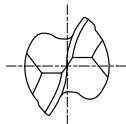


CARBIDE, 2 FLUTE LONG LENGTH BALL NOSE

- VOLLHARTMETALL, 2 SCHNEIDEN LANG KUGELSTIRN
- Fraise carbure, 2 dents, hémisphérique, longue
- 2 TAGLIANTI, SEMISFERICA, SERIE LUNGA

- ▶ Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ▶ For copy - milling machines.

- ▶ Zur Bearbeitung von Werkzeugstählen, Legierten Stählen, Stahlguß und gehärteten Stählen.
- ▶ Für Kopierfräsmaschinen.



CARBIDE
2
30°
R ±0.02
PLAIN
P.372-373

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	R(±0.02)	D1	D2	L1	L2
GM813010	R0.5	1.0	4	2.5	50
GM813020	R1.0	2.0	6	5	50
GM813030	R1.5	3.0	6	8	60
GM813040	R2.0	4.0	6	8	70
GM813050	R2.5	5.0	6	10	80
GM813060	R3.0	6.0	6	12	90
GM813080	R4.0	8.0	8	14	100
GM813100	R5.0	10.0	10	18	100
GM813120	R6.0	12.0	12	22	110
GM813160	R8.0	16.0	16	30	140
GM813200	R10.0	20.0	20	38	160

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ - 0.03	h5

◎ : Excellent ○ : Good

ISO Material Description	P											M			K							
	Non-alloy steel					Low alloy steel						High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
HRc	125	130	135	140	145	150	155	160	165	170	175	180	185	190	200	210	220	230	240	250		
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230		
Recommend	○	○	○	◎	◎	○	◎	◎	◎	○	◎	○	○	○	○	○	○	○	○	○		

ISO Material Description	N										S						H				
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys						Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc	60	100	75	90	130	110	90	100			15	30	25	38	34	400 Rm	1050 Rm	550	630	400	550
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommend																		○	◎	○	○

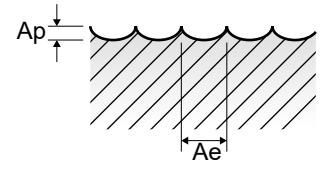
GM876, GM813 SERIES 2 FLUTE BALL NOSE

Vc = m/min.
fz = mm/tooth
RPM = rev./min.
FEED = mm/min.
Ap = mm

NORMAL SPEED

ISO	VDI 3323	Material Description	Ae	Parameter	Diameter (Ø)															
					1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	20.0			
P	1-4	Non-alloy steel	0.2D	Vc	55	85	100	125	140	150	160	180	200	225	245	270	290			
				fz	0.008	0.011	0.026	0.026	0.026	0.035	0.045	0.06	0.09	0.12	0.15	0.18	0.2			
				RPM	17507	18038	15915	15915	14854	11937	10186	9549	7958	7162	6499	5371	4615			
				FEED	280	397	828	828	772	836	917	1146	1432	1719	1950	1934	1846			
				Ap	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3			
				Vc	45	65	75	95	105	120	130	145	160	180	195	215	230			
	5	Non-alloy steel	0.2D	fz	0.008	0.011	0.023	0.023	0.023	0.032	0.040	0.060	0.080	0.100	0.120	0.140	0.160			
				RPM	14324	13793	11937	12096	11141	9549	8276	7692	6366	5730	5173	4277	3661			
				FEED	229	303	549	556	512	611	662	923	1019	1146	1241	1198	1171			
				Ap	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3			
				Vc	55	85	100	125	140	150	160	180	200	225	245	270	290			
				fz	0.008	0.011	0.026	0.026	0.026	0.035	0.045	0.06	0.09	0.12	0.15	0.18	0.2			
	6-7	Low alloy steel	0.2D	RPM	17507	18038	15915	15915	14854	11937	10186	9549	7958	7162	6499	5371	4615			
				FEED	280	397	828	828	772	836	917	1146	1432	1719	1950	1934	1846			
				Ap	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3			
				Vc	45	65	75	95	105	120	130	145	160	180	195	215	230			
				fz	0.008	0.011	0.023	0.023	0.023	0.032	0.040	0.060	0.080	0.100	0.120	0.140	0.160			
				RPM	14324	13793	11937	12096	11141	9549	8276	7692	6366	5730	5173	4277	3661			
8-9	Low alloy steel	0.2D	FEED	229	303	549	556	512	611	662	923	1019	1146	1241	1198	1171				
			Ap	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3				
			Vc	55	85	100	125	140	150	160	180	200	225	245	270	290				
			fz	0.008	0.011	0.026	0.026	0.026	0.035	0.045	0.06	0.09	0.12	0.15	0.18	0.2				
			RPM	17507	18038	15915	15915	14854	11937	10186	9549	7958	7162	6499	5371	4615				
			FEED	280	397	828	828	772	836	917	1146	1432	1719	1950	1934	1846				
10	High alloyed steel, and tool steel	0.2D	Ap	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3				
			Vc	45	65	75	95	105	120	130	145	160	180	195	215	230				
			fz	0.008	0.011	0.023	0.023	0.023	0.032	0.040	0.060	0.080	0.100	0.120	0.140	0.160				
			RPM	14324	13793	11937	12096	11141	9549	8276	7692	6366	5730	5173	4277	3661				
			FEED	229	303	549	556	512	611	662	923	1019	1146	1241	1198	1171				
			Ap	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3			
11.1 - 11.2	High alloyed steel, and tool steel	0.2D	Vc	55	85	100	125	140	150	160	180	200	225	245	270	290				
			fz	0.008	0.011	0.026	0.026	0.026	0.035	0.045	0.06	0.09	0.12	0.15	0.18	0.2				
			RPM	17507	18038	15915	15915	14854	11937	10186	9549	7958	7162	6499	5371	4615				
			FEED	280	397	828	828	772	836	917	1146	1432	1719	1950	1934	1846				
			Ap	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3			
			Vc	45	65	75	95	105	120	130	145	160	180	195	215	230				
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.2D	fz	0.008	0.011	0.026	0.026	0.026	0.035	0.045	0.06	0.09	0.12	0.15	0.181	0.201			
				RPM	17507	16977	15915	15915	14324	11539	10186	9549	7958	7003	6499	5272	4615			
				FEED	280	373	828	828	745	808	917	1146	1432	1681	1950	1908	1855			
				Ap	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3			
				Vc	20	30	35	40	50	60	65	70	70	75	75	80				
				fz	0.008	0.011	0.016	0.016	0.017	0.021	0.024	0.030	0.044	0.055	0.070	0.091	0.113			
H	38.1 - 38.2	Hardened steel	0.1D	RPM	6366	6366	5570	5093	5305	4775	4138	3448	2785	2228	1989	1492	1273			
				FEED	102	140	178	163	180	201	199	207	245	245	279	272	288			
				Ap	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3			
				Vc	45	65	75	95	105	120	130	145	160	180	195	215	230			
				fz	0.008	0.011	0.023	0.023	0.023	0.032	0.040	0.060	0.080	0.100	0.120	0.140	0.160			
				RPM	14324	13793	11937	12096	11141	9549	8276	7692	6366	5730	5173	4277	3661			
	40	Chilled Cast Iron	0.2D	FEED	229	303	549	556	512	611	662	923	1019	1146	1241	1198	1171			
				Ap	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3			
				Vc	20	30	35	40	50	60	65	70	70	75	75	80				
				fz	0.008	0.011	0.016	0.016	0.017	0.021	0.024	0.030	0.044	0.055	0.070	0.091	0.113			
				RPM	6366	6366	5570	5093	5305	4775	4138	3448	2785	2228	1989	1492	1273			
				FEED	102	140	178	163	180	201	199	207	245	245	279	272	288			
	41	Hardened Cast Iron	0.1D	Ap	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3			
				Vc	20	30	35	40	50	60	65	70	70	75	75	80				
				fz	0.008	0.011	0.016	0.016	0.017	0.021	0.024	0.030	0.044	0.055	0.070	0.091	0.113			
				RPM	6366	6366	5570	5093	5305	4775	4138	3448	2785	2228	1989	1492	1273			
				FEED	102	140	178	163	180	201	199	207	245	245	279	272	288			
				Ap	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3		

▶ NEXT PAGE

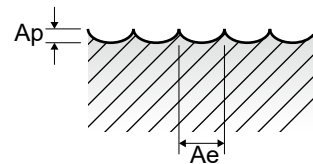


Vc = m/min.
fz = mm/tooth
RPM = rev./min.
FEED = mm/min.
Ap = mm

GM876, GM813 SERIES 2 FLUTE BALL NOSE

HIGH SPEED

ISO	VDI 3323	Material Description	Ae	Parameter	Diameter (Ø)															
					1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	20.0			
P	1-5	Non-alloy steel	0.05D	Vc	90	120	150	185	220	295	370	445	470	495	515	540	560			
				fz	0.026	0.03	0.035	0.042	0.048	0.07	0.086	0.095	0.12	0.139	0.16	0.181	0.2			
				RPM	28648	25465	23873	23555	23343	23475	23555	23608	18701	15756	13661	10743	8913			
				FEED	1490	1528	1671	1979	2241	3287	4051	4486	4488	4380	4371	3889	3565			
	6-9	Low alloy steel	0.05D	Vc	90	120	150	185	220	295	370	445	470	495	515	540	560			
				fz	0.026	0.030	0.035	0.042	0.048	0.070	0.086	0.095	0.120	0.139	0.160	0.181	0.200			
				RPM	28648	25465	23873	23555	23343	23475	23555	23608	18701	15756	13661	10743	8913			
				FEED	1490	1528	1671	1979	2241	3287	4051	4486	4488	4380	4371	3889	3565			
	10 - 11.2	High alloyed steel, and tool steel	0.05D	Vc	90	120	150	185	220	295	370	445	470	495	515	540	560			
				fz	0.026	0.03	0.035	0.042	0.048	0.07	0.086	0.095	0.12	0.139	0.16	0.181	0.2			
				RPM	28648	25465	23873	23555	23343	23475	23555	23608	18701	15756	13661	10743	8913			
				FEED	1490	1528	1671	1979	2241	3287	4051	4486	4488	4380	4371	3889	3565			
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.05D	Vc	90	120	150	185	220	295	370	445	470	495	515	540	560			
				fz	0.026	0.03	0.035	0.042	0.048	0.07	0.086	0.095	0.12	0.139	0.16	0.181	0.2			
				RPM	28648	25465	23873	23555	23343	23475	23555	23608	18701	15756	13661	10743	8913			
				FEED	1490	1528	1671	1979	2241	3287	4051	4486	4488	4380	4371	3889	3565			
H	38.1 - 38.2	Hardened steel	0.05D	Vc	90	120	150	165	180	190	210	220	235	245	255	270	280			
				fz	0.016	0.019	0.022	0.026	0.031	0.042	0.050	0.060	0.075	0.086	0.095	0.105	0.115			
				RPM	28648	25465	23873	21008	19099	15120	13369	11671	9350	7799	6764	5371	4456			
				FEED	917	968	1050	1092	1184	1270	1337	1401	1403	1341	1285	1128	1025			
	40	Chilled Cast Iron	0.05D	Vc	90	120	150	185	220	295	370	445	470	495	515	540	560			
				fz	0.026	0.030	0.035	0.042	0.048	0.070	0.086	0.095	0.120	0.139	0.160	0.181	0.200			
				RPM	28648	25465	23873	23555	23343	23475	23555	23608	18701	15756	13661	10743	8913			
				FEED	1490	1528	1671	1979	2241	3287	4051	4486	4488	4380	4371	3889	3565			
	41	Hardened Cast Iron	0.05D	Vc	90	120	150	165	180	190	210	220	235	245	255	270	280			
				fz	0.016	0.019	0.022	0.026	0.031	0.042	0.050	0.060	0.075	0.086	0.095	0.105	0.115			
				RPM	28648	25465	23873	21008	19099	15120	13369	11671	9350	7799	6764	5371	4456			
				FEED	917	968	1050	1092	1184	1270	1337	1401	1403	1341	1285	1128	1025			
				Ap	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3				



SELECTION GUIDE



SERIES	GM876	GM813	GM886	GM902
FLUTE	2	2	2	2
HELIX ANGLE	30°	30°	30°	30°
CUTTING EDGE SHAPE	BALL NOSE	BALL NOSE	BALL NOSE	BALL NOSE
SIZE MIN	R0.5	R0.5	R0.25	R0.5
SIZE MAX	R8.0	R10.0	R3.0	R4.0
PAGE	350	351	352	354

SOLID CARBIDE
X-POWER PRO
END MILLS

for Pre-Hardened Steels up to HRC55,
 Mold & Die, Dry & Wet Cutting

SHORT LENGTH	LONG LENGTH	RIB PROCESSING	TAPER NECK
Y-Coating	Y-Coating	Y-Coating	Y-Coating



Please visit
globalyg1.com/mat
 for material search

◎ : Excellent ○ : Good

Recommended cutting conditions : P 372

ISO	VDI 3323	Material Description	Composition / Structure / Heat Treatment	HB	HRC	GM876	GM813	GM886	GM902	
P	1	Non-alloy steel	About 0.15% C Annealed	125		○	○	○	○	
	2		About 0.45% C Annealed	190	13	○	○	○	○	
	3		About 0.45% C Quenched & Tempered	250	25	○	○	○	○	
	4		About 0.75% C Annealed	270	28	◎	◎	◎	○	
	5		About 0.75% C Quenched & Tempered	300	32	◎	◎	◎	○	
	6	Low alloy steel	Annealed	180	10	○	○	○	○	
	7		Quenched & Tempered	275	29	◎	◎	◎	○	
	8		Quenched & Tempered	300	32	◎	◎	◎	◎	
	9		Quenched & Tempered	350	38	◎	◎	◎	◎	
	10		High alloyed steel, and tool steel	Annealed	200	15	○	○	○	○
	11			Quenched & Tempered	325	35	◎	◎	◎	◎
M	12	Stainless steel	Ferritic / Martensitic Annealed	200	15					
	13		Martensitic Quenched & Tempered	240	23					
	14		Austenitic	180	10					
K	15	Grey cast iron	Pearlitic / ferritic	180	10	○	○	○		
	16		Pearlitic (Martensitic)	260	26	○	○	○		
	17	Nodular cast iron	Ferritic	160	3	○	○	○		
	18		Pearlitic	250	25	○	○	○		
	19		Ferritic	130		○	○	○		
20	Malleable cast iron	Pearlitic	230	21	○	○	○			
N	21	Aluminum-wrought alloy	Not Curable	60						
	22		Curable Hardened	100						
	23	Aluminum-cast, alloyed	≤ 12% Si, Not Curable	75						
	24		≤ 12% Si, Curable Hardened	90						
	25		> 12% Si, Not Curable	130						
	26		Cutting Alloys, PB>1%	110						
	27	Copper and Copper Alloys	CuZn, CuSnZn (Brass)	90						
	28		CuSn, lead-free copper and electrolytic copper	100						
	29	Non Metallic Materials	Duroplastic, Fiber Reinforced Plastic							
	30		Rubber, Wood, etc.							
S	31	Heat Resistant Super Alloys	Fe Based Annealed	200	15					
	32		Cured	280	30					
	33		Annealed	250	25					
	34		Ni or Co Based Cured	350	38					
	35	Cast	320	34						
	36	Titanium Alloys	Pure Titanium	400 Rm						
	37		Alpha + Beta Alloys Hardened	1050 Rm						
H	38	Hardened steel	Hardened	550	55	○	○	○	○	
	39		Hardened	630	60	○	○	○	○	
	40	Chilled Cast Iron	Cast	400	42	◎	◎	◎	◎	
	41	Hardened Cast Iron	Hardened	550	55	○	○	○	○	