X-POWER PRO END MILLS

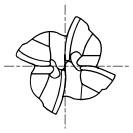
PLAIN SHANK **GM815** SERIES

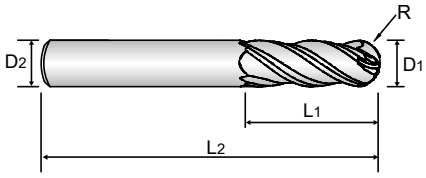
CARBIDE, 4 FLUTE LONG LENGTH BALL NOSE

VOLLHARTMETALL, 4 SCHNEIDEN LANG KUGELSTIRN
Fraise carbure, 4 dents, hémisphérique, longue
4 TAGLIENTI, SEMISFERICA, SERIE LUNGA

- ▶ Designed to machine tool steels, alloy steels, mold steels and other high hardened materials.
- ▶ For copy - milling machines.
- ▶ 4 Flute design - higher feed than GM813 series

- ▶ Zur Bearbeitung von Werkzeugstählen, Legierten Stählen, Stahlguß und gehärteten Stählen.
- ▶ Für Kopierfräsmaschinen.
- ▶ 4 Schneiden - Höherer Vorschub als bei GM813 serien.





CARBIDE | 4 | 30° | R ±0.02 | PLAIN

P.378-379

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	R(±0.02)	D_1	D_2	L_1	L_2
GM815020	R1.0	**2.0**	6	5	50
GM815030	R1.5	**3.0**	6	8	60
GM815040	R2.0	**4.0**	6	8	70
GM815050	R2.5	**5.0**	6	10	80
GM815060	R3.0	**6.0**	6	12	90
GM815080	R4.0	**8.0**	8	14	100
GM815100	R5.0	**10.0**	10	18	100
GM815120	R6.0	**12.0**	12	22	110
GM815160	R8.0	**16.0**	16	30	140

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

◎ : Excellent ○ : Good

ISO	P											M			K					
Material Description	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		13	25	28	32	10	29	32	38	15	35	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230
Recommend	○	○	○	◎	◎	○	◎	◎	◎	○	◎				○	○	○	○	○	○

ISO	N										S							H			
Material Description	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											15	30	25	38	34			55	60	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommend																		○	○	◎	○

X-POWER PRO END MILLS

RECOMMENDED CUTTING CONDITIONS
EMPFOHLENE SCHNEIDPARAMETER

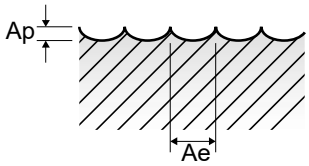
GM815 SERIES — 4 FLUTE BALL NOSE

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) 2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0
P	1-4	Non-alloy steel	0.2D	Vc	105	130	140	150	170	190	210	230	250
				fz	0.013	0.019	0.026	0.034	0.045	0.068	0.09	0.111	0.136
				RPM	16711	13793	11141	9549	9019	7560	6685	6101	4974
				FEED	869	1048	1159	1299	1623	2056	2406	2709	2706
				Ap	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
	5		0.2D	Vc	75	100	110	120	135	150	170	185	200
				fz	0.010	0.017	0.024	0.030	0.045	0.060	0.075	0.089	0.106
				RPM	11937	10610	8754	7639	7162	5968	5411	4907	3979
				FEED	477	722	840	917	1289	1432	1623	1747	1687
				Ap	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
	6-7	Low alloy steel	0.2D	Vc	105	130	140	150	170	190	210	230	250
				fz	0.013	0.019	0.026	0.034	0.045	0.068	0.09	0.111	0.136
				RPM	16711	13793	11141	9549	9019	7560	6685	6101	4974
				FEED	869	1048	1159	1299	1623	2056	2406	2709	2706
				Ap	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
	8-9		0.2D	Vc	75	100	110	120	135	150	170	185	200
				fz	0.010	0.017	0.024	0.030	0.045	0.060	0.075	0.089	0.106
				RPM	11937	10610	8754	7639	7162	5968	5411	4907	3979
				FEED	477	722	840	917	1289	1432	1623	1747	1687
				Ap	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
	10	High alloyed steel, and tool steel	0.2D	Vc	105	130	140	150	170	190	210	230	250
				fz	0.013	0.019	0.026	0.034	0.045	0.068	0.09	0.111	0.136
				RPM	16711	13793	11141	9549	9019	7560	6685	6101	4974
				FEED	869	1048	1159	1299	1623	2056	2406	2709	2706
				Ap	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
	11.1 - 11.2		0.2D	Vc	75	100	110	120	135	150	170	185	200
				fz	0.010	0.017	0.024	0.030	0.045	0.060	0.075	0.089	0.106
				RPM	11937	10610	8754	7639	7162	5968	5411	4907	3979
				FEED	477	722	840	917	1289	1432	1623	1747	1687
				Ap	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.2D	Vc	105	130	140	150	170	190	210	230	250
				fz	0.013	0.019	0.026	0.034	0.045	0.068	0.09	0.111	0.136
				RPM	16711	13793	11141	9549	9019	7560	6685	6101	4974
				FEED	869	1048	1159	1299	1623	2056	2406	2709	2706
				Ap	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
H	38.1 - 39.2	Hardened steel	0.1D	Vc	30	45	55	60	65	65	65	70	70
				fz	0.008	0.012	0.016	0.018	0.022	0.033	0.041	0.053	0.069
				RPM	4775	4775	4377	3820	3448	2586	2069	1857	1393
				FEED	153	229	280	275	303	341	339	394	384
				Ap	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
	40	Chilled Cast Iron	0.2D	Vc	75	100	110	120	135	150	170	185	200
				fz	0.01	0.017	0.024	0.03	0.045	0.06	0.075	0.089	0.106
				RPM	11937	10610	8754	7639	7162	5968	5411	4907	3979
				FEED	477	722	840	917	1289	1432	1623	1747	1687
				Ap	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
	41	Hardened Cast Iron	0.1D	Vc	30	45	55	60	65	65	65	70	70
				fz	0.008	0.012	0.016	0.018	0.022	0.033	0.041	0.053	0.069
				RPM	4775	4775	4377	3820	3448	2586	2069	1857	1393
				FEED	153	229	280	275	303	341	339	394	384
				Ap	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3

▶ NEXT PAGE

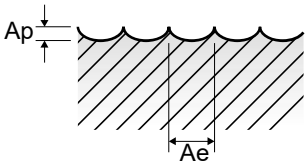


X-POWER PRO END MILLS

RECOMMENDED CUTTING CONDITIONS
EMPFOHLENE SCHNEIDPARAMETER

GM815 SERIES — 4 FLUTE BALL NOSE

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

HIGH SPEED

ISO	VDI 3323	Material Description	Ae	Parameter	Diameter (Ø) 2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0
P	1-5	Non-alloy steel	0.05D	Vc	140	210	275	345	415	440	460	485	505
				fz	0.026	0.036	0.052	0.064	0.071	0.09	0.105	0.12	0.136
				RPM	22282	22282	21884	21963	22016	17507	14642	12865	10047
				FEED	2317	3209	4552	5623	6253	6303	6150	6175	5465
				Ap	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
	6-9	Low alloy steel	0.05D	Vc	140	210	275	345	415	440	460	485	505
				fz	0.026	0.036	0.052	0.064	0.071	0.090	0.105	0.120	0.136
				RPM	22282	22282	21884	21963	22016	17507	14642	12865	10047
				FEED	2317	3209	4552	5623	6253	6303	6150	6175	5465
				Ap	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
	10 - 11.2	High alloyed steel, and tool steel	0.05D	Vc	140	210	275	345	415	440	460	485	505
				fz	0.026	0.036	0.052	0.064	0.071	0.09	0.105	0.12	0.136
				RPM	22282	22282	21884	21963	22016	17507	14642	12865	10047
				FEED	2317	3209	4552	5623	6253	6303	6150	6175	5465
				Ap	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.05D	Vc	140	210	275	345	415	440	460	485	505
				fz	0.026	0.036	0.052	0.064	0.071	0.09	0.105	0.12	0.136
				RPM	22282	22282	21884	21963	22016	17507	14642	12865	10047
				FEED	2317	3209	4552	5623	6253	6303	6150	6175	5465
				Ap	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
H	38.1 - 39.2	Hardened steel	0.05D	Vc	140	170	180	200	210	220	230	240	250
				fz	0.017	0.023	0.032	0.038	0.045	0.056	0.064	0.071	0.079
				RPM	22282	18038	14324	12732	11141	8754	7321	6366	4974
				FEED	1515	1659	1833	1935	2005	1961	1874	1808	1572
				Ap	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
	40	Chilled Cast Iron	0.05D	Vc	140	210	275	345	415	440	460	485	505
				fz	0.026	0.036	0.052	0.064	0.071	0.09	0.105	0.12	0.136
				RPM	22282	22282	21884	21963	22016	17507	14642	12865	10047
				FEED	2317	3209	4552	5623	6253	6303	6150	6175	5465
				Ap	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
	41	Hardened Cast Iron	0.05D	Vc	140	170	180	200	210	220	230	240	250
				fz	0.017	0.023	0.032	0.038	0.045	0.056	0.064	0.071	0.079
				RPM	22282	18038	14324	12732	11141	8754	7321	6366	4974
				FEED	1515	1659	1833	1935	2005	1961	1874	1808	1572
				Ap	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3