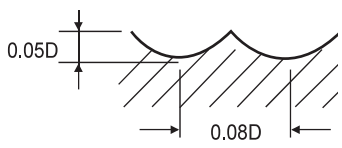
4G MILL END MILLS

RECOMMENDED CUTTING CONDITIONS

CARBIDE, 2 FLUTE BALL NOSE

SEMD98 SERIES

MATERIAL	P											
	NON-ALLOYED STEELS ALLOY STEELS CAST IRON				ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS			
HARDNESS	~ HRc35				HRc35 ~ HRc45				HRc45 ~ HRc55			
STRENGTH	~ 1100N/mm²				1110 ~ 1500N/mm²				1500 ~ 2000N/mm²			
DIAMETER	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
R0.05 × 0.1	40000	550	13	0.007	40000	500	13	0.006	33000	400	10	0.006
R0.1 × 0.2	30000	720	19	0.012	30000	630	19	0.011	27000	575	17	0.011
R0.15 × 0.3	30000	900	28	0.015	30000	810	28	0.014	27000	720	25	0.013
R0.2 × 0.4	30000	1140	38	0.019	30000	1020	38	0.017	27000	900	34	0.017
R0.25 × 0.5	30000	1440	47	0.024	30000	1260	47	0.021	27000	1140	42	0.021
R0.3 × 0.6	30000	1740	57	0.029	30000	1500	57	0.025	27000	1320	51	0.024
R0.35 × 0.7	30000	2040	66	0.034	30000	1740	66	0.029	27000	1560	59	0.029
R0.4 × 0.8	30000	2340	75	0.039	30000	1980	75	0.033	27000	1800	68	0.033
R0.45 × 0.9	30000	2610	85	0.044	30000	2250	85	0.038	27000	2040	76	0.038
R0.5 × 1.0	30000	2880	94	0.048	30000	2520	94	0.042	27000	2280	85	0.042
R0.6 × 1.2	30000	3060	113	0.051	28800	2580	109	0.045	25800	2310	97	0.045
R0.75 × 1.5	30000	3240	141	0.054	28800	2700	136	0.047	25800	2400	122	0.047
R1.0 × 2.0	29820	3420	187	0.057	28680	2880	180	0.050	24000	2400	151	0.050
R1.25 × 2.5	23800	3510	187	0.074	22900	3030	180	0.066	19200	2400	151	0.063
R1.5 × 3.0	19860	3600	187	0.091	19080	3180	180	0.083	16000	2400	151	0.075
R1.75 × 3.5	17000	3600	187	0.106	16400	3180	180	0.097	13700	2400	151	0.088
R2.0 × 4.0	14900	3600	187	0.121	14340	3180	180	0.111	12000	2400	151	0.100
R2.25 × 4.5	13030	3540	184	0.136	12510	3060	177	0.122	10500	2325	148	0.111
R2.5 × 5.0	11160	3480	175	0.156	10680	2940	168	0.138	9000	2250	141	0.125
R2.75 × 5.5	9750	3195	168	0.164	9360	2700	162	0.144	7800	2055	135	0.132
R3.0 × 6.0	8340	2910	157	0.174	8040	2460	152	0.153	6600	1860	124	0.141
R3.25 × 6.5	7780	2780	159	0.179	7500	2340	153	0.156	6200	1780	127	0.144
R3.5 × 7.0	7220	2650	159	0.184	6960	2220	153	0.159	5800	1700	128	0.147
R4.0 × 8.0	6660	2520	167	0.189	6420	2100	161	0.164	5400	1620	136	0.150
R4.25 × 8.5	6300	2420	168	0.192	6060	2020	162	0.167	5100	1560	136	0.153
R4.5 × 9.0	5940	2320	168	0.195	5700	1940	161	0.170	4800	1500	136	0.156
R5.0 × 10.0	5580	2220	175	0.199	5340	1860	168	0.174	4500	1440	141	0.160
R5.5 × 11.0	4875	1995	168	0.205	4670	1680	161	0.180	3930	1290	136	0.164
R6.0 × 12.0	4170	1770	157	0.212	4000	1500	151	0.188	3360	1140	127	0.170
R6.5 × 13.0	3960	1725	162	0.218	3800	1500	155	0.197	3200	1110	131	0.173
R7.0 × 14.0	3750	1680	165	0.224	3600	1500	158	0.208	3030	1080	133	0.178
R7.5 × 15.0	3550	1635	167	0.230	3400	1500	160	0.221	2870	1050	135	0.183
R8.0 × 16.0	3340	1590	168	0.238	3210	1320	161	0.206	2700	1020	136	0.189
R9.0 × 18.0	3005	1500	170	0.250	2895	1245	164	0.215	2430	960	137	0.198
R10.0 × 20.0	2670	1410	168	0.264	2580	1170	162	0.227	2160	900	136	0.208
R12.5 × 25.0	2130	1150	167	0.270	2060	950	162	0.231	1730	730	136	0.211



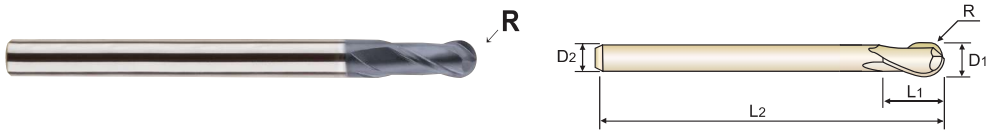
RPM = rev./min.
FEED = mm/min.
Vc = m/min.
fz = mm/t

4G MILL END MILLS

SEMD98 SERIES PLAIN SHANK

CARBIDE, 2 FLUTE BALL NOSE (Short, Regular, Long Shank)

- Due to new coating and new tool geometry, outstanding cutting ability and wear resistance.
- Due to unique ball nose geometry and cutting edges, cutting force decreased, and wear resistance increased.
- Excellent performance when cutting prehardened steels, up to HRc55 which are used for molds & dies.



NG | 2 | 30° | R ±0.005 (R≤3) | R ±0.010 (R>3) | PLAIN

P.814

◇ Call for Availability

Unit : mm

EDP No.	Radius of Ball Nose R	Mill Diameter D1	Shank Diameter D2	Length of Cut L1	Overall Length L2	Remark
SEMD98001S	R0.05	0.1	4	0.1	40	Short
SEMD98001	R0.05	0.1	4	0.2	40	Regular
SEMD980013S	R0.05	0.1	3	0.2	40	3mm Shank
SEMD980015S	R0.075	0.15	4	0.15	40	Short
SEMD980015	R0.075	0.15	4	0.3	40	Regular
SEMD98001535	R0.075	0.15	3	0.3	40	3mm Shank
SEMD98002S	R0.1	0.2	4	0.2	40	Short
SEMD98002	R0.1	0.2	4	0.4	40	Regular
SEMD980023S	R0.1	0.2	3	0.4	40	3mm Shank
SEMD98003S	R0.15	0.3	4	0.3	40	Short
SEMD98003	R0.15	0.3	4	0.6	40	Regular
SEMD980033S	R0.15	0.3	3	0.6	40	3mm Shank
SEMD98004S	R0.2	0.4	4	0.4	40	Short
SEMD98004	R0.2	0.4	4	0.8	40	Regular
SEMD980043S	R0.2	0.4	3	0.8	40	3mm Shank
SEMD98005S	R0.25	0.5	4	0.5	40	Short
SEMD98005	R0.25	0.5	4	1.0	40	Regular
SEMD980053S	R0.25	0.5	3	1.0	40	3mm Shank
SEMD98006S	R0.3	0.6	4	0.6	40	Short
SEMD98006	R0.3	0.6	4	1.2	40	Regular
SEMD980063S	R0.3	0.6	3	1.2	40	3mm Shank
SEMD98007S	R0.35	0.7	4	0.7	40	Short
SEMD98007	R0.35	0.7	4	1.4	40	Regular
SEMD980073S	R0.35	0.7	3	1.4	40	3mm Shank
SEMD98008S	R0.4	0.8	4	0.8	40	Short
SEMD98008	R0.4	0.8	4	1.6	40	Regular
SEMD980083S	R0.4	0.8	3	1.6	40	3mm Shank
SEMD98009S	R0.45	0.9	4	0.9	40	Short
SEMD98009	R0.45	0.9	4	1.8	40	Regular
SEMD980093S	R0.45	0.9	3	1.8	40	3mm Shank

▶ NEXT PAGE

◎ : Excellent ○ : Good

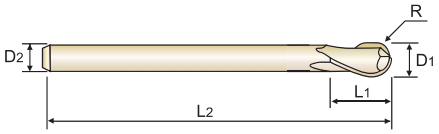
P					H	M	K	N					S	
Carbon Steels	Alloy Steels	Prehardened Steels	Hardened Steels		High Hardened Steels	Stainless Steels	Cast Iron	Copper	Graphite	Aluminum	Acrylic	CFRP	Titanium	High Temperature Alloy
~HB225	HB225~325	HRc30~40	HRc40~45	HRc45~55	HRc55~70									
○	◎	◎	◎	○			○							

4G MILL END MILLS

SEMD98 SERIES PLAIN SHANK

CARBIDE, 2 FLUTE BALL NOSE (Short, Regular, Long Shank)

- Due to new coating and new tool geometry, outstanding cutting ability and wear resistance.
- Due to unique ball nose geometry and cutting edges, cutting force decreased, and wear resistance increased.
- Excellent performance when cutting prehardened steels, up to HRc55 which are used for molds & dies.



NG | 2 | 30° | R ±0.005 (R≤3) | R ±0.010 (R>3) | PLAIN

P.814

◇ Call for Availability

Unit : mm

EDP No.	Radius of Ball Nose R	Mill Diameter D1	Shank Diameter D2	Length of Cut L1	Overall Length L2	Remark
SEMD98010040	R0.5	1.0	6	1.5	40	Short
SEMD980103S	R0.5	1.0	3	2.5	50	3mm Shank
SEMD980104S	R0.5	1.0	4	2.5	50	Regular
SEMD98010	R0.5	1.0	6	2.5	50	Regular
SEMD98010070	R0.5	1.0	6	2.5	70	Long Shank
SEMD98010100	R0.5	1.0	6	2.5	100	Long Shank
SEMD98012040	R0.6	1.2	6	2	40	Short
SEMD980123S	R0.6	1.2	3	3	50	3mm Shank
SEMD980124S	R0.6	1.2	4	3	50	Regular
SEMD98012	R0.6	1.2	6	3	50	Regular
SEMD98012070	R0.6	1.2	6	3	70	Long Shank
SEMD98012100	R0.6	1.2	6	3	100	Long Shank
SEMD98015040	R0.75	1.5	6	2.5	40	Short
SEMD980153S	R0.75	1.5	3	4	50	3mm Shank
SEMD980154S	R0.75	1.5	4	4	50	Regular
SEMD98015	R0.75	1.5	6	4	50	Regular
SEMD98015070	R0.75	1.5	6	4	70	Long Shank
SEMD98015100	R0.75	1.5	6	4	100	Long Shank
SEMD98020040	R1.0	2.0	6	3	40	Short
SEMD980203S	R1.0	2.0	3	5	50	3mm Shank
SEMD980204S	R1.0	2.0	4	5	50	Regular
SEMD98020	R1.0	2.0	6	5	50	Regular
SEMD98020080	R1.0	2.0	6	5	80	Long Shank
SEMD98020100	R1.0	2.0	6	5	100	Long Shank
SEMD98025040	R1.25	2.5	6	4	40	Short
SEMD980253S	R1.25	2.5	3	6	60	3mm Shank
SEMD980254S	R1.25	2.5	4	6	60	Regular
SEMD98025	R1.25	2.5	6	6	60	Regular
SEMD98025080	R1.25	2.5	6	6	80	Long Shank
SEMD98025100	R1.25	2.5	6	6	100	Long Shank

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P					H	M	K	N					S	
Carbon Steels	Alloy Steels	Prehardened Steels	Hardened Steels		High Hardened Steels	Stainless Steels	Cast Iron	Copper	Graphite	Aluminum	Acrylic	CFRP	Titanium	High Temperature Alloy
~HB225	HB225~325	HRc30~40	HRc40~45	HRc45~55	HRc55~70									
○	◎	◎	◎	○			○							

4G MILL END MILLS

SEMD98 SERIES PLAIN SHANK

CARBIDE, 2 FLUTE BALL NOSE (Short, Regular, Long Shank)

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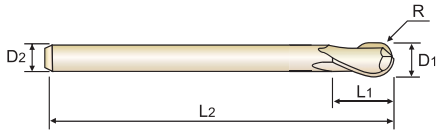

NG | 2 | 30° | R ±0.005 (R≤3) | R ±0.010 (R>3) | PLAIN

P.814

◇ Call for Availability

Unit : mm

EDP No.	Radius of Ball Nose R	Mill Diameter D1	Shank Diameter D2	Length of Cut L1	Overall Length L2	Remark
SEMD98030040	R1.5	3.0	6	4.5	40	Short
SEMD980303S	R1.5	3.0	3	6	60	3mm Shank
SEMD980304S	R1.5	3.0	4	6	60	Regular
SEMD98030	R1.5	3.0	6	6	60	Regular
SEMD98030080	R1.5	3.0	6	6	80	Long Shank
SEMD98030100	R1.5	3.0	6	6	100	Long Shank
SEMD98035	R1.75	3.5	6	8	70	-
SEMD98040050	R2.0	4.0	6	6	50	Short
SEMD980404S	R2.0	4.0	4	8	70	Regular
SEMD98040	R2.0	4.0	6	8	70	Regular
SEMD9804010045	R2.0	4.0	4	8	100	Long Shank
SEMD9804012045	R2.0	4.0	4	8	120	Long Shank
SEMD98040100	R2.0	4.0	6	8	100	Long Shank
SEMD98040120	R2.0	4.0	6	8	120	Long Shank
SEMD98045	R2.25	4.5	6	9	80	-
SEMD98050060	R2.5	5.0	6	7.5	60	Short
SEMD98050	R2.5	5.0	6	10	80	Regular
SEMD980505S	R2.5	5.0	5	10	80	5mmShank
SEMD98055	R2.75	5.5	6	11	90	-
SEMD98060050	R3.0	6.0	6	9	50	Short
SEMD98060060	R3.0	6.0	6	9	60	Short
SEMD98060080	R3.0	6.0	6	9	80	Short
SEMD98060	R3.0	6.0	6	12	90	Regular
SEMD98060110	R3.0	6.0	6	12	110	Long Shank
SEMD98060130	R3.0	6.0	6	12	130	Long Shank
SEMD98060150	R3.0	6.0	6	12	150	Long Shank
SEMD98065	R3.25	6.5	8	13	90	-
SEMD98070	R3.5	7.0	8	14	90	-
SEMD98080050	R4.0	8.0	8	12	50	Short
SEMD98080060	R4.0	8.0	8	12	60	Short

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P					H	M	K	N					S	
Carbon Steels	Alloy Steels	Prehardened Steels	Hardened Steels		High Hardened Steels	Stainless Steels	Cast Iron	Copper	Graphite	Aluminum	Acrylic	CFRP	Titanium	High Temperature Alloy
~HB225	HB225~325	HRc30~40	HRc40~45	HRc45~55	HRc55~70									
○	◎	◎	◎	○			○							

4G MILL END MILLS

SEMD98 SERIES PLAIN SHANK

CARBIDE, 2 FLUTE BALL NOSE (Short, Regular, Long Shank)

- ▶Due to new coating and new tool geometry, outstanding cutting ability and wear resistance.
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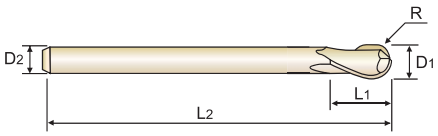
- ▶Excellent performance when cutting prehardened steels, up to HRc55 which are used for molds & dies.



NG | 2 | 30° | R ±0.005 (R≤3) | R ±0.010 (R>3) | PLAIN

P.814

◇ Call for Availability

Unit : mm

EDP No.	Radius of Ball Nose R	Mill Diameter D1	Shank Diameter D2	Length of Cut L1	Overall Length L2	Remark
SEMD98080080	R4.0	8.0	8	12	80	Short
SEMD98080090	R4.0	8.0	8	12	90	Short
SEMD98080	R4.0	8.0	8	14	100	Regular
SEMD98080130	R4.0	8.0	8	14	130	Long Shank
SEMD98080150	R4.0	8.0	8	14	150	Long Shank
SEMD98085	R4.25	8.5	10	16	100	-
SEMD98090	R4.5	9.0	10	18	100	-
SEMD98100050	R5.0	10.0	10	15	50	Short
SEMD98100060	R5.0	10.0	10	15	60	Short
SEMD98100080	R5.0	10.0	10	15	80	Short
SEMD98100090	R5.0	10.0	10	15	90	Short
SEMD98100	R5.0	10.0	10	18	100	Regular
SEMD98100130	R5.0	10.0	10	18	130	Long Shank
SEMD98100150	R5.0	10.0	10	18	150	Long Shank
SEMD98100180	R5.0	10.0	10	18	180	Long Shank
SEMD98100200	R5.0	10.0	10	18	200	Long Shank
SEMD98110	R5.5	11.0	12	20	100	-
SEMD98120060	R6.0	12.0	12	18	60	Short
SEMD98120080	R6.0	12.0	12	18	80	Short
SEMD98120090	R6.0	12.0	12	18	90	Short
SEMD98120100	R6.0	12.0	12	18	100	Short
SEMD98120	R6.0	12.0	12	22	110	Regular
SEMD98120130	R6.0	12.0	12	22	130	Long Shank
SEMD98120150	R6.0	12.0	12	22	150	Long Shank
SEMD98120180	R6.0	12.0	12	22	180	Long Shank
SEMD98120220	R6.0	12.0	12	22	200	Long Shank
SEMD98130	R6.5	13.0	12	24	100	-
SEMD98140	R7.0	14.0	12	26	100	Regular
SEMD9814014S	R7.0	14.0	14	26	100	-
SEMD9814016S	R7.0	14.0	16	26	100	-

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◎ : Excellent ○ : Good

P					H	M	K	N					S	
Carbon Steels	Alloy Steels	Prehardened Steels	Hardened Steels		High Hardened Steels	Stainless Steels	Cast Iron	Copper	Graphite	Aluminum	Acrylic	CFRP	Titanium	High Temperature Alloy
~HB225	HB225~325	HRc30~40	HRc40~45	HRc45~55	HRc55~70									
○	◎	◎	◎	○			○							

CARBIDE, 2 FLUTE BALL NOSE (Short, Regular, Long Shank)

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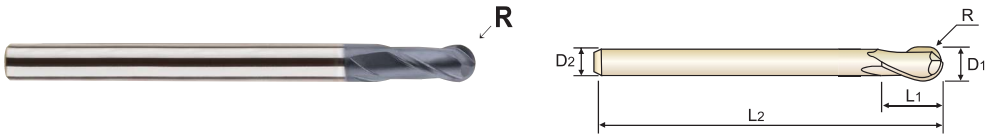

NG | 2 | 30° | R ±0.005 (R≤3) | R ±0.010 (R>3) | PLAIN

P.814

◇ Call for Availability

Unit : mm

EDP No.	Radius of Ball Nose R	Mill Diameter D1	Shank Diameter D2	Length of Cut L1	Overall Length L2	Remark
SEMD98150	R7.5	15.0	16	28	140	-
SEMD98160100	R8.0	16.0	16	24	100	Short
SEMD98160130	R8.0	16.0	16	24	130	Short
SEMD98160	R8.0	16.0	16	30	150	Regular
SEMD98160180	R8.0	16.0	16	30	180	Long Shank
SEMD98160200	R8.0	16.0	16	30	200	Long Shank
SEMD98180	R9.0	18.0	16	34	150	Regular
SEMD9818018S	R9.0	18.0	18	34	150	-
SEMD98200100	R10.0	20.0	20	30	100	Short
SEMD98200130	R10.0	20.0	20	30	130	Short
SEMD98200	R10.0	20.0	20	38	150	Regular
SEMD98200200	R10.0	20.0	20	38	200	Long Shank
SEMD98250120	R12.5	25.0	25	50	120	Short
SEMD98250	R12.5	25.0	25	50	180	Regular

Size	Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R3	±0.005	0~-0.012	h6
over R3	±0.010	0~-0.015	

◎ : Excellent ○ : Good

P					H	M	K	N					S	
Carbon Steels	Alloy Steels	Prehardened Steels	Hardened Steels		High Hardened Steels	Stainless Steels	Cast Iron	Copper	Graphite	Aluminum	Acrylic	CFRP	Titanium	High Temperature Alloy
~HB225	HB225~325	HRc30~40	HRc40~45	HRc45~55	HRc55~70									
○	◎	◎	◎	○			○							