TIGHTENING PROCEDURE


1 ◀ Cleaning

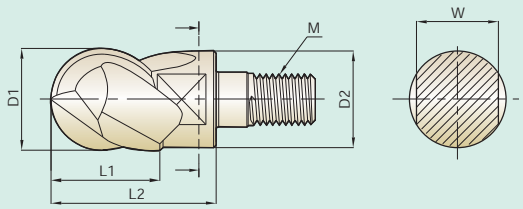

2 ◀ Initial Tightening


3 ◀ Final Tightening

SIZE (ØD)	CLAMPING TORQUE [N · m]
Ø10	6.5
Ø12	6.5
Ø16	10.0
Ø20	12.0
Ø25	15.0
Ø30	20.0
Ø32	20.0

Notice : Please tighten the screw with designated torque, too much torque will damage the screw.

XSEMD98 - 2Flute Ball

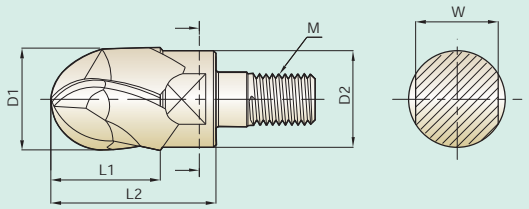


EDP No.	Stock	Mill Diameter	Neck Diameter	Length of Cut	Length Below Shank	Wrench Width	Thread
		D1	D2	L1	L2	W	M
XSEMD98100	◎	10	9	10	17.5	8	M6
XSEMD98120	◎	12	11	12	20.5	10	M6
XSEMD98160	◎	16	15	16	25.5	13	M8
XSEMD98200	◎	20	19	20	30	17	M10
XSEMD98250	◎	25	24	25	37	22	M12
XSEMD98300	◎	30	29	30	43	27	M16
XSEMD98320	◎	32	31	32	45	27	M16

* Stock situation is subject to change without notice.

* ● : Stock item ○ : Order made item ◎ : Will be launched by end of 2014

XSEME59 - 3Flute Ball

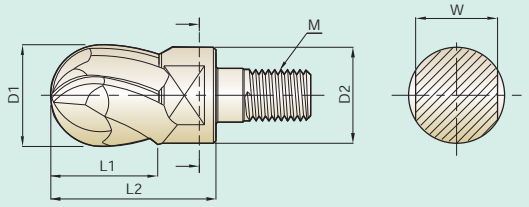


EDP No.	Stock	Mill Diameter	Neck Diameter	Length of Cut	Length Below Shank	Wrench Width	Thread
		D1	D2	L1	L2	W	M
XSEME59100	◎	10	9	10	17.5	8	M6
XSEME59120	◎	12	11	12	20.5	10	M6
XSEME59160	◎	16	15	16	25.5	13	M8
XSEME59200	◎	20	19	20	30	17	M10
XSEME59250	◎	25	24	25	37	22	M12
XSEME59300	◎	30	29	30	43	27	M16
XSEME59320	◎	32	31	32	45	27	M16

* Stock situation is subject to change without notice.

* ● : Stock item ○ : Order made item ◎ : Will be launched by end of 2014

XSEME60 - 4Flute Ball



EDP No.	Stock	Mill Diameter	Neck Diameter	Length of Cut	Length Below Shank	Wrench Width	Thread
		D1	D2	L1	L2	W	M
XSEME60100	◎	10	9	10	17.5	8	M6
XSEME60120	◎	12	11	12	20.5	10	M6
XSEME60160	◎	16	15	16	25.5	13	M8
XSEME60200	◎	20	19	20	30	17	M10
XSEME60250	◎	25	24	25	37	22	M12
XSEME60300	◎	30	29	30	43	27	M16
XSEME60320	◎	32	31	32	45	27	M16

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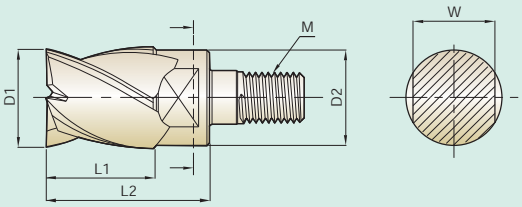
* ● : Stock item ○ : Order made item ◎ : Will be launched by end of 2014

XSEME36 - 4Flute Square



EDP No.	Stock	Mill Diameter	Neck Diameter	Length of Cut	Length Below Shank	Wrench Width	Thread
		D1	D2	L1	L2	W	M
XSEME36100	◎	10	9	10	17.5	8	M6
XSEME36120	◎	12	11	12	20.5	10	M6
XSEME36160	◎	16	15	16	25.5	13	M8
XSEME36200	◎	20	19	20	30	17	M10
XSEME36250	◎	25	24	25	37	22	M12
XSEME36300	◎	30	29	30	43	27	M16
XSEME36320	◎	32	31	32	45	27	M16

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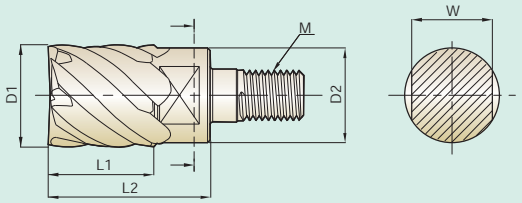
XSEME75 - 6Flute Square



EDP No.	Stock	Mill Diameter	Neck Diameter	Length of Cut	Length Below Shank	Wrench Width	Thread
		D1	D2	L1	L2	W	M
XSEME75100	◎	10	9	10	17.5	8	M6
XSEME75120	◎	12	11	12	20.5	10	M6
XSEME75160	◎	16	15	16	25.5	13	M8
XSEME75200	◎	20	19	20	30	17	M10
XSEME75250	◎	25	24	25	37	22	M12
XSEME75300	◎	30	29	30	43	27	M16
XSEME75320	◎	32	31	32	45	27	M16

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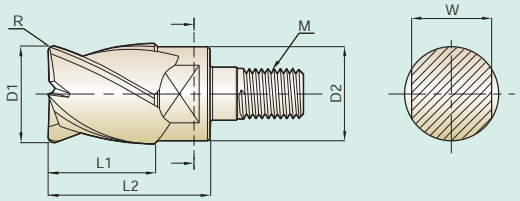
* ● : Stock item ○ : Order made item ◎ : Will be launched by end of 2014

XSEME01 - 4Flute Corner Radius



EDP No.	Stock	Corner Radius	Mill Diameter	Neck Diameter	Length of Cut	Length Below Shank	Wrench Width	Thread
		R	D1	D2	L1	L2	W	M
XSEME01100 010	◎	R0.1	10	9	10	17.5	8	M6
XSEME01100 020	◎	R0.2	10	9	10	17.5	8	M6
XSEME01100 030	◎	R0.3	10	9	10	17.5	8	M6
XSEME01100 050	◎	R0.5	10	9	10	17.5	8	M6
XSEME01100 100	◎	R1.0	10	9	10	17.5	8	M6
XSEME01100 150	◎	R1.5	10	9	10	17.5	8	M6
XSEME01100 200	◎	R2.0	10	9	10	17.5	8	M6
XSEME01100 250	◎	R2.5	10	9	10	17.5	8	M6
XSEME01100 300	◎	R3.0	10	9	10	17.5	8	M6
XSEME01100 400	◎	R4.0	10	9	10	17.5	8	M6
XSEME01120 010	◎	R0.1	12	11	12	20.5	10	M6
XSEME01120 020	◎	R0.2	12	11	12	20.5	10	M6
XSEME01120 030	◎	R0.3	12	11	12	20.5	10	M6
XSEME01120 050	◎	R0.5	12	11	12	20.5	10	M6
XSEME01120 100	◎	R1.0	12	11	12	20.5	10	M6
XSEME01120 150	◎	R1.5	12	11	12	20.5	10	M6
XSEME01120 200	◎	R2.0	12	11	12	20.5	10	M6
XSEME01120 250	◎	R2.5	12	11	12	20.5	10	M6
XSEME01120 300	◎	R3.0	12	11	12	20.5	10	M6
XSEME01120 400	◎	R4.0	12	11	12	20.5	10	M6
XSEME01120 500	◎	R5.0	12	11	12	20.5	10	M6
XSEME01160 050	◎	R0.5	16	15	16	25.5	13	M8
XSEME01160 100	◎	R1.0	16	15	16	25.5	13	M8
XSEME01160 150	◎	R1.5	16	15	16	25.5	13	M8
XSEME01160 200	◎	R2.0	16	15	16	25.5	13	M8
XSEME01200 050	◎	R0.5	20	19	20	30	17	M10
XSEME01200 100	◎	R1.0	20	19	20	30	17	M10
XSEME01200 150	◎	R1.5	20	19	20	30	17	M10
XSEME01200 200	◎	R2.0	20	19	20	30	17	M10
XSEME01250 050	◎	R0.5	25	24	25	37	22	M12
XSEME01250 100	◎	R1.0	25	24	25	37	22	M12
XSEME01250 150	◎	R1.5	25	24	25	37	22	M12
XSEME01250 200	◎	R2.0	25	24	25	37	22	M12
XSEME01300 050	◎	R0.5	30	29	30	43	27	M16
XSEME01300 100	◎	R1.0	30	29	30	43	27	M16
XSEME01300 150	◎	R1.5	30	29	30	43	27	M16
XSEME01300 200	◎	R2.0	30	29	30	43	27	M16
XSEME01320 050	◎	R0.5	32	31	32	45	27	M16
XSEME01320 100	◎	R1.0	32	31	32	45	27	M16
XSEME01320 150	◎	R1.5	32	31	32	45	27	M16
XSEME01320 200	◎	R2.0	32	31	32	45	27	M16

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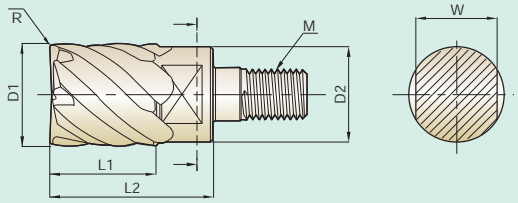
XSEME68 - 6Flute Corner Radius



EDP No.	Stock	Corner Radius	Mill Diameter	Neck Diameter	Length of Cut	Length Below Shank	Wrench Width	Thread
		R	D1	D2	L1	L2	W	M
XSEME68100 030	◎	R0.3	10	9	10	17.5	8	M6
XSEME68100 050	◎	R0.5	10	9	10	17.5	8	M6
XSEME68100 100	◎	R1.0	10	9	10	17.5	8	M6
XSEME68120 030	◎	R0.3	12	11	12	20.5	10	M6
XSEME68120 050	◎	R0.5	12	11	12	20.5	10	M6
XSEME68120 100	◎	R1.0	12	11	12	20.5	10	M6
XSEME68160 050	◎	R0.5	16	15	16	25.5	13	M8
XSEME68160 100	◎	R1.0	16	15	16	25.5	13	M8
XSEME68160 150	◎	R1.5	16	15	16	25.5	13	M8
XSEME68160 200	◎	R2.0	16	15	16	25.5	13	M8
XSEME68200 050	◎	R0.5	20	19	20	30	17	M10
XSEME68200 100	◎	R1.0	20	19	20	30	17	M10
XSEME68200 150	◎	R1.5	20	19	20	30	17	M10
XSEME68200 200	◎	R2.0	20	19	20	30	17	M10
XSEME68250 050	◎	R0.5	25	24	25	37	22	M12
XSEME68250 100	◎	R1.0	25	24	25	37	22	M12
XSEME68250 150	◎	R1.5	25	24	25	37	22	M12
XSEME68250 200	◎	R2.0	25	24	25	37	22	M12
XSEME68300 050	◎	R0.5	30	29	30	43	27	M16
XSEME68300 100	◎	R1.0	30	29	30	43	27	M16
XSEME68300 150	◎	R1.5	30	29	30	43	27	M16
XSEME68300 200	◎	R2.0	30	29	30	43	27	M16
XSEME68320 050	◎	R0.5	32	31	32	45	27	M16
XSEME68320 100	◎	R1.0	32	31	32	45	27	M16
XSEME68320 150	◎	R1.5	32	31	32	45	27	M16
XSEME68320 200	◎	R2.0	32	31	32	45	27	M16

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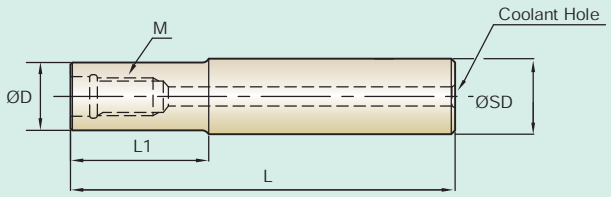
ZMS

STEEL HOLDER

Straight Neck Type



EDP No.	Stock	Mill Dia.	Shank Dia.	Overall Length	Neck Length	Neck Dia.	Thread Size	Coolant Hole
			SD	L	L1	D	M	
ZMS1001100	◎	10.0	10.0	70.0	20.0	9.0	M6	Ø3
ZMS1201120	◎	12.0	12.0	90.0	30.0	11.0	M6	Ø3
ZMS1601160	◎	16.0	16.0	100.0	30.0	15.0	M8	Ø4
ZMS2001200	◎	20.0	20.0	100.0	30.0	19.0	M10	Ø5
ZMS2501250	◎	25.0	25.0	115.0	40.0	24.0	M12	Ø5
ZMS3001320	◎	30.0, 32.0	32.0	125.0	40.0	29.0	M16	Ø6

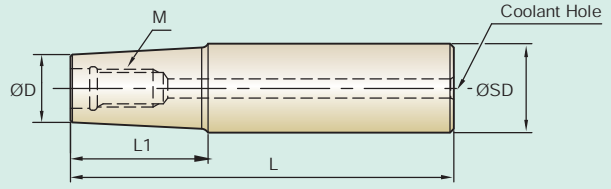
* Stock situation is subject to change without notice.

* ● : Stock item ○ : Order made item ◎ : Will be launched by end of 2014

ZMT

STEEL HOLDER

Taper Neck Type



EDP No.	Stock	Mill Dia.	Shank Dia.	Overall Length	Neck Length	Neck Dia.	Thread Size	Coolant Hole
			SD	L	L1	D	M	
ZMT1001120	◎	10.0	12.0	100.0	50.0	9.0	M6	Ø3
ZMT1201160	◎	12.0	16.0	130.0	70.0	11.0	M6	Ø3
ZMT1601200	◎	16.0	20.0	150.0	90.0	15.0	M8	Ø4
ZMT2001250	◎	20.0	25.0	170.0	100.0	19.0	M10	Ø5
ZMT2501320	◎	25.0	32.0	200.0	110.0	24.0	M12	Ø5
ZMT3001320	◎	30.0, 32.0	32.0	200.0	110.0	29.0	M16	Ø6

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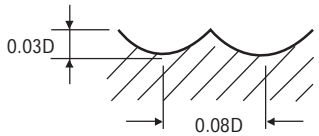
* ● : Stock item ○ : Order made item ◎ : Will be launched by end of 2014

XSEMD98 - 2Flute Ball

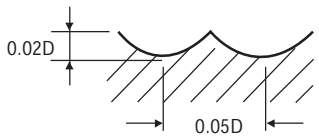
MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON				ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS			
HARDNESS	~ HRc 35				HRc 35~ HRc 45				HRc 45~ HRc 55			
STRENGTH	~ 1100N/mm²				1110 ~ 1500N/mm²				1500 ~ 2000N/mm²			
DIAMETER	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
10	5580	2220	175	0.199	5340	1860	168	0.174	4500	1440	141	0.160
12	4170	1770	157	0.212	4000	1500	151	0.188	3360	1140	127	0.170
16	3340	1590	168	0.238	3210	1320	161	0.206	2700	1020	136	0.189
20	2670	1410	168	0.264	2580	1170	162	0.227	2160	900	136	0.208
25	2130	1150	167	0.270	2060	950	162	0.231	1730	730	136	0.211
30	1770	1060	167	0.299	1720	860	162	0.250	1440	660	136	0.229
32	1660	995	167	0.300	1610	805	162	0.250	1350	620	136	0.230



RPM = rev./min.
FEED = mm/min.
Vc = m/min.
fz = mm/t

XSEME59 - 3Flute Ball

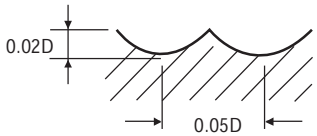
MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON				ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS			
HARDNESS	~ HRc 35				HRc 35~ HRc 45				HRc 45~ HRc 55			
STRENGTH	~ 1100N/mm²				1110 ~ 1500N/mm²				1500 ~ 2000N/mm²			
DIAMETER	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
10	9720	5870	305	0.201	8190	4130	257	0.168	6620	3100	208	0.156
12	8100	5490	305	0.226	6790	3830	256	0.188	5520	2870	208	0.173
16	6070	4280	305	0.235	5090	3050	256	0.200	4140	2240	208	0.180
20	4850	3490	305	0.240	4070	2560	256	0.210	3310	1890	208	0.190
25	3880	2910	305	0.250	3260	2150	256	0.220	2650	1590	208	0.200
30	3240	2530	305	0.260	2720	1880	256	0.230	2210	1390	208	0.210
32	3030	2450	305	0.270	2550	1800	256	0.235	2070	1370	208	0.221



RPM = rev./min.
FEED = mm/min.
Vc = m/min.
fz = mm/t

XSEME60 - 4Flute Ball

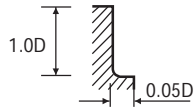
MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON				ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS			
HARDNESS	~ HRc 35				HRc 35~ HRc 45				HRc 45~ HRc 55			
STRENGTH	~ 1100N/mm^2				1110 ~ 1500N/mm^2				1500 ~ 2000N/mm^2			
DIAMETER	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
10	9100	5870	286	0.161	7350	3450	231	0.117	6660	2870	209	0.108
12	7590	5490	286	0.181	6130	3190	231	0.130	5530	2400	208	0.108
16	5690	4550	286	0.200	4590	2570	231	0.140	4140	1790	208	0.108
20	4550	4000	286	0.220	3680	2350	231	0.160	3310	1590	208	0.120
25	3640	3640	286	0.250	2940	2000	231	0.170	2650	1270	208	0.120
30	3030	3390	286	0.280	2450	1760	231	0.180	2210	1150	208	0.130
32	2850	3310	287	0.290	2300	1750	231	0.190	2070	1080	208	0.130

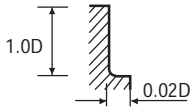


RPM = rev./min.
FEED = mm/min.
Vc = m/min.
fz = mm/t

XSEME01 - 4Flute Corner Radius

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON				ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS			
HARDNESS	~ HRc 35				HRc 35~ HRc 45				HRc 45~ HRc 55			
STRENGTH	~ 1100N/mm²				1110 ~ 1500N/mm²				1500 ~ 2000N/mm²			
DIAMETER	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
10	5040	460	158	0.023	3280	360	103	0.027	2020	170	63	0.021
12	4120	360	155	0.022	2780	320	105	0.029	1680	140	63	0.021
16	3100	280	156	0.023	2100	230	106	0.027	1280	115	64	0.022
20	2520	230	158	0.023	1640	180	103	0.027	1000	90	63	0.023
25	1990	180	156	0.023	1340	145	105	0.027	800	75	63	0.023
30	1650	150	156	0.023	1110	120	105	0.027	670	65	63	0.024
32	1550	140	156	0.023	1040	110	105	0.026	630	60	63	0.024

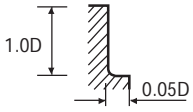


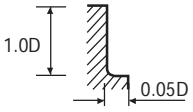


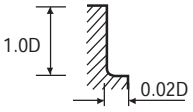
RPM = rev./min.
FEED = mm/min.
Vc = m/min.
fz = mm/t

XSEME68 - 6Flute Corner Radius

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON				ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS			
HARDNESS	~ HRc 35				HRc 35~ HRc 45				HRc 45~ HRc 55			
STRENGTH	~ 1100N/mm²				1110 ~ 1500N/mm²				1500 ~ 2000N/mm²			
DIAMETER	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
10	9600	2940	302	0.051	9300	1370	292	0.025	5700	210	179	0.006
12	7800	2700	294	0.058	7500	1160	283	0.026	4800	180	181	0.006
16	6000	2400	302	0.067	5820	880	293	0.025	3600	130	181	0.006
20	4800	2010	302	0.070	4680	690	294	0.025	2880	110	181	0.006
25	3850	1615	302	0.070	3740	600	294	0.027	2305	90	181	0.007
30	3200	1440	302	0.075	3120	540	294	0.029	1920	85	181	0.007
32	3000	1350	302	0.075	2920	525	294	0.030	1800	80	181	0.007



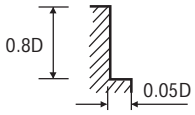




RPM = rev./min.
FEED = mm/min.
Vc = m/min.
fz = mm/t

XSEME36 - 4Flute Square

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON				ALLOY STEELS HEAT RESISTANT STEELS				STAINLESS STEELS				HARDENED STEELS			
HARDNESS	~ HRc 35				HRc 35~ HRc 45								HRc 45~ HRc 55			
STRENGTH	~ 1100N/mm^2				1110 ~ 1500N/mm^2								1500 ~ 2000N/mm^2			
DIAMETER	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
10	4080	640	128	0.039	2500	300	79	0.030	2100	300	66	0.036	1700	90	53	0.013
12	3430	545	129	0.040	2100	250	79	0.030	1700	240	64	0.035	1450	80	55	0.014
16	2750	440	138	0.040	1700	205	85	0.030	1380	200	69	0.036	1130	60	57	0.013
20	2100	335	132	0.040	1330	160	84	0.030	1050	150	66	0.036	850	40	53	0.012
25	1700	265	134	0.039	1050	130	82	0.031	850	120	67	0.035	680	30	53	0.011
30	1420	230	134	0.040	870	110	82	0.032	710	100	67	0.035	560	25	53	0.011
32	1330	215	134	0.040	820	105	82	0.032	670	95	67	0.035	530	25	53	0.012

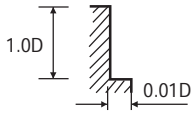


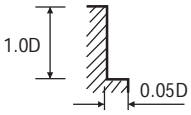
RPM = rev./min.
FEED = mm/min.
Vc = m/min.
fz = mm/t

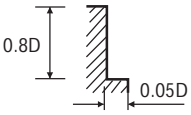
XSEME75 - 6Flute 45° Square

NORMAL SPEED

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON				ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS			
HARDNESS	~ HRc 35				HRc 35~ HRc 45				HRc 45~ HRc 55			
STRENGTH	~ 1100N/mm²				1110 ~ 1500N/mm²				1500 ~ 2000N/mm²			
DIAMETER	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
10	3530	2100	111	0.099	2435	1370	76	0.094	1050	210	33	0.033
12	2980	1765	112	0.099	2100	1160	79	0.092	880	180	33	0.034
16	2205	1325	111	0.100	1555	880	78	0.094	670	130	34	0.032
20	1765	1060	111	0.100	1220	690	77	0.094	525	110	33	0.035
25	1410	845	111	0.100	980	555	77	0.094	420	85	33	0.034
30	1180	710	111	0.100	820	460	77	0.093	350	75	33	0.036
32	1100	660	111	0.100	765	430	77	0.094	330	70	33	0.035



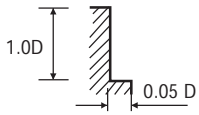


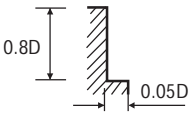


RPM = rev./min.
FEED = mm/min.
Vc = m/min.
fz = mm/t

HIGH SPEED

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON				HARDENED STEELS			
HARDNESS	~ HRc 50				HRc 50~ HRc 60			
STRENGTH	1750N/mm²				1750 ~ 2080N/mm²			
DIAMETER	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
10	10480	5990	329	0.095	5290	3050	166	0.096
12	8820	5040	333	0.095	4410	2520	166	0.095
16	6615	3780	333	0.095	3320	1890	167	0.095
20	5290	3050	332	0.096	2645	1470	166	0.093
25	4230	2400	332	0.095	2114	1200	166	0.095
30	3520	2000	332	0.095	1761	1000	166	0.095
32	3300	1890	332	0.095	1651	940	166	0.095





RPM = rev./min.
FEED = mm/min.
Vc = m/min.
fz = mm/t

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