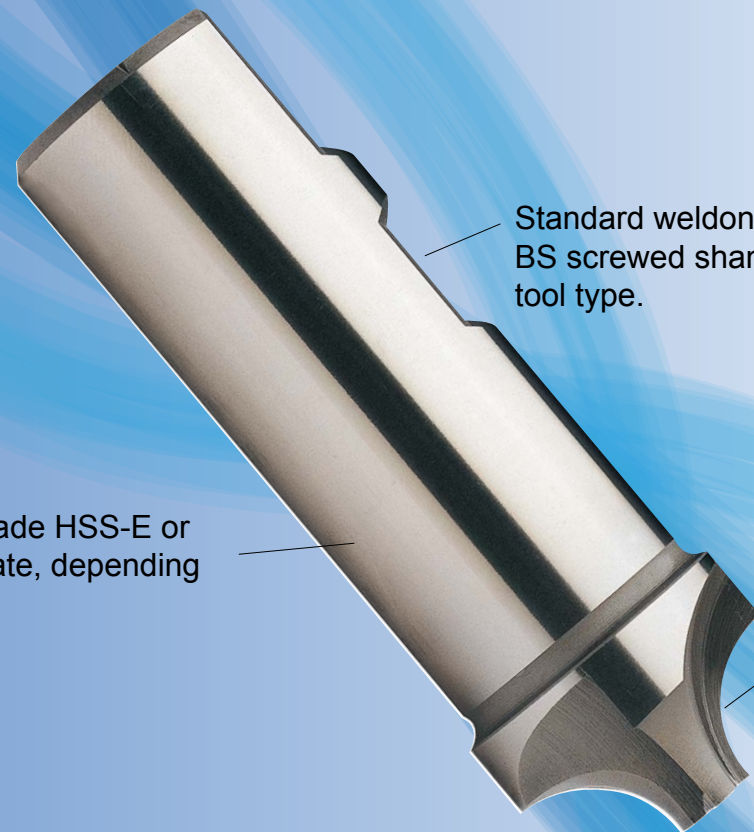


SUPERIOR PERFORMANCE



FORM TOOLS

HSS-E & HSS



Standard weldon flatted shank or
BS screwed shank, depending on
tool type.

Premium grade HSS-E or
HSS substrate, depending
on tool type.

Dovetail, Woodruff,
T-Slot and Corner
Radius forms
available.

Tools can be coated to extend
tool life if required.

IDEAL FOR MATERIAL GROUPS



APPLICATION

FORM CUTTERS



HSS-E and HSS milling cutters
for varying forms on a variety
of materials



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APPLICATION GUIDE

INDEX

●: Excellent ○: Good

P				H		M			K				S						N								O			APPLICATION FORM CUTTERS						
11	12	13	14	15	16	21	22	23	31	32	33	34	41	42	43	51	52	53	61	62	63	64	71	72	73	74	81	82	83	Artikel Nummer	Europa Code	Clarkson Code	Item	Description	Page No.	
o	o	o	o																				o	o	o					2732 45° 2733 60°	153116 154116			Dovetail Cutter HSS-E ø16.0mm - 50.0mm Flatted Shank	P.424	
o	o	o	o																				o	o	o					2730 45° 2731 60°		26M, 25M		Dovetail Cutter HSS ø16.0mm - 50.0mm Screwed Shank	P.426	
o	o	o	o																				o	o	o					2742 45° 2743 60°	156116 155116			Inverted Dovetail Cutter HSS-E ø16.0mm - 38.0mm Flatted shank	P.425	
o	o	o	o																				o	o	o					2740 45° 2741 60°		26L, 25L		Inverted Dovetail Cutter HSS ø16.0mm - 50.0mm Screwed Shank	P.427	
o	o	o	o																				o	o	o					2721	158116			Woodruff Cutter HSS-E ø10.5mm - 45.5mm Flatted Shank	P.428	
o	o	o	o																				o	o	o					2720		20M		Woodruff Cutter HSS ø10.5mm - 45.5mm Screwed Shank	P.429	
o	o	o	o																				o	o	o					2711	152116	21M		T-Slot Cutter HSS-E ø12.5mm - 60.0mm Flatted Shank, Screwed Shank	P.432	
o	o	o	o																				o	o	o					2751	159102			Corner Rounding Cutter HSSCo8 R1.0mm - R20.0mm Flatted Shank	P.430	
o	o	o	o																				o	o	o					2750		29L		Corner Rounding Cutter HSS R1.0mm - R20.0mm Screwed Shank	P.431	
																																			Cutting Data	P.433

HSS-E DOVETAIL CUTTERS



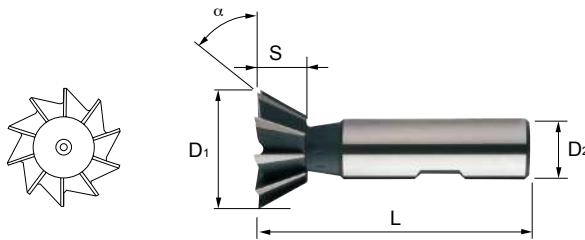
HSS-E

DIN 1833

N

Series No. 153116, 154116

▶ cutting conditions : p.434



Artikel Nr.: 2732

Cutting Diameter	Width	Angle	Shank Diameter	Overall Length	No. Flutes	EUROPA CODE
						Flatted Shank
16.0	4.0	45°	12	60	6	1531161600
20.0	5.0	45°	12	63	6	1531162000
22.0	6.0	45°	12	67	6	1531162200
25.0	6.3	45°	16	67	8	1531162500
28.0	7.5	45°	16	67	8	1531162800
32.0	8.0	45°	16	71	10	1531163200
38.0	10.0	45°	16	80	12	1531163800

Artikel Nr.: 2733

Cutting Diameter	Width	Angle	Shank Diameter	Overall Length	No. Flutes	EUROPA CODE
						Flatted Shank
16.0	6.3	60°	12	60	6	1541161600
20.0	8.0	60°	12	63	6	1541162000
22.0	9.0	60°	12	67	6	1541162200
25.0	10.0	60°	16	67	8	1541162500
28.0	11.0	60°	16	67	8	1541162800
32.0	12.5	60°	16	71	10	1541163200
38.0	16.0	60°	16	80	12	1541163800
40.0	13.0	60°	25	85	12	1541164000
50.0	16.0	60°	25	100	16	1541165000

HSS-E INVERTED DOVERTAIL CUTTERS



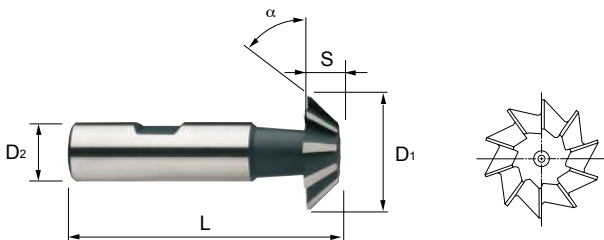
HSS-E

DIN 1833

N

Series No. 155116, 156116

▶ cutting conditions : p.434



Artikel Nr.: 2742

Cutting Diameter	Width	Angle	Shank Diameter	Overall Length	No. Flutes	EUROPA CODE
						Flatted Shank
16.0	4.0	45°	12	60	6	1551161600
20.0	5.0	45°	12	63	6	1551162000
22.0	6.0	45°	12	67	6	1551162200
25.0	6.3	45°	16	67	8	1551162500
28.0	7.5	45°	16	67	8	1551162800
32.0	8.0	45°	16	71	10	1551163200
38.0	10.0	45°	16	80	12	1551163800

Artikel Nr.: 2743

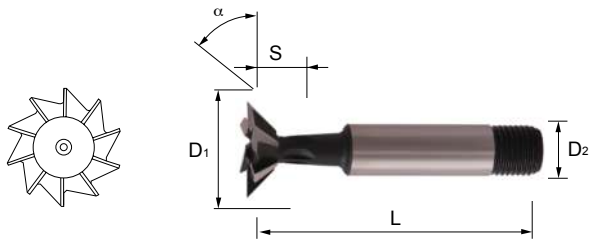
Cutting Diameter	Width	Angle	Shank Diameter	Overall Length	No. Flutes	EUROPA CODE
						Flatted Shank
16.0	6.3	60°	12	60	6	1561161600
20.0	8.0	60°	12	63	6	1561162000
22.0	9.0	60°	12	67	6	1561162200
25.0	10.0	60°	16	67	8	1561162500
28.0	11.0	60°	16	67	8	1561162800
32.0	12.5	60°	16	71	10	1561163200
38.0	16.0	60°	16	80	12	1561163800

HSS DOVETAIL CUTTERS



Series No. 26M, 25M

► cutting conditions : p.434



Artikel Nr.: 2730

Cutting Diameter	Width	Angle	Shank Diameter	Overall Length	No. Flutes	CLARKSON CODE
						Screwed Shank
13.0	3.0	45°	12	63.5	6	26M32
16.0	4.0	45°	12	66.5	6	26M40
19.0	5.5	45°	12	66.5	6	26M48
22.0	6.5	45°	12	68.5	6	26M56
25.0	7.5	45°	12	70	6	26M64
28.0	8.5	45°	16	71.5	6	26M72
32.0	8.5	45°	16	74.5	8	26M80
35.0	9.5	45°	25	79.5	8	26M88
38.0	10.5	45°	25	80	8	26M96
50.0	15.0	45°	25	896	10	26M00

Artikel Nr.: 2731

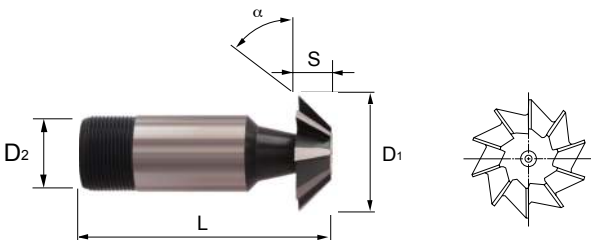
Cutting Diameter	Width	Angle	Shank Diameter	Overall Length	No. Flutes	CLARKSON CODE
						Screwed Shank
13.0	4.0	60°	12	63.5	6	25M32
16.0	5.5	60°	12	66.5	6	25M40
19.0	7.0	60°	12	67.5	6	25M48
22.0	9.5	60°	12	67.5	6	25M56
25.0	12.0	60°	12	70	6	25M64
28.0	12.5	60°	16	73	6	25M72
32.0	13.5	60°	16	74.5	8	25M80
35.0	14.5	60°	25	82.5	8	25M88
38.0	16.0	60°	25	84	8	25M96
50.0	22.0	60°	25	95	10	25M00

HSS INVERTED DOVERTAIL CUTTERS



Series No. 26L, 25L

► cutting conditions : p.434



Artikel Nr.: 2740

Cutting Diameter	Width	Angle	Shank Diameter	Overall Length	No. Flutes	CLARKSON CODE
						Screwed Shank
13.0	3.0	45°	12	63.5	6	26L32
16.0	4.0	45°	12	66.5	6	26L40
19.0	5.5	45°	12	66.5	6	26L48
22.0	6.5	45°	12	68.5	6	26L56
25.0	7.5	45°	12	70	6	26L64
28.0	8.5	45°	16	71.5	6	26L72
32.0	8.5	45°	16	74.5	8	26L80
35.0	9.5	45°	25	79.5	8	26L88
38.0	10.5	45°	25	80	8	26L96
50.0	15.0	45°	25	896	10	26L00

Artikel Nr.: 2741

Cutting Diameter	Width	Angle	Shank Diameter	Overall Length	No. Flutes	CLARKSON CODE
						Screwed Shank
13.0	4.0	60°	12	63.5	6	25L32
16.0	5.5	60°	12	66.5	6	25L40
19.0	7.0	60°	12	67.5	6	25L48
22.0	9.5	60°	12	67.5	6	25L56
25.0	12.0	60°	12	70	6	25L64
28.0	12.5	60°	16	73	6	25L72
32.0	13.5	60°	16	74.5	8	25L80
35.0	14.5	60°	25	82.5	8	25L88
38.0	16.0	60°	25	84	8	25L96
50.0	22.0	60°	25	95	10	25L00

HSS-E WOODRUFF
KEYSEAT CUTTERS

HSS-E

DIN
850

N

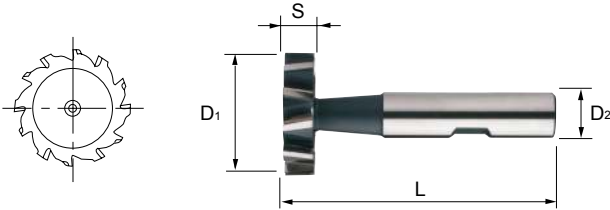
10-12°

DIN
1835B



Series No. 158116

► cutting conditions : p.434



Artikel Nr.: 2721

Cutting Diameter	Width	Shank Diameter	Overall Length	No. Flutes	EUROPA CODE
					Flatted Shank
10.5	2.0	6	50	8	1581161050
10.5	2.5	6	50	8	1581161051
10.5	3.0	6	50	8	1581161052
13.5	2.0	10	56	8	1581161350
13.5	2.5	10	56	8	1581161351
13.5	3.0	10	56	8	1581161352
13.5	4.0	10	56	8	1581161353
16.5	2.5	10	56	8	1581161650
16.5	3.0	10	56	8	1581161651
16.5	4.0	10	56	8	1581161652
16.5	5.0	10	56	8	1581161653
19.5	3.0	10	56	8	1581161950
19.5	4.0	10	63	8	1581161951
19.5	5.0	10	63	8	1581161952
19.5	6.0	10	63	8	1581161953
22.5	4.0	10	63	10	1581162250
22.5	5.0	10	63	10	1581162251
22.5	6.0	10	63	10	1581162252
22.5	8.0	10	63	10	1581162253
25.5	5.0	10	63	10	1581162550
25.5	6.0	10	63	10	1581162551
25.5	7.0	10	63	10	1581162552
25.5	8.0	10	63	10	1581162553
28.5	5.0	10	63	10	1581162850
28.5	6.0	10	63	10	1581162851
28.5	7.0	10	63	10	1581162852
28.5	8.0	10	63	10	1581162853
28.5	10.0	12	71	10	1581162854
32.5	5.0	12	71	12	1581163250
32.5	6.0	12	71	12	1581163251
32.5	7.0	12	71	12	1581163252
32.5	8.0	12	71	12	1581163253
32.5	10.0	12	71	12	1581163254
38.5	7.0	12	71	12	1581163850
38.5	8.0	12	71	12	1581163851
38.5	9.0	12	71	12	1581163852
38.5	10.0	12	71	12	1581163853
45.5	10.0	12	71	14	1581164550

HSS WOODRUFF
KEYSEAT CUTTERS

HSS

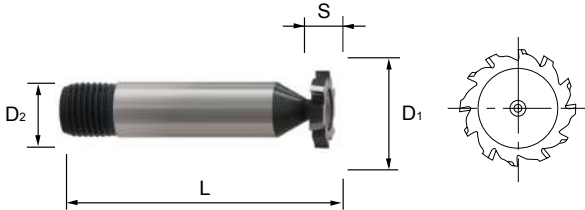
N

10-12°



Series No. 20M

► cutting conditions : p.434



Artikel Nr.: 2720

Cutting Diameter	Width	Shank Diameter	Overall Length	No. Flutes	CLARKSON CODE
					Screwed Shank
10.5	2.0	12	57	6	20M01
10.5	2.5	12	57	6	20M02
10.5	3.0	12	57	6	20M03
13.5	2.0	12	57	6	20M04
13.5	2.5	12	57	6	20M05
13.5	3.0	12	57	6	20M06
13.5	4.0	12	57	6	20M07
16.5	2.5	12	57	6	20M08
16.5	3.0	12	57	6	20M09
16.5	4.0	12	57	6	20M10
16.5	5.0	12	57	6	20M11
19.5	3.0	12	57	6	20M12
19.5	4.0	12	57	6	20M13
19.5	5.0	12	57	6	20M14
19.5	6.0	12	57	6	20M14-6
22.5	4.0	12	63.5	8	20M15
22.5	5.0	12	63.5	8	20M16
22.5	6.0	12	63.5	8	20M17
25.5	5.0	12	70	8	20M18
25.5	6.0	12	70	8	20M19
25.5	7.0	12	70	8	20M20
25.5	8.0	12	70	8	20M21
28.5	5.0	12	70	8	20M22
28.5	6.0	12	70	8	20M23
28.5	7.0	12	70	8	20M24
28.5	8.0	12	70	8	20M25
28.5	10.0	12	70	8	20M25-10
32.5	5.0	12	70	10	20M26
32.5	6.0	12	70	10	20M27
32.5	7.0	12	70	10	20M28
32.5	8.0	12	70	10	20M29
32.5	10.0	12	70	10	20M29-10
35.5	6.0	12	76	10	20M30
35.5	7.0	12	76	10	20M31
35.5	8.0	12	76	10	20M32
35.5	9.0	12	76	10	20M33
38.5	7.0	12	76	10	20M34
38.5	8.0	12	76	10	20M35
38.5	9.0	12	76	10	20M36
38.5	10.0	12	76	10	20M37
45.5	10.0	12	76	12	20M38

HSS-E 4 FLUTE CORNER ROUNDDING CUTTERS



HSS
Co8

DIN
6518

N

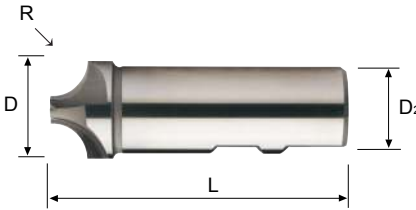
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FLUTE
4

DIN
1835B

Series No. 159102

► cutting conditions : p.435



Artikel Nr.: 2751

Radius	Outside Diameter	Shank Diameter	Overall Length	EUROPA CODE	
				Flatted Shank	
R1.0	8.0	10	60	1591020100	
R1.5	9.0	10	60	1591020150	
R2.0	10.0	10	60	1591020200	
R2.5	11.0	10	60	1591020250	
R3.0	12.0	12	60	1591020300	
R3.5	13.0	12	60	1591020350	
R4.0	14.0	12	60	1591020400	
R4.5	15.0	12	60	1591020450	
R5.0	16.0	12	60	1591020500	
R5.5	19.0	16	67	1591020550	
R6.0	20.0	16	67	1591020600	
R6.5	21.0	16	71	1591020650	
R7.0	22.0	16	71	1591020700	
R7.5	23.0	16	71	1591020750	
R8.0	24.0	16	71	1591020800	
R8.5	25.0	25	85	1591020850	
R9.0	26.0	25	85	1591020900	
R9.5	27.0	25	85	1591020950	
R10.0	28.0	25	85	1591021000	
R10.5	31.0	25	90	1591021050	
R11.0	32.0	25	90	1591021100	
R12.0	34.0	25	90	1591021200	
R12.5	41.0	25	100	1591021250	
R13.0	42.0	25	100	1591021300	
R14.0	44.0	25	100	1591021400	
R15.0	46.0	25	100	1591021500	
R16.0	48.0	25	100	1591021600	
R18.0	52.0	32	112	1591021800	
R20.0	56.0	32	112	1591022000	

HSS 4 FLUTE CORNER ROUNDDING CUTTERS



HSS

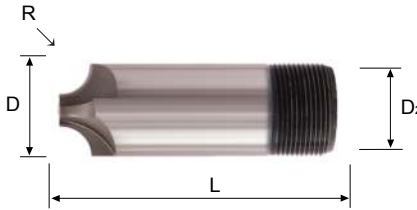
N

0°

FLUTE
4

Series No. 29L

► cutting conditions : p.435



Artikel Nr.: 2750

Radius	Outside Diameter	Shank Diameter	Overall Length	CLARKSON CODE	
				Screwed Shank	
R1.0	12.0	12	60.5	29L02	
R1.5	12.0	12	60.5	29L03	
R2.0	12.0	12	60.5	29L04	
R2.5	12.0	12	60.5	29L05	
R3.0	12.0	12	60.5	29L06	
R3.5	13.0	12	60.5	29L07	
R4.0	14.0	12	60.5	29L08	
R4.5	16.0	16	60.5	29L09	
R5.0	16.0	16	60.5	29L10	
R6.0	22.0	16	63.5	29L12	
R7.0	22.0	25	73	29L14	
R8.0	25.0	25	73	29L16	
R9.0	26.0	25	79.5	29L18	
R10.0	28.0	25	79.5	29L20	
R12.0	35.0	25	82.5	29L24	
R14.0	42.0	25	85.5	29L28	
R15.0	45.0	25	85.5	29L30	
R16.0	48.0	25	87.5	29L32	
R18.0	18.5	25	92	29L36	
R20.0	52.5	25	92	29L40	

HSS-E T-SLOT CUTTERS



HSS-E

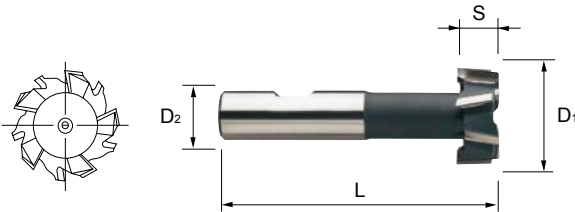
DIN 851

N

10°

Series No. 152116, 21M

► cutting conditions : p.435



Artikel Nr.: 2711

Bolt Size	Cutting Diameter	Width	Shank Diameter	Overall Length	No. Flutes	EUROPA CODE
						Flatted Shank
M6	12.5	6.0	10	57	6	1521161250
M8	16.0	8.0	10	62	6	1521161600
M10	18.0	8.0	12	70	6	1521161800
M10	19.0	9.0	12	71	6	1521161900
M12	21.0	9.0	12	74	6	1521162100
M12	22.0	10.0	12	75	6	1521162200
M14	25.0	11.0	16	82	6	1521162500
M16	28.0	12.0	16	83	6	1521162800
M18	32.0	14.0	16	90	8	1521163200
M20	36.0	16.0	25	103	8	1521163600
M22	40.0	18.0	25	108	8	1521164000

Artikel Nr.: 2710

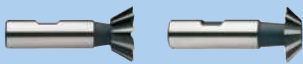
Bolt Size	Cutting Diameter	Width	Shank Diameter	Overall Length	No. Flutes	CLARKSON CODE
						Screwed Shank
M6	12.5	6.0	10	57	6	21M06
M8	16.0	8.0	10	62	6	21M08
M10	18.0	8.0	12	65	6	21M10
M10	19.0	9.0	12	65	6	21M10M
M12	21.0	9.0	12	69	6	21M12
M12	22.0	10.0	12	69	6	21M12M
M14	25.0	11.0	16	79	6	21M14
M16	28.0	12.0	16	76	8	21M16
M18	32.0	14.0	25	98	8	21M18
M20	36.0	16.0	25	100	8	21M20
M22	40.0	18.0	25	108	8	21M22
M24	45.0	20.0	25	112	8	21M24
M28	50.0	22.0	32	124	8	21M28
M36	60.0	28.0	32	139	8	21M36

APPLICATION
FORM CUTTERS
CUTTING DATA

APPLICATION FORM CUTTERS
CUTTING CONDITION



153116, 154116, 155116, 156116
26M, 25M, 26L, 25L (Dovetail Cutter)



MATERIAL GROUP		HRc		Size (mm)					
				16.0	20.0	25.0	32.0	40.0	50.0
P	11 12	< 20	v _c (m/min)	15	15	15	15	15	15
			n	305	255	190	155	125	100
			f _z	0.031	0.036	0.031	0.041	0.043	0.025
			f (mm/min)	57	55	47	64	64	42
	11 12	20-30	v _c (m/min)	10	10	10	10	10	10
			n	215	180	135	100	90	75
			f _z	0.031	0.035	0.028	0.04	0.042	0.03
			f (mm/min)	40	38	30	40	45	36
	13 14	30-40	v _c (m/min)	8	8	8	8	8	8
			n	160	125	100	80	60	50
			f _z	0.021	0.02	0.02	0.02	0.022	0.02
			f (mm/min)	20	15	16	16	16	16
71 72 73		v _c (m/min)	95	85	90	90	95	85	
		n	1850	1350	1150	920	765	550	
		f _z	0.03	0.04	0.029	0.041	0.042	0.03	
		f (mm/min)	336	324	270	375	387	265	

158116, 20M (Woodruff Cutter)



MATERIAL GROUP		HRc		Size (mm)							
				10.5	13.5	16.5	19.5	22.5	28.5	32.5	45.5
P	11 12	< 20	v _c (m/min)	20	20	20	20	20	20	20	20
			n	600	470	380	320	280	220	190	130
			f _z	0.01	0.01	0.025	0.035	0.04	0.05	0.06	0.07
			f (mm/min)	48	38	76	90	112	110	137	127
	11 12	20-30	v _c (m/min)	15	15	15	15	15	15	15	15
			n	480	370	300	260	220	180	155	110
			f _z	0.01	0.01	0.025	0.035	0.04	0.05	0.06	0.07
			f (mm/min)	480	370	300	260	220	180	155	110
	13 14	30-40	v _c (m/min)	10	10	10	10	10	10	10	10
			n	300	230	190	160	140	110	90	70
			f _z	0.01	0.01	0.025	0.035	0.04	0.05	0.06	0.07
			f (mm/min)	24	18	38	45	56	55	65	69
N	71 72 73		v _c (m/min)	100	100	100	100	100	100	90	100
			n	3000	2300	1900	1600	1400	1100	900	700
			f _z	0.01	0.01	0.025	0.035	0.04	0.05	0.06	0.07
			f (mm/min)	240	184	380	448	560	550	648	686

APPLICATION FORM CUTTERS
CUTTING CONDITION



152116, 21M (T-Slot Cutter)



MATERIAL GROUP	HRc		Size (mm)									
			12.5	16.0	18.0	19.0	21.0	22.0	25.0	28.0	32.0	40.0
P	11 12	< 20	v _c (m/min)	15	15	15	15	15	15	15	15	15
			n	380	300	270	250	230	220	190	170	150
			f _z	0.007	0.011	0.012	0.013	0.016	0.019	0.026	0.037	0.035
			f (mm/min)	16	19	20	20	22	25	30	38	42
	11 12	20-30	f (mm/min)	16	19	20	20	22	25	30	38	42
			v _c (m/min)	10	10	10	10	10	10	10	10	10
			n	270	210	195	180	160	150	135	120	100
			f _z	0.005	0.007	0.01	0.014	0.017	0.019	0.022	0.028	0.025
			f (mm/min)	8	9	12	15	16	17	18	20	20
			v _c (m/min)	90	90	95	90	95	90	90	90	95
			n	2350	1830	1680	1540	1430	1330	1170	1040	910
			f _z	0.008	0.013	0.015	0.017	0.019	0.021	0.026	0.034	0.034
N	71 72 73		f (mm/min)	110	140	150	160	165	170	180	210	200
			v _c (m/min)	90	90	95	90	95	90	90	90	95
			n	2350	1830	1680	1540	1430	1330	1170	1040	910
			f _z	0.008	0.013	0.015	0.017	0.019	0.021	0.026	0.034	0.034

159102, 29L (Corner Rounding Cutter)



MATERIAL GROUP	HRc		RADIUS (mm)											
			1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0
P	11 12	< 20	v _c (m/min)	15	15	15	15	15	15	15	15	15	15	15
			n	600	470	470	390	390	330	260	230	190	155	130
			f _z	0.015	0.016	0.016	0.019	0.019	0.023	0.029	0.033	0.039	0.04	0.048
			f (mm/min)	35	30	30	30	30	30	30	30	25	25	20
	11 12	20-30	f (mm/min)	35	30	30	30	30	30	30	30	25	25	20
			v _c (m/min)	10	10	10	10	10	10	10	10	10	10	10
			n	480	380	380	315	315	270	210	185	155	125	105
			f _z	0.018	0.023	0.02	0.024	0.024	0.023	0.03	0.034	0.04	0.05	0.048
			f (mm/min)	35	35	30	30	30	25	25	25	25	20	15
			v _c (m/min)	90	80	90	85	90	90	80	90	85	85	90
			n	3500	2800	2800	2400	2400	2000	1600	1400	1200	950	800
			f _z	0.018	0.021	0.02	0.023	0.022	0.025	0.031	0.034	0.038	0.045	0.05
N	71 72 73		f (mm/min)	245	230	220	220	210	200	200	190	180	170	160
			v _c (m/min)	90	80	90	85	90	90	80	90	85	85	90
			n	3500	2800	2800	2400	2400	2000	1600	1400	1200	950	800
			f _z	0.018	0.021	0.02	0.023	0.022	0.025	0.031	0.034	0.038	0.045	0.05

v_c - cutting speed (m/min)
n - RPM (rev/min)
f_z - feed rate (mm/tooth)
f - feed rate (mm/rev)
z - No. of teeth
a_p - axial depth of cut
a_e - radial depth of cut

To calculate RPM from cutting speed: $n = \frac{v_c \cdot 1000}{\pi \cdot \varnothing}$

To calculate cutting speed from RPM: $v_c = \frac{n \cdot \pi \cdot \varnothing}{1000}$

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.