



ALU

NON-FERROUS MATERIALS

✚ Uncoated micrograin carbide and cutting geometry specifically developed for non-ferrous machining. Lapped cutting edges and ad-hoc profile of the chip pocket for low cutting forces and outstanding finishing quality. Also available in the HF ALU version with unequal pitch (UP) with a specific design allowing mirror finishing and DxD machining, even in the 4-flutes version.

🇮🇹 Micrograna non rivestita e geometria di taglio sviluppata specificamente per la lavorazione di materiali non-ferrosi. Taglienti lappati e particolare profilo del vano truciolo per bassi sforzi di taglio e un'eccellente finitura superficiale. Disponibile anche la versione HF Alu con passo differenziato (UP) con un particolare design che permette finiture a specchio e lavorazioni DxD, anche nella versione a 4 taglienti.

🇩🇪 Unbeschichtete Mikrokörnung und eigens für die Bearbeitung von NE-Metallen entwickelte Schnittgeometrie. Dank der geläpften Schneiden und der besonderen Form der Nuten ist die aufzubringende Schnittkraft gering, bei gleichzeitig ausgezeichnetem Oberflächenfinish. Auch in der Version HF Alu mit ungleicher Teilung (UP) und besonderer Form erhältlich, die auch in der Version mit 4 Schneiden ein spiegelblankes Oberflächenfinish und DxD-Bearbeitungen ermöglicht.

🇫🇷 Micrograin non revêtu et géométrie de coupe développée spécifiquement pour l'usinage de matériaux non ferreux. Arêtes de coupe polies et profil particulier de la goujure pour de faibles efforts de coupe et une excellente finition superficielle. Également disponible la version HF Alu à pas décalé(UP), avec un design particulier qui permet des finitions glacées et des usinages DxD, aussi dans la version à 4 arêtes de coupe.

🇪🇸 Micrograna no revestida y geometría de corte desarrollada específicamente para la elaboración de materiales no ferrosos. Filos de corte lapeados y perfil especial del compartimento de virutas, para bajos esfuerzos de corte y un excelente acabado de la superficie. También está disponible la versión HF Alu con paso diferenciado (UP) con un diseño especial que permite acabados a espejo y elaboraciones D x D, incluso en la versión de 4 filos.

🇷🇺 Мелкозернистый твердый сплав без покрытия со специально разработанной геометрией для обработки цветных металлов. Доведенные режущие кромки и специальный профиль стружечных канавок снижают силы резания и улучшают качество обработанной поверхности. Также доступна версия HF Alu с неравномерным шагом (UP) и специальной геометрией, позволяющая получать зеркальную поверхность и работать в режиме DxD, в том числе для версии с 4-мя зубьями.

INFO
TYPHOON TA-HTA-4HTA
TYPHOON PU-HPU
TYPHOON SUH
TYPHOON ALH
TYPHOON HRC
TYPHOON SUH MINI
TYPHOON HL
C-SD-TA
LFTA
SUTA
HSS-HSS/CO DRILLS
G2
MDTA
HF VH/UP
MEF
ALU
MEX
UH
HSS/CO-HSSP END MILLS
CARBIDE BURRS

CUTTING PARAMETERS

HFAL4

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	D x D			D x D			D x D			D x D		
	Vc (m/min)	300-500			200-400			150-350			600-1000		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
	3	42460	0.030	5040	31850	0.025	3220	26540	0.021	2210	50000	0.033	6530
	4	31850	0.040	5050	23890	0.034	3220	19900	0.028	2210	50000	0.044	8710
	5	25480	0.050	5050	19110	0.042	3220	15920	0.035	2210	50000	0.054	10890
	6	21230	0.059	4970	15920	0.050	3170	13270	0.041	2170	42460	0.064	10930
	8	15920	0.077	4930	11940	0.066	3140	9950	0.054	2160	31850	0.085	10850
	10	12740	0.095	4820	9550	0.080	3070	7960	0.066	2110	25480	0.104	10590
	12	10620	0.108	4590	7960	0.092	2920	6630	0.076	2000	21230	0.119	10090
	14	9100	0.126	4590	6820	0.107	2920	5690	0.088	2010	18200	0.139	10090
16	7960	0.144	4580	5970	0.122	2920	4980	0.101	2010	15920	0.158	10090	
18	7080	0.158	4490	5310	0.135	2860	4420	0.111	1960	14150	0.174	9860	
20	6370	0.176	4470	4780	0.149	2850	3980	0.123	1960	12740	0.193	9840	

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	1.5D x 0.5D			1.5D x 0.5D			1.5D x 0.5D			1.5D x 0.5D		
	Vc (m/min)	300-600			200-500			200-400			600-1000		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
	3	47770	0.036	6810	37150	0.032	4770	31850	0.029	3630	50000	0.039	7840
	4	35830	0.048	6810	27870	0.043	4770	23890	0.038	3630	50000	0.052	10450
	5	28660	0.059	6810	22290	0.053	4770	19110	0.048	3630	50000	0.065	13070
	6	23890	0.070	6710	18580	0.063	4700	15920	0.056	3580	42460	0.077	13120
	8	17910	0.093	6650	13930	0.084	4660	11940	0.074	3550	31850	0.102	13020
	10	14330	0.113	6500	11150	0.102	4550	9550	0.091	3470	25480	0.125	12710
	12	11940	0.130	6190	9290	0.117	4330	7960	0.104	3300	21230	0.143	12110
	14	10240	0.151	6190	7960	0.136	4330	6820	0.121	3300	18200	0.166	12110
16	8960	0.173	6190	6970	0.156	4340	5970	0.138	3300	15920	0.190	12100	
18	7960	0.190	6050	6190	0.171	4240	5310	0.152	3230	14150	0.209	11830	
20	7170	0.211	6040	5570	0.190	4220	4780	0.168	3220	12740	0.232	11810	

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	α° x ae	8° x 0.5D			5° x 0.5D			5° x 0.5D			8° x 0.5D		
	Vc (m/min)	300-600			200-500			200-400			600-1000		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
	3	47770	0.021	3925	37150	0.018	2730	31850	0.015	1929	50000	0.023	4517
	4	35830	0.027	3925	27870	0.025	2730	23890	0.020	1929	50000	0.030	6023
	5	28660	0.034	3925	22290	0.031	2730	19110	0.025	1929	50000	0.038	7529
	6	23890	0.040	3865	18580	0.036	2690	15920	0.030	1899	42460	0.044	7556
	8	17910	0.054	3835	13930	0.048	2670	11940	0.039	1884	31850	0.059	7499
	10	14330	0.065	3745	11150	0.058	2610	9550	0.048	1840	25480	0.072	7325
	12	11940	0.075	3565	9290	0.067	2485	7960	0.055	1753	21230	0.082	6975
	14	10240	0.087	3570	7960	0.078	2485	6820	0.064	1752	18200	0.096	6976
16	8960	0.100	3570	6970	0.089	2485	5970	0.073	1753	15920	0.110	6974	
18	7960	0.110	3485	6190	0.098	2425	5310	0.081	1715	14150	0.120	6818	
20	7170	0.121	3480	5570	0.109	2420	4780	0.089	1710	12740	0.133	6801	

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

- INFO
- TYPHOON TA-HTA-4HTA
- TYPHOON PU-HPU
- TYPHOON SUH
- TYPHOON ALH
- TYPHOON HRC
- TYPHOON SUH MINI
- TYPHOON HL
- C-SD-TA
- LFTA
- SUTA
- HSS-HSS/CO DRILLS
- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX
- UH
- HSS/CO-HSSP END MILLS
- CARBIDE BURRS

CUTTING PARAMETERS

HFAL4


	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	α° x ae	15° x 0.5D			10° x 0.5D			7° x 0.5D			15° x 0.5D		
	Vc (m/min)	300-500			200-400			200-300			600-1000		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
3	42460	0.020	3355	31850	0.017	2185	26540	0.015	1545	50000	0.022	4344	
4	31850	0.026	3355	23890	0.023	2185	19900	0.019	1544	50000	0.029	5792	
5	25480	0.033	3355	19110	0.029	2185	15920	0.024	1544	50000	0.036	7240	
6	21230	0.039	3305	15920	0.034	2150	13270	0.029	1521	42460	0.043	7266	
8	15920	0.051	3275	11940	0.045	2135	9950	0.038	1509	31850	0.057	7211	
10	12740	0.063	3200	9550	0.055	2085	7960	0.046	1474	25480	0.069	7043	
12	10620	0.072	3050	7960	0.062	1985	6630	0.053	1403	21230	0.079	6707	
14	9100	0.084	3050	6820	0.073	1985	5690	0.062	1405	18200	0.092	6708	
16	7960	0.096	3050	5970	0.083	1985	4980	0.071	1405	15920	0.105	6706	
18	7080	0.105	2980	5310	0.092	1945	4420	0.078	1372	14150	0.116	6556	
20	6370	0.117	2975	4780	0.101	1940	3980	0.086	1369	12740	0.128	6540	

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	D x 0.4D			D x 0.4D			D x 0.4D			D x 0.4D		
	Vc (m/min)	300-500			200-400			150-350			600-1000		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
3	42460	0.030	5040	31850	0.027	3410	26540	0.024	2520	50000	0.033	6530	
4	31850	0.040	5050	23890	0.036	3410	19900	0.032	2520	50000	0.044	8710	
5	25480	0.050	5050	19110	0.045	3410	15920	0.040	2520	50000	0.054	10890	
6	21230	0.059	4970	15920	0.053	3350	13270	0.047	2480	42460	0.064	10930	
8	15920	0.077	4930	11940	0.070	3330	9950	0.062	2460	31850	0.085	10850	
10	12740	0.095	4820	9550	0.085	3250	7960	0.076	2410	25480	0.104	10590	
12	10620	0.108	4590	7960	0.097	3090	6630	0.086	2290	21230	0.119	10090	
14	9100	0.126	4590	6820	0.113	3090	5690	0.101	2290	18200	0.139	10090	
16	7960	0.144	4580	5970	0.130	3090	4980	0.115	2290	15920	0.158	10090	
18	7080	0.158	4490	5310	0.143	3030	4420	0.127	2240	14150	0.174	9860	
20	6370	0.176	4470	4780	0.158	3020	3980	0.140	2240	12740	0.193	9840	


	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	D x D			D x D			0.5D x D			0.5D x D		
	Vc (m/min)	270-370			190-290			150-250			590-690		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
3	33970	0.015	2020	25480	0.013	1360	21230	0.012	1010	50000	0.016	3270	
4	25480	0.020	2020	19110	0.018	1360	15920	0.016	1010	50000	0.022	4360	
5	20380	0.025	2020	15290	0.022	1360	12740	0.020	1010	40760	0.027	4440	
6	16990	0.029	1990	12740	0.026	1340	10620	0.023	990	33970	0.032	4370	
8	12740	0.039	1970	9550	0.035	1330	7960	0.031	990	25480	0.043	4340	
10	10190	0.047	1930	7640	0.043	1300	6370	0.038	960	20380	0.052	4240	
12	8490	0.054	1830	6370	0.049	1240	5310	0.043	920	16990	0.059	4040	
14	7280	0.063	1830	5460	0.057	1240	4550	0.050	920	14560	0.069	4040	
16	6370	0.072	1830	4780	0.065	1240	3980	0.058	920	12740	0.079	4040	
18	5660	0.079	1790	4250	0.071	1210	3540	0.063	900	11320	0.087	3940	
20	5100	0.088	1790	3820	0.079	1210	3180	0.070	890	10190	0.097	3930	

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION


HFAL3



Material Group ISO 513	N1			N2 N3			N4			N5		
Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
ap x ae	D x D			D x D			D x D			D x D		
Vc (m/min)	300-500			200-400			150-350			600-900		
D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
2	50000	0.022	3300	47770	0.019	2680	39810	0.015	1840	50000	0.024	3630
3	42460	0.033	4200	31850	0.028	2680	26540	0.023	1840	50000	0.036	5450
4	31850	0.044	4200	23890	0.037	2680	19900	0.031	1840	50000	0.048	7260
5	25480	0.055	4200	19110	0.047	2680	15920	0.039	1840	47770	0.061	8670
6	21230	0.065	4140	15920	0.055	2640	13270	0.046	1810	39810	0.072	8540
8	15920	0.086	4110	11940	0.073	2620	9950	0.060	1800	29860	0.095	8470
10	12740	0.105	4010	9550	0.089	2560	7960	0.074	1760	23890	0.116	8280
12	10620	0.120	3820	7960	0.102	2440	6630	0.084	1670	19900	0.132	7880
14	9100	0.140	3820	6820	0.119	2430	5690	0.098	1670	17060	0.154	7880
16	7960	0.160	3820	5970	0.136	2440	4980	0.112	1670	14930	0.176	7880
18	7080	0.176	3740	5310	0.150	2380	4420	0.123	1630	13270	0.194	7710
20	6370	0.195	3730	4780	0.166	2380	3980	0.137	1630	11940	0.215	7680



Material Group ISO 513	N1			N2 N3			N4			N5		
Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
ap x ae	1.5D x 0.5D			1.5D x 0.5D			1.5D x 0.5D			1.5D x 0.5D		
Vc (m/min)	300-600			200-500			200-400			600-1000		
D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
2	50000	0.026	3960	55730	0.024	3970	47770	0.021	3030	50000	0.029	4360
3	47770	0.040	5680	37150	0.036	3970	31850	0.032	3030	50000	0.044	6530
4	35830	0.053	5680	27870	0.048	3970	23890	0.042	3030	50000	0.058	8710
5	28660	0.066	5670	22290	0.059	3970	19110	0.053	3030	50000	0.073	10890
6	23890	0.078	5590	18580	0.070	3910	15920	0.062	2980	42460	0.086	10930
8	17910	0.103	5540	13930	0.093	3880	11940	0.083	2960	31850	0.114	10850
10	14330	0.126	5420	11150	0.113	3790	9550	0.101	2890	25480	0.139	10590
12	11940	0.144	5160	9290	0.130	3610	7960	0.115	2750	21230	0.158	10090
14	10240	0.168	5160	7960	0.151	3610	6820	0.134	2750	18200	0.185	10090
16	8960	0.192	5160	6970	0.173	3610	5970	0.154	2750	15920	0.211	10090
18	7960	0.211	5040	6190	0.190	3530	5310	0.169	2690	14150	0.232	9860
20	7170	0.234	5030	5570	0.211	3520	4780	0.187	2680	12740	0.257	9840



Material Group ISO 513	N1			N2 N3			N4			N5		
Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
α° x ae	8° x 0.5D			5° x 0.5D			5° x 0.5D			8° x 0.5D		
Vc (m/min)	300-500			200-400			150-350			600-900		
D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
2	50000	0.015	2280	47770	0.014	1950	39810	0.011	1339	50000	0.017	2510
3	42460	0.023	2905	31850	0.020	1950	26540	0.017	1339	50000	0.025	3764
4	31850	0.030	2905	23890	0.027	1950	19900	0.022	1339	50000	0.033	5019
5	25480	0.038	2905	19110	0.034	1950	15920	0.028	1339	47770	0.042	5994
6	21230	0.045	2860	15920	0.040	1920	13270	0.033	1319	39810	0.049	5904
8	15920	0.059	2840	11940	0.053	1905	9950	0.044	1308	29860	0.065	5859
10	12740	0.073	2775	9550	0.065	1860	7960	0.054	1278	23890	0.080	5723
12	10620	0.083	2645	7960	0.074	1775	6630	0.061	1217	19900	0.091	5448
14	9100	0.097	2640	6820	0.087	1775	5690	0.071	1218	17060	0.106	5449
16	7960	0.111	2640	5970	0.099	1775	4980	0.082	1218	14930	0.122	5450
18	7080	0.122	2585	5310	0.109	1735	4420	0.090	1189	13270	0.134	5328
20	6370	0.135	2575	4780	0.121	1730	3980	0.099	1187	11940	0.148	5312

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

HFAL3

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	α° x ae	15° x 0.5D			10° x 0.5D			7° x 0.5D			15° x 0.5D		
	Vc (m/min)	300-500			200-400			150-350			600-900		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
2	50000	0.015	2194	47770	0.013	1822	39810	0.011	1287	50000	0.016	2413	
3	42460	0.022	2794	31850	0.019	1822	26540	0.016	1287	50000	0.024	3620	
4	31850	0.029	2795	23890	0.025	1822	19900	0.022	1287	50000	0.032	4826	
5	25480	0.037	2795	19110	0.032	1822	15920	0.027	1287	47770	0.040	5764	
6	21230	0.043	2752	15920	0.038	1794	13270	0.032	1268	39810	0.048	5677	
8	15920	0.057	2731	11940	0.050	1780	9950	0.042	1258	29860	0.063	5634	
10	12740	0.070	2668	9550	0.061	1738	7960	0.051	1228	23890	0.077	5503	
12	10620	0.080	2542	7960	0.069	1656	6630	0.059	1169	19900	0.088	5239	
14	9100	0.093	2541	6820	0.081	1655	5690	0.069	1171	17060	0.102	5240	
16	7960	0.106	2540	5970	0.092	1656	4980	0.078	1171	14930	0.117	5241	
18	7080	0.117	2485	5310	0.102	1620	4420	0.086	1143	13270	0.129	5124	
20	6370	0.130	2477	4780	0.113	1616	3980	0.096	1141	11940	0.143	5108	

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	D x 0.4D			D x 0.4D			D x 0.4D			D x 0.4D		
	Vc (m/min)	300-500			200-400			150-350			600-900		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
2	50000	0.022	3300	47770	0.020	2840	39810	0.018	2100	50000	0.024	3630	
3	42460	0.033	4200	31850	0.030	2840	26540	0.026	2100	50000	0.036	5450	
4	31850	0.044	4200	23890	0.040	2840	19900	0.035	2100	50000	0.048	7260	
5	25480	0.055	4200	19110	0.050	2840	15920	0.044	2100	47770	0.061	8670	
6	21230	0.065	4140	15920	0.059	2790	13270	0.052	2070	39810	0.072	8540	
8	15920	0.086	4110	11940	0.077	2770	9950	0.069	2050	29860	0.095	8470	
10	12740	0.105	4010	9550	0.095	2710	7960	0.084	2010	23890	0.116	8280	
12	10620	0.120	3820	7960	0.108	2580	6630	0.096	1910	19900	0.132	7880	
14	9100	0.140	3820	6820	0.126	2580	5690	0.112	1910	17060	0.154	7880	
16	7960	0.160	3820	5970	0.144	2580	4980	0.128	1910	14930	0.176	7880	
18	7080	0.176	3740	5310	0.158	2520	4420	0.141	1870	13270	0.194	7710	
20	6370	0.195	3730	4780	0.176	2520	3980	0.156	1860	11940	0.215	7680	

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	D x D			D x D			0.5D x D			0.5D x D		
	Vc (m/min)	270-370			190-290			150-250			500-700		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
2	50000	0.011	1650	38220	0.010	1140	31850	0.009	840	50000	0.012	1820	
3	33970	0.017	1680	25480	0.015	1140	21230	0.013	840	50000	0.018	2720	
4	25480	0.022	1680	19110	0.020	1140	15920	0.018	840	47770	0.024	3470	
5	20380	0.028	1680	15290	0.025	1140	12740	0.022	840	38220	0.030	3470	
6	16990	0.033	1660	12740	0.029	1120	10620	0.026	830	31850	0.036	3420	
8	12740	0.043	1640	9550	0.039	1110	7960	0.034	820	23890	0.047	3390	
10	10190	0.053	1600	7640	0.047	1080	6370	0.042	800	19110	0.058	3310	
12	8490	0.060	1530	6370	0.054	1030	5310	0.048	760	15920	0.066	3150	
14	7280	0.070	1530	5460	0.063	1030	4550	0.056	760	13650	0.077	3150	
16	6370	0.080	1530	4780	0.072	1030	3980	0.064	760	11940	0.088	3150	
18	5660	0.088	1490	4250	0.079	1010	3540	0.070	750	10620	0.097	3080	
20	5100	0.098	1490	3820	0.088	1010	3180	0.078	740	9550	0.107	3070	

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

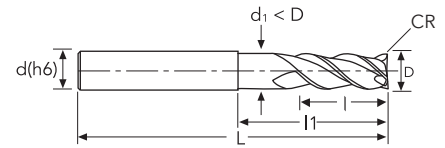
- INFO
- TYPHOON TA-HTA-4HTA
- TYPHOON PU-HPU
- TYPHOON SUH
- TYPHOON ALH
- TYPHOON HRC
- TYPHOON SUH MINI
- TYPHOON HL
- C-SD-TA
- LFTA
- SUTA
- HSS-HSS/CO DRILLS
- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX
- UH
- HSS/CO-HSSP END MILLS
- CARBIDE BURRS

HFA53

cylindrical shank, reduced neck, 3 flutes, long reach, corner radius



★ 1st choice ☆ suitable



D	D Tol.	CR	CR Tol.	d(h6)	l	l1	d1	L	z	EDP No.	Stock
3	0/-0.030	0.2	+/-0.010	6	5	18	2.80	60	3	HFA5302030	●
3	0/-0.030	0.5	+/-0.010	6	5	18	2.80	60	3	HFA5305030	●
4	0/-0.030	0.5	+/-0.010	6	6	22	3.80	60	3	HFA5305040	●
4	0/-0.030	1.0	+/-0.010	6	6	22	3.80	60	3	HFA5310040	●
5	0/-0.030	0.5	+/-0.010	6	8	24	4.80	60	3	HFA5305050	●
5	0/-0.030	1.0	+/-0.010	6	8	24	4.80	60	3	HFA5310050	●
6	0/-0.030	0.5	+/-0.010	6	9	29	5.80	65	3	HFA5305060	●
6	0/-0.030	1.0	+/-0.010	6	9	29	5.80	65	3	HFA5310060	●
6	0/-0.030	2.0	+/-0.010	6	9	29	5.80	65	3	HFA5320060	●
8	0/-0.030	0.5	+/-0.010	8	12	39	7.80	75	3	HFA5305080	●
8	0/-0.030	1.0	+/-0.010	8	12	39	7.80	75	3	HFA5310080	●
8	0/-0.030	2.0	+/-0.010	8	12	39	7.80	75	3	HFA5320080	●
8	0/-0.030	3.0	+/-0.010	8	12	39	7.80	75	3	HFA5330080	●
10	0/-0.030	0.5	+/-0.010	10	15	52	9.80	100	3	HFA5305100	●
10	0/-0.030	1.0	+/-0.010	10	15	52	9.80	100	3	HFA5310100	●
10	0/-0.030	2.0	+/-0.010	10	15	52	9.80	100	3	HFA5320100	●
10	0/-0.030	3.0	+/-0.010	10	15	52	9.80	100	3	HFA5330100	●
10	0/-0.030	4.0	+/-0.010	10	15	52	9.80	100	3	HFA5340100	●
12	0/-0.030	0.5	+/-0.010	12	18	62	11.80	120	3	HFA5305120	●
12	0/-0.030	1.0	+/-0.010	12	18	62	11.80	120	3	HFA5310120	●
12	0/-0.030	2.0	+/-0.010	12	18	62	11.80	120	3	HFA5320120	●
12	0/-0.030	3.0	+/-0.010	12	18	62	11.80	120	3	HFA5330120	●
12	0/-0.030	4.0	+/-0.010	12	18	62	11.80	120	3	HFA5340120	●
16	0/-0.030	0.5	+/-0.010	16	24	82	15.70	130	3	HFA5305160	●
16	0/-0.030	1.0	+/-0.010	16	24	82	15.70	130	3	HFA5310160	●
16	0/-0.030	2.0	+/-0.010	16	24	82	15.70	130	3	HFA5320160	●
16	0/-0.030	3.0	+/-0.010	16	24	82	15.70	130	3	HFA5330160	●
16	0/-0.030	4.0	+/-0.010	16	24	82	15.70	130	3	HFA5340160	●
20	0/-0.030	0.5	+/-0.010	20	30	100	19.70	150	3	HFA5305200	●
20	0/-0.030	1.0	+/-0.010	20	30	100	19.70	150	3	HFA5310200	●
20	0/-0.030	2.0	+/-0.010	20	30	100	19.70	150	3	HFA5320200	●
20	0/-0.030	3.0	+/-0.010	20	30	100	19.70	150	3	HFA5330200	●
20	0/-0.030	4.0	+/-0.010	20	30	100	19.70	150	3	HFA5340200	●

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

HFA53

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	0.5D x D			0.5D x D			0.5D x D			0.5D x D		
	Vc (m/min)	200-500			150-350			150-250			500-900		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
	3	37150	0.026	2940	26540	0.022	1790	21230	0.018	1180	50000	0.029	4360
	4	27870	0.035	2940	19900	0.030	1790	15920	0.025	1180	50000	0.039	5810
	5	22290	0.044	2940	15920	0.037	1790	12740	0.031	1180	44590	0.048	6470
	6	18580	0.052	2900	13270	0.044	1760	10620	0.036	1160	37150	0.057	6370
	8	13930	0.069	2880	9950	0.058	1750	7960	0.048	1150	27870	0.076	6330
	10	11150	0.084	2810	7960	0.071	1710	6370	0.059	1120	22290	0.092	6180
	12	9290	0.096	2680	6630	0.082	1620	5310	0.067	1070	18580	0.106	5890
	14	7960	0.112	2670	5690	0.095	1630	4550	0.078	1070	15920	0.123	5880
16	6970	0.128	2680	4980	0.109	1630	3980	0.090	1070	13930	0.141	5880	
18	6190	0.141	2610	4420	0.120	1590	3540	0.099	1050	12380	0.155	5750	
20	5570	0.156	2610	3980	0.133	1580	3180	0.109	1040	11150	0.172	5740	

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	1.5D x 0.5D			1.5D x 0.5D			1.5D x 0.5D			1.5D x 0.5D		
	Vc (m/min)	300-500			200-400			150-350			600-900		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
	3	42460	0.032	4040	31850	0.029	2720	26540	0.025	2020	50000	0.035	5230
	4	31850	0.042	4040	23890	0.038	2720	19900	0.034	2020	50000	0.046	6970
	5	25480	0.053	4040	19110	0.048	2720	15920	0.042	2020	47770	0.058	8320
	6	21230	0.062	3970	15920	0.056	2680	13270	0.050	1990	39810	0.069	8200
	8	15920	0.083	3940	11940	0.074	2660	9950	0.066	1970	29860	0.091	8140
	10	12740	0.101	3850	9550	0.091	2600	7960	0.081	1930	23890	0.111	7950
	12	10620	0.115	3670	7960	0.104	2480	6630	0.092	1830	19900	0.127	7570
	14	9100	0.134	3670	6820	0.121	2470	5690	0.108	1840	17060	0.148	7570
16	7960	0.154	3670	5970	0.138	2480	4980	0.123	1840	14930	0.169	7570	
18	7080	0.169	3590	5310	0.152	2420	4420	0.135	1790	13270	0.186	7400	
20	6370	0.187	3580	4780	0.168	2420	3980	0.150	1790	11940	0.206	7380	

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	α° x ae	8° x 0.5D			5° x 0.5D			5° x 0.5D			8° x 0.5D		
	Vc (m/min)	200-500			150-350			200-400			500-900		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
	3	37150	0.018	2035	26540	0.016	1300	31850	0.013	1285	50000	0.020	3010
	4	27870	0.024	2035	19900	0.022	1300	23890	0.018	1285	50000	0.027	4015
	5	22290	0.030	2035	15920	0.027	1300	19110	0.022	1285	44590	0.033	4475
	6	18580	0.036	2005	13270	0.032	1280	15920	0.027	1265	37150	0.040	4405
	8	13930	0.048	1990	9950	0.043	1270	11940	0.035	1255	27870	0.052	4375
	10	11150	0.058	1945	7960	0.052	1240	9550	0.043	1225	22290	0.064	4270
	12	9290	0.066	1850	6630	0.059	1180	7960	0.049	1170	18580	0.073	4070
	14	7960	0.077	1850	5690	0.069	1185	6820	0.057	1170	15920	0.085	4070
16	6970	0.088	1850	4980	0.079	1185	5970	0.065	1170	13930	0.097	4070	
18	6190	0.097	1810	4420	0.087	1155	5310	0.072	1145	12380	0.107	3975	
20	5570	0.108	1800	3980	0.097	1155	4780	0.080	1140	11150	0.119	3970	

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

- INFO
- TYPHOON TA-HTA-4HTA
- TYPHOON PU-HPU
- TYPHOON SUH
- TYPHOON ALH
- TYPHOON HRC
- TYPHOON SUH MINI
- TYPHOON HL
- C-SD-TA
- LFTA
- SUTA
- HSS-HSS/CO DRILLS
- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX
- UH
- HSS/CO-HSSP END MILLS
- CARBIDE BURRS

CUTTING PARAMETERS

HFA53

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	α° x ae	15° x D			10° x D			7° x D			15° x D		
	Vc (m/min)	200-500			150-350			200-400			500-900		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
3	37150	0.018	1955	26540	0.014	1095	21230	0.013	825	50000	0.019	2895	
4	27870	0.023	1955	19900	0.018	1095	15920	0.017	825	50000	0.026	3860	
5	22290	0.029	1955	15920	0.023	1095	12740	0.022	825	44590	0.032	4305	
6	18580	0.035	1925	13270	0.027	1075	10620	0.025	810	37150	0.038	4240	
8	13930	0.046	1910	9950	0.036	1070	7960	0.034	805	27870	0.050	4205	
10	11150	0.056	1870	7960	0.044	1045	6370	0.041	785	22290	0.061	4110	
12	9290	0.064	1780	6630	0.050	995	5310	0.047	750	18580	0.070	3915	
14	7960	0.074	1780	5690	0.058	995	4550	0.055	750	15920	0.082	3910	
16	6970	0.085	1780	4980	0.067	995	3980	0.063	750	13930	0.094	3910	
18	6190	0.094	1740	4420	0.073	970	3540	0.069	735	12380	0.103	3825	
20	5570	0.104	1735	3980	0.081	970	3180	0.076	730	11150	0.114	3815	

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	D x 0.4D			D x 0.4D			D x 0.4D			D x 0.4D		
	Vc (m/min)	200-500			150-350			150-250			500-900		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
3	37150	0.026	2940	26540	0.024	1890	21230	0.021	1350	50000	0.029	4360	
4	27870	0.035	2940	19900	0.032	1890	15920	0.028	1340	50000	0.039	5810	
5	22290	0.044	2940	15920	0.040	1890	12740	0.035	1350	44590	0.048	6470	
6	18580	0.052	2900	13270	0.047	1860	10620	0.042	1330	37150	0.057	6370	
8	13930	0.069	2880	9950	0.062	1850	7960	0.055	1310	27870	0.076	6330	
10	11150	0.084	2810	7960	0.076	1810	6370	0.067	1280	22290	0.092	6180	
12	9290	0.096	2680	6630	0.086	1720	5310	0.077	1220	18580	0.106	5890	
14	7960	0.112	2670	5690	0.101	1720	4550	0.090	1220	15920	0.123	5880	
16	6970	0.128	2680	4980	0.115	1720	3980	0.102	1220	13930	0.141	5880	
18	6190	0.141	2610	4420	0.127	1680	3540	0.113	1200	12380	0.155	5750	
20	5570	0.156	2610	3980	0.140	1680	3180	0.125	1190	11150	0.172	5740	

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	0.5D x D			0.5D x D			0.5D x D			0.5D x D		
	Vc (m/min)	230-330			150-250			110-210			510-610		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
3	29720	0.013	1180	21230	0.012	760	16990	0.011	540	50000	0.015	2180	
4	22290	0.018	1180	15920	0.016	760	12740	0.014	540	44590	0.019	2590	
5	17830	0.022	1180	12740	0.020	760	10190	0.018	540	35670	0.024	2590	
6	14860	0.026	1160	10620	0.023	750	8490	0.021	530	29720	0.029	2550	
8	11150	0.034	1150	7960	0.031	740	6370	0.028	530	22290	0.038	2530	
10	8920	0.042	1120	6370	0.038	720	5100	0.034	510	17830	0.046	2470	
12	7430	0.048	1070	5310	0.043	690	4250	0.038	490	14860	0.053	2350	
14	6370	0.056	1070	4550	0.050	690	3640	0.045	490	12740	0.062	2350	
16	5570	0.064	1070	3980	0.058	690	3180	0.051	490	11150	0.070	2350	
18	4950	0.070	1050	3540	0.063	670	2830	0.056	480	9910	0.077	2300	
20	4460	0.078	1040	3180	0.070	670	2550	0.062	480	8920	0.086	2300	

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

MDCSA1

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	0.5D x D			0.5D x D			0.5D x D			0.5D x D		
	Vc (m/min)	300-500			200-400			150-350			400-600		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
	2	50000	0.023	1130	47770	0.019	910	39810	0.016	630	50000	0.023	1130
	3	42460	0.030	1270	31850	0.026	810	31850	0.021	670	50000	0.030	1500
	4	35830	0.039	1400	27870	0.033	920	23890	0.027	650	39810	0.039	1550
	5	28660	0.049	1400	22290	0.041	920	19110	0.034	650	38220	0.049	1860
	6	23890	0.058	1380	18580	0.049	910	15920	0.040	640	31850	0.058	1840
8	17910	0.079	1410	13930	0.067	930	11940	0.055	660	23890	0.079	1880	
10	14330	0.098	1400	11150	0.083	920	9550	0.068	650	19110	0.098	1860	
12	11940	0.116	1390	9290	0.099	920	7960	0.081	650	15920	0.116	1850	

< D3 ap x ae D x 0.25D

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	D x 0.5D			D x 0.5D			D x 0.5D			D x 0.5D		
	Vc (m/min)	300-600			200-500			200-400			400-800		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
	2	50000	0.030	1500	50000	0.026	1280	47770	0.021	1000	50000	0.030	1500
	3	47770	0.040	1910	37150	0.034	1260	31850	0.028	890	50000	0.040	2000
	4	35830	0.052	1860	27870	0.044	1230	23890	0.036	870	47770	0.052	2480
	5	28660	0.065	1860	22290	0.055	1230	19110	0.046	870	38220	0.065	2480
	6	23890	0.077	1840	18580	0.065	1220	15920	0.054	860	31850	0.077	2450
8	17910	0.105	1880	13930	0.089	1240	11940	0.074	880	23890	0.105	2510	
10	14330	0.130	1860	11150	0.111	1230	9550	0.091	870	19110	0.130	2480	
12	11940	0.155	1850	9290	0.132	1220	7960	0.109	860	15920	0.155	2470	

< D3 ap x ae D x 0.25D

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	D x D			D x D			D x D			0.5D x D		
	Vc (m/min)	200-400			150-350			100-300			300-500		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
	2	47770	0.011	540	39810	0.010	380	31850	0.008	250	50000	0.011	560
	3	31850	0.015	480	26540	0.013	340	21230	0.011	220	42460	0.015	640
	4	23890	0.020	470	19900	0.017	330	15920	0.014	220	31850	0.020	620
	5	19110	0.024	470	15920	0.021	330	12740	0.017	220	25480	0.024	620
	6	15920	0.029	460	13270	0.025	330	10620	0.020	210	21230	0.029	610
8	11940	0.039	470	9950	0.033	330	7960	0.028	220	15920	0.039	630	
10	9550	0.049	470	7960	0.041	330	6370	0.034	220	12740	0.049	620	
12	7960	0.058	460	6630	0.049	330	5310	0.041	220	10620	0.058	620	

< D3 ap x ae 0.5D x D

MDCSA2

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	0.5D x D			0.5D x D			0.5D x D			0.5D x D		
	Vc (m/min)	200-600			150-350			150-250			500-900		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
1	50000	0.011	1120	50000	0.010	950	50000	0.008	780	50000	0.011	1120	
1.5	50000	0.017	1680	50000	0.014	1430	42460	0.012	1000	50000	0.017	1680	
2	50000	0.022	2240	39810	0.019	1520	31850	0.016	1000	50000	0.022	2240	
3	37150	0.028	2100	26540	0.024	1270	21230	0.020	840	50000	0.028	2820	
4	27870	0.038	2090	19900	0.032	1270	15920	0.026	840	50000	0.038	3750	
5	22290	0.047	2100	15920	0.040	1270	12740	0.033	840	44590	0.047	4200	
6	18580	0.056	2090	13270	0.048	1270	10620	0.039	840	37150	0.056	4190	
8	13930	0.075	2080	9950	0.064	1270	7960	0.052	830	27870	0.075	4170	
10	11150	0.094	2090	7960	0.080	1270	6370	0.066	840	22290	0.094	4170	
12	9290	0.112	2080	6630	0.095	1260	5310	0.078	830	18580	0.112	4160	
14	7960	0.130	2080	5690	0.111	1260	4550	0.091	830	15920	0.130	4150	
16	6970	0.148	2060	4980	0.126	1250	3980	0.103	820	13930	0.148	4120	
18	6190	0.166	2060	4420	0.141	1250	3540	0.116	820	12380	0.166	4120	
20	5570	0.185	2060	3980	0.157	1250	3180	0.129	820	11150	0.185	4120	

< D3 ap x ae 0.25D x D

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	D x 0.5D			D x 0.5D			D x 0.5D			D x 0.5D		
	Vc (m/min)	300-500			200-400			150-350			600-1000		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
1	50000	0.013	1340	50000	0.011	1140	50000	0.009	940	50000	0.013	1340	
1.5	50000	0.020	2020	50000	0.017	1710	50000	0.014	1410	50000	0.020	2020	
2	50000	0.027	2690	50000	0.023	2280	39810	0.019	1500	50000	0.027	2690	
3	42460	0.034	2880	31850	0.029	1830	26540	0.024	1260	50000	0.034	3390	
4	31850	0.045	2870	23890	0.038	1830	19900	0.032	1250	50000	0.045	4500	
5	25480	0.056	2880	19110	0.048	1830	15920	0.040	1260	50000	0.056	5640	
6	21230	0.068	2870	15920	0.057	1830	13270	0.047	1260	42460	0.068	5740	
8	15920	0.090	2860	11940	0.076	1820	9950	0.063	1250	31850	0.090	5720	
10	12740	0.112	2860	9550	0.096	1820	7960	0.079	1250	25480	0.112	5730	
12	10620	0.134	2850	7960	0.114	1820	6630	0.094	1250	21230	0.134	5710	
14	9100	0.157	2850	6820	0.133	1820	5690	0.110	1250	18200	0.157	5700	
16	7960	0.177	2820	5970	0.151	1800	4980	0.124	1240	15920	0.177	5650	
18	7080	0.200	2830	5310	0.170	1800	4420	0.140	1240	14150	0.200	5650	
20	6370	0.222	2830	4780	0.188	1800	3980	0.155	1240	12740	0.222	5650	

< D3 ap x ae D x 0.5D

MDCSA2

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	0.5D x D			0.5D x D			0.5D x D			0.5D x D		
	Vc (m/min)	200-400			150-350			150-350			500-900		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
1	50000	0.006	560	50000	0.005	480	50000	0.004	390	50000	0.006	560	
1.5	50000	0.008	840	50000	0.007	710	50000	0.006	590	50000	0.008	840	
2	47770	0.011	1070	39810	0.010	760	39810	0.008	620	50000	0.011	1120	
3	31850	0.014	900	26540	0.012	640	26540	0.010	520	50000	0.014	1410	
4	23890	0.019	900	19900	0.016	630	19900	0.013	520	50000	0.019	1880	
5	19110	0.024	900	15920	0.020	640	15920	0.016	520	44590	0.024	2100	
6	15920	0.028	900	13270	0.024	640	13270	0.020	520	37150	0.028	2090	
8	11940	0.037	890	9950	0.032	630	9950	0.026	520	27870	0.037	2090	
10	9550	0.047	890	7960	0.040	630	7960	0.033	520	22290	0.047	2090	
12	7960	0.056	890	6630	0.048	630	6630	0.039	520	18580	0.056	2080	
14	6820	0.065	890	5690	0.055	630	5690	0.046	520	15920	0.065	2080	
16	5970	0.074	880	4980	0.063	630	4980	0.052	520	13930	0.074	2060	
18	5310	0.083	880	4420	0.071	620	4420	0.058	510	12380	0.083	2060	
20	4780	0.092	880	3980	0.079	630	3980	0.065	510	11150	0.092	2060	

< D3 ap x ae 0.25D x D

- INFO
- TYPHOON TA-HTA-4HTA
- TYPHOON PU-HPU
- TYPHOON SUH
- TYPHOON ALH
- TYPHOON HRC
- TYPHOON SUH MINI
- TYPHOON HL
- C-SD-TA
- LFTA
- SUTA
- HSS-HSS/CO DRILLS
- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX
- UH
- HSS/CO-HSSP END MILLS
- CARBIDE BURRS

MDCSA3

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	0.5D x D			0.5D x D			0.5D x D			0.5D x D		
	Vc (m/min)	200-600			150-350			150-250			500-900		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
1	50000	0.010	1510	50000	0.009	1290	50000	0.007	1060	50000	0.010	1510	
1.5	50000	0.015	2270	50000	0.013	1930	42460	0.011	1350	50000	0.015	2270	
2	50000	0.020	3020	39810	0.017	2050	31850	0.014	1350	50000	0.020	3020	
3	37150	0.025	2830	26540	0.022	1720	21230	0.018	1130	50000	0.025	3810	
4	27870	0.034	2820	19900	0.029	1710	15920	0.024	1130	50000	0.034	5070	
5	22290	0.042	2830	15920	0.036	1720	12740	0.030	1130	44590	0.042	5660	
6	18580	0.051	2830	13270	0.043	1720	10620	0.035	1130	37150	0.051	5650	
8	13930	0.067	2810	9950	0.057	1710	7960	0.047	1130	27870	0.067	5630	
10	11150	0.084	2820	7960	0.072	1710	6370	0.059	1130	22290	0.084	5640	
12	9290	0.101	2810	6630	0.086	1700	5310	0.071	1120	18580	0.101	5620	
14	7960	0.117	2800	5690	0.100	1700	4550	0.082	1120	15920	0.117	5610	
16	6970	0.133	2780	4980	0.113	1690	3980	0.093	1110	13930	0.133	5560	
18	6190	0.150	2780	4420	0.127	1690	3540	0.105	1110	12380	0.150	5560	
20	5570	0.166	2780	3980	0.141	1690	3180	0.116	1110	11150	0.166	5560	

< D3 ap x ae 0.25D x D

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	1.5D x 0.3D			1.5D x 0.3D			1.5D x 0.3D			1.5D x 0.3D		
	Vc (m/min)	300-500			200-400			150-350			600-1000		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
1	50000	0.012	1810	50000	0.010	1540	50000	0.008	1270	50000	0.012	1810	
1.5	50000	0.018	2720	50000	0.015	2310	50000	0.013	1910	50000	0.018	2720	
2	50000	0.024	3630	50000	0.021	3080	39810	0.017	2020	50000	0.024	3630	
3	42460	0.030	3880	31850	0.026	2480	26540	0.021	1700	50000	0.030	4570	
4	31850	0.041	3870	23890	0.034	2470	19900	0.028	1690	50000	0.041	6080	
5	25480	0.051	3880	19110	0.043	2480	15920	0.036	1700	50000	0.051	7620	
6	21230	0.061	3880	15920	0.052	2470	13270	0.043	1700	42460	0.061	7750	
8	15920	0.081	3860	11940	0.069	2460	9950	0.057	1690	31850	0.081	7720	
10	12740	0.101	3860	9550	0.086	2460	7960	0.071	1690	25480	0.101	7730	
12	10620	0.121	3850	7960	0.103	2460	6630	0.085	1680	21230	0.121	7700	
14	9100	0.141	3850	6820	0.120	2450	5690	0.099	1680	18200	0.141	7690	
16	7960	0.160	3810	5970	0.136	2430	4980	0.112	1670	15920	0.160	7630	
18	7080	0.180	3820	5310	0.153	2430	4420	0.126	1670	14150	0.180	7630	
20	6370	0.200	3810	4780	0.170	2430	3980	0.140	1670	12740	0.200	7630	

< D3 ap x ae D x 0.1D

- INFO
- TYPHOON TA-HTA-4HTA
- TYPHOON PU-HPU
- TYPHOON SUH
- TYPHOON ALH
- TYPHOON HRC
- TYPHOON SUH MINI
- TYPHOON HL
- C-SD-TA
- LFTA
- SUTA
- HSS-HSS/CO DRILLS
- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX
- UH
- HSS/CO-HSSP END MILLS
- CARBIDE BURRS

MDA310-11-12

cylindrical shank, 3 flutes polished, long



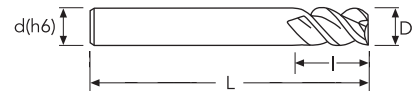
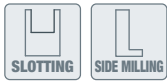
MDA310



MDA311 - MDA312



★ 1st choice ☆ suitable



D	D Tol.	C	C Tol.	d(h6)	l	l1	L	z	EDP No.	Stock
3	0/-0.030			6	12		75	3	MDA310030	●
4	0/-0.030			6	16		75	3	MDA310040	●
5	0/-0.030			6	20		75	3	MDA310050	●
6	0/-0.030			6	25		75	3	MDA310060	●
3	0/-0.030			6	15		100	3	MDA311030	●
4	0/-0.030			6	20		100	3	MDA311040	●
5	0/-0.030			6	25		100	3	MDA311050	●
6	0/-0.030			6	30		100	3	MDA311060	●
8	0/-0.035			8	35		100	3	MDA311080	●
10	0/-0.035			10	40		100	3	MDA311100	●
12	0/-0.035			12	45		100	3	MDA311120	●
8	0/-0.035			8	40		150	3	MDA312080	●
10	0/-0.035			10	50		150	3	MDA312100	●
12	0/-0.035			12	50		150	3	MDA312120	●
16	0/-0.040			16	70		150	3	MDA312160	●
20	0/-0.040			20	80		150	3	MDA312200	●

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

MDA310

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	0.3D x D			0.3D x D			0.3D x D			0.3D x D		
	Vc (m/min)	220-340			150-250			100-200			400-700		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
	3	29720	0.023	2040	21230	0.019	1240	15920	0.016	760	50000	0.023	3430
	4	22290	0.030	2030	15920	0.026	1230	11940	0.021	760	50000	0.030	4560
5	17830	0.038	2040	12740	0.032	1240	9550	0.027	760	35030	0.038	4000	
6	14860	0.046	2030	10620	0.039	1240	7960	0.032	760	29190	0.046	4000	

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	1.5D x 0.1D			1.5D x 0.1D			1.5D x 0.1D			1.5D x 0.1D		
	Vc (m/min)	270-370			200-300			150-250			500-800		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
	3	33970	0.027	2800	26540	0.023	1860	21230	0.019	1220	50000	0.027	4120
	4	25480	0.036	2790	19900	0.031	1850	15920	0.026	1220	50000	0.036	5470
5	20380	0.046	2800	15920	0.039	1860	12740	0.032	1220	50000	0.046	6860	
6	16990	0.055	2790	13270	0.047	1850	10620	0.038	1220	34500	0.055	5670	

MDA311

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	0.3D x D			0.3D x D			0.3D x D			0.3D x D		
	Vc (m/min)	180-280			110-210			100-160			350-550		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
	3	24420	0.019	1400	16990	0.016	830	13800	0.013	550	50000	0.019	2860
	4	18310	0.025	1390	12740	0.022	820	10350	0.018	550	50000	0.025	3800
5	14650	0.032	1400	10190	0.027	830	8280	0.022	550	28660	0.032	2730	
6	12210	0.038	1390	8490	0.032	820	6900	0.027	550	23890	0.038	2730	
8	9160	0.051	1390	6370	0.043	820	5180	0.035	550	17910	0.051	2710	
10	7320	0.063	1390	5100	0.054	820	4140	0.044	550	14330	0.063	2720	
12	6100	0.076	1380	4250	0.064	820	3450	0.053	550	11940	0.076	2710	

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	2D x 0.05D			2D x 0.05D			2D x 0.05D			2D x 0.05D		
	Vc (m/min)	210-310			150-250			110-210			420-620		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
	3	27600	0.023	1890	21230	0.019	1240	16990	0.016	820	50000	0.023	3430
	4	20700	0.030	1890	15920	0.026	1230	12740	0.021	810	50000	0.030	4560
5	16560	0.038	1890	12740	0.032	1240	10190	0.027	820	50000	0.038	5720	
6	13800	0.046	1890	10620	0.039	1240	8490	0.032	810	27600	0.046	3780	
8	10350	0.061	1880	7960	0.052	1230	6370	0.042	810	20700	0.061	3760	
10	8280	0.076	1880	6370	0.064	1230	5100	0.053	810	16560	0.076	3770	
12	6900	0.091	1880	5310	0.077	1230	4250	0.064	810	13800	0.091	3760	

- INFO
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- TYPHOON HL
- C-SD-TA
- LFTA
- SUTA
- HSS-HSS/CO DRILLS
- G2
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- MEF
- ALU
- MEX
- UH
- HSS/CO-HSSP END MILLS
- CARBIDE BURRS

MDA312

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	0.1D x D			0.1D x D			0.1D x D			0.1D x D		
	Vc (m/min)	130-230			100-160			80-120			250-450		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
	8	7170	0.040	870	5180	0.034	530	3980	0.028	340	13930	0.040	1690
	10	5730	0.051	870	4140	0.043	530	3180	0.035	340	11150	0.051	1690
12	4780	0.060	870	3450	0.051	530	2650	0.042	340	9290	0.060	1690	
16	3580	0.080	860	2590	0.068	530	1990	0.056	330	6970	0.080	1670	
20	2870	0.100	860	2070	0.085	530	1590	0.070	330	5570	0.100	1670	

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	2.5D x 0.05D			2.5D x 0.05D			2.5D x 0.05D			2.5D x 0.05D		
	Vc (m/min)	150-250			100-200			100-160			300-500		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
	8	7960	0.048	1160	5970	0.041	740	5180	0.034	530	15920	0.048	2320
	10	6370	0.061	1160	4780	0.052	740	4140	0.042	530	12740	0.061	2320
12	5310	0.073	1160	3980	0.062	740	3450	0.051	530	10620	0.073	2310	
16	3980	0.096	1140	2990	0.081	730	2590	0.067	520	7960	0.096	2290	
20	3180	0.120	1140	2390	0.102	730	2070	0.084	520	6370	0.120	2290	

- INFO
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- CARBIDE BURRS

MDCSAM

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	1.5D x 0.05D			1.5D x 0.05D			1.5D x 0.05D			1.5D x 0.05D		
	Vc (m/min)	600-1000			400-800			300-700			900-1300		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
6	42460	0.050	12810	31850	0.043	8170	26540	0.035	5610	50000	0.050	15090	
8	31850	0.067	12770	23890	0.057	8140	19900	0.047	5580	43790	0.067	17550	
10	25480	0.084	12780	19110	0.071	8150	15920	0.059	5590	35030	0.084	17570	
12	21230	0.100	12740	15920	0.085	8120	13270	0.070	5570	29190	0.100	17510	

- INFO
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- CARBIDE BURRS

MCA212R

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	0.5D x D			0.5D x D			0.5D x D			0.5D x D		
	Vc (m/min)	200-600			200-400			150-350			600-1000w		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
2	50000	0.022	2240	47770	0.019	1820	39810	0.016	1250	50000	0.022	2240	
3	42460	0.028	2400	31850	0.024	1530	26540	0.020	1050	50000	0.028	2820	
4	31850	0.038	2390	23890	0.032	1520	19900	0.026	1050	50000	0.038	3750	
5	25480	0.047	2400	19110	0.040	1530	15920	0.033	1050	50000	0.047	4700	
6	21230	0.056	2390	15920	0.048	1520	13270	0.039	1050	42460	0.056	4780	
8	15920	0.075	2380	11940	0.064	1520	9950	0.052	1040	31850	0.075	4770	
10	12740	0.094	2390	9550	0.080	1520	7960	0.066	1040	25480	0.094	4770	
12	10620	0.112	2380	7960	0.095	1520	6630	0.078	1040	21230	0.112	4760	

< D3 ap x ae 0.25D x D

	Material Group ISO 513	N1			N2 N3			N4			N5		
	Material	Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae	1.5D x 0.3D			1.5D x 0.3D			1.5D x 0.3D			1.5D x 0.3D		
	Vc (m/min)	300-600			250-450			200-400			600-1000		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
2	50000	0.027	2690	50000	0.023	2280	47770	0.019	1800	50000	0.027	2690	
3	47770	0.034	3240	37150	0.029	2140	31850	0.024	1510	50000	0.034	3390	
4	35830	0.045	3230	27870	0.038	2130	23890	0.032	1510	50000	0.045	4500	
5	28660	0.056	3240	22290	0.048	2140	19110	0.040	1510	50000	0.056	5640	
6	23890	0.068	3230	18580	0.057	2140	15920	0.047	1510	42460	0.068	5740	
8	17910	0.090	3220	13930	0.076	2130	11940	0.063	1500	31850	0.090	5720	
10	14330	0.112	3220	11150	0.096	2130	9550	0.079	1500	25480	0.112	5730	
12	11940	0.134	3210	9290	0.114	2120	7960	0.094	1500	21230	0.134	5710	

< D3 ap x ae D x 0.5D

MDCAB2

	Material Group ISO 513		N1			N2 N3			N4			N5		
	Material		Alluminium ≤ 12% Si - Copper Alloy			Alluminium > 12% Si - Copper Alloy			Brass and bronze			Plastics		
	ap x ae		0.2D x 0.4D			0.2D x 0.4D			0.2D x 0.4D			0.2D x 0.4D		
	Vc (m/min)		200-600			250-450			200-400			600-1000		
	D (mm)	D (eff.) (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
1	0.80	40000	0.013	1010	111460	0.011	2530	95540	0.010	1930	254780	0.013	6420	
1.5	1.20	84930	0.017	2850	74310	0.015	2250	63690	0.013	1710	169850	0.017	5710	
2	1.60	63690	0.017	2140	55730	0.015	1690	47770	0.013	1280	127390	0.017	4280	
2.5	2.00	50960	0.021	2140	44590	0.019	1690	38220	0.017	1280	101910	0.021	4280	
3	2.40	42460	0.025	2140	37150	0.023	1690	31850	0.020	1280	84930	0.025	4280	
4	3.20	31850	0.035	2230	27870	0.032	1760	23890	0.028	1340	63690	0.035	4460	
5	4.00	25480	0.045	2280	22290	0.040	1800	19110	0.036	1370	50960	0.045	4570	
6	4.80	21230	0.053	2260	18580	0.048	1780	15920	0.043	1360	42460	0.053	4520	
8	6.40	15920	0.067	2140	13930	0.060	1680	11940	0.054	1280	31850	0.067	4280	
10	8.00	12740	0.080	2030	11150	0.072	1600	9550	0.064	1220	25480	0.080	4070	
12	9.60	10620	0.094	1990	9290	0.084	1570	7960	0.075	1190	21230	0.094	3980	

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