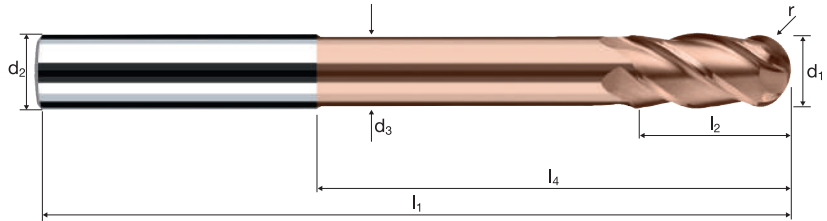


# Ball nose end mills SpheroX

Tolerance  $r \pm 0.005$ , 6xd



HM XA	$\lambda$ 40° $\gamma$ 0°
h4	SC
Vario	$r$
R	F

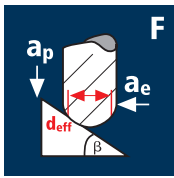


	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Ti Titanium	HSS
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Ø Code	d <sub>1</sub>	d <sub>2</sub> h4	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	r ±0.005	α	z	DURO-Si	
											Example: Order-N°.	H7494
100	1.00	6.00	0.95	66	2.00	6.00	16.08	0.500	9.5°	4	●	
140	2.00	6.00	1.90	66	4.00	12.00	20.31	1.000	6.1°	4	●	
180	3.00	6.00	2.80	66	6.00	18.00	24.63	1.500	3.9°	4	●	
220	4.00	6.00	3.70	69	8.00	24.00	28.95	2.000	2.2°	4	●	
260	5.00	6.00	4.60	75	10.00	30.00	33.27	2.500	1.0°	4	●	
300	6.00	6.00	5.50	80	12.00	42.34	43.00	3.000	0.0°	4	●	
391	8.00	8.00	7.40	90	16.00	52.29	53.00	4.000	0.0°	4	●	
450	10.00	10.00	9.20	105	20.00	63.20	64.00	5.000	0.0°	4	●	
501	12.00	12.00	11.00	120	24.00	73.13	74.00	6.000	0.0°	4	●	
610	16.00	16.00	15.00	135	32.00	85.13	86.00	8.000	0.0°	4	●	

## Application

## Material



Hardened tool steel  
52 - 56 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>s</sub> [mm]	a <sub>s</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>t</sub> [mm/min]	β [°]
1.00	4	120	0.014	0.030	0.090	0.91	41975	2350	45°
2.00	4	130	0.022	0.030	0.120	1.72	24060	2115	45°
3.00	4	160	0.034	0.050	0.150	2.59	19665	2675	45°
4.00	4	160	0.042	0.050	0.180	3.39	15025	2525	45°
5.00	4	160	0.048	0.050	0.210	4.17	12215	2345	45°
6.00	4	160	0.052	0.050	0.230	4.94	10310	2145	45°
8.00	4	160	0.056	0.080	0.280	6.67	7635	1710	45°
10.00	4	160	0.060	0.080	0.310	8.22	6195	1485	45°
12.00	4	160	0.066	0.100	0.340	9.89	5150	1360	45°

Hardened tool steel  
56 - 60 HRC



1.00	4	100	0.014	0.030	0.090	0.91	34980	1960	45°
2.00	4	100	0.022	0.030	0.120	1.72	18505	1630	45°
3.00	4	130	0.034	0.050	0.150	2.59	15975	2175	45°
4.00	4	130	0.042	0.050	0.180	3.39	12205	2050	45°
5.00	4	130	0.048	0.050	0.210	4.17	9925	1905	45°
6.00	4	130	0.052	0.050	0.230	4.94	8375	1740	45°
8.00	4	130	0.056	0.080	0.280	6.67	6205	1390	45°
10.00	4	130	0.060	0.080	0.310	8.22	5035	1210	45°
12.00	4	130	0.066	0.100	0.340	9.89	4185	1105	45°

Hardened tool steel  
> 60 HRC

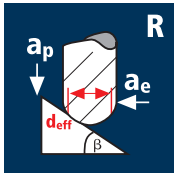


1.00	4	60	0.014	0.030	0.090	0.91	20985	1175	45°
2.00	4	60	0.022	0.030	0.120	1.72	11105	975	45°
3.00	4	80	0.034	0.050	0.150	2.59	9830	1335	45°
4.00	4	80	0.042	0.050	0.180	3.39	7510	1260	45°
5.00	4	80	0.048	0.050	0.210	4.17	6105	1170	45°
6.00	4	80	0.052	0.050	0.230	4.94	5155	1070	45°
8.00	4	80	0.056	0.080	0.280	6.67	3820	855	45°
10.00	4	80	0.060	0.080	0.310	8.22	3100	745	45°
12.00	4	80	0.066	0.100	0.340	9.89	2575	680	45°

High speed steel,  
hardened  
64 - 70 HRC



1.00	4	40	0.014	0.030	0.090	0.91	13990	785	45°
2.00	4	40	0.022	0.030	0.120	1.72	7405	650	45°
3.00	4	50	0.034	0.050	0.150	2.59	6145	835	45°
4.00	4	50	0.042	0.050	0.180	3.39	4695	790	45°
5.00	4	50	0.048	0.050	0.210	4.17	3815	735	45°
6.00	4	50	0.052	0.050	0.230	4.94	3220	670	45°
8.00	4	50	0.056	0.080	0.280	6.67	2385	535	45°
10.00	4	50	0.060	0.080	0.310	8.22	1935	465	45°
12.00	4	50	0.066	0.100	0.340	9.89	1610	425	45°



Hardened tool steel  
52 - 56 HRC



1.00	4	52	0.023	0.130	0.130	0.95	17425	1605	30°
2.00	4	52	0.039	0.200	0.200	1.84	8995	1405	30°
3.00	4	52	0.049	0.250	0.250	2.69	6155	1205	30°
4.00	4	52	0.058	0.340	0.340	3.59	4610	1070	30°
5.00	4	52	0.065	0.420	0.420	4.48	3695	960	30°
6.00	4	52	0.070	0.500	0.500	5.37	3080	865	30°
8.00	4	52	0.086	0.670	0.670	7.17	2310	795	30°
10.00	4	52	0.098	0.840	0.840	8.96	1845	725	30°
12.00	4	52	0.101	1.010	1.010	10.76	1540	620	30°

Hardened tool steel  
56 - 60 HRC



1.00	4	24	0.014	0.130	0.130	0.95	8040	450	30°
2.00	4	24	0.023	0.200	0.200	1.84	4150	380	30°
3.00	4	24	0.029	0.250	0.250	2.69	2840	330	30°
4.00	4	24	0.035	0.340	0.340	3.59	2130	300	30°
5.00	4	24	0.039	0.420	0.420	4.48	1705	265	30°
6.00	4	24	0.042	0.500	0.500	5.37	1425	240	30°
8.00	4	24	0.051	0.670	0.670	7.17	1065	215	30°
10.00	4	24	0.058	0.840	0.840	8.96	855	200	30°
12.00	4	24	0.061	1.010	1.010	10.76	710	175	30°

Hardened tool steel  
> 60 HRC



1.00	4	18	0.011	0.130	0.130	0.95	6030	265	30°
2.00	4	18	0.019	0.200	0.200	1.84	3115	235	30°
3.00	4	18	0.023	0.250	0.250	2.69	2130	195	30°
4.00	4	18	0.028	0.340	0.340	3.59	1595	180	30°
5.00	4	18	0.031	0.420	0.420	4.48	1280	160	30°
6.00	4	18	0.034	0.500	0.500	5.37	1065	145	30°
8.00	4	18	0.041	0.670	0.670	7.17	800	130	30°
10.00	4	18	0.047	0.840	0.840	8.96	640	120	30°
12.00	4	18	0.049	1.010	1.010	10.76	530	105	30°

High speed steel,  
hardened  
64 - 70 HRC



1.00	4	12	0.007	0.130	0.130	0.95	4020	115	30°
2.00	4	12	0.012	0.200	0.200	1.84	2075	100	30°
3.00	4	12	0.015	0.250	0.250	2.69	1420	85	30°
4.00	4	12	0.018	0.340	0.340	3.59	1065	75	30°
5.00	4	12	0.020	0.420	0.420	4.48	855	70	30°
6.00	4	12	0.022	0.500	0.500	5.37	710	65	30°
8.00	4	12	0.026	0.670	0.670	7.17	535	55	30°
10.00	4	12	0.030	0.840	0.840	8.96	425	50	30°
12.00	4	12	0.031	1.010	1.010	10.76	355	45	30°