109,20	195	158,30	195
19,70	h10	22	19,0	36	36	38	88	20	3	93,99	197	126,60	197				
20,00	e8	22	19,0	36	36	38	88	20	3	82,09	200	110,20	200				
20,00	e8	38	19,0	52	52	54	104	20	3					82,41	200	105,70	200
21,70	h10	22	19,0	36	36	38	88	20	3	143,00	217	179,00	217				
22,00	e8	22	19,0	36	36	38	88	20	3	127,70	220	158,30	220				
22,00	e8	38	19,0	52	52	54	104	20	3					101,00	220	120,10	220
23,70	h10	26	23,0	42	44	46	102	25	3	171,40	237	210,70	237				
24,00	e8	26	23,0	42	44	46	102	25	3	146,40	240	186,70	240				
24,70	h10	26	24,0	44	44	46	102	25	3	164,90	247	217,20	247				
P											●		●		●		●
M											○		●		○		●
K											●		●		●		●
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S											○		○		○		○
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O											○		○		○		○

1) Standard de operare

→ v_c/f_z pagina: 40–42

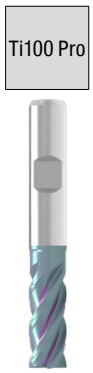
Freză deget, HSS-E Co 8













Standard de operare



DIN 844



DIN 844

B



B



B



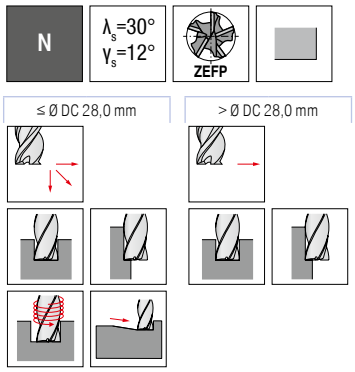
DC mm	Tole-ranța	APMX mm	DN mm	LH mm	l_6 mm	LPR mm	OAL mm	DCONMS $_{h6}$ mm	ZEFP	54 017 ... EUR U8		50 124 ... EUR U8		54 011 ... EUR U8	
4	k10	11		11	17	19	55	6	4			37,54	**040**	53,49	**040**
5	k10	13		13	19	21	57	6	4			37,54	**050**	57,96	**050**
6	e8	8	5,5	14	14	16	52	6	4	29,37	**060**				
6	k10	13	5,5	19	19	21	57	6	4			37,54	**060**	57,96	**060**
8	e8	11	7,5	17	19	21	61	10	4	36,68	**080**				
8	k10	19	7,5	25	27	29	69	10	4			41,48	**080**	70,73	**080**
9	k10	19	8,5	26	27	29	69	10	4			52,50	**090**	77,17	**090**
10	e8	13	9,5	21	21	23	63	10	4	38,98	**100**				
10	k10	22	9,5	30	30	32	72	10	4			50,97	**100**	70,73	**100**
12	e8	16	11,5	26	26	28	73	12	4	47,05	**120**				
12	k10	26	11,5	36	36	38	83	12	4			56,76	**120**	88,96	**120**
14	e8	16	11,5	26	26	28	73	12	4	66,04	**140**				
14	k10	26	11,5	36	36	38	83	12	4			66,69	**140**	117,90	**140**
15	k10	26	11,5	36	36	38	83	12	4			86,23	**150**		
16	e8	19	15,0	29	29	31	79	16	4	67,57	**160**				
16	k10	32	15,0	42	42	44	92	16	4			75,97	**160**	128,80	**160**
17	k10	32	15,0	42	42	44	92	16	4			107,20	**170**	180,00	**170**
18	e8	19	15,0	29	29	31	79	16	4	83,62	**180**				
18	k10	32	15,0	42	42	44	92	16	4			98,89	**180**	175,80	**180**
20	e8	22	19,0	36	36	38	88	20	4	95,51	**200**				
20	k10	38	19,0	52	52	54	104	20	4			111,30	**200**	184,50	**200**
25	k10	45	24,0	63	63	65	121	25	5			158,30	**250**	265,20	**250**

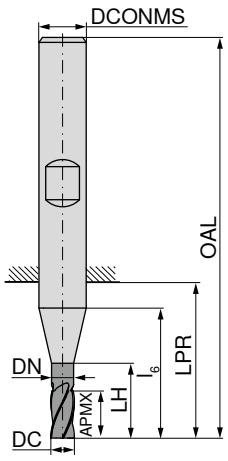
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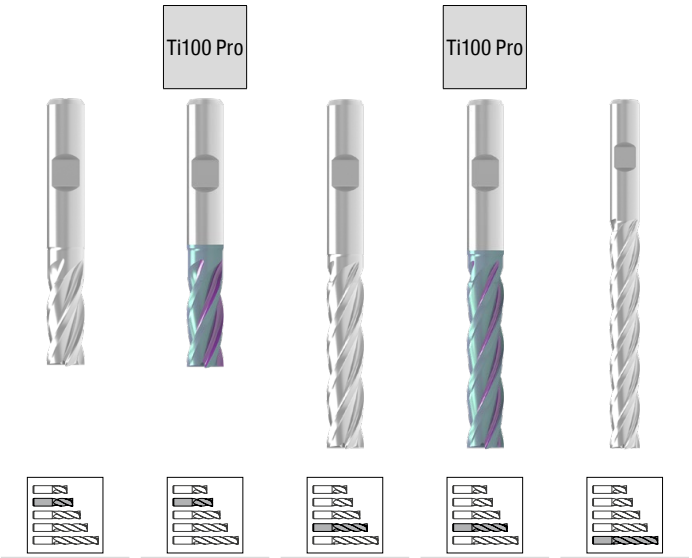
→ v_c/f_z pagina: 40–42

Freză deget, HSS-E Co 8

▲ > Ø 28,0 mm cu centrul gol







									DIN 69844		DIN 69844		DIN 844		DIN 844		Standard de operare			
									B		B		B		B		B			
									50 110 ...		54 018 ...		50 111 ...		54 019 ...		50 104 ...			
DC k10 mm	APMX mm	DN mm	LH mm	l6 mm	LPR mm	OAL mm	DCONMS h6 mm	ZEFP	EUR U8		EUR U8		EUR U8		EUR U8		EUR U6			
2,0	7		7	13	15	51	6	4	21,84	020	36,03	020								
2,5	8		8	14	16	52	6	4	23,03	025	34,49	025								
3,0	8		8	14	16	52	6	4	21,84	030	33,73	030								
3,0	12		12	18	20	56	6	4					30,46	030	43,33	030				
3,5	10		10	16	18	54	6	4	21,84	035	36,03	035								
4,0	11		11	17	19	55	6	4	19,87	040	32,31	040								
4,0	19		19	25	27	63	6	4					29,91	040	43,33	040				
4,5	11		11	17	19	55	6	4	21,84	045	35,26	045								
5,0	13		13	19	21	57	6	4	19,87	050	32,31	050								
5,0	24		24	30	32	68	6	4					29,91	050	43,33	050				
5,5	13		13	19	21	57	6	4	21,84	055	36,03	055								
6,0	13	5,5	19	19	21	57	6	4	18,45	060	32,96	060								
6,0	24	5,5	30	30	32	68	6	4					27,07	060	42,47	060				
6,0	56	5,5	62	62	64	100	6	4									47,15	060		
6,5	16	6,0	22	24	26	66	10	4	25,87	065	45,52	065								
7,0	16	6,5	22	24	26	66	10	4	25,87	070	44,87	070								
7,0	30	6,5	36	38	40	80	10	4					44,87	070	54,36	070				
7,5	16	7,0	22	24	26	66	10	4	25,87	075	45,52	075								
8,0	19	7,5	25	27	29	69	10	4	22,71	080	43,33	080								
8,0	38	7,5	44	46	48	88	10	4					38,42	080	49,88	080				
8,0	70	7,5	73	73	75	115	10	4									53,27	080		
8,5	19	8,0	26	27	29	69	10	4	27,61	085	45,52	085								
9,0	19	8,5	26	27	29	69	10	4	27,73	090	49,23	090								
9,0	38	8,5	45	46	48	88	10	4					46,71	090	58,72	090				
9,5	19	9,0	26	27	29	69	10	4	27,61	095	56,54	095								
10,0	22	9,5	30	30	32	72	10	4	26,31	100	45,52	100								
10,0	45	9,5	53	53	55	95	10	4					40,49	100	53,59	100				
10,0	75	9,5	79	79	81	121	10	4									64,19	100		
10,5	22	10,0	30	32	34	79	12	4	43,99	105	62,55	105								
11,0	22	10,5	30	32	34	79	12	4	38,09	110	55,77	110								
11,0	45	10,5	53	55	57	102	12	4					53,17	110	71,28	110				
11,5	22	11,0	30	32	34	79	12	4	42,35	115	57,21	115								
12,0	26	11,5	36	36	38	83	12	4	36,45	120	52,94	120								
12,0	53	11,5	63	63	65	110	12	4					43,76	120	63,20	120				
12,0	85		85	85	85	130	12	4									69,32	120		
13,0	26	11,5	36	36	38	83	12	4	55,01	130	77,83	130								
14,0	26	11,5	36	36	38	83	12	4	48,90	140	66,04	140								
14,0	53	11,5	63	63	65	110	12	4					56,11	140	83,62	140				
14,0	85		85	85	85	130	12	4									87,98	140		

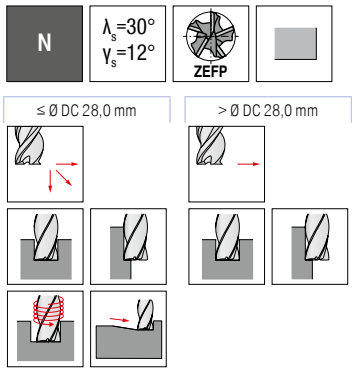
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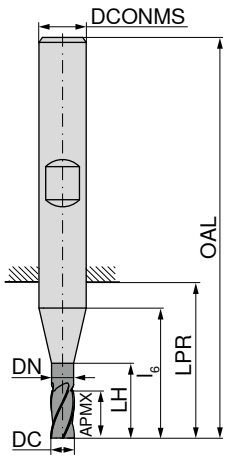
→ v_c/f_z pagina: 40–42

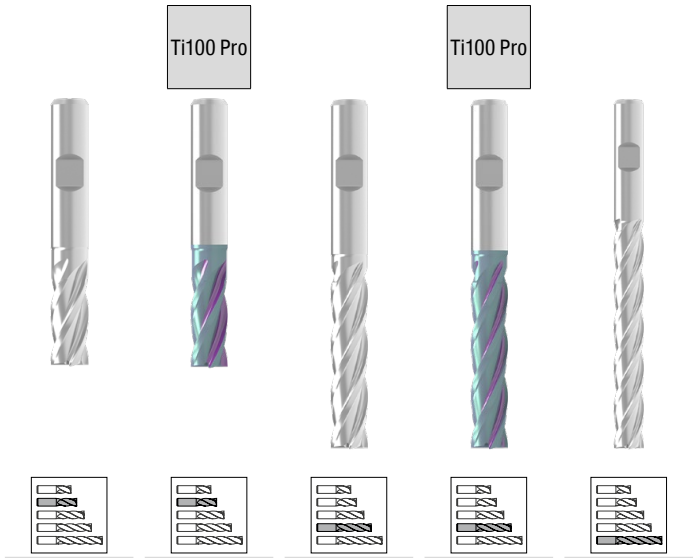
continuarea pe pagina următoare cuttingtools.ceratizit.com

Freză deget, HSS-E Co 8

▲ > Ø 28,0 mm cu centrul gol





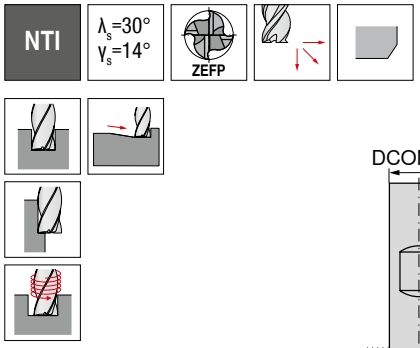


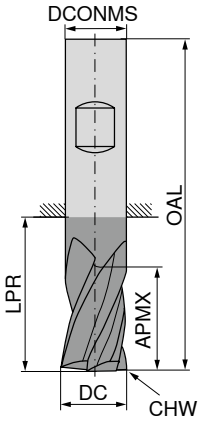
									DIN 69844		DIN 69844		DIN 844		DIN 844		Standard de operare	
									B		B		B		B		B	
									50 110 ...		54 018 ...		50 111 ...		54 019 ...		50 104 ...	
DC k10 mm	APMX mm	DN mm	LH mm	l6 mm	LPR mm	OAL mm	DCONMS h6 mm	ZEFP	EUR U8		EUR U8		EUR U8		EUR U8		EUR U6	
15,0	26	11,5	36	36	38	83	12	4	55,56	150	79,25	150						
15,0	53	11,5	63	63	65	110	12	4					72,81	150	96,83	150		
16,0	32	15,0	42	42	44	92	16	4	50,65	160	77,83	160						
16,0	63	15,0	73	73	75	123	16	4					62,33	160	93,87	160		
16,0	90	15,0	95	95	97	145	16	4									83,62	160
18,0	32	15,0	42	42	44	92	16	4	71,28	180	107,20	180						
18,0	63	15,0	73	73	75	123	16	4					77,17	180	133,20	180		
18,0	100	15,0	110	110	112	160	16	5									154,00	180
20,0	38	19,0	52	52	54	104	20	4	74,77	200	112,50	200						
20,0	75	19,0	89	89	91	141	20	4					89,40	200	139,70	200		
20,0	110	19,0	128	128	130	180	20	5									144,10	200
22,0	38	19,0	52	52	54	104	20	5	103,80	220	149,60	220						
22,0	75	19,0	89	89	91	141	20	5					125,60	220	225,90	220		
22,0	110	19,0	128	128	130	180	20	5									203,00	220
24,0	45	23,0	61	63	65	121	25	5	120,10	240	172,40	240						
24,0	90	23,0	106	108	110	166	25	5					169,20	240	251,10	240		
25,0	45	24,0	63	63	65	121	25	5	120,10	250	164,90	250						
25,0	90	24,0	108	108	110	166	25	5					170,40	250	240,20	250		
25,0	125	24,0	142	142	144	200	25	6									203,00	250
28,0	45	24,0	63	63	65	121	25	5	137,50	280	203,00	280						
28,0	90	24,0	108	108	110	166	25	5					201,90	280	314,40	280		
28,0	140	24,0	147	147	149	205	25	6									284,90	280
30,0	45	24,0	63	63	65	121	25	5	192,10	300	241,20	300						
30,0	90	24,0	108	108	110	166	25	5					222,70	300	374,40	300		
32,0	53	31,0	70	70	73	133	32	6	186,70	320								
32,0	53	31,0	70	70	73	133	32	5			229,30	320						
32,0	106	31,0	123	123	126	186	32	6					211,80	320	364,60	320		
32,0	160	31,0	167	167	170	230	32	6									348,20	320
36,0	53	31,0	70	70	73	133	32	6	211,80	360	330,80	360						
40,0	63	38,0	80	80	85	155	40	6	279,40	400	411,60	400						
40,0	125	38,0	142	142	147	217	40	6					400,70	400	540,30	400		
40,0	180	31,0	197	197	200	260	32	8									579,60	400
45,0	125	38,0	142	142	147	217	40	8					672,40	450	744,50	450		
50,0	150	48,0	172	172	172	252	50	8					776,10	500	864,60	500		

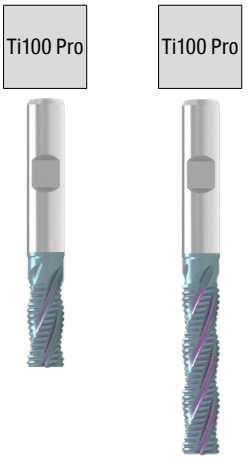
P	●	●	●	●	●
M	○	●	○	●	○
K	●	●	●	●	●
N	○	○	○	○	○
S	○	○	○	○	○
H					
O	○	○	○	○	○

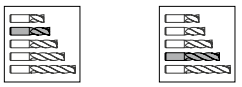
→ v_c/f_z pagina: 40–42

Freză deget sinterizat de degroșare-finisare







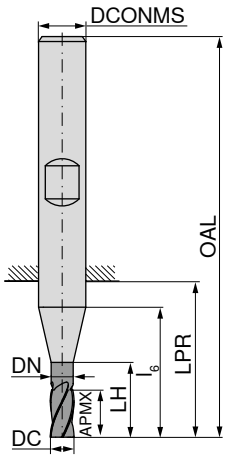


							DIN 69844		DIN 844		
							B		B		
							54 007 ...		54 008 ...		
DC k12 mm	APMX mm	LPR mm	OAL mm	DCONMS h6 mm	CHW mm	ZEFP	EUR U8		EUR U8		
6	13	21	57	6	0,3	4	104,60	060			
6	24	32	68	6	0,3	4			149,60	060	
7	16	26	66	10	0,3	4	147,40	070			
8	19	29	69	10	0,3	4	137,50	080			
8	38	48	88	10	0,3	4			176,90	080	
9	19	29	69	10	0,5	4	158,30	090			
10	22	32	72	10	0,5	4	147,40	100			
10	45	55	95	10	0,5	4			185,50	100	
12	26	38	83	12	0,7	4	151,70	120			
12	53	65	110	12	0,7	4			207,30	120	
14	26	38	83	12	0,8	4	192,10	140			
14	53	65	110	12	0,8	4			246,70	140	
16	32	44	92	16	0,8	4	217,20	160			
16	63	75	123	16	0,8	4			280,60	160	
18	32	44	92	16	0,8	4	273,00	180			
18	63	75	123	16	0,8	4			356,90	180	
20	38	54	104	20	0,8	4	289,20	200			
20	75	91	141	20	0,8	4			386,40	200	
25	45	65	121	25	1,0	5	429,00	250			
25	90	110	166	25	1,0	4			627,60	250	
30	90	110	166	25	1,3	5			985,70	300	
32	53	73	133	32	1,3	6	574,10	320			
32	106	126	186	32	1,3	5			912,60	320	
40	63	85	155	40	1,3	6	985,70	400			
40	125	147	217	40	1,3	6			1.419,00	400	
P								○		○	
M								●		●	
K								○		○	
N								○		○	
S								●		●	
H											
O								○		○	

→ v_c/f_z pagina: 40–42

Freză deget de degroșare-finisare, HSS-E Co 5

NF | λ_s=30° γ_s=12° | ZEFP











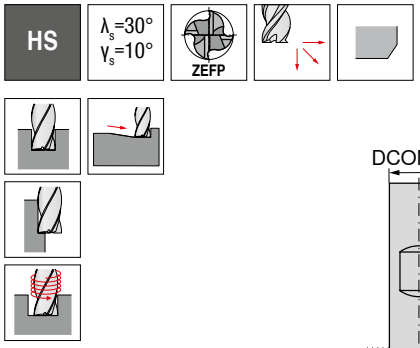
DIN 69844 | DIN 844

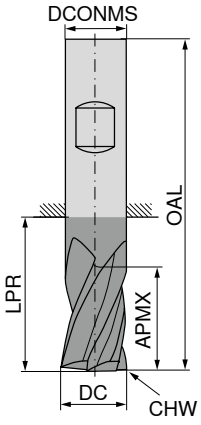
B | B

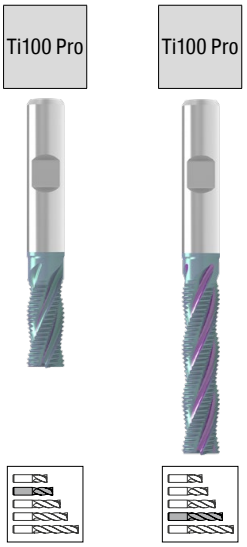
DC $_{k12}$ mm	APMX mm	DN mm	LH mm	l_6 mm	LPR mm	OAL mm	DCONMS $_{h6}$ mm	ZEFP	54 028 ... EUR U8		54 029 ... EUR U8	
6	13	5,5	19	19	21	57	6	4	49,88	060		
6	24	5,5	30	30	32	68	6	4			71,28	060
7	16	6,5	22	24	26	66	10	4	68,23	070		
8	19	7,5	25	27	29	69	10	4	64,51	080		
8	38	7,5	44	46	48	88	10	4			83,62	080
9	19	8,5	26	27	29	69	10	4	73,46	090		
10	22	9,5	30	30	32	72	10	4	67,57	100		
10	45	9,5	53	53	55	95	10	4			89,51	100
11	22	10,5	30	32	32	79	12	4	80,78	110		
11	45	10,5	53	55	57	102	12	4			119,00	110
12	26	11,5	36	36	38	83	12	4	74,88	120		
12	53	11,5	63	63	65	110	12	4			99,88	120
13	26	11,5	36	36	38	83	12	4	96,83	130		
14	26	11,5	36	36	38	83	12	4	93,87	140		
15	26	11,5	36	36	38	83	12	4	104,30	150		
15	53	11,5	63	63	65	110	12	4			126,60	150
16	32	15,0	42	42	44	92	16	4	102,70	160		
16	63	15,0	73	73	75	123	16	4			135,50	160
18	32	15,0	42	42	44	92	16	4	139,70	180		
20	38	19,0	52	52	54	104	20	4	143,00	200		
20	75	19,0	89	89	91	141	20	4			192,10	200
22	75	19,0	89	89	91	141	20	4			286,00	220
22	38	19,0	52	52	54	104	20	4	187,80	220		
25	90	24,0	108	108	110	166	25	4			314,40	250
25	45	24,0	63	63	65	121	25	4	204,20	250		
28	90	24,0	108	108	110	166	25	5			408,20	280
P									●		●	
M									○		○	
K									●		●	
N									○		○	
S									○		○	
H												
O									○		○	

→ v_c/f_z pagina: 40–42

Freză deget sinterizat de degroșare-finisare







DIN 69844 | DIN 844

B | B

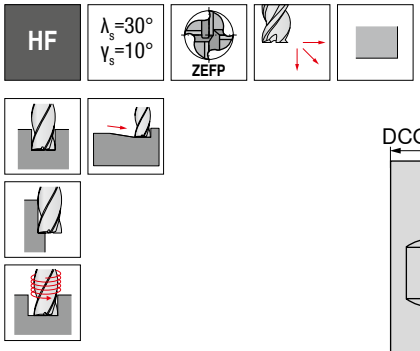
DC k12 mm	APMX mm	LPR mm	OAL mm	DCONMS h6 mm	CHW mm	ZEFP	54 009 ... EUR U8		54 012 ... EUR U8	
6	13	21	57	6	0,45	4	104,60	060		
6	24	32	68	6	0,45	4			149,60	060
8	19	29	69	10	0,45	4	137,50	080		
8	38	48	88	10	0,45	4			176,90	080
10	22	32	72	10	0,45	4	147,40	100		
10	45	55	95	10	0,45	4			185,50	100
12	26	38	83	12	0,45	4	151,70	120		
12	53	65	110	12	0,45	4			207,30	120
14	26	38	83	12	0,45	4	192,10	140		
14	53	65	110	12	0,45	4			246,70	140
16	32	44	92	16	0,60	4	217,20	160		
16	63	75	123	16	0,60	4			280,60	160
18	32	44	92	16	0,60	4	273,00	180		
18	63	75	123	16	0,60	4			356,90	180
20	38	54	104	20	0,60	4	289,20	200		
20	75	91	141	20	0,60	4			386,40	200
22	38	54	104	20	0,60	5	379,90	220		
25	45	65	121	25	0,75	5	429,00	250		
25	90	110	166	25	0,75	5			627,60	250
28	45	65	121	25	0,75	5	538,20	280		
28	90	110	166	25	0,75	5			946,40	280
30	45	65	121	25	0,75	5	623,40	300		
30	90	110	166	25	0,75	5			985,70	300
32	53	73	133	32	0,75	6	574,10	320		
32	106	126	186	32	0,75	5			912,60	320
40	63	85	155	40	0,90	6	985,70	400		

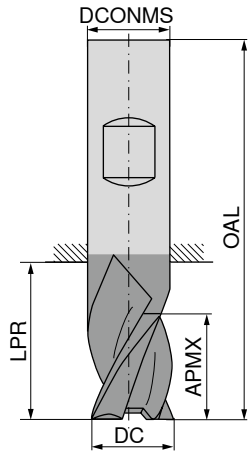
P	○	○
M		
K	●	●
N		
S	●	●
H		
O	○	○

→ v_c/f_z pagina: 40–42

Freză deget sinterizat de degroșare-finisare

HF | λ_s=30° γ_s=10° | ZEFP





Ti100 Pro





DIN 844



54 034 ...

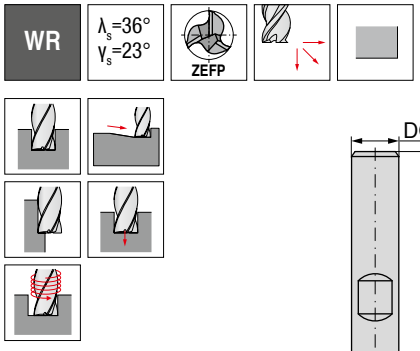
DC $_{k12}$ mm	APMX mm	LPR mm	OAL mm	DCONMS $_{h6}$ mm	ZEFP	EUR U8	
6	13	21	57	6	4	57,21	**060**
8	19	29	69	10	4	77,83	**080**
10	22	32	72	10	4	83,62	**100**
12	26	38	83	12	4	90,93	**120**
14	26	38	83	12	4	102,70	**140**
16	32	44	92	16	4	135,50	**160**
18	32	44	92	16	4	143,00	**180**
20	38	54	104	20	4	173,60	**200**
25	45	65	121	25	4	266,30	**250**

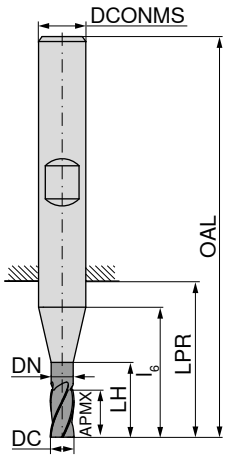
P	●
M	○
K	●
N	○
S	○
H	
O	○

→ v_c/f_z pagina: 40–42

13

Freză deget de degroșare, HSS-E Co 8









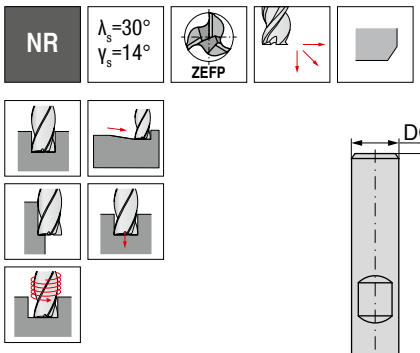


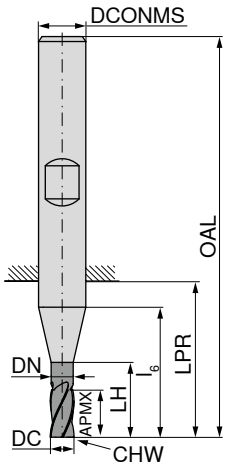


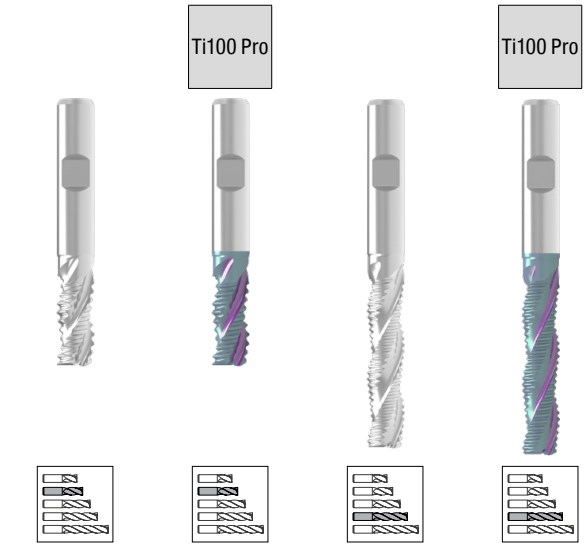
									DIN 844		Standard de operare	
									B		B	
									54 013 ...		54 010 ...	
DC k12 mm	APMX mm	DN mm	LH mm	l_6 mm	LPR mm	OAL mm	DCONMS h6 mm	ZEFP	EUR U8		EUR U8	
6	13	5,5	19	19	21	57	6	3	81,65	060		
6	19	5,5	25	25	27	63	6	3			106,80	060
8	19	7,5	25	27	29	69	10	3	109,00	080		
8	28	7,5	34	36	38	78	10	3			125,60	080
10	22	9,5	30	30	32	72	10	3	119,00	100		
10	34	9,5	42	42	44	84	10	3			130,00	100
12	26	11,5	36	36	38	83	12	3	127,70	120		
12	40	11,5	50	50	52	97	12	3			146,40	120
16	32	15,0	42	42	44	92	16	3	177,90	160		
16	48	15,0	58	58	60	108	16	3			196,40	160
20	38	19,0	52	52	54	104	20	3	239,10	200		
20	56	19,0	70	70	72	122	20	3			280,60	200
25	45	24,0	63	63	65	121	25	3	343,80	250		
25	68	24,0	86	86	88	144	25	3			448,70	250
32	80	31,0	97	97	100	160	32	3			626,60	320
P												
M												
K												
N										●		●
S												
H												
O										●		●

→ v_c/f_z pagina: 40–42

Freză deget de degroșare, HSS-E Co 8







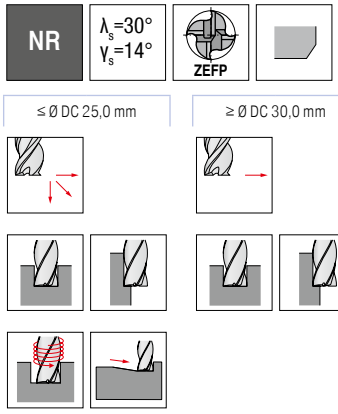
										DIN 69844		DIN 69844		DIN 844		DIN 844	
										B		B		B		B	
										50 153 ...		54 026 ...		50 157 ...		54 027 ...	
DC k12 mm	APMX mm	DN mm	LH mm	l6 mm	LPR mm	OAL mm	DCONMS h6 mm	CHW mm	ZEFP	EUR U8		EUR U8		EUR U8		EUR U8	
6	13	5,5	19	19	21	57	6	0,5	3	43,22	060	49,88	060				
6	24	5,5	30	30	32	68	6	0,5	3					51,41	060	71,28	060
7	16	6,5	22	24	26	66	10	0,5	3	56,76	070	68,99	070				
8	19	7,5	25	27	29	69	10	0,7	3	51,85	080	64,51	080				
8	38	7,5	44	46	48	88	10	0,7	3					57,41	080	83,62	080
9	19	8,5	26	27	29	69	10	0,7	3	62,44	090	73,46	090				
9	38	8,5	45	46	48	88	10	0,7	3					85,14	090	96,83	090
10	22	9,5	30	30	32	72	10	0,7	3	55,23	100	67,57	100				
10	45	9,5	53	53	55	95	10	0,7	3					73,13	100	89,51	100
11	22	10,5	30	32	34	79	12	0,7	3	69,97	110	83,62	110				
11	45	10,5	53	55	55	102	12	0,7	3					95,51	110	119,00	110
12	26	11,5	36	36	38	83	12	0,7	3	59,38	120	74,88	120				
12	53	11,5	63	63	65	110	12	0,7	3					79,03	120	99,88	120
14	26	11,5	36	36	38	83	12	0,9	3	68,99	140	93,87	140				
14	53	11,5	63	63	65	110	12	0,9	3					95,30	140	120,10	140
15	26	11,5	36	36	38	83	12	0,9	3	81,43	150	105,70	150				
15	53	11,5	63	63	65	110	12	0,9	3					113,50	150	140,90	150
16	32	15,0	42	42	44	92	16	0,9	3	78,59	160	102,70	160				
16	63	15,0	73	73	75	123	16	0,9	3					98,24	160	135,50	160
18	32	15,0	42	42	44	92	16	0,9	3	99,23	180	139,70	180				
18	63	15,0	73	73	75	123	16	0,9	3					149,60	180	181,30	180
20	38	19,0	52	52	54	104	20	0,9	3	108,90	200	143,00	200				
20	75	19,0	89	89	91	141	20	0,9	3					144,10	200	192,10	200
25	45	24,0	63	63	65	121	25	0,9	3	169,20	250	204,20	250				
25	90	24,0	108	108	110	166	25	0,9	3					211,80	250	314,40	250
P											●		●		●		●
M											○		○		○		○
K											●		●		●		●
N											○		○		○		○
S											○		○		○		○
H																	
O											○		○		○		○

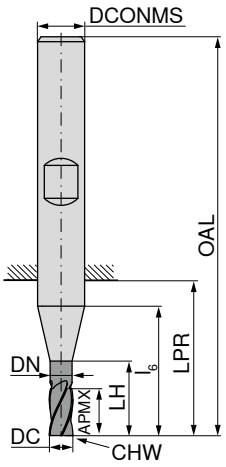
13

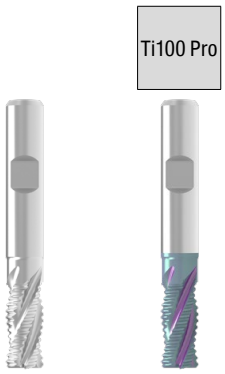
→ v_c/f_z pagina: 40–42

Freză deget de degroșare, HSS-E Co 5

▲ > Ø 25,0 mm cu centrul gol











DIN 69844 | DIN 69844

B | B

50 125 ... | **54 030 ...**

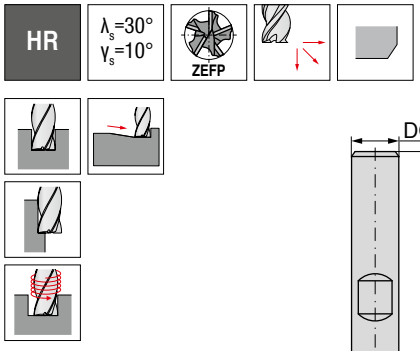
DC k12 mm	APMX mm	DN mm	LH mm	l_6 mm	LPR mm	OAL mm	DCONMS h6 mm	CHW mm	ZEFP	EUR U8		EUR U8	
6	13	5,5	19	19	21	57	6	0,5	4	34,17	**060**	49,88	**060**
7	16	6,5	22	24	26	66	10	0,5	4	43,12	**070**	68,99	**070**
8	19	7,5	25	27	29	69	10	0,7	4	37,33	**080**	64,51	**080**
9	19	8,5	26	27	29	69	10	0,7	4	50,33	**090**	66,04	**090**
10	22	9,5	30	30	32	72	10	0,7	4	39,84	**100**	67,57	**100**
11	22	10,5	30	32	32	79	12	0,7	4	55,13	**110**	89,51	**110**
12	26	11,5	36	36	38	83	12	0,7	4	42,02	**120**	74,88	**120**
13	26	11,5	36	36	38	83	12	0,7	4			96,83	**130**
14	26	11,5	36	36	38	83	12	0,9	4	54,58	**140**	93,87	**140**
15	26	11,5	36	36	38	83	12	0,9	4			104,30	**150**
16	32	15,0	42	42	44	92	16	0,9	4	65,50	**160**	102,70	**160**
18	32	15,0	42	42	44	92	16	0,9	4	70,41	**180**	139,70	**180**
20	38	19,0	52	52	54	104	20	0,9	4	86,99	**200**	143,00	**200**
22	38	19,0	52	52	54	104	20	0,9	4			187,80	**220**
24	45	23,0	61	63	65	121	25	0,9	4			200,90	**240**
25	45	24,0	63	63	65	121	25	0,9	4	111,30	**250**	204,20	**250**
30	45	24,0	63	63	65	121	25	1,1	5			307,90	**300**
32	53	31,0	70	70	73	133	32	1,1	6			289,20	**320**
40	63	38,0	80	80	85	155	40	1,1	6			519,50	**400**

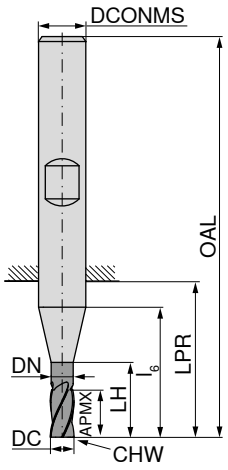
P	●	●
M	○	○
K	●	●
N	○	○
S	○	○
H		
O	○	○

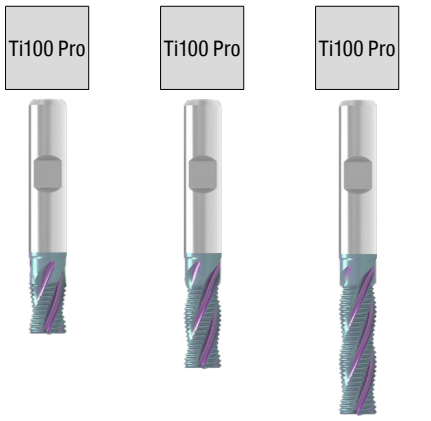
→ v_c/f_z pagina: 40–42

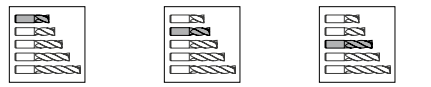
Freză deget sinterizată de degroșare fină

HR | λ_s=30° γ_s=10° | ZEFP









Standard de operare | DIN 844 | Standard de operare

B | B | B

DC $_{k12}$ mm	APMX mm	DN mm	LH mm	l_6 mm	LPR mm	OAL mm	DCONMS $_{h6}$ mm	CHW mm	ZEFP	54 031 ... EUR U8		54 032 ... EUR U8		54 033 ... EUR U8	
6	8	5,5	14	14	16	52	6	0,35	4	65,28	**060**				
6	13	5,5	19	19	21	57	6	0,35	4			49,88	**060**		
8	11	7,5	17	19	21	61	10	0,45	4	73,46	**080**				
8	19	7,5	25	27	29	69	10	0,45	4			70,41	**080**		
8	28	7,5	34	36	38	78	10	0,45	4					96,06	**080**
10	13	9,5	21	21	23	63	10	0,45	4	73,46	**100**				
10	22	9,5	30	30	32	72	10	0,45	4			77,83	**100**		
10	34	9,5	42	42	44	84	10	0,45	4					103,00	**100**
12	16	11,5	26	26	28	73	12	0,60	4	86,67	**120**				
12	26	11,5	36	36	38	83	12	0,60	4			88,09	**120**		
12	40	11,5	50	50	52	97	12	0,60	4					120,10	**120**
14	16	11,5	26	26	28	73	12	0,60	4	111,30	**140**				
14	26	11,5	36	36	38	83	12	0,60	4			98,24	**140**		
14	40	11,5	50	50	52	97	12	0,60	4					157,20	**140**
16	19	15,0	29	29	31	79	16	0,70	4	122,30	**160**				
16	32	15,0	42	42	44	92	16	0,70	4			122,30	**160**		
16	48	15,0	58	58	60	108	16	0,70	4					180,00	**160**
18	19	15,0	29	29	31	79	16	0,70	4	146,40	**180**				
18	32	15,0	42	42	44	92	16	0,70	4			149,60	**180**		
18	48	15,0	58	58	60	108	16	0,70	4					222,70	**180**
20	22	19,0	36	36	38	88	20	0,70	4	164,90	**200**				
20	38	19,0	52	52	54	104	20	0,70	4			171,40	**200**		
20	56	19,0	70	70	72	122	20	0,70	4					225,90	**200**
22	22	19,0	36	36	38	88	20	0,70	4	220,40	**220**				
22	38	19,0	52	52	54	104	20	0,70	4			239,10	**220**		
22	56	19,0	70	70	72	122	20	0,70	4					314,40	**220**
25	26	24,0	44	44	46	102	25	0,70	4	259,80	**250**				
25	45	24,0	63	63	65	121	25	0,70	4			234,70	**250**		
25	68	24,0	86	86	88	144	25	0,70	4					352,60	**250**
28	26	24,0	44	44	46	102	25	0,90	5	326,40	**280**				
30	45	24,0	63	63	65	121	25	0,90	5			399,50	**300**		
32	32	31,0	49	49	52	112	32	0,90	6	347,10	**320**				
32	53	31,0	70	70	73	133	32	0,90	6			375,40	**320**		
P										●		●		●	
M										●		●		●	
K										●		●		●	
N										○		○		○	
S										○		○		○	
H															
O										○		○		○	

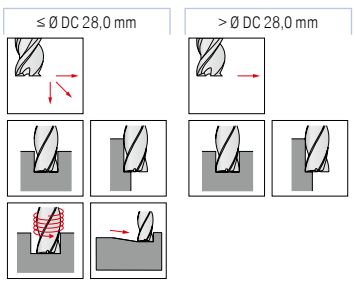
→ v_c/f_z pagina: 40–42

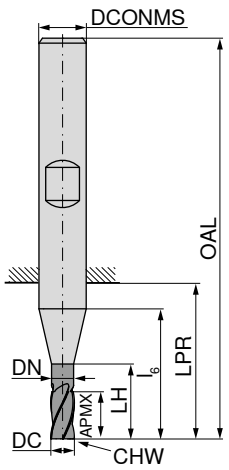
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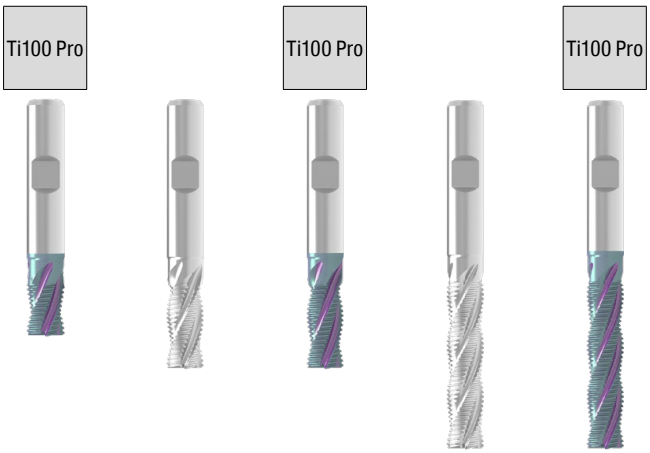
Freză deget de degroșare fină, HSS-E Co 8

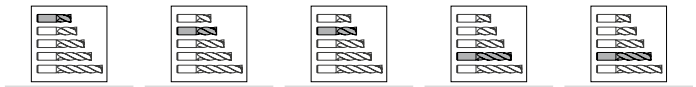
▲ > Ø 28,0 mm cu centrul gol

HR | λ_s=30° γ_s=10° | ZEFP









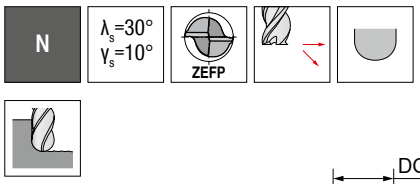
	Standard de operare	DIN 69844	DIN 69844	DIN 844	DIN 844
B	○	○	○	○	○
	54 022 ...	**50 140 ...**	**54 023 ...**	**50 141 ...**	**54 024 ...**

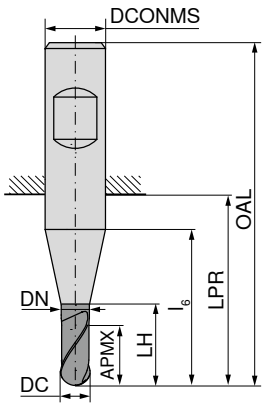
DC $_{k12}$ mm	APMX mm	DN mm	LH mm	l_6 mm	LPR mm	OAL mm	DCONMS $_{h6}$ mm	CHW mm	ZEFP	EUR U8		EUR U8		EUR U8		EUR U8		EUR U8	
4	11		11	17	19	55	6	0,35	3			38,21	**040**	48,46	**040**				
5	13		13	19	21	57	6	0,35	3			38,21	**050**	48,46	**050**				
6	8	5,5	14	14	16	52	6	0,35	4	52,07	**060**								
6	13	5,5	19	19	21	57	6	0,35	4			38,21	**060**	41,81	**060**				
6	24	5,5	30	30	32	68	6	0,35	4							58,83	**060**	79,25	**060**
8	11	7,5	17	19	21	61	10	0,45	4	64,51	**080**								
8	19	7,5	25	27	29	69	10	0,45	4			40,49	**080**	46,29	**080**				
8	38	7,5	44	46	48	88	10	0,45	4							67,90	**080**	93,87	**080**
10	13	9,5	21	21	23	63	10	0,45	4	57,21	**100**								
10	22	9,5	30	30	32	72	10	0,45	4			43,88	**100**	49,88	**100**				
10	45	9,5	53	53	55	95	10	0,45	4							73,13	**100**	98,24	**100**
12	16	11,5	26	26	28	73	12	0,60	4	70,41	**120**								
12	26	11,5	36	36	38	83	12	0,60	4			48,57	**120**	58,72	**120**				
12	53	11,5	63	63	65	110	12	0,60	4							81,53	**120**	110,20	**120**
14	16	11,5	26	26	28	73	12	0,60	4	89,51	**140**								
14	26	11,5	36	36	38	83	12	0,60	4			53,27	**140**	66,04	**140**				
14	53	11,5	63	63	65	110	12	0,60	4							88,53	**140**	126,60	**140**
16	19	15,0	29	29	31	79	16	0,70	4	93,87	**160**								
16	32	15,0	42	42	44	92	16	0,70	4			57,08	**160**	76,30	**160**				
16	63	15,0	73	73	75	123	16	0,70	4							106,20	**160**	148,40	**160**
18	19	15,0	29	29	31	79	16	0,70	4	122,30	**180**								
18	32	15,0	42	42	44	92	16	0,70	4			72,81	**180**	93,87	**180**				
18	63	15,0	73	73	75	123	16	0,70	4							123,40	**180**	181,30	**180**
20	22	19,0	36	36	38	88	20	0,70	4	126,60	**200**								
20	38	19,0	52	52	54	104	20	0,70	4			84,70	**200**	111,30	**200**				
20	75	19,0	89	89	91	141	20	0,70	4							144,10	**200**	210,70	**200**
22	38	19,0	52	52	54	114	20	0,70	4			113,50	**220**	140,90	**220**				
22	75	19,0	89	89	91	141	20	0,70	4							177,90	**220**	288,20	**220**
25	45	24,0	63	63	65	121	25	0,70	4			159,40	**250**	151,70	**250**				
25	90	24,0	108	108	110	166	25	0,70	4									337,30	**250**
28	45	24,0	63	63	65	121	25	0,90	5					230,30	**280**				
28	90	24,0	108	108	110	166	25	0,90	5									424,70	**280**
30	45	24,0	63	63	65	121	25	0,90	5					197,60	**300**				
30	90	24,0	108	108	110	166	25	0,90	5									462,90	**300**
32	53	31,0	70	70	73	133	32	0,90	6					235,80	**320**				
32	106	31,0	123	123	126	186	32	0,90	6									471,50	**320**

P	●	●	●	●	●
M	●	○	●	○	●
K	●	●	●	●	●
N	○	○	○	○	○
S	○	○	○	○	○
H					
O	○	○	○	○	○

→ v_c/f_z pagina: 40–42

Freză deget cu frontal sferic, HSS-E Co 8











Standard de operare





Standard de operare





Standard de operare



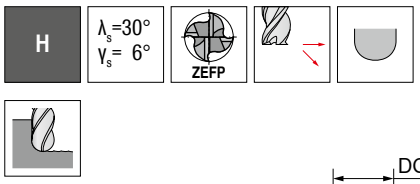
DC h10 mm	APMX mm	DN mm	LH mm	l_6 mm	LPR mm	OAL mm	DCONMS h6 mm	ZEFP	50 320 ... EUR U8		54 041 ... EUR U8		50 321 ... EUR U8	
2	4		4	10	12	48	6	2	36,24	020	47,05	020		
3	5		5	11	13	49	6	2	34,17	030	46,29	030		
3	8		8	18	20	56	6	2					50,76	030
4	7		7	13	15	51	6	2	34,17	040	46,29	040		
4	11		11	25	27	63	6	2					50,76	040
5	8		8	14	16	52	6	2	34,17	050	46,29	050		
5	13		13	30	32	68	6	2					50,76	050
6	8	5,50	14	14	16	52	6	2	34,17	060	46,29	060		
6	13	5,50	30	30	32	68	6	2					53,59	060
7	10	6,50	16	18	20	60	10	2	46,16	070	67,57	070		
7	16	6,35	36	38	40	80	10	2					60,26	070
8	11	7,50	17	19	21	61	10	2	37,44	080	63,20	080		
8	19	7,35	44	46	48	88	10	2					54,68	080
9	11	8,50	18	19	21	61	10	2	43,33	090	71,28	090		
9	19	8,35	45	46	48	88	10	2					63,96	090
10	13	9,50	21	21	23	63	10	2	43,12	100	66,04	100		
10	22	9,35	53	53	55	95	10	2					68,44	100
11	13	10,50	21	23	25	70	12	2	50,10	110				
11	22	10,50	53	55	57	102	12	2					73,90	110
12	16	11,50	26	26	28	73	12	2	48,36	120	74,88	120		
12	26	11,50	63	63	65	110	12	2					69,64	120
13	16	11,50	26	26	28	73	12	2	55,67	130	107,20	130		
14	16	11,50	26	26	28	73	12	2	56,54	140	98,24	140		
14	26	11,50	63	63	65	110	12	2					80,89	140
15	16	11,50	26	26	28	73	12	2	65,93	150	117,90	150		
15	26	11,50	63	63	65	110	12	2					105,10	150
16	19	15,50	29	29	31	79	16	2	68,55	160	117,90	160		
16	32	15,00	73	73	75	123	16	2					105,30	160
18	19	15,50	29	29	31	79	16	2	85,47	180	140,90	180		
18	32	15,00	73	73	75	123	16	2					133,20	180
20	22	19,00	36	36	38	88	20	2	90,93	201	139,70	201		
22	22	19,00	36	36	38	88	20	2	116,80	220				
24	26	23,00	42	44	46	102	25	2	119,00	240	221,70	240		
24	45	23,00	106	108	110	166	25	2					197,60	240
25	26	24,00	44	44	46	102	25	2	119,00	250				
25	45	24,00	108	108	110	166	25	2					185,50	250
26	26	24,00	44	44	46	102	25	2	173,60	260				
28	26	24,00	44	44	46	102	25	2	163,80	280				
30	26	24,00	44	44	46	102	25	2	188,90	300				
30	45	24,00	108	108	110	166	25	2					268,50	300

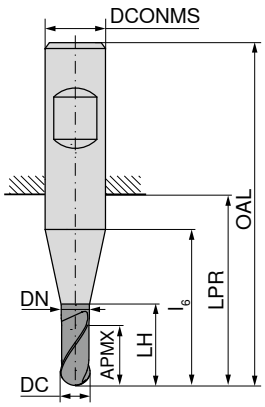
P	●	●	●
M	○	○	○
K	●	●	●
N	○	○	○
S	○	○	○
H			
O	○	○	○

→ v_c/f_z pagina: 40–42

13

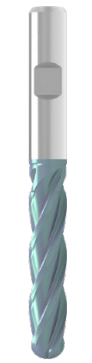
Freză deget cu frontal sferic, HSS-E Co 8

















									DIN 1889 B		DIN 1889 B		DIN 1889 B	
									B		B		B	
									50 308 ...		54 038 ...		54 039 ...	
DC k12 mm	APMX mm	DN mm	LH mm	l6 mm	LPR mm	OAL mm	DCONMS h6 mm	ZEFP	EUR U8		EUR U8		EUR U8	
6	13	5,5	19	19	21	57	6	4	77,17	060	82,19	060		
6	24	5,5	30	30	32	68	6	4					99,88	060 1)
8	19	7,5	25	27	29	69	10	4	84,82	080	107,20	080		
8	38	7,5	44	46	48	88	10	4					120,10	080 1)
10	22	9,5	30	30	32	72	10	4	86,99	100	117,90	100		
10	45	9,5	53	53	55	95	10	4					130,00	100
12	26	11,5	36	36	38	83	12	4	98,46	120	133,20	120		
12	53	11,5	63	63	65	110	12	4					150,60	120
16	32	15,0	42	42	44	92	16	4	130,00	160	179,00	160		
16	63	15,0	73	73	75	123	16	4					211,80	160
20	38	19,0	52	52	54	104	20	4			251,10	200		
20	75	19,0	89	89	91	141	20	4					300,10	200
25	45	24,0	63	63	65	121	25	5			315,50	250		
P										●		●		●
M										○		○		○
K										●		●		●
N										○		○		○
S										○		○		○
H														
O										○		○		○

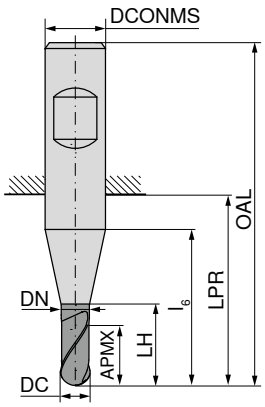
1) Standard de operare

→ v_c/f_z pagina: 40–42

Freză deget cu frontal sferic de degroșare fină, HSS-E Co 8

HR | λ_s=30° γ_s=10° | ZEFP

Ti100 Pro





DIN 1889 B

B

54 040 ...

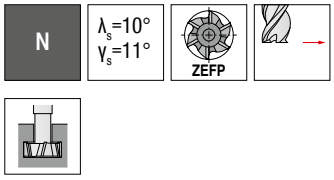
DC $_{js14}$ mm	APMX mm	DN mm	LH mm	l_6 mm	LPR mm	OAL mm	DCONMS $_{h6}$ mm	ZEFP	EUR U8	
6	13	5,5	19	19	21	57	6	4	104,30	**060**
8	19	7,5	25	27	29	69	10	4	127,70	**080**
10	22	9,5	30	30	32	72	10	4	128,80	**100**
12	26	11,5	36	36	38	83	12	4	151,70	**120**
16	32	15,0	42	42	44	92	16	4	213,90	**160**
20	38	19,0	52	52	54	104	20	4	275,10	**200**

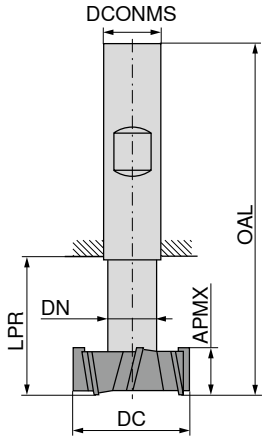
P	●
M	○
K	●
N	○
S	○
H	
O	○

→ v_c/f_z pagina: 40–42

Freză canal-T, HSS-E Co 5, cu dantură încrucișată

▲ pentru canale conform DIN 650







DIN 851 A

B 

50 240 ...

DC d11 mm	APMX d11 mm	DN h12 mm	LPR mm	OAL mm	DCONMS h6 mm	ZEFP	EUR U6	
11,0	4	4	13,5	53,5	10	6	83,62	**110**
12,5	6	5	17,0	57,0	10	6	80,89	**125**
16,0	8	7	22,0	62,0	10	6	89,40	**160**
18,0	8	8	25,0	70,0	12	6	93,76	**180**
19,0	9	8	26,0	71,0	12	6	113,50	**190** 1)
21,0	9	10	29,0	74,0	12	6	116,80	**210**
22,0	10	10	30,0	75,0	12	6	120,10	**220** 1)
25,0	11	12	34,0	82,0	16	8	140,90	**250**
28,0	12	13	37,0	85,0	16	8	169,20	**280** 1)
32,0	14	15	42,0	90,0	16	8	191,00	**320**
36,0	16	17	47,0	103,0	25	8	287,10	**360** 1)
40,0	18	19	52,0	108,0	25	10	323,10	**400**
45,0	20	21	57,0	113,0	25	10	359,20	**450** 1)
50,0	22	25	64,0	124,0	32	10	395,20	**500**
60,0	28	30	79,0	139,0	32	10	528,30	**600**

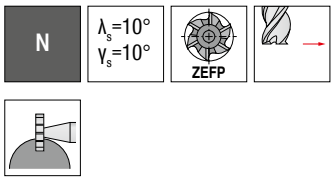
P	●
M	○
K	●
N	○
S	○
H	
O	○

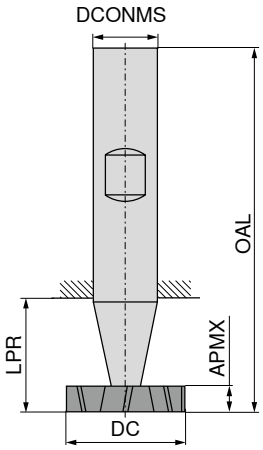
1) Standard de operare

→ v_c/f_z pagina: 43

Freză pentru canale, HSS-E Co 5, cu dantură încrucișată

▲ pentru canale conform DIN 6888
▲ CDX = $a_{p\,max.}$







DIN 850
B

DC h12 mm	APMX e8 mm	LPR mm	OAL mm	DCONMS h6 mm	CDX mm	ZEFP	EUR U6	50 234 ...	
10,5	2,0	14	50	6	3,25	6	63,64	**100**	
10,5	2,5	14	50	6	3,15	6	63,64	**101**	
10,5	3,0	14	50	6	3,15	6	63,64	**102**	
13,5	2,0	16	56	10	4,45	6	63,64	**130**	1)
13,5	3,0	16	56	10	4,45	6	63,64	**132**	
13,5	4,0	16	56	10	4,45	6	63,64	**133**	
16,5	3,0	16	56	10	5,95	6	69,32	**161**	
16,5	4,0	16	56	10	5,95	6	69,32	**162**	
16,5	5,0	16	56	10	5,75	6	69,32	**163**	
19,5	3,0	23	63	10	6,95	8	76,41	**190**	1)
19,5	4,0	23	63	10	6,95	8	76,41	**191**	
19,5	5,0	23	63	10	6,75	8	76,41	**192**	
22,5	4,0	23	63	10	8,25	8	90,71	**220**	1)
22,5	5,0	23	63	10	8,25	8	90,71	**221**	
22,5	6,0	23	63	10	8,00	8	90,71	**222**	
25,5	5,0	23	63	10	9,00	10	90,71	**250**	1)
25,5	6,0	23	63	10	9,00	10	90,71	**251**	
28,5	6,0	23	63	10	10,00	10	133,20	**281**	
28,5	8,0	23	63	10	10,00	10	133,20	**283**	
32,5	6,0	26	71	12	12,00	10	135,50	**321**	1)
32,5	8,0	26	71	12	12,00	10	135,50	**322**	
38,5	8,0	26	71	12	13,35	10	200,90	**381**	1)
45,5	10,0	26	71	12	16,85	12	244,50	**450**	

P	●
M	○
K	●
N	○
S	○
H	
O	○

13

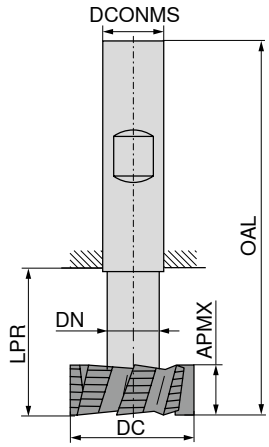
1) Standard de operare

→ v_c/f_z pagina: 43

Freză canal-T, HSS-E Co 5

▲ pentru canale conform DIN 650

NF | λ_s=20° γ_s=11° | ZEFP





DIN 851 A

B

50 241 ...

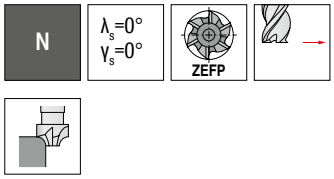
DC $_{d11}$ mm	APMX mm	DN $_{h12}$ mm	LPR mm	OAL mm	DCONMS $_{h6}$ mm	ZEFP	EUR U6	
21	9	10	29	74	12	6	135,50	**210**
22	10	10	30	75	12	6	149,60	**220** 1)
25	11	12	34	82	16	6	161,50	**250**
28	12	13	37	85	16	6	176,90	**280** 1)
32	14	15	42	90	16	6	222,70	**320**
36	16	17	47	103	25	6	271,80	**360** 1)
40	18	19	52	108	25	8	351,40	**400**
45	20	21	57	113	25	8	367,80	**450** 1)

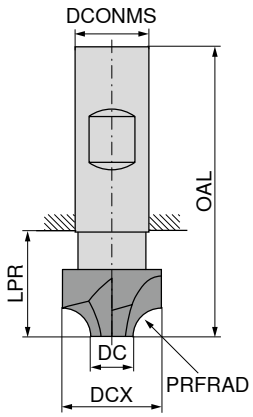
P	●
M	○
K	●
N	○
S	○
H	
O	○

1) Standard de operare

→ v_c/f_z pagina: 43

Freză cu profil sfert-sferic, HSS-E Co 5, concav







DIN 6518

B

50 248 ...

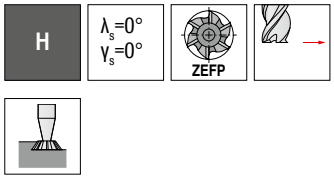
PRFRAD h11 mm	DCX mm	DC mm	LPR mm	OAL mm	DCONMS h6 mm	ZEFP	EUR U6	
1,0	8	6	20	60	10	4	49,01	**010**
1,5	9	6	20	60	10	4	59,93	**015**
2,0	10	6	20	60	10	4	55,56	**020**
2,5	11	6	20	60	10	4	62,55	**025**
3,0	12	6	15	60	12	4	56,87	**030**
4,0	14	6	15	60	12	4	73,57	**040**
5,0	16	6	15	60	12	4	76,41	**050**
6,0	20	8	19	67	16	4	99,65	**060**
8,0	24	8	23	71	16	4	133,20	**080**
9,0	26	8	29	85	25	4	140,90	**090**
10,0	28	8	29	85	25	4	162,60	**100**
12,0	34	10	34	90	25	4	247,80	**120**
15,0	46	16	44	100	25	6	340,50	**150**
16,0	48	16	44	100	25	6	400,70	**160**

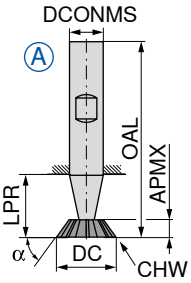
P	●
M	○
K	●
N	○
S	○
H	
O	○

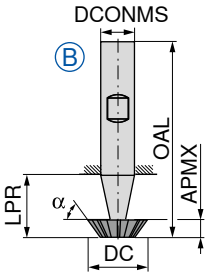
→ v_c/f_z pagina: 43

13

Freză unghiulară, HSS-E Co 5











α°	DC mm	APMX mm	LPR mm	OAL mm	DCONMS h6 mm	CHW mm	ZEFP	Figura	DIN 1833 B 50 246 ... EUR U6		DIN 1833 B 50 245 ... EUR U6	
45	16	4,0	15	60	12	0,3	10	A			73,57	016
	16	4,0	15	60	12		10	B	83,62	016		
	20	5,0	18	63	12	0,3	10	A			106,80	020
	20	5,0	18	63	12		10	B	112,50	020		
	25	6,3	22	67	12	0,3	10	A			130,00	025
	25	6,3	22	67	12		10	B	130,00	025		
60	16	6,3	15	60	12	0,3	10	A			83,62	116
	16	6,3	15	60	12		10	B	83,62	116		
	20	8,0	18	63	12	0,3	10	A			106,80	120
	20	8,0	18	63	12		10	B	106,80	120		
	25	10,0	22	67	12	0,3	10	A			115,70	125
	25	10,0	22	67	12		10	B	130,00	125		
70	16	7,0	15	60	12	0,3	10	A			83,62	216 1)
	20	9,0	18	63	12	0,3	10	A			106,80	220 1)
	25	11,0	19	67	16	0,3	10	A			130,00	225 1)

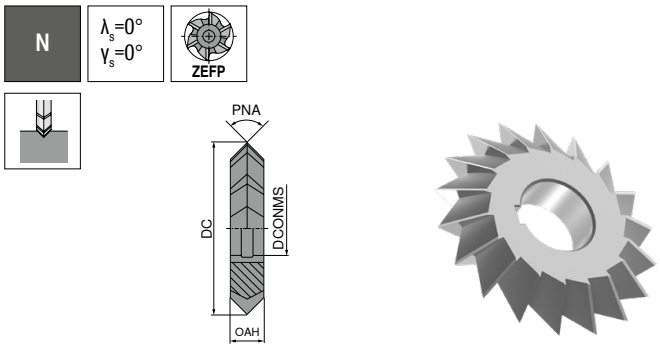
P	●	●
M	○	○
K	●	●
N	○	○
S	○	○
H		
O	○	○

1) Standard de operare

→ v_c/f_z pagina: 44

Freză biunghiulară, HSS

▲ canal pentru pană conform DIN 138



DIN 847

50 360 ...

PNA °	DC mm	OAH mm	DCONMS mm	ZEFP	EUR U6	
45	50	8	16	22	135,50	045
	63	10	22	24	169,20	145
	80	12	27	26	268,50	245
	100	18	32	28	400,70	345
60	50	10	16	18	135,50	060
	63	14	22	20	169,20	160
	80	18	27	22	311,10	260
	100	25	32	24	498,80	360
90	50	14	16	16	158,30	090
	63	20	22	18	201,90	190
	80	22	27	20	330,80	290
	100	32	32	24	551,30	390
120	50	14	16	16	180,00	120 1)
	63	20	22	16	262,00	121 1)

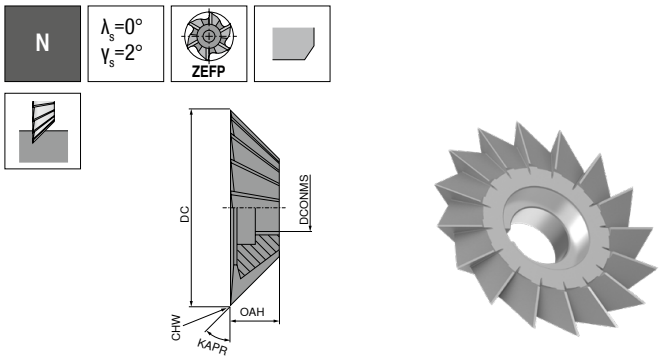
P	●
M	○
K	●
N	○
S	○
H	
O	○

1) Standard de operare

→ v_c/f_z pagina: 44

Freză biunghiulară cuplabilă, HSS

▲ cu canal pentru pană conform DIN 138



DIN 842 A

50 362 ...

KAPR °	DC mm	OAH mm	DCONMS mm	CHW mm	ZEFP	EUR U6	
45	40	10	10	0,3	14	156,10	045
	50	13	13	0,3	16	213,90	145
	63	18	16	0,3	18	269,70	245
	80	22	22	0,3	20	380,90	345
	100	28	27	0,3	22	578,60	445
50	50	16	13	0,3	16	213,90	150
60	40	13	10	0,3	14	137,50	060
	50	16	13	0,3	16	169,20	160
	63	20	16	0,3	18	232,60	260
	80	25	22	0,3	20	380,90	360
	100	32	27	0,3	22	578,60	460
	125	40	32	0,3	28	953,00	560

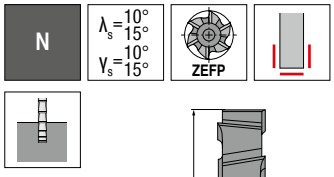
P	●
M	○
K	●
N	○
S	○
H	
O	○

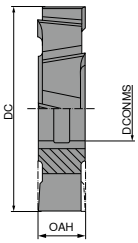
→ v_c/f_z pagina: 44

13

Freză disc, HSS-E Co 5

▲ dantură încrucișată, rară
▲ canal pentru pană conform DIN 138







DIN 885 A

50 348 ...

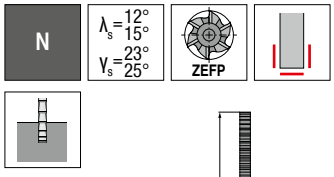
DC js16 mm	OAH k11 mm	DCONMS H7 mm	ZEFP	EUR U6	
50	4	16	12	105,40	100
50	5	16	12	107,20	102
50	6	16	12	109,00	104
50	8	16	12	122,30	106
50	10	16	12	132,10	108
63	4	22	12	114,60	200
63	5	22	12	122,30	202
63	6	22	12	121,10	204
63	8	22	12	134,20	206
63	10	22	12	147,40	208
63	12	22	12	169,20	210
63	14	22	12	189,90	212
80	5	27	14	155,00	300
80	6	27	14	157,20	302
80	8	27	14	169,20	304
80	10	27	14	173,60	306
80	12	27	14	192,10	308
80	14	27	14	222,70	310
80	16	27	14	240,20	312
80	18	27	14	277,30	314
80	20	27	14	300,10	316
100	6	32	14	225,90	400
100	8	32	14	224,90	402
100	10	32	14	237,90	404
100	12	32	14	258,70	406
100	14	32	14	290,40	408
100	16	32	14	303,40	410
100	18	32	14	359,20	412
100	20	32	14	351,40	414
100	25	32	14	456,20	418
125	8	32	16	297,00	500
125	10	32	16	317,70	502
125	12	32	16	343,80	504
125	14	32	16	387,60	506
125	16	32	16	409,30	508
125	18	32	16	444,20	510
125	20	32	16	474,80	512
125	25	32	16	570,80	516
160	10	40	18	470,50	600
160	12	40	18	522,80	602
160	14	40	18	553,40	604
160	16	40	18	594,90	606
160	18	40	18	663,70	608
160	20	40	18	672,40	610
160	25	40	18	823,00	614
160	32	40	18	1.045,00	618

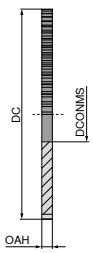
P	○
M	●
K	●
N	●
S	○
H	
O	●

→ v_c/f_z pagina: 45

Freză disc îngustă, HSS-E Co 5

▲ dantură încrucișată, rară
▲ canal pentru pană conform DIN 138







Standard de operare

50 342 ...

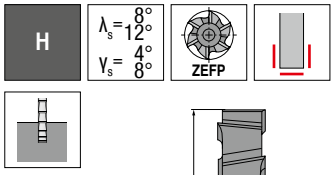
DC js16 mm	OAH k11 mm	DCONMS H7 mm	ZEFP	EUR U6	
63	1,6	22	16	112,50	200
63	2,0	22	16	99,33	202
63	2,5	22	16	101,20	204
63	3,0	22	16	104,10	206
80	1,6	27	20	120,10	300
80	2,0	27	20	116,80	302
80	2,5	27	20	119,00	304
80	3,0	27	20	122,30	306
80	4,0	27	20	132,10	310
100	1,6	32	24	154,00	400
100	2,0	32	24	151,70	402
100	2,5	32	24	151,70	404
100	3,0	32	24	155,00	406
100	4,0	32	24	165,90	410
100	5,0	32	24	177,90	414
125	1,6	32	26	192,10	500
125	2,0	32	26	184,50	502
125	2,5	32	26	189,90	504
125	3,0	32	26	193,20	506
125	4,0	32	26	210,70	510
125	5,0	32	26	224,90	514
125	6,0	32	26	241,20	516
160	2,0	40	30	300,10	600
160	2,5	40	30	290,40	602
160	3,0	40	30	294,70	604
160	4,0	40	30	310,00	606
160	5,0	40	30	329,60	608
160	6,0	40	30	351,40	610
160	8,0	40	22	403,90	612

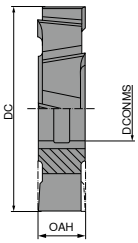
P	○
M	●
K	
N	●
S	○
H	
O	●

→ v_c/f_z pagina: 45

Freză disc, HSS-E Co 5

▲ dantură încrucișată, fină
▲ canal pentru pană conform DIN 138







DIN 885 A

50 349 ...

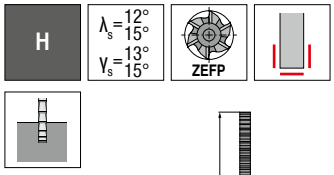
DC js16 mm	OAH k11 mm	DCONMS H7 mm	ZEFP	EUR U6	
50	4	16	16	124,50	100
50	5	16	16	124,50	102
50	6	16	16	133,20	104
50	8	16	16	140,90	106
50	10	16	16	155,00	108
63	4	22	18	136,50	200
63	5	22	18	145,10	202
63	6	22	18	139,70	204
63	8	22	18	157,20	206
63	10	22	18	175,80	208
63	12	22	18	198,70	210
63	14	22	18	223,80	212
80	5	27	20	183,40	300
80	6	27	20	188,90	302
80	8	27	20	197,60	304
80	10	27	18	200,90	306
80	12	27	18	227,10	308
80	14	27	18	263,10	310
80	16	27	18	284,90	312
80	18	27	18	329,60	314
80	20	27	18	329,60	316
100	6	32	22	265,20	400
100	8	32	22	263,10	402
100	10	32	20	283,80	404
100	12	32	20	305,60	406
100	14	32	20	340,50	408
100	16	32	20	361,30	410
100	18	32	20	421,30	412
100	20	32	20	424,70	414
100	25	32	20	526,20	418
125	8	32	24	350,40	500
125	10	32	22	375,40	502
125	12	32	22	406,10	504
125	14	32	22	456,20	506
125	16	32	22	473,80	508
125	18	32	22	546,80	510
125	20	32	22	555,70	512
125	25	32	22	665,90	516
160	10	40	26	558,90	600
160	12	40	26	609,00	602
160	14	40	26	655,00	604
160	16	40	26	705,10	606
160	18	40	26	775,00	608
160	20	40	26	776,10	610
160	25	40	26	966,00	614
160	32	40	26	1.214,00	618

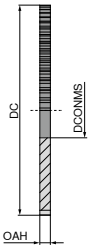
P	●
M	○
K	●
N	●
S	○
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O	●

→ v_c/f_z pagina: 45

Freză disc îngustă, HSS-E Co 5

▲ dantură încrucișată, fină
▲ canal pentru pană conform DIN 138







DIN 1834 A

50 340 ...

DC js16 mm	OAH k11 mm	DCONMS H7 mm	ZEFP	EUR U6	
63	1,6	22	28	107,40	200
63	2,0	22	28	92,57	202
63	2,5	22	28	94,53	204
63	3,0	22	28	96,93	206
80	1,6	27	32	111,30	300
80	2,0	27	32	108,70	302
80	2,5	27	32	110,20	304
80	3,0	27	32	113,50	306
80	4,0	27	32	122,30	310
100	1,6	32	36	135,50	400
100	2,0	32	36	134,20	402
100	2,5	32	36	134,20	404
100	3,0	32	36	136,50	406
100	4,0	32	36	145,10	410
100	5,0	32	36	159,40	414
125	1,6	32	40	175,80	500
125	2,0	32	40	169,20	502
125	2,5	32	40	174,60	504
125	3,0	32	40	177,90	506
125	4,0	32	40	188,90	510
125	5,0	32	40	201,90	514
125	6,0	32	40	223,80	516
160	2,0	40	48	279,40	600
160	2,5	40	48	269,70	602
160	3,0	40	48	274,00	604
160	4,0	40	48	292,50	606
160	5,0	40	48	307,90	608
160	6,0	40	48	332,90	610
160	8,0	40	36	377,70	612

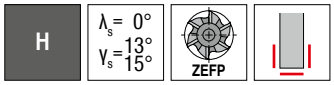
P	●
M	
K	●
N	●
S	●
H	
O	●

→ v_c/f_z pagina: 45

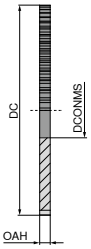
13

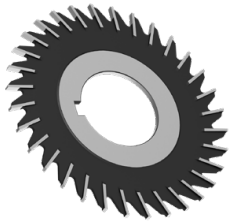
Freză disc îngustă, HSS-E Co 5

▲ dantură dreaptă
▲ canal pentru pană conform DIN 138









				DIN 1834 B	
				50 341 ...	
DC js16 **mm**	OAH k11 mm	DCONMS H7 mm	ZEFP	**EUR** U6	
63	1,6	22	32	123,40	**200**
63	2,0	22	32	109,20	**202**
63	2,5	22	32	111,30	**204**
63	3,0	22	32	114,60	**206**
80	1,6	27	36	133,20	**300**
80	2,0	27	36	128,80	**302**
80	2,5	27	36	130,00	**304**
80	3,0	27	36	135,50	**306**
80	4,0	27	36	143,00	**310**
100	1,6	32	40	157,20	**400**
100	2,0	32	40	157,20	**402**
100	2,5	32	40	157,20	**404**
100	3,0	32	40	159,40	**406**
100	4,0	32	40	173,60	**410**
100	5,0	32	40	182,30	**414**
125	1,6	32	44	212,90	**500**
125	2,0	32	44	203,00	**502**
125	2,5	32	44	210,70	**504**
125	3,0	32	44	215,00	**506**
125	4,0	32	44	229,30	**510**
125	5,0	32	44	246,70	**514**
125	6,0	32	44	270,70	**516**
160	2,0	40	52	329,60	**600**
160	2,5	40	52	316,50	**602**
160	3,0	40	52	323,10	**604**
160	4,0	40	52	340,50	**606**
160	5,0	40	52	362,40	**608**
160	6,0	40	52	386,40	**610**
160	8,0	40	40	443,20	**612**

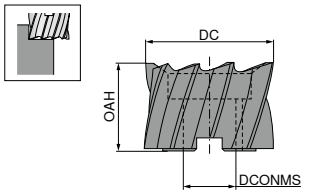
P	●
M	○
K	●
N	●
S	○
H	
O	●

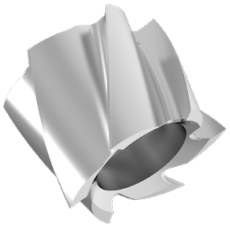
→ v_c/f_z pagina: 45

Freză cilindro frontală, HSS-E Co 5

▲ canal pentru pană conform DIN 138

W | λ_s=30° γ_s=24° | ZEFP





DIN 1880

50 255 ...

DC $_{k10}$ mm	OAH mm	DCONMS mm	ZEFP	EUR U8	
40	32	16	6	218,40	**040**
50	36	22	6	250,00	**050**
63	40	27	6	317,70	**063**
80	45	27	6	514,20	**080**
100	50	32	6	808,90	**100**

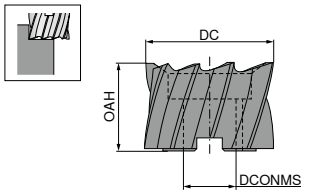
P	
M	
K	
N	●
S	
H	
O	●

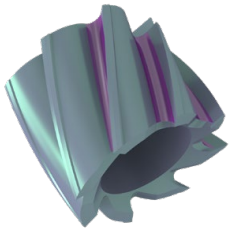
→ v_c/f_z pagina: 46+47

Freză cilindro frontală, HSS-E Co 5

▲ canal pentru pană conform DIN 138

N | λ_s=25° γ_s=10° | ZEFP | Ti100 Pro





DIN 1880

54 035 ...

DC $_{k10}$ mm	OAH mm	DCONMS mm	ZEFP	EUR U8	
40	32	16	8	247,80	**040**
50	36	22	8	317,70	**050**
63	40	27	8	402,70	**063**
80	45	27	10	601,50	**080**
100	50	32	12	942,00	**100**

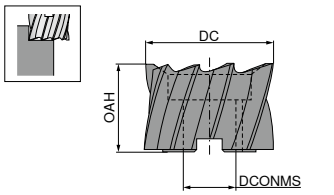
P	●
M	●
K	●
N	●
S	○
H	
O	●

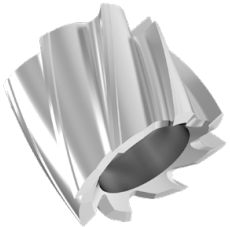
→ v_c/f_z pagina: 46+47

Freză cilindro frontală, HSS-E Co 5

▲ canal pentru pană conform DIN 138

N | λ_s=25° γ_s=10° | ZEFP





DIN 1880

50 250 ...

DC $_{k10}$ mm	OAH mm	DCONMS mm	ZEFP	EUR U8	
40	32	16	8	173,60	**040**
50	36	22	8	227,10	**050**
63	40	27	8	312,20	**063**
80	45	27	10	471,50	**080**
100	50	32	12	745,50	**100**

P	●
M	●
K	●
N	●
S	○
H	
O	●

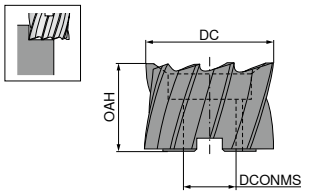
→ v_c/f_z pagina: 46+47

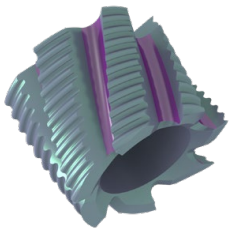
Freză cilindro frontală de degroșare-finisare, HSS-Co 5

▲ canal pentru pană conform DIN 138

▲ toleranța de fabricare se află în domeniul pozitiv a câmpului de toleranță js14

NF | λ_s=25° γ_s=12° | ZEFP | Ti100 Pro





DIN 1880

54 036 ...

DC $_{js14}$ mm	OAH mm	DCONMS mm	ZEFP	EUR U8	
40	32	16	7	235,80	**040**
50	36	22	8	302,40	**050**
63	40	27	8	461,70	**063**
80	45	27	10	675,70	**080**
100	50	32	12	1.025,00	**100**

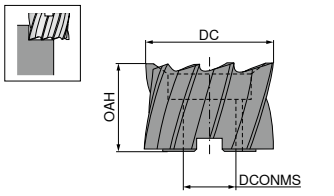
P	●
M	●
K	●
N	●
S	○
H	
O	●

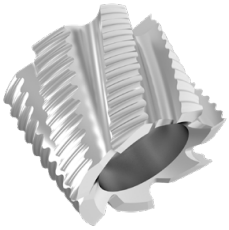
→ v_c/f_z pagina: 46+47

Freză cilindro frontală de degroșare, HSS-Co 5

▲ canal pentru pană conform DIN 138
▲ toleranța de fabricare se află în domeniul pozitiv a câmpului de toleranță js14

NR | λ_s=25° γ_s=14° | ZEFP





DIN 1880

50 260 ...

DC js14 mm	OAH mm	DCONMS mm	ZEFP	EUR U8	
40	32	16	7	176,90	**040**
50	36	22	8	233,60	**050**
63	40	27	8	314,40	**063**
80	45	27	10	441,10	**080**
100	50	32	12	677,80	**100**

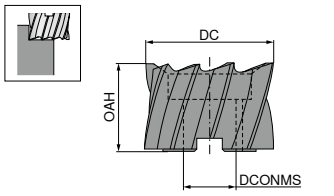
P	●
M	●
K	●
N	●
S	○
H	
O	●

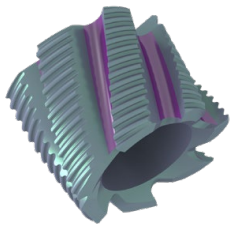
→ v_c/f_z pagina: 46+47

Freză cilindro frontală de degroșare fină, HSS-Co 8

▲ canal pentru pană conform DIN 138
▲ toleranța de fabricare se află în domeniul pozitiv a câmpului de toleranță js14

HR | λ_s=25° γ_s=10° | ZEFP | Ti100 Pro





DIN 1880

54 037 ...

DC js14 mm	OAH mm	DCONMS mm	ZEFP	EUR U8	
40	32	16	7	247,80	**040**
50	36	22	8	310,00	**050**
63	40	27	8	479,20	**063**
80	45	27	10	703,00	**080**
100	50	32	12	1.062,00	**100**

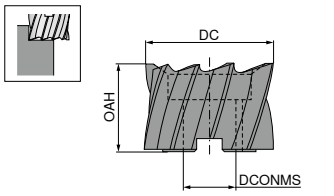
P	●
M	●
K	●
N	●
S	○
H	
O	●

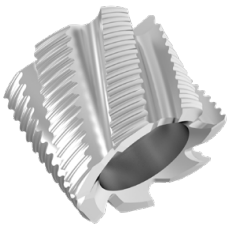
→ v_c/f_z pagina: 46+47

Freză cilindro frontală de degroșare fină, HSS-Co 8

▲ canal pentru pană conform DIN 138
▲ toleranța de fabricare se află în domeniul pozitiv a câmpului de toleranță js14

HR | λ_s=25° γ_s=10° | ZEFP





DIN 1880

50 297 ...

DC js14 mm	OAH mm	DCONMS mm	ZEFP	EUR U8	
40	32	16	7	176,90	**040**
50	36	22	8	233,60	**050**
63	40	27	8	314,40	**063**
80	45	27	10	441,10	**080**
100	50	32	12	677,80	**100**

P	●
M	●
K	●
N	●
S	○
H	
O	●

→ v_c/f_z pagina: 46+47

Exemple de materiale pentru tabele cu date de aşchiere

	Subgrupă de materiale	Index	Compoziţie / structură / tratament termic		Rezistenţă N/mm²* / HB / HRC	Număr material	Denumire material	Număr material	Denumire material
P	Oţel nealiat	P.1.1	< 0,15 % C	temperat	420 N/mm² / 125 HB	1.0401	C15	1.1141	Ck15
		P.1.2	< 0,45 % C	temperat	640 N/mm² / 190 HB	1.1191	C45E	1.0718	9SMnPb28
		P.1.3		îmbunătăţit	840 N/mm² / 250 HB	1.1191	C45E	1.0535	C55
		P.1.4	< 0,75 % C	temperat	910 N/mm² / 270 HB	1.1223	C60R	1.0535	C55
		P.1.5		îmbunătăţit	1010 N/mm² / 300 HB	1.1223	C60R	1.0727	45S20
	Oţel slab aliat	P.2.1		temperat	610 N/mm² / 180 HB	1.7131	16MnCr5	1.6587	17CrNiMo6
		P.2.2		îmbunătăţit	930 N/mm² / 275 HB	1.7131	16MnCr5	1.6587	17CrNiMo6
		P.2.3		îmbunătăţit	1010 N/mm² / 300 HB	1.7225	42CrMo4	1.3505	100Cr6
		P.2.4		îmbunătăţit	1200 N/mm² / 375 HB	1.7225	42CrMo4	1.3505	100Cr6
	oţel puternic aliat şi oţel de scule	P.3.1		temperat	680 N/mm² / 200 HB	1.4021	X20Cr13	1.4034	X46Cr13
		P.3.2		călit şi revenit	1100 N/mm² / 300 HB	1.2343	X38CrMoV5-1	1.4034	X46Cr13
		P.3.3		călit şi revenit	1300 N/mm² / 400 HB	1.2343	X38CrMoV5-1	1.4034	X46Cr13
	Oţel inoxidabil	P.4.1	feritic / martensitic	temperat	680 N/mm² / 200 HB	1.4016	X6Cr17	1.2316	X36CrMo16
		P.4.2	martensitic	îmbunătăţit	1010 N/mm² / 300 HB	1.4112	X90CrMoV18	1.2316	X36CrMo16
M	Oţel inoxidabil	M.1.1	austenitic / austenitic-feritic	călit	610 N/mm² / 180 HB	1.4301	X5CrNi18-10	1.4571	X6CrNiMoTi17-12-2
		M.2.1	austenitic	îmbunătăţit	300 HB	1.4841	X15CrNiSi25-21	1.4539	X1NiCrMoCu25-20-5
		M.3.1	austenitic / feritic (Duplex)		780 N/mm² / 230 HB	1.4462	X2CrNiMoN22-5-3	1.4501	X2CrNiMoCuWN25-7-4
K	Fontă cenuşie	K.1.1	perlitic / feritic		350 N/mm² / 180 HB	0.6010	GG-10	0.6025	GG-25
		K.1.2	perlitic (martensitic)		500 N/mm² / 260 HB	0.6030	GG-30	0.6045	GG-45
	Fontă cu grafit nodular	K.2.1	feritic		540 N/mm² / 160 HB	0.7040	GGG-40	0.7060	GGG-60
		K.2.2	perlitic		845 N/mm² / 250 HB	0.7070	GGG-70	0.7080	GGG-80
	Fontă maleabilă	K.3.1	feritic		440 N/mm² / 130 HB	0.8035	GTW-35-04	0.8045	GTW-45
		K.3.2	perlitic		780 N/mm² / 230 HB	0.8165	GTS-65-02	0.8170	GTS-70-02
N	Aluminiu – aliaj forjat	N.1.1	necălibil		60 HB	3.0255	Al99,5	3.3315	AlMg1
		N.1.2	călibil	călit	340 N/mm² / 100 HB	3.1355	AlCuMg2	3.2315	AlMgSi1
	Aluminiu – aliaj turnat	N.2.1	≤ 12 % Si, necălibil		250 N/mm² / 75 HB	3.2581	G-AlSi12	3.2163	G-AlSi9Cu3
		N.2.2	≤ 12 % Si, călibil	călit	300 N/mm² / 90 HB	3.2134	G-AlSi5Cu1Mg	3.2373	G-AlSi9Mg
		N.2.3	> 12 % Si, necălibil		440 N/mm² / 130 HB		G-AlSi17Cu4Mg		G-AlSi18CuNiMg
	Cupru şi aliaje de cupru (bronz / alamă)	N.3.1	Aliaje de maşini automate, PB > 1 %		375 N/mm² / 110 HB	2.0380	CuZn39Pb2 (Ms58)	2.0410	CuZn44Pb2
		N.3.2	CuZn, CuSnZn		300 N/mm² / 90 HB	2.0331	CuZn15	2.4070	CuZn28Sn1As
		N.3.3	CuSn, cupru fără plumb şi cupru electrolitic		340 N/mm² / 100 HB	2.0060	E-Cu57	2.0590	CuZn40Fe
	Aliaje de magneziu	N.4.1	Magneziu şi aliaje de magneziu		70 HB	3.5612	MgAl6Zn	3.5312	MgAl3Zn
S	Aliaje termorezistente	S.1.1	pe bază de Fe	temperat	680 N/mm² / 200 HB	1.4864	X12NiCrSi 36-16	1.4865	G-X40NiCrSi38-18
		S.1.2		călit	950 N/mm² / 280 HB	1.4980	X6NiCrTiMoVB25-15-2	1.4876	X10NiCrAlTi32-20
		S.2.1	pe bază de Ni sau Co	temperat	840 N/mm² / 250 HB	2.4631	NiCr20TiAl (Nimonic80A)	3.4856	NiCr22Mo9Nb
		S.2.2		călit	1180 N/mm² / 350 HB	2.4668	NiCr19Nb5Mo3 (Inconel 718)	2.4955	NiFe25Cr20NbTi
		S.2.3		turnat	1080 N/mm² / 320 HB	2.4765	CoCr20W15Ni	1.3401	G-X120Mn12
	Aliaje din titan	S.3.1	Titan pur		400 N/mm²	3.7025	Ti99,8	3.7034	Ti99,7
		S.3.2	Aliaje alfa + beta	călit	1050 N/mm² / 320 HB	3.7165	TiAl6V4	Ti-6246	Ti-6Al-2Sn-4Zr-6Mo
		S.3.3	Aliaje beta		1400 N/mm² / 410 HB	Ti555.3	Ti-5Al-5V-5Mo-3Cr	R56410	Ti-10V-2Fe-3Al
H	Oţel călit	H.1.1		călit şi revenit	46–55 HRC				
		H.1.2		călit şi revenit	56–60 HRC				
		H.1.3		călit şi revenit	61–65 HRC				
		H.1.4		călit şi revenit	66–70 HRC				
	Fontă dură	H.2.1		turnat	400 HB				
	Fontă călită	H.3.1		călit şi revenit	55 HRC				
O	Materiale nemetalilce	O.1.1	Materiale plastice, termorigide		≤ 150 N/mm²				
		O.1.2	Materiale plastice, termoplastice		≤ 100 N/mm²				
		O.2.1	armat cu fibre de aramidă		≤ 1000 N/mm²				
		O.2.2	armat cu fibre de sticlă / carbon		≤ 1000 N/mm²				
		O.3.1	Grafit						

*** Rezistenţa la tracţiune**

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Viteze de așchiere orientative – freze deget și freze slot

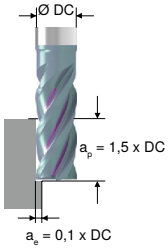
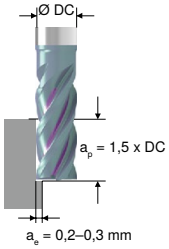
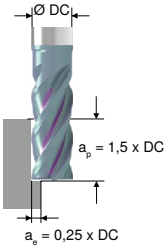
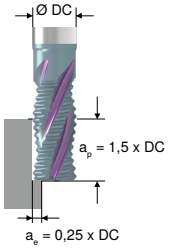
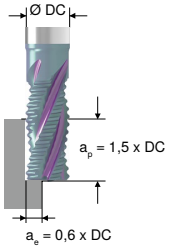
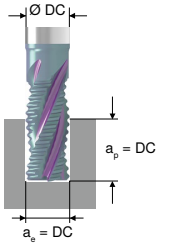
		neacoperit	Ti100 Pro	Sinterizat	● prima alegere ○ adecvat		
				Ti100 Pro			
Indice	Kf f_z	v_c în m/min			Emulsie	Aer comprimat	Ungere minimă
P.1.1	1,2	20	45	50	●		
P.1.2	1,2	20	45	50	●		
P.1.3	1,2	20	45	50	●		
P.1.4	1,0	15	30	35	●		
P.1.5	1,0	15	30	35	●		
P.2.1	1,2	20	40	45	●		
P.2.2	1,0	15	40	45	●		
P.2.3	0,8	15	30	35	●		
P.2.4	0,8	15	30	35	●		
P.3.1	1,0	15	30	35	●		
P.3.2	0,8	12	25	30	●		
P.3.3	0,8	10	20	25	●		
P.4.1	1,0	10	20	25	●		
P.4.2	1,0	10	20	25	●		
M.1.1	1,0	10	20	25	●		
M.2.1	0,9	7	15	20	●		
M.3.1	1,0	5	10	15	●		
K.1.1	1,0	18	35	40	●		
K.1.2	1,0	18	25	30	●		
K.2.1	1,0	15	30	35	●		
K.2.2	1,0	15	30	35	●		
K.3.1	1,0	15	35	40	●		
K.3.2	0,8	12	25	30	●		
N.1.1	1,9	150	240	260	●		
N.1.2	1,9	100	130	150	●		
N.2.1	1,8		100	140	●		
N.2.2	1,7		60	80	●		
N.2.3							
N.3.1	1,1		100	130	●		
N.3.2	1,2	30	60	80	●		
N.3.3	1,2	30	60	80	●		
N.4.1	1,8	90	140	160		●	
S.1.1							
S.1.2							
S.2.1							
S.2.2							
S.2.3							
S.3.1	1,0	10	15	25	●		
S.3.2	1,1	10	15	25	●		
S.3.3							
H.1.1							
H.1.2							
H.1.3							
H.1.4							
H.2.1							
H.3.1							
O.1.1	2,0	30	50	70	●		
O.1.2	2,0	20	25	40	●		
O.2.1							
O.2.2							
O.3.1	1,0		30	40	o		

În cazul frezării slot plin, vitezele de așchiere date în tabel trebuie micșorate cu aproximativ 15–20 %!

Kf f_z = coeficient de corecție pentru calcularea avansului pe dinte

Avansul pe dinte – freză deget HSS

Valori orientative ale avansului pe dinte (f_z) în (mm)

	Frezare contur										Frezare slot	
												
	f_z în mm		f_z în mm		f_z în mm		f_z în mm		f_z în mm		f_z în mm	
Ø DC mm	neacoperit	acoperit	neacoperit	acoperit	neacoperit	acoperit	neacoperit	acoperit	neacoperit	acoperit	neacoperit	acoperit
2	0,008	0,009	0,008	0,009	0,008	0,009						
3	0,011	0,012	0,010	0,012	0,009	0,010						
4	0,017	0,018	0,014	0,015	0,013	0,014	0,015	0,016	0,013	0,014	0,011	0,012
5	0,024	0,026	0,018	0,020	0,014	0,015	0,019	0,021	0,016	0,018	0,014	0,016
6	0,032	0,035	0,022	0,024	0,015	0,017	0,024	0,027	0,020	0,022	0,018	0,019
8	0,047	0,051	0,029	0,032	0,020	0,022	0,032	0,036	0,027	0,030	0,024	0,026
10	0,065	0,072	0,037	0,041	0,026	0,028	0,042	0,047	0,035	0,039	0,031	0,034
12	0,084	0,091	0,044	0,049	0,031	0,034	0,051	0,057	0,043	0,047	0,037	0,041
14	0,100	0,106	0,054	0,059	0,037	0,041	0,063	0,069	0,053	0,058	0,045	0,050
16	0,111	0,121	0,061	0,067	0,042	0,046	0,072	0,079	0,060	0,066	0,052	0,057
18	0,126	0,136	0,070	0,077	0,048	0,053	0,084	0,093	0,071	0,078	0,061	0,067
20	0,141	0,151	0,076	0,083	0,052	0,057	0,092	0,101	0,077	0,084	0,066	0,073
22	0,160	0,166	0,085	0,094	0,059	0,065	0,104	0,114	0,087	0,096	0,075	0,082
25	0,170	0,188	0,095	0,104	0,065	0,072	0,117	0,129	0,098	0,108	0,084	0,093
28	0,196	0,210	0,109	0,120	0,075	0,083	0,136	0,150	0,114	0,125	0,098	0,108
32	0,212	0,240	0,124	0,137	0,086	0,094	0,157	0,173	0,131	0,145	0,113	0,125
36	0,224	0,240	0,144	0,159	0,099	0,109	0,170	0,194	0,142	0,162	0,126	0,140
40	0,240	0,240	0,157	0,173	0,108	0,119	0,184	0,202	0,154	0,169	0,132	0,146
45	0,240	0,240	0,157	0,173	0,108	0,119	0,200	0,220	0,170	0,180	0,140	0,160
50	0,240	0,240	0,157	0,173	0,108	0,119	0,200	0,220	0,170	0,180	0,140	0,160

Atenție:
În cazul frezelor fără acoperire frezarea în sensul avansului este mai avantajos decât în cel contrar. În cazul frezelor acoperite este necesar frezarea în sensul avansului pentru rezultatul optim.

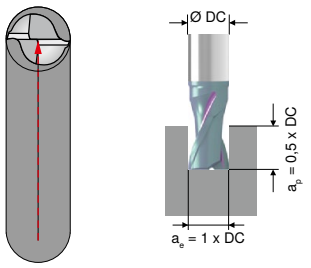
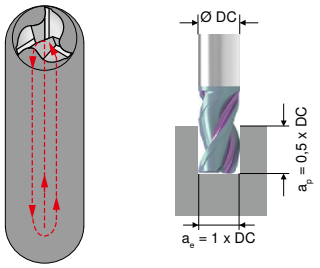
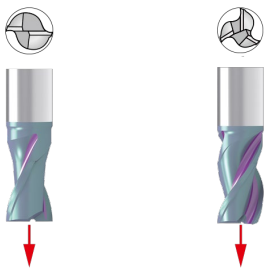
Corecție avans:
Vă rugăm multipicați rezultatul obținut din tabel a valorii f_z, cu **Kf f_z coeficientul de corecție** adecvat din tabelul aflat pe → **pagina 40**.

În gereral sunt valabile următoarele:
f_z (frezare) = f_z * Kf f_z
f_z (găurire) = f_z (frezare) / număr dinți

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Avansul pe dinte – frezare canale cu freză slot HSS

Valori orientative ale avansului pe dinte (f_z) în (mm)

	Frezare plină slot (cu o trecere)		Frezare sub mărime nominală (frezare ramă)				Frezare alezaj			
										
			Degroșare		Finisare					
	f_z în mm		f_z în mm				f_z în mm			
Ø DC mm	neacoperit	acoperit	neacoperit	acoperit	neacoperit	acoperit	neacoperit	acoperit	neacoperit	acoperit
2	0,005	0,006	0,005	0,006	0,008	0,009	0,003	0,003	0,002	0,002
3	0,009	0,010	0,009	0,010	0,015	0,016	0,004	0,005	0,003	0,003
4	0,012	0,013	0,012	0,013	0,022	0,024	0,006	0,007	0,004	0,004
5	0,016	0,017	0,016	0,017	0,030	0,033	0,008	0,009	0,005	0,006
6	0,020	0,022	0,020	0,022	0,039	0,043	0,010	0,011	0,007	0,007
8	0,026	0,029	0,026	0,029	0,055	0,061	0,013	0,014	0,009	0,010
10	0,034	0,037	0,034	0,037	0,075	0,082	0,017	0,019	0,011	0,012
12	0,040	0,044	0,040	0,044	0,093	0,101	0,020	0,022	0,013	0,015
14	0,049	0,054	0,049	0,054	0,117	0,118	0,024	0,027	0,016	0,018
16	0,056	0,062	0,056	0,062	0,135	0,135	0,028	0,031	0,019	0,021
18	0,065	0,072	0,065	0,072	0,151	0,151	0,033	0,036	0,022	0,024
20	0,071	0,078	0,071	0,078	0,167	0,167	0,035	0,039	0,024	0,026
22	0,080	0,088	0,080	0,088	0,184	0,184	0,040	0,044	0,027	0,029
25	0,089	0,098	0,089	0,098	0,208	0,208	0,044	0,049	0,030	0,033
28	0,103	0,113	0,103	0,113	0,233	0,233	0,051	0,056	0,034	0,037
32	0,118	0,130	0,118	0,130	0,260	0,260	0,060	0,065	0,040	0,043
36	0,130	0,143	0,130	0,143	0,260	0,260	0,060	0,065	0,040	0,043
40	0,130	0,143	0,130	0,143	0,260	0,260	0,060	0,065	0,040	0,043
45	0,130	0,143	0,130	0,143	0,260	0,260	0,060	0,065	0,040	0,043
50	0,130	0,143	0,130	0,143	0,260	0,260	0,060	0,065	0,040	0,043

Atenție:
În cazul frezelor fără acoperire frezarea în sensul avansului este mai avantajos decât în cel contrar. În cazul frezelor acoperite este necesar frezarea în sensul avansului pentru rezultatul optim.

Corecție avans:
Vă rugăm multipicați rezultatul obținut din tabel a valorii f_z, cu **Kf f_z** coeficientul de corecție adecvat din tabelul aflat pe → **pagina 40.**

În gereral sunt valabile următoarele:
f_z (frezare) = f_z * Kf f_z
f_z (găurire) = f_z (frezare) / număr dinți

Date orientative de așchiere – freze profil

		50 241 ...			50 240 ...					50 234 ...				50 248 ...				● prima alegere ○ adecvat		
		Ø DC = 21–25 mm	Ø DC = 28–36 mm	Ø DC = 40–45 mm	Ø DC = 11–16 mm	Ø DC = 18–22 mm	Ø DC = 25–32 mm	Ø DC = 36–45 mm	Ø DC = 50–60 mm	Ø DC = 10–17 mm	Ø DC = 19–26 mm	Ø DC = 28–33 mm	Ø DC = 33–46 mm	Ø DC = 8–11 mm	Ø DC = 12–24 mm	Ø DC = 26–34 mm	Ø DC = 46–48 mm	Emulsie	Aer comprimat	Ungere minimă
Indice	v_c m/min	f_z mm			f_z mm					v_c m/min	f_z mm			f_z mm						
P.1.1	**28**	**0,07**	**0,1**	**0,12**	**0,015**	**0,03**	**0,03**	**0,03**	**0,04**	**28**	**0,02**	**0,03**	**0,04**	**0,05**	**0,03**	**0,06**	**0,1**	**0,12**	●		
P.1.2	**28**	**0,07**	**0,1**	**0,12**	**0,015**	**0,03**	**0,03**	**0,03**	**0,04**	**28**	**0,02**	**0,03**	**0,04**	**0,05**	**0,03**	**0,06**	**0,1**	**0,12**	●		
P.1.3	**28**	**0,07**	**0,1**	**0,12**	**0,015**	**0,03**	**0,03**	**0,03**	**0,04**	**28**	**0,02**	**0,03**	**0,04**	**0,05**	**0,03**	**0,06**	**0,1**	**0,12**	●		
P.1.4	**22**	**0,06**	**0,08**	**0,1**	**0,015**	**0,03**	**0,03**	**0,03**	**0,04**	**22**	**0,02**	**0,03**	**0,035**	**0,045**	**0,025**	**0,055**	**0,08**	**0,1**	●		
P.1.5	**22**	**0,06**	**0,08**	**0,1**	**0,015**	**0,03**	**0,03**	**0,03**	**0,04**	**22**	**0,02**	**0,03**	**0,035**	**0,045**	**0,025**	**0,055**	**0,08**	**0,1**	●		
P.2.1	**22**	**0,06**	**0,08**	**0,1**	**0,015**	**0,03**	**0,03**	**0,03**	**0,04**	**22**	**0,02**	**0,03**	**0,035**	**0,045**	**0,025**	**0,055**	**0,08**	**0,1**	●		
P.2.2	**28**	**0,07**	**0,1**	**0,12**	**0,015**	**0,03**	**0,03**	**0,03**	**0,04**	**28**	**0,02**	**0,03**	**0,04**	**0,05**	**0,03**	**0,06**	**0,1**	**0,12**	●		
P.2.3	**20**	**0,06**	**0,08**	**0,1**	**0,015**	**0,03**	**0,03**	**0,03**	**0,04**	**20**	**0,02**	**0,03**	**0,035**	**0,045**	**0,025**	**0,055**	**0,08**	**0,1**	●		
P.2.4	**20**	**0,06**	**0,08**	**0,1**	**0,015**	**0,03**	**0,03**	**0,03**	**0,04**	**20**	**0,02**	**0,03**	**0,035**	**0,045**	**0,025**	**0,055**	**0,08**	**0,1**	●		
P.3.1																				
P.3.2																				
P.3.3																				
P.4.1	**10**	**0,06**	**0,08**	**0,1**	**0,01**	**0,025**	**0,025**	**0,025**	**0,03**	**10**	**0,02**	**0,025**	**0,03**	**0,04**	**0,02**	**0,045**	**0,08**	**0,09**	●		
P.4.2	**10**	**0,06**	**0,08**	**0,1**	**0,01**	**0,025**	**0,025**	**0,025**	**0,03**	**10**	**0,02**	**0,025**	**0,03**	**0,04**	**0,02**	**0,045**	**0,08**	**0,09**	●		
M.1.1	10	0,06	0,08	0,1	0,01	0,025	0,025	0,025	0,03	10	0,02	0,025	0,03	0,04	0,02	0,045	0,08	0,09	●		
M.2.1																				
M.3.1																				
K.1.1	**28**	**0,07**	**0,1**	**0,12**	**0,015**	**0,03**	**0,025**	**0,04**	**0,035**	**24**	**0,025**	**0,03**	**0,04**	**0,05**	**0,03**	**0,06**	**0,1**	**0,12**	●		
K.1.2																				
K.2.1	**22**	**0,07**	**0,1**	**0,12**	**0,015**	**0,03**	**0,025**	**0,04**	**0,035**	**22**	**0,025**	**0,03**	**0,04**	**0,05**	**0,03**	**0,06**	**0,1**	**0,12**	●		
K.2.2	**20**	**0,07**	**0,1**	**0,12**	**0,015**	**0,03**	**0,025**	**0,04**	**0,035**	**20**	**0,025**	**0,03**	**0,04**	**0,05**	**0,03**	**0,06**	**0,1**	**0,12**	●		
K.3.1	**15**	**0,07**	**0,1**	**0,12**	**0,015**	**0,03**	**0,025**	**0,04**	**0,035**	**15**	**0,025**	**0,03**	**0,04**	**0,05**	**0,03**	**0,06**	**0,1**	**0,12**	●		
K.3.2	**15**	**0,07**	**0,1**	**0,12**	**0,015**	**0,03**	**0,025**	**0,04**	**0,035**	**15**	**0,025**	**0,03**	**0,04**	**0,05**	**0,03**	**0,06**	**0,1**	**0,12**	●		
N.1.1	100	0,1	0,12	0,15	0,02	0,045	0,045	0,045	0,055	90	0,03	0,04	0,06	0,07	0,035	0,07	0,14	0,15	●		
N.1.2	100	0,1	0,12	0,15	0,02	0,045	0,045	0,045	0,055	90	0,03	0,04	0,06	0,07	0,035	0,07	0,14	0,15	●		
N.2.1	80	0,09	0,11	0,13	0,015	0,04	0,035	0,04	0,045	80	0,03	0,035	0,045	0,055	0,03	0,06	0,12	0,12	●		
N.2.2	60	0,09	0,11	0,13	0,015	0,04	0,035	0,04	0,045	60	0,03	0,035	0,045	0,055	0,03	0,06	0,12	0,12	●		
N.2.3																				
N.3.1	25	0,08	0,1	0,12	0,015	0,04	0,035	0,03	0,035	25	0,02	0,035	0,045	0,055	0,03	0,06	0,12	0,12	●		
N.3.2	25	0,08	0,1	0,12	0,015	0,04	0,035	0,03		25	0,02	0,035	0,045	0,055	0,03	0,06	0,12	0,12	●		
N.3.3	25	0,08	0,1	0,12	0,015	0,04	0,035	0,03		25	0,02	0,035	0,045	0,055	0,03	0,06	0,12	0,12	●		
N.4.1	70	0,1	0,12	0,15	0,018	0,04	0,03	0,035	0,045	70	0,03	0,035	0,05	0,06	0,025	0,06	0,1	0,12	●		
S.1.1																				
S.1.2																				
S.2.1																				
S.2.2																				
S.2.3																				
S.3.1	20	0,06	0,08	0,1	0,012	0,025	0,025	0,025	0,035	20	0,015	0,025	0,035	0,045	0,02	0,05	0,07	0,09	●		
S.3.2																				
S.3.3																				
H.1.1																				
H.1.2																				
H.1.3																				
H.1.4																				
H.2.1																				
H.3.1																				
O.1.1	65	0,12	0,15	0,18		0,06	0,055	0,055	0,07	65	0,04	0,05	0,07	0,09	0,045	0,1	0,18	0,18	●		
O.1.2	80	0,12	0,15	0,18		0,06	0,055	0,055	0,07	80	0,04	0,05	0,07	0,09	0,045	0,1	0,18	0,18	●		
O.2.1																				
O.2.2																				
O.3.1																				

13

Datele de așchiere depind în mare măsură de condițiile externe, ex. stabilitatea sculei și a portsculei, tipul materialului și a mașinii. Valorile date indică datele de așchiere posibile, care pot fi majorate sau reduse potrivit condițiilor de utilizare.

Date orientative de așchiere – freze profil

		50 245 ... / 50 246 ...			50 360 ...					50 362 ...				● prima alegere ○ adecvat		
		Ø DC = 16 mm a_e = 3,2	Ø DC = 20 mm a_e = 4	Ø DC = 25 mm a_e = 5	Ø DC = 50 mm a_e = 5	Ø DC = 63 mm a_e = 6,3	Ø DC = 80 mm a_e = 8	Ø DC = 100 mm a_e = 10	Ø DC = 40–50 mm	Ø DC = 63 mm	Ø DC = 80 mm	Ø DC = 100 mm	Emulsie	Aer comprimat	Ungere minimă
Indice	v_c m/min	f_z mm			v_c m/min	f_z mm				f_z mm						
P.1.1	28	0,01	0,015	0,018	22	0,01	0,01	0,015	0,02	0,005	0,008	0,01	0,012	●		
P.1.2	28	0,01	0,015	0,018	22	0,01	0,01	0,015	0,02	0,005	0,008	0,01	0,012	●		
P.1.3	28	0,01	0,015	0,018	22	0,01	0,01	0,015	0,02	0,005	0,008	0,01	0,012	●		
P.1.4	22	0,01	0,015	0,018	20	0,008	0,01	0,012	0,018	0,005	0,008	0,01	0,012	●		
P.1.5	22	0,01	0,015	0,018	20	0,01	0,01	0,015	0,02	0,005	0,008	0,01	0,012	●		
P.2.1	22	0,01	0,015	0,018	20	0,01	0,01	0,015	0,02	0,005	0,008	0,01	0,012	●		
P.2.2	28	0,01	0,015	0,018	22	0,008	0,01	0,012	0,018	0,005	0,008	0,01	0,012	●		
P.2.3	20	0,01	0,015	0,018	20	0,01	0,01	0,015	0,02	0,005	0,008	0,01	0,012	●		
P.2.4	20	0,01	0,015	0,018	20	0,01	0,01	0,015	0,02	0,005	0,008	0,01	0,012	●		
P.3.1																
P.3.2																
P.3.3																
P.4.1	10	0,007	0,01	0,012	10	0,008	0,01	0,012	0,018	0,005	0,008	0,01	0,012	●		
P.4.2	10	0,007	0,01	0,012	10	0,008	0,01	0,012	0,018	0,005	0,008	0,01	0,012	●		
M.1.1	10	0,007	0,01	0,012	10	0,008	0,01	0,012	0,018	0,005	0,008	0,01	0,012	●		
M.2.1																
M.3.1																
K.1.1	24	0,01	0,012	0,015	19	0,008	0,01	0,012	0,018	0,005	0,008	0,01	0,012	●		
K.1.2					12	0,008	0,01	0,012	0,018	0,005	0,008	0,01	0,012	●		
K.2.1	22	0,01	0,012	0,015	15	0,008	0,01	0,012	0,018	0,005	0,008	0,01	0,012	●		
K.2.2	20	0,01	0,012	0,015	12	0,008	0,01	0,012	0,018	0,005	0,008	0,01	0,012	●		
K.3.1	15	0,01	0,012	0,015	16	0,008	0,01	0,012	0,018	0,005	0,008	0,01	0,012	●		
K.3.2	15	0,01	0,012	0,015	13	0,008	0,01	0,012	0,018	0,005	0,008	0,01	0,012	●		
N.1.1	90	0,01	0,015	0,02										●		
N.1.2	90	0,01	0,015	0,02	70	0,012	0,015	0,02	0,024	0,008	0,012	0,014	0,018	●		
N.2.1	80	0,01	0,015	0,02	60	0,012	0,015	0,02	0,024	0,008	0,012	0,014	0,018	●		
N.2.2	60	0,01	0,015	0,02	60	0,012	0,015	0,02	0,024	0,008	0,012	0,014	0,018	●		
N.2.3																
N.3.1	25	0,01	0,015	0,02	20	0,01	0,012	0,015	0,018	0,005	0,008	0,01	0,012	●		
N.3.2	25	0,01	0,015	0,02	20	0,01	0,012	0,015	0,018	0,005	0,008	0,01	0,012	●		
N.3.3	25	0,01	0,015	0,02	20	0,01	0,012	0,015	0,018	0,005	0,008	0,01	0,012	●		
N.4.1	70	0,01	0,015	0,0175	45	0,01	0,012	0,015	0,018	0,005	0,008	0,01	0,01	●		
S.1.1																
S.1.2																
S.2.1																
S.2.2																
S.2.3																
S.3.1	20	0,008	0,01	0,015	20	0,008	0,01	0,012	0,016	0,005	0,007	0,009	0,012	●		
S.3.2																
S.3.3																
H.1.1																
H.1.2																
H.1.3																
H.1.4																
H.2.1																
H.3.1																
O.1.1	65	0,018	0,02	0,025	60	0,015	0,02	0,025	0,03	0,008	0,012	0,018	0,022	●		
O.1.2	80	0,018	0,02	0,025	65	0,015	0,02	0,025	0,03	0,008	0,012	0,018	0,022	●		
O.2.1																
O.2.2																
O.3.1																

Datele de așchiere depind în mare măsură de condițiile externe, ex. stabilitatea sculei și a portsculei, tipul materialului și a mașinii. Valorile date indică datele de așchiere posibile, care pot fi majorate sau reduse potrivit condițiilor de utilizare.

Date orientative de așchiere – freză disc

		50 340 ... / 50 341 ... / 50 342 ... / 50 348 ... / 50 349 ...						● alegere primară ○ potrivit		
		Ø DC = 50 mm	Ø DC = 63 mm	Ø DC = 80 mm	Ø DC = 100 mm	Ø DC = 125 mm	Ø DC = 160 mm	Emulsie	Aer comprimat	Ungere minimă
Indice	v_c în m/min	f_z mm								
P.1.1	30	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	0,095–0,11	0,1–0,12	●		
P.1.2	20	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	0,095–0,11	0,1–0,12	●		
P.1.3	20	0,05–0,07	0,06–0,08	0,07–0,09	0,08–0,10	0,095–0,12	0,1–0,13	●		
P.1.4	15	0,04–0,05	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	0,09–0,1	●		
P.1.5	15	0,04–0,05	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	0,09–0,1	●		
P.2.1	20	0,04–0,05	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	0,09–0,1	●		
P.2.2	20	0,04–0,05	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	0,09–0,1	●		
P.2.3	10	0,03–0,04	0,04–0,05	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	●		
P.2.4	10	0,03–0,04	0,04–0,05	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	●		
P.3.1	15	0,04–0,05	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	0,09–0,1	●		
P.3.2	10	0,03–0,04	0,04–0,05	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	●		
P.3.3	10	0,03–0,04	0,04–0,05	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	●		
P.4.1	10	0,04–0,05	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	0,09–0,1	●		
P.4.2	10	0,04–0,06	0,05–0,07	0,06–0,08	0,07–0,09	0,08–0,10	0,09–0,2	●		
M.1.1	10	0,03–0,04	0,04–0,05	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	●		
M.2.1	10	0,03–0,04	0,04–0,05	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	●		
M.3.1	8	0,04–0,05	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	0,09–0,1	●		
K.1.1	20	0,04–0,05	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	0,09–0,1	●		
K.1.2	18	0,04–0,05	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	0,09–0,1	●		
K.2.1	18	0,04–0,05	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	0,09–0,1	●		
K.2.2	15	0,04–0,05	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	0,09–0,1	●		
K.3.1	18	0,04–0,05	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	0,09–0,1	●		
K.3.2	18	0,04–0,05	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	0,09–0,1	●		
N.1.1	150	0,06–0,075	0,075–0,09	0,009–0,1	0,01–0,12	0,12–0,135	0,135–0,15	●		
N.1.2	100	0,06–0,075	0,075–0,09	0,009–0,1	0,01–0,12	0,12–0,135	0,135–0,15	●		
N.2.1	80	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	0,095–0,11	0,1–0,12	●		
N.2.2	40	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	0,095–0,11	0,1–0,12	●		
N.2.3										
N.3.1	80	0,04–0,05	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	0,09–0,1	●		
N.3.2	30	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	0,095–0,11	0,1–0,12	●		
N.3.3	30	0,05–0,07	0,06–0,08	0,07–0,09	0,08–0,10	0,095–0,12	0,1–0,13	●		
N.4.1	90	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	0,095–0,11	0,1–0,12		●	
S.1.1										
S.1.2										
S.2.1										
S.2.2										
S.2.3										
S.3.1	10	0,04–0,05	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	0,09–0,1	●		
S.3.2	10	0,04–0,05	0,05–0,06	0,06–0,07	0,07–0,08	0,08–0,09	0,09–0,1	●		
S.3.3										
H.1.1										
H.1.2										
H.1.3										
H.1.4										
H.2.1										
H.3.1										
O.1.1	30	0,08–0,1	0,1–0,12	0,12–0,14	0,14–0,16	0,16–0,18	0,18–0,2	●		
O.1.2	20	0,08–0,1	0,1–0,12	0,12–0,14	0,14–0,16	0,16–0,18	0,18–0,2	●		
O.2.1										
O.2.2										
O.3.1										

La freza disc coeficientul de corecție (Kf f_z) se referă la lățimea de așchiere (a_e)

a_e	Kf f_z
0,05 x DC	1,4
0,1 x DC	1,0
0,15 x DC	0,8
0,2 x DC	0,7
0,25 x DC	0,6

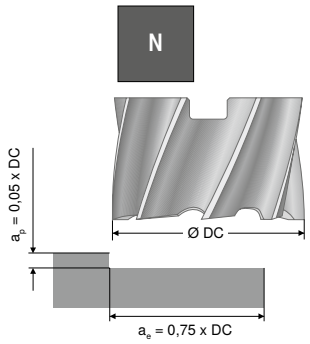
Valorile de avans date se referă la freze disc cu dinți drepți, la adâncimea de așchiere 0,1 x DC! La varianta cu dinți încrucișate, avansul trebuie redus cu 50 %!

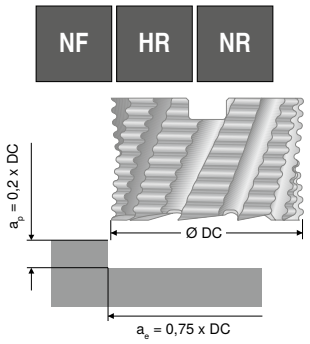
Viteze de așchiere orientative – freze cilindro frontale

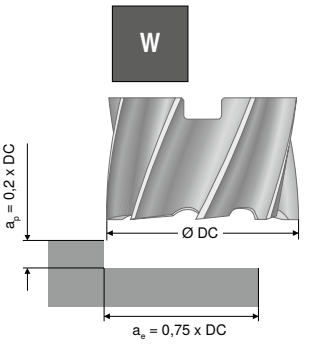
		50 250 ... / 50 255 ... / 50 260 ... / 50 297 ...	54 035 ... / 54 036 ... / 54 037 ...	● alegere primară ○ potrivit		
		neacoperit	Ti100 Pro	Emulsie	Aer comprimat	Ungere minimă
Indice	Kf f_z	v_c în m/min				
P.1.1	**1,2**	**25**	**45**	●		
P.1.2	**1,2**	**20**	**40**	●		
P.1.3	**1,2**	**20**	**40**	●		
P.1.4	**1,0**	**15**	**30**	●		
P.1.5	**1,0**	**15**	**30**	●		
P.2.1	**1,2**	**20**	**40**	●		
P.2.2	**1,0**	**20**	**40**	●		
P.2.3	**0,8**	**10**	**20**	●		
P.2.4	**0,8**	**10**	**20**	●		
P.3.1	**1,0**	**15**	**30**	●		
P.3.2	**0,8**	**10**	**20**	●		
P.3.3	**0,8**	**10**	**20**	●		
P.4.1	**1,0**	**10**	**15**	●		
P.4.2	**1,0**	**10**	**15**	●		
M.1.1	**1,0**	**10**	**15**	●		
M.2.1	**0,9**	**7**	**15**	●		
M.3.1	**1,0**	**5**	**10**	●		
K.1.1	**1,0**	**20**	**30**	●		
K.1.2	**1,0**	**18**	**30**	●		
K.2.1	**1,0**	**18**	**30**	●		
K.2.2	**1,0**	**15**	**25**	●		
K.3.1	**1,0**	**18**	**30**	●		
K.3.2	**1,0**	**18**	**30**	●		
N.1.1	**1,5**	**150**				
N.1.2	**1,5**	**100**				
N.2.1	**1,3**	**80**				
N.2.2	**1,3**	**40**				
N.2.3						
N.3.1	**1,1**	**80**	**110**	●		
N.3.2	**1,2**	**30**	**60**	●		
N.3.3	**1,2**	**30**	**60**	●		
N.4.1	**1,3**	**90**	**120**		●	
S.1.1						
S.1.2						
S.2.1						
S.2.2						
S.2.3						
S.3.1	1,0	10	15	●		
S.3.2	1,1	10	15	●		
S.3.3	0,8		10	●		
H.1.1						
H.1.2						
H.1.3						
H.1.4						
H.2.1						
H.3.1						
O.1.1	**2,0**	**30**	**50**	●		
O.1.2	**2,0**	**20**	**25**	●		
O.2.1						
O.2.2						
O.3.1						

Avansul pe dinte – freze cilindro forntale HSS

Valori orientative ale avansului pe dinte (f_z) în (mm)







	f_z în mm		f_z în mm		f_z în mm
Ø DC mm	neacoperit	Ti100 Pro	neacoperit	Ti100 Pro	neacoperit
40	0,049	0,054	0,064	0,070	0,060
50	0,055	0,060	0,071	0,078	0,066
63	0,061	0,067	0,079	0,087	0,074
80	0,065	0,071	0,084	0,092	0,078
100	0,059	0,065	0,076	0,084	0,071

Corecție avans:
Vă rugăm multipicați rezultatul obținut din tabel a valorii f_z, cu **Kf f_z coeficientul de corecție** adecvat din tabelul aflat pe → **pagina 46**.

În gereral sunt valabile următoarele:
f_z (frezare) = f_z * Kf f_z
f_z (găurire) = f_z (frezare) / număr dinți

Formule de calcul pentru parametrii de așchiere

Denumire	Semn	Unitatea de măsură	Formula
Turația	n	min^{-1}	$n = \frac{v_c \times 1000}{DC \times \pi}$
Viteza de așchiere	v_c	m/min	$v_c = \frac{DC \times \pi \times n}{1000}$
Avans pe dinte	f_z	mm	$f_z = \frac{v_f}{ZEFP \times n}$ $f_z = h_m \times \sqrt{\frac{DC}{a_e}}$
Avans per rotație	f	mm	$f = f_z \times ZEFP$
Viteza de avans	v_f	mm/min	$v_f = f_z \times ZEFP \times n$
Grosimea medie de așchiere	h_m	mm	$h_m = f_z \times \sqrt{\frac{a_e}{DC}}$

ZEFP = Număr dinți
a_e = lățimea de așchiere (în cazul frezelor disc, adâncimea de așchiere)
DC = diametrul frezei

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Descrierea tipurilor

H	pentru oțeluri de înaltă rezistență și materiale călite
HF	pentru oțeluri de înaltă rezistență și materiale călite – cu profil de cordon drept
HR	pentru oțeluri de înaltă rezistență și materiale călite – cu profil de cordon rotund
HS	pentru oțeluri de înaltă rezistență și materiale călite – cu divizor de aşchii fină special pentru fontă și aliaje de nichel
N	pentru aşchierea oțelurilor și fontelor precum și oțelurilor inoxidabile
NF	pentru aşchierea oțelurilor și fontelor precum și oțelurilor inoxidabile – cu profil de cordon drept
NR	pentru aşchierea oțelurilor și fontelor precum și oțelurilor inoxidabile – cu profil de cordon rotund
NTI	pentru aşchierea oțelurilor și fontelor precum și oțelurilor inoxidabile – cu divizor de aşchii mediu
W	pentru materiale moi și metale neferoase (aluminiu, cupru, alamă)
WF	pentru materiale moi și metale neferoase (aluminiu, cupru, alamă) – cu profil de cordon drept
WR	pentru materiale moi și metale neferoase (aluminiu, cupru, alamă) – cu profil de cordon rotund

Acoperire

Ti100 Pro

- acoperire Ti Multilayer
- HV0,05 = 3500
- coeficient de frecare (contra oțel) = 0,7
- temperatura maximă de utilizare: 900 °C

