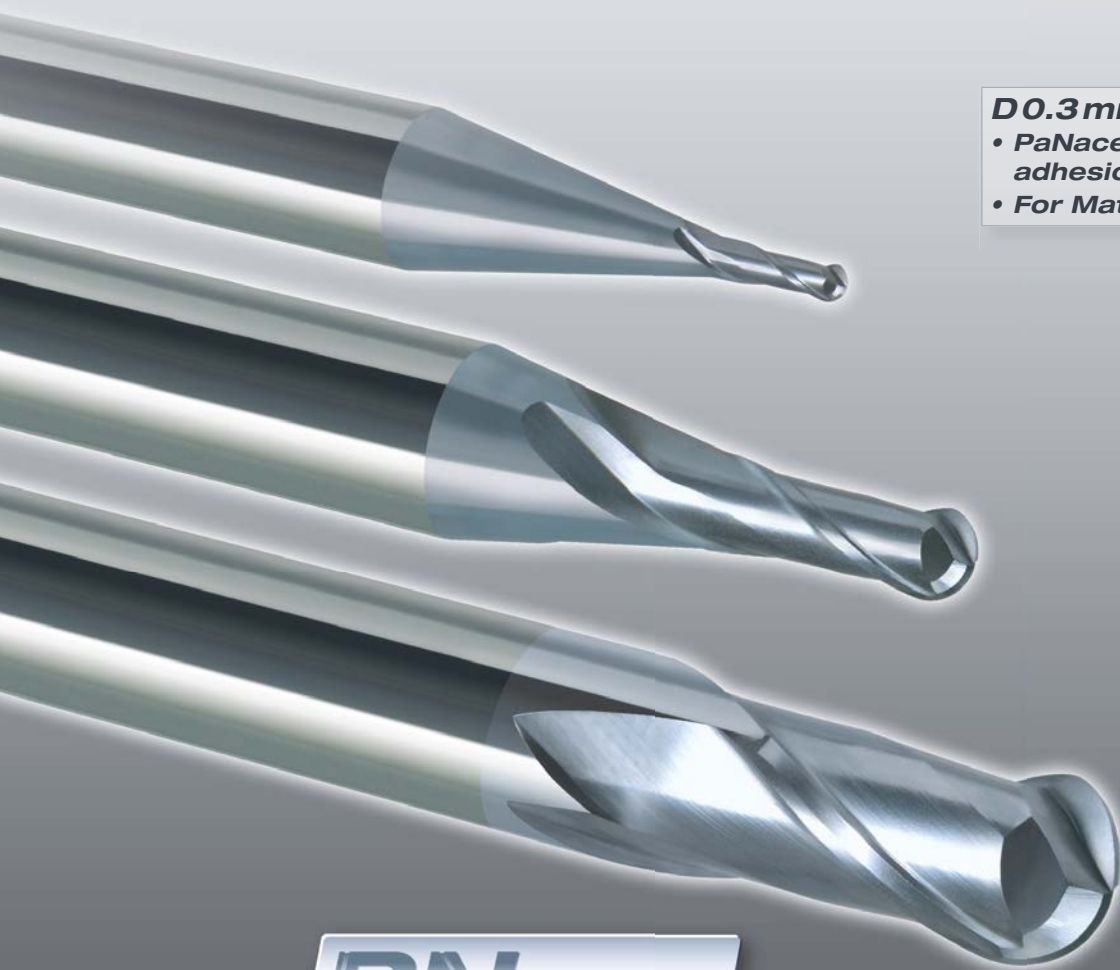


GO-Line PaNacea HGOB-2-PN

Solid Carbide End Mill

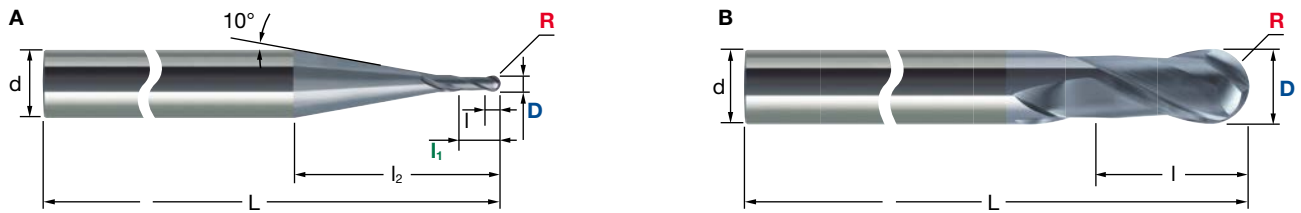


D0.3mm ~ D12mm

- **PaNacea Coating** for high adhesion & wear resistance
- **For Materials $\leq 50\text{HRC}$**

PNCoating

HGOB-2-PN | GO-Line PaNacea



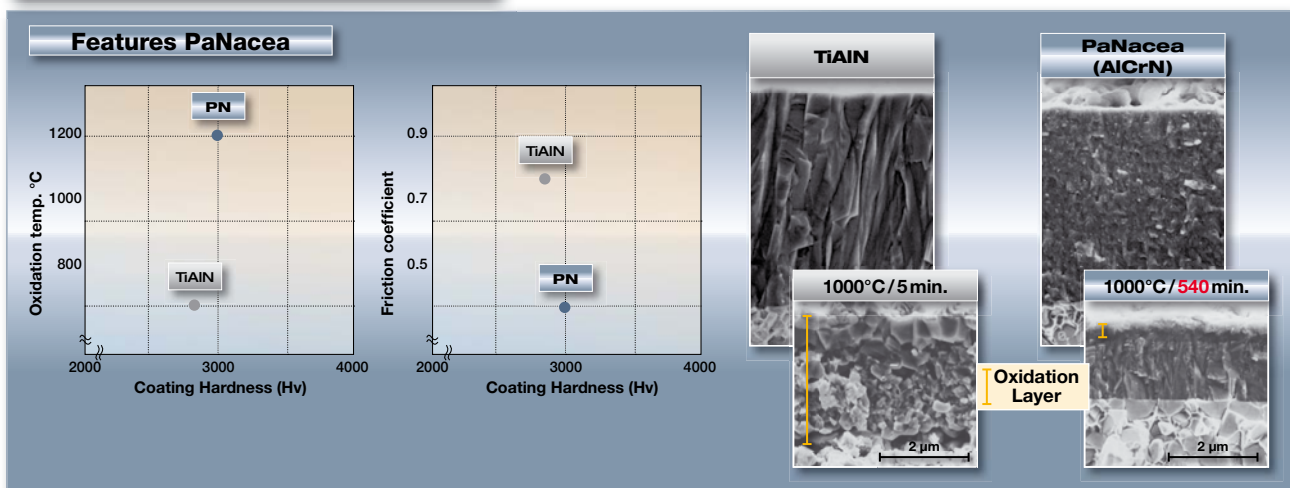
Carbide	PN	Rake Angle
Micro Grain	PaNacea Coating	Negative

R Tol. [mm]	d Tol.
+/- 0.005	h5

ID Code	Item Code	Z	D	R	I	I ₁	I ₂	L	d	Type
EL094	HGOB-2003-PN	2	0.3	0.15	0.6	0.9	11.4	50	4	A
EL095	HGOB-2004-PN		0.4	0.2	0.8	1.1	11.3			
EL096	HGOB-2005-PN		0.5	0.25	1	1.3	11.2			
EL097	HGOB-2006-PN		0.6	0.3	1.2	1.5	11.1			
EL098	HGOB-2008-PN		0.8	0.4	1.6	1.9	11.0			
EL099	HGOB-2010-PN		1	0.5	2.5	3.5	12.0			
EL100	HGOB-2015-PN		1.5	0.75	4	5.1	12.1	70	6	B
EL101	HGOB-2020-PN		2	1	5	6.0	17.3			
EL102	HGOB-2025-PN		2.5	1.25	7	8.0	17.9			
EL103	HGOB-2030-PN		3	1.5	8	9.0	17.5			
EL104	HGOB-2040-PN		4	2	8		14.7			
EL105	HGOB-2050-PN		5	2.5	10	11.0	13.8			
EL106	HGOB-2060-PN		6	3	12	-	-	90		
EL107	HGOB-2080-PN		8	4	14			100		
EL108	HGOB-2100-PN		10	5	18			110		
EL109	HGOB-2120-PN		12	6	22					

PaNacea Coating

high adhesion and wear resistance





HGOB-2-PN | Recommended Cutting Conditions

HGOB-2-PN

		D0.3/R0.15		D0.4/R0.2		D0.5/R0.25		D0.6/R0.3		D0.8/R0.4		D1/R0.5		D1.5/R0.75		D2/R1	
		▽	▽▽▽	▽	▽▽▽	▽	▽▽▽	▽	▽▽▽	▽	▽▽▽	▽	▽▽▽	▽	▽▽▽	▽	▽▽▽
		Roughing	Finishing	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing
Copper, Aluminium	V_c (m/min)	60	60	80	80	90	90	110	110	150	150	190	190	280	280	300	350
	n (min ⁻¹)	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	47700	55700
	f_z (mm/tooth)	0.006	0.005	0.008	0.007	0.010	0.009	0.013	0.011	0.017	0.015	0.021	0.019	0.032	0.028	0.043	0.037
	V_f (mm/min)	720	600	960	840	1200	1080	1560	1320	2040	1800	2520	2280	3840	3360	4100	4120
	a_p (mm)	0.038	0.015	0.050	0.02	0.063	0.025	0.075	0.03	0.100	0.04	0.125	0.05	0.188	0.07	0.250	0.1
Carbon steel, Alloy steel, Cast iron (180~250HB)	a_e (mm)	0.150	0.015	0.200	0.02	0.250	0.025	0.300	0.03	0.400	0.04	0.500	0.05	0.750	0.07	1.000	0.1
	V_c (m/min)	60	60	80	80	90	90	110	110	150	150	190	190	250	270	250	270
	n (min ⁻¹)	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	53100	57300	39800	43000
	f_z (mm/tooth)	0.006	0.005	0.008	0.007	0.010	0.009	0.012	0.011	0.016	0.015	0.020	0.019	0.030	0.028	0.040	0.037
	V_f (mm/min)	720	600	960	840	1200	1080	1440	1320	1920	1800	2400	2280	3190	3210	3180	3180
Stainless steel (20~40HRC)	a_p (mm)	0.038	0.015	0.050	0.02	0.063	0.025	0.075	0.03	0.100	0.04	0.125	0.05	0.188	0.07	0.250	0.1
	a_e (mm)	0.150	0.015	0.200	0.02	0.250	0.025	0.300	0.03	0.400	0.04	0.500	0.05	0.750	0.07	1.000	0.1
	V_c (m/min)	60	60	80	80	90	90	110	110	150	150	190	190	210	230	210	230
	n (min ⁻¹)	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	44600	48800	33400	36600
	f_z (mm/tooth)	0.005	0.004	0.007	0.006	0.009	0.008	0.010	0.009	0.014	0.012	0.018	0.015	0.027	0.024	0.036	0.032
Alloy steel, Tool steel (25~35HRC)	V_f (mm/min)	600	480	840	720	1080	960	1200	1080	1680	1440	2160	1800	2410	2340	2400	2340
	a_p (mm)	0.036	0.015	0.048	0.02	0.060	0.025	0.072	0.03	0.096	0.04	0.120	0.05	0.180	0.07	0.240	0.1
	a_e (mm)	0.144	0.015	0.192	0.02	0.240	0.025	0.288	0.03	0.384	0.04	0.480	0.05	0.720	0.07	0.960	0.1
	V_c (m/min)	60	60	80	80	90	90	110	110	150	150	190	190	210	230	210	230
	n (min ⁻¹)	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	44600	48800	33400	36600
Alloy steel, Tool steel (35~45HRC)	f_z (mm/tooth)	0.005	0.004	0.007	0.006	0.009	0.008	0.010	0.009	0.014	0.012	0.018	0.015	0.027	0.024	0.036	0.032
	V_f (mm/min)	600	480	840	720	1080	960	1200	1080	1680	1440	2160	1800	2410	2340	2400	2340
	a_p (mm)	0.033	0.015	0.044	0.02	0.055	0.025	0.066	0.03	0.088	0.04	0.110	0.05	0.165	0.07	0.220	0.1
	a_e (mm)	0.132	0.015	0.176	0.02	0.220	0.025	0.264	0.03	0.352	0.04	0.440	0.05	0.660	0.07	0.880	0.1
	V_c (m/min)	60	60	80	80	90	90	110	110	150	150	190	190	200	200	180	200
Hardened Steel, Tool Steels (hot&cold) (45~50HRC)	n (min ⁻¹)	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	49300	54100	32900	36100	24700	27100
	f_z (mm/tooth)	0.004	0.004	0.005	0.005	0.007	0.007	0.008	0.008	0.011	0.011	0.014	0.013	0.021	0.020	0.028	0.027
	V_f (mm/min)	480	460	600	620	840	780	960	940	1320	1260	1380	1410	1380	1440	1380	1460
	a_p (mm)	0.030	0.015	0.040	0.02	0.050	0.025	0.060	0.03	0.080	0.04	0.100	0.05	0.150	0.07	0.200	0.1
	a_e (mm)	0.120	0.015	0.160	0.02	0.200	0.025	0.240	0.03	0.320	0.04	0.400	0.05	0.600	0.07	0.800	0.1

HGOB-2-PN

HGOB-2-PN		D2.5/R1.25		D3/R1.5		D4/R2		D5/R2.5		D6/R3		D8/R4		D10/R5		D12/R6	
		▽	▽▽▽	▽	▽▽▽	▽	▽▽▽	▽	▽▽▽	▽	▽▽▽	▽	▽▽▽	▽	▽▽▽	▽	▽▽▽
		Roughing	Finishing	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing
Copper, Aluminium	V _c (m/min)	300	350	300	350	300	350	300	350	300	350	300	350	300	350	300	350
	n (min ⁻¹)	38200	44600	31800	37100	23900	27900	19100	22300	15900	18600	11900	13900	9500	11100	8000	9300
	f _z (mm/tooth)	0.054	0.047	0.065	0.056	0.086	0.074	0.108	0.093	0.130	0.111	0.177	0.150	0.220	0.186	0.260	0.222
	V _f (mm/min)	4130	4190	4130	4160	4110	4130	4130	4150	4130	4130	4210	4170	4180	4130	4160	4130
	a _p (mm)	0.313	0.1	0.375	0.12	0.500	0.14	0.625	0.16	0.750	0.18	1.000	0.2	1.250	0.23	1.500	0.25
Carbon steel, Alloy steel, Cast iron (180~250HB)	a _e (mm)	1.250	0.1	1.500	0.12	2.000	0.14	2.500	0.16	3.000	0.18	4.000	0.2	5.000	0.23	6.000	0.25
	V _c (m/min)	250	270	250	270	250	270	250	270	250	270	250	270	250	270	250	270
	n (min ⁻¹)	31800	34400	26500	28600	19900	21500	15900	17200	13300	14300	9900	10700	8000	8600	6600	7200
	f _z (mm/tooth)	0.050	0.047	0.062	0.056	0.083	0.074	0.105	0.093	0.125	0.111	0.165	0.150	0.200	0.186	0.235	0.222
	V _f (mm/min)	3180	3230	3290	3200	3300	3180	3340	3200	3330	3170	3270	3210	3200	3200	3100	3200
Stainless steel (20~40HRC)	a _p (mm)	0.313	0.1	0.375	0.12	0.500	0.14	0.625	0.16	0.750	0.18	1.000	0.2	1.250	0.23	1.500	0.25
	a _e (mm)	1.250	0.1	1.500	0.12	2.000	0.14	2.500	0.16	3.000	0.18	4.000	0.2	5.000	0.23	6.000	0.25
	V _c (m/min)	210	230	210	230	210	230	210	230	210	230	210	230	210	230	210	230
	n (min ⁻¹)	26700	29300	22300	24400	16700	18300	13400	14600	11100	12200	8400	9200	6700	7300	5600	6100
	f _z (mm/tooth)	0.045	0.040	0.055	0.048	0.074	0.065	0.093	0.082	0.112	0.098	0.150	0.130	0.185	0.165	0.220	0.190
Alloy steel, Tool steel (25~35HRC)	V _f (mm/min)	2400	2340	2450	2340	2470	2380	2490	2390	2490	2390	2520	2390	2480	2410	2460	2320
	a _p (mm)	0.300	0.1	0.360	0.12	0.480	0.14	0.600	0.16	0.720	0.18	0.960	0.2	1.200	0.23	1.440	0.25
	a _e (mm)	1.200	0.1	1.440	0.12	1.920	0.14	2.400	0.16	2.880	0.18	3.840	0.2	4.800	0.23	5.760	0.25
	V _c (m/min)	210	230	210	230	210	230	210	230	210	230	210	230	210	230	210	230
	n (min ⁻¹)	26700	29300	22300	24400	16700	18300	13400	14600	11100	12200	8400	9200	6700	7300	5600	6100
Alloy steel, Tool steel (35~45HRC)	f _z (mm/tooth)	0.045	0.040	0.055	0.048	0.074	0.065	0.093	0.082	0.112	0.098	0.150	0.130	0.185	0.165	0.220	0.190
	V _f (mm/min)	2400	2340	2450	2340	2470	2380	2490	2390	2490	2390	2520	2390	2480	2410	2460	2320
	a _p (mm)	0.300	0.1	0.360	0.12	0.480	0.14	0.600	0.16	0.720	0.18	0.960	0.2	1.200	0.23	1.440	0.25
	a _e (mm)	1.200	0.1	1.440	0.12	1.920	0.14	2.400	0.16	2.880	0.18	3.840	0.2	4.800	0.23	5.760	0.25
	V _c (m/min)	190	200	180	200	180	200	190	200	180	200	190	200	190	200	180	200
Hardened Steel, Tool Steels (hot&cold) (45~50HRC)	n (min ⁻¹)	23600	25500	19600	21200	14700	15900	11800	12700	9800	10600	7400	8000	5900	6400	4900	5300
	f _z (mm/tooth)	0.038	0.038	0.046	0.046	0.062	0.062	0.077	0.078	0.091	0.094	0.120	0.120	0.150	0.145	0.180	0.173
	V _f (mm/min)	1790	1940	1800	1950	1820	1970	1820	1980	1780	1990	1780	1920	1770	1860	1760	1830
	a _p (mm)	0.275	0.1	0.330	0.12	0.440	0.14	0.550	0.16	0.660	0.18	0.880	0.2	1.100	0.23	1.320	0.25
	a _e (mm)	1.100	0.1	1.320	0.12	1.760	0.14	2.200	0.16	2.640	0.18	3.520	0.2	4.400	0.23	5.280	0.25
Hardened Steel, Tool Steels (hot&cold) (45~50HRC)	V _c (m/min)	150	170	150	170	150	170	160	170	150	170	160	170	150	170	150	170
	n (min ⁻¹)	19700	21600	16400	18000	12300	13500	9900	10800	8200	9000	6200	6800	4900	5400	4100	4500
	f _z (mm/tooth)	0.035	0.035	0.042	0.042	0.054	0.055	0.066	0.070	0.080	0.084	0.105	0.110	0.130	0.140	0.155	0.168
	V _f (mm/min)	1380	1510	1380	1510	1330	1490	1310	1510	1310	1510	1300	1500	1270	1510	1270	1510
	a _p (mm)	0.250	0.1	0.300	0.12	0.400	0.14	0.500	0.16	0.600	0.18	0.800	0.2	1.000	0.23	1.200	0.25
a _e (mm)	1.000	0.1	1.200	0.12	1.600	0.14	2.000	0.16	2.400	0.18	3.200	0.2	4.000	0.23	4.800	0.25	

Always up to date: Please check our P50 QuickFinder



Attentions on Safety

1. Cautions regarding handling

- (1) When removing the tool from its case (packaging), be careful that the tool does not pop out or is dropped. Be particularly careful regarding contact with the tool flutes.
- (2) When handling tools with sharp cutting flutes, be careful not to touch the cutting flutes directly with your bare hands.

2. Cautions regarding mounting

- (1) Before use, check the outside appearance of the tool for scratches, cracks, etc. and that it is firmly mounted in the collet chuck, etc.
- (2) When preparing for use, be sure that the inserts are firmly mounted in place and that they are firmly mounted on the arbor, etc.
- (3) If abnormal chattering, etc. occurs during use, stop the machine immediately and remove the cause of the chattering.

3. Cautions during use

- (1) Before use, confirm the dimensions and direction of rotation of the tool and milling work material.
- (2) The numerical values in the standard cutting conditions table should be used as criteria when starting new work. The cutting conditions should be adjusted as appropriate when the cutting depth is large, the rigidity of the machine being used is low, or according to the conditions of the work material.
- (3) Cutting tools are made of a hard material. During use, they may break and fly off. In addition, cutting chips may also fly off. Since there is a danger of injury to workers, fire, or eye damage from such flying pieces, a safety cover should be attached when work is performed and safety equipment such as safety goggles should be worn to create a safe environment for work.
- (4) There is a risk of fire or inflammation due to sparks, heat due to breakage, and cutting chips. Do not use where there is a risk of fire or explosion. Please caution of fire while using oil base coolant, fire prevention is necessary.
- (5) Do not use the tool for any purpose other than that for which it is intended.

4. Cautions regarding regrinding

- (1) If regrinding is not performed at the proper time, there is a risk of the tool breaking. Replace the tool with one in good condition, or perform regrinding.
- (2) Grinding dust will be created when regrinding a tool. When regrinding, be sure to attach a safety cover over the work area and wear safety clothes such as safety goggles, etc.
- (3) This product contains the specified chemical substance cobalt and its inorganic compounds. When performing regrinding or similar processing, be sure to handle the processing in accordance with the local laws and regulations regarding prevention of hazards due to specified chemical substances.

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Specifications for the products listed in this catalog are subject to change without notice due to replacement or modification.

MOLDINO Tool Engineering Europe GmbH

Itterpark 12 · 40724 Hilden · Germany · Phone +49 (0) 21 03-24 82-0 · Fax +49 (0) 21 03-24 82-30
E-Mail info@moldino.eu · Internet www.moldino.eu
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