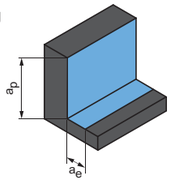
Cutting data recommendations for ball nose milling cutters

Feed and cutting speed

Roughing



Plunge angle
1.0° - 3.0°

OptiMill-3D-BN-Alu | MBN114, 115, 116

MMG*			Workpiece material	Strength/hardness [N/mm²] [HRC]	Cooling			a_p [mm]	a_e [mm]	v_c [m/min]	f_z [mm]												
					Dry	Air/MQL	KSS				Diameter of milling cutter [mm]												
											1.00	1.50	2.00	2.50	3.00	4.00	5.00	6.00	8.00	10.00	12.00	16.00	20.00
N	N1	N1.1	Aluminium, unalloyed and alloyed < 3% Si				✓	0.1xD	< 0.3xD	**400-600**	0.022	0.030	0.038	0.045	0.057	0.062	0.082	0.090	0.102	0.120	0.155	0.180	0.205
		N1.2	Aluminium, alloyed ≤ 7% Si				✓	0.1xD	< 0.3xD	**380-580**	0.024	0.033	0.042	0.050	0.063	0.068	0.090	0.099	0.112	0.132	0.171	0.198	0.226
		N1.3	Aluminium, alloyed > 7 - 12% Si				✓	0.1xD	< 0.3xD	**340-540**	0.026	0.036	0.046	0.054	0.068	0.074	0.098	0.108	0.122	0.144	0.186	0.216	0.246
		N1.4	Aluminium, alloyed > 12% Si				✓	0.1xD	< 0.3xD	**300-500**	0.029	0.039	0.049	0.059	0.074	0.081	0.107	0.117	0.133	0.156	0.202	0.234	0.267
	N2	N2.1	Copper, unalloyed and low alloyed	< 300			✓	0.1xD	< 0.3xD	**400-500**	0.022	0.030	0.038	0.045	0.057	0.062	0.082	0.090	0.102	0.120	0.155	0.180	0.205
		N2.2	Copper, alloyed	> 300			✓	0.1xD	< 0.3xD	**300-400**	0.022	0.030	0.038	0.045	0.057	0.062	0.082	0.090	0.102	0.120	0.155	0.180	0.205
		N2.3	Brass, bronze, gunmetal	< 1,200	✓	✓	✓	0.1xD	< 0.3xD	**400-500**	0.026	0.036	0.046	0.054	0.068	0.074	0.098	0.108	0.122	0.144	0.186	0.216	0.246

OptiMill-3D-BN-Alu | MBN114, 115, 116

MMG*			Workpiece material	Strength/hardness [N/mm²] [HRC]	Cooling			a_p [mm]	a_e [mm]	v_c [m/min]	f_z [mm]												
					Dry	Air/MQL	KSS				Diameter of milling cutter [mm]												
											1.00	1.50	2.00	2.50	3.00	4.00	5.00	6.00	8.00	10.00	12.00	16.00	20.00
N	N1	N1.1	Aluminium, unalloyed and alloyed < 3% Si				✓	0.015xD	0.025xD	**400-600**	0.022	0.030	0.038	0.045	0.057	0.062	0.082	0.090	0.102	0.120	0.155	0.180	0.205
		N1.2	Aluminium, alloyed ≤ 7% Si				✓	0.015xD	0.025xD	**380-580**	0.024	0.033	0.042	0.050	0.063	0.068	0.090	0.099	0.112	0.132	0.171	0.198	0.226
		N1.3	Aluminium, alloyed > 7 - 12% Si				✓	0.015xD	0.025xD	**340-540**	0.026	0.036	0.046	0.054	0.068	0.074	0.098	0.108	0.122	0.144	0.186	0.216	0.246
		N1.4	Aluminium, alloyed > 12% Si				✓	0.015xD	0.025xD	**300-500**	0.029	0.039	0.049	0.059	0.074	0.081	0.107	0.117	0.133	0.156	0.202	0.234	0.267
	N2	N2.1	Copper, unalloyed and low alloyed	< 300			✓	0.015xD	0.025xD	**400-500**	0.022	0.030	0.038	0.045	0.057	0.062	0.082	0.090	0.102	0.120	0.155	0.180	0.205
		N2.2	Copper, alloyed	> 300			✓	0.015xD	0.025xD	**300-400**	0.022	0.030	0.038	0.045	0.057	0.062	0.082	0.090	0.102	0.120	0.155	0.180	0.205
		N2.3	Brass, bronze, gunmetal	< 1,200	✓	✓	✓	0.015xD	0.025xD	**400-500**	0.026	0.036	0.046	0.054	0.068	0.074	0.098	0.108	0.122	0.144	0.186	0.216	0.246

Working depth correction factor – k_{AT}

AT	k_{AT}		
	a_p	n	v_f
≤ 3xD	1,00	1,00	1,00
≤ 5xD	0,80	0,90	0,90
≤ 6xD	0,70	0,85	0,85
≤ 8xD	0,60	0,75	0,75
≤ 10xD	0,50	0,70	0,70
≤ 12xD	0,45**	0,65	0,65
≤ 15xD	0,40**	0,60	0,60
≤ 20xD	0,35**	0,60	0,60
≤ 25xD	0,35**	0,50	0,50
≤ 30xD	0,30**	0,50	0,50
≤ 35xD	0,30**	0,50	0,50

Cone angle correction factor – k_{KW}

φ [°]	k_{KW}		
	a_p	n	v_f
0	1,00	1,00	1,00
0,5	1,01	1,01	1,01
1	1,02	1,02	1,02
1,5	1,03	1,03	1,03
3	1,06	1,06	1,06

Note:
To determine cutting data, please observe the notes on page 548-551.

* MAPAL machining groups
** Consultation with a MAPAL application engineer.

The specified machining values are guide values.
The optimum data for the respective machining task should be determined during the test or machining.