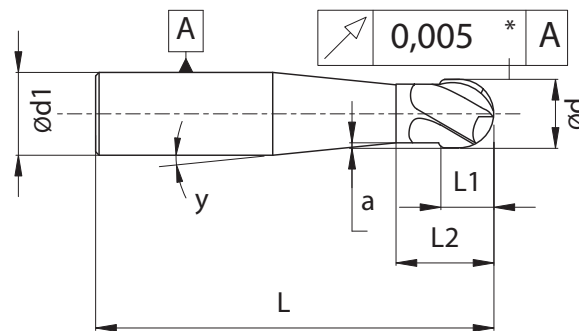


2 Flute

Centre cutting high performance ball nose 2 flute for 55-70 HRc



END MILLS



H3-H4

Unit : mm

Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle				EDP No
									0.5°	1.0°	2.0°	3.0°	
0.1	0.05	4	51	0.15	-	-	2	15	0.684	0.706	0.755	0.812	FBK0506053
0.1	0.05	4	51	0.15	2	0.005	2	15	2.357	2.437	2.616	2.825	FBK0506054
0.2	0.1	4	51	0.3	-	-	2	15	0.786	0.810	0.863	0.925	FBK0506055
0.2	0.1	4	51	0.3	2	0.005	2	15	2.355	2.434	2.609	2.812	FBK0506056
0.2	0.1	4	51	0.3	4	0.005	2	15	4.423	4.573	4.909	5.299	FBK0506057
0.2	0.1	4	51	0.3	6	0.005	2	15	6.490	6.713	7.208	7.785	FBK0506058
0.4	0.2	4	51	0.5	-	-	2	15	1.299	1.337	1.423	1.522	FBK0506059
0.4	0.2	4	51	0.5	2	0.01	2	15	2.371	2.447	2.615	2.811	FBK0506060
0.4	0.2	4	51	0.5	4	0.01	2	15	4.439	4.586	4.915	5.298	FBK0506061
0.4	0.2	4	51	0.5	6	0.01	2	15	6.506	6.726	7.215	7.784	FBK0506062
0.4	0.2	4	51	0.5	8	0.01	2	15	8.573	8.865	9.515	10.270	FBK0506063
0.5	0.25	4	51	0.7	-	-	2	15	1.504	1.548	1.645	1.758	FBK0506064
0.5	0.25	4	51	0.7	2	0.02	2	15	2.408	2.483	2.651	2.846	FBK0506065
0.5	0.25	4	51	0.7	4	0.02	2	15	4.476	4.623	4.951	5.332	FBK0506066
0.5	0.25	4	51	0.7	6	0.02	2	15	6.543	6.762	7.250	7.818	FBK0506067
0.5	0.25	4	51	0.7	8	0.02	2	15	8.610	8.902	9.550	10.304	FBK0506068
0.6	0.3	4	51	0.8	-	-	2	15	2.259	2.327	2.479	2.656	FBK0506069
0.6	0.3	4	51	0.8	2	0.02	2	15	2.543	2.621	2.795	2.997	FBK0506070
0.8	0.4	4	51	1	-	-	2	15	2.462	2.534	2.694	2.880	FBK0506071
1	0.5	4	51	1.2	-	-	2	15	2.665	2.741	2.909	3.104	FBK0506072
1	0.5	4	51	1.2	2.2	0.02	2	15	2.743	2.821	2.995	3.197	FBK0506073
1	0.5	4	51	1.2	4	0.02	2	15	4.603	4.746	5.064	5.435	FBK0506074
1	0.5	4	51	1.2	6	0.02	2	15	6.671	6.886	7.364	7.921	FBK0506075

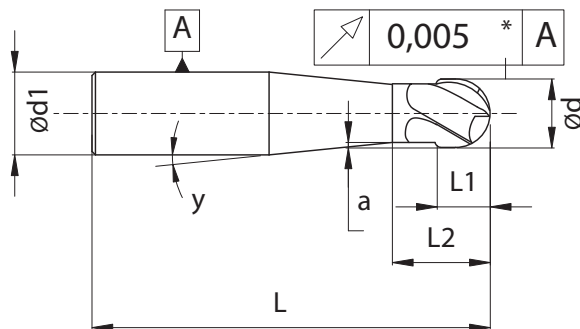
∞ Remark ∞ means no collision in projection length area
Application data on page no 2.012

2 Flute

Centre cutting high performance ball nose 2 flute for 55-70 HRc



END MILLS



H2-H3

Unit : mm

Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle				EDP No
									0.5°	1.0°	2.0°	3.0°	
1	0.5	4	51	1.2	8	0.02	2	15	8.738	9.025	9.664	10.407	FBK0506076
1	0.5	4	51	1.2	10	0.02	2	15	10.805	11.164	11.964	12.894	FBK0506077
1.5	0.75	4	51	1.8	-	-	2	15	4.066	4.182	4.439	4.738	FBK0506078
1.5	0.75	4	51	1.8	3.3	0.025	2	15	4.163	4.282	4.546	4.854	FBK0506079
1.5	0.75	4	51	1.8	4	0.025	2	15	4.886	5.030	5.351	5.725	FBK0506080
1.5	0.75	4	51	1.8	6	0.025	2	15	6.954	7.170	7.651	8.211	FBK0506081
1.5	0.75	4	51	1.8	8	0.025	2	15	9.021	9.309	9.951	10.697	FBK0506082
1.5	0.75	4	51	1.8	10	0.025	2	15	11.088	11.448	12.250	13.183	FBK0506083
2	1	4	51	2.5	-	-	2	15	4.781	4.913	5.206	5.548	FBK0506084
2	1	4	51	2.5	4	0.05	2	15	4.974	5.113	5.421	5.780	FBK0506085
2	1	4	51	2.5	6	0.05	2	15	7.042	7.252	7.721	8.266	FBK0506086
2	1	4	51	2.5	8	0.05	2	15	9.109	9.392	10.020	10.752	FBK0506087
2	1	4	51	2.5	10	0.05	2	15	11.176	11.531	12.320	13.239	FBK0506088
2.5	1.25	4	51	3	-	-	2	15	5.290	5.431	5.744	6.109	FBK0506089
2.5	1.25	4	51	3	4.5	0.05	2	15	5.483	5.630	5.959	6.341	FBK0506090
2.5	1.25	4	51	3	6	0.05	2	15	7.033	7.235	7.683	8.205	FBK0506091
2.5	1.25	4	51	3	8	0.05	2	15	9.101	9.374	9.983	10.692	FBK0506092
2.5	1.25	4	51	3	10	0.05	2	15	11.168	11.513	12.283	13.178	FBK0506093
3	1.5	4	51	3.5	-	-	2	15	5.798	5.948	6.281	6.669	FBK0506094
3	1.5	4	51	3.5	5	0.05	2	15	5.991	6.148	6.496	6.901	FBK0506095
3	1.5	4	51	3.5	6	0.05	2	15	7.025	7.217	7.646	8.144	FBK0506096
3	1.5	4	51	3.5	7	0.05	2	15	8.058	8.287	8.796	9.388	FBK0506097
3	1.5	4	51	3.5	8	0.05	2	15	9.092	9.357	9.946	10.631	FBK0506098
3	1.5	4	51	3.5	10	0.05	2	15	11.159	11.496	12.245	∞	FBK0506099

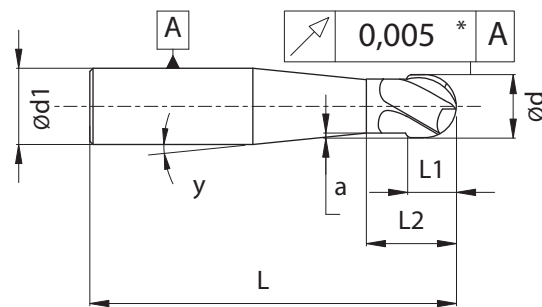
∞ Remark ∞ means no collision in projection length area
Application data on page no 2.012

2 Flute

Centre cutting high performance ball nose 2 flute for 55-70 HRC



END MILLS



H3-H4

Unit : mm

Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	y (°)	Effective length compared with Inclined Angle				EDP No
									0.5°	1.0°	2.0°	3.0°	
0.1	0.05	6	64	0.15	-	-	2	15	0.684	0.706	0.755	0.812	FBK0505685
0.1	0.05	6	64	0.15	2	0.005	2	15	2.357	2.437	2.616	2.825	FBK0505686
0.2	0.1	6	64	0.3	-	-	2	15	0.786	0.810	0.863	0.925	FBK0505687
0.2	0.1	6	64	0.3	2	0.005	2	15	2.355	2.434	2.609	2.812	FBK0505688
0.2	0.1	6	64	0.3	4	0.005	2	15	4.423	4.573	4.909	5.299	FBK0505689
0.2	0.1	6	64	0.3	6	0.005	2	15	6.490	6.713	7.208	7.785	FBK0505690
0.4	0.2	6	64	0.5	-	-	2	15	1.299	1.337	1.423	1.522	FBK0505691
0.4	0.2	6	64	0.5	2	0.01	2	15	2.371	2.447	2.615	2.811	FBK0505692
0.4	0.2	6	64	0.5	4	0.01	2	15	4.439	4.586	4.915	5.298	FBK0505693
0.4	0.2	6	64	0.5	6	0.01	2	15	6.506	6.726	7.215	7.784	FBK0505694
0.4	0.2	6	64	0.5	8	0.01	2	15	8.573	8.865	9.515	10.270	FBK0505695
0.5	0.25	6	64	0.7	-	-	2	15	1.504	1.548	1.645	1.758	FBK0504418
0.5	0.25	6	64	0.7	2	0.02	2	15	2.408	2.483	2.651	2.846	FBK0505696
0.5	0.25	6	64	0.7	4	0.02	2	15	4.476	4.623	4.951	5.332	FBK0505697
0.5	0.25	6	64	0.7	6	0.02	2	15	6.543	6.762	7.250	7.818	FBK0505698
0.5	0.25	6	64	0.7	8	0.02	2	15	8.610	8.902	9.550	10.304	FBK0505699
0.6	0.3	6	64	0.8	-	-	2	15	2.259	2.327	2.479	2.656	FBK0504419
0.6	0.3	6	64	0.8	2	0.02	2	15	2.543	2.621	2.795	2.997	FBK0504420
0.8	0.4	6	64	1	-	-	2	15	2.462	2.534	2.694	2.880	FBK0504421
1	0.5	6	64	1.2	-	-	2	15	2.665	2.741	2.909	3.104	FBK0504422
1	0.5	6	64	1.2	2.2	0.02	2	15	2.743	2.821	2.995	3.197	FBK0505700
1	0.5	6	64	1.2	4	0.02	2	15	4.603	4.746	5.064	5.435	FBK0504424

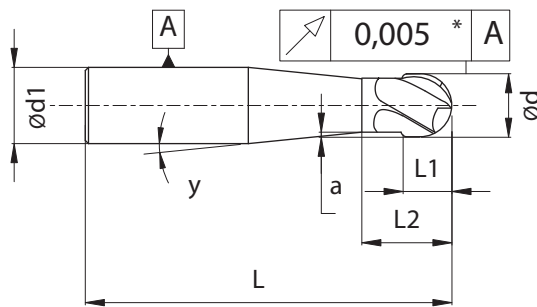
∞ Remark ∞ means no collision in projection length area
Application data on page no 2.012

2 Flute

Centre cutting high performance ball nose 2 flute for 55-70 HRC



END MILLS



H3-H4

Unit : mm

Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle				EDP No
									0.5°	1.0°	2.0°	3.0°	
1	0.5	6	64	1.2	6	0.02	2	15	6.671	6.886	7.364	7.921	FBK0505701
1	0.5	6	64	1.2	8	0.02	2	15	8.738	9.025	9.664	10.407	FBK0505702
1	0.5	6	64	1.2	10	0.02	2	15	10.805	11.164	11.964	12.894	FBK0505703
1.5	0.75	6	64	1.8	-	-	2	15	4.066	4.182	4.439	4.738	FBK0504425
1.5	0.75	6	64	1.8	3.3	0.025	2	15	4.163	4.282	4.546	4.854	FBK0505704
1.5	0.75	6	64	1.8	4	0.025	2	15	4.886	5.030	5.351	5.725	FBK0505705
1.5	0.75	6	64	1.8	6	0.025	2	15	6.954	7.170	7.651	8.211	FBK0505706
1.5	0.75	6	64	1.8	8	0.025	2	15	9.021	9.309	9.951	10.697	FBK0505707
1.5	0.75	6	64	1.8	10	0.025	2	15	11.088	11.448	12.250	13.183	FBK0505708
2	1	6	64	2.5	-	-	2	15	4.781	4.913	5.206	5.548	FBK0504426
2	1	6	64	2.5	4	0.05	2	15	4.974	5.113	5.421	5.780	FBK0504427
2	1	6	64	2.5	6	0.05	2	15	7.042	7.252	7.721	8.266	FBK0505709
2	1	6	64	2.5	8	0.05	2	15	9.109	9.392	10.020	10.752	FBK0505710
2	1	6	64	2.5	10	0.05	2	15	11.176	11.531	12.320	13.239	FBK0505711
2.5	1.25	6	64	3	-	-	2	15	5.290	5.431	5.744	6.109	FBK0504428
2.5	1.25	6	64	3	4.5	0.05	2	15	5.483	5.630	5.959	6.341	FBK0505712
2.5	1.25	6	64	3	6	0.05	2	15	7.033	7.235	7.683	8.205	FBK0505713
2.5	1.25	6	64	3	8	0.05	2	15	9.101	9.374	9.983	10.692	FBK0505714
2.5	1.25	6	64	3	10	0.05	2	15	11.168	11.513	12.283	13.178	FBK0505715
3	1.5	6	64	3.5	-	-	2	15	5.798	5.948	6.281	6.669	FBK0504429
3	1.5	6	64	3.5	5	0.05	2	15	5.991	6.148	6.496	6.901	FBK0505716
3	1.5	6	64	3.5	6	0.05	2	15	7.025	7.217	7.646	8.144	FBK0505717
3	1.5	6	64	3.5	7	0.05	2	15	8.058	8.287	8.796	9.388	FBK0504430

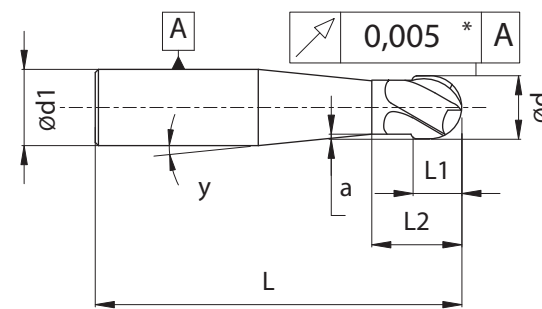
∞ Remark ∞ means no collision in projection length area
Application data on page no 2.012

2 Flute

Centre cutting high performance ball nose 2 flute for 55-70 HRC



END MILLS



H3-H4

Unit : mm

Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	y (°)	Effective length compared with Inclined Angle				EDP No
									0.5°	1.0°	2.0°	3.0°	
3	1.5	6	64	3.5	8	0.05	2	15	9.092	9.357	9.946	10.631	FBK0505718
3	1.5	6	64	3.5	10	0.05	2	15	11.159	11.496	12.245	13.117	FBK0505719
4	2	6	64	4.5	-	-	2	15	6.815	6.983	7.356	7.791	FBK0504431
4	2	6	64	4.5	8	0.1	2	15	9.268	9.521	10.085	10.741	FBK0504432
5	2.5	6	64	6	-	-	2	15	8.349	8.553	9.006	9.534	FBK0504433
5	2.5	6	64	6	10	0.15	2	15	11.512	11.826	12.525	∞	FBK0504434
6	3	6	64	7	-	-	2	-	∞	∞	∞	∞	FBK0503535
6	3	6	64	7	12	0.15	2	-	∞	∞	∞	∞	FBK0504435
6	3	6	64	7	25	0.15	2	-	∞	∞	∞	∞	FBK0504436
8	4	8	64	9	-	-	2	-	∞	∞	∞	∞	FBK0504437
8	4	8	64	9	16	0.2	2	-	∞	∞	∞	∞	FBK0504438
8	4	8	64	9	25	0.2	2	-	∞	∞	∞	∞	FBK0503536
10	5	10	78	12	-	-	2	-	∞	∞	∞	∞	FBK0504439
10	5	10	78	12	20	0.2	2	-	∞	∞	∞	∞	FBK0503537
12	6	12	78	15	-	-	2	-	∞	∞	∞	∞	FBK0504440

Tolerance chart

Diameter range	Shank	Cutting diameter	Cutting diameter	Cutting diameter	Cutting diameter
	Ød1-h5	Ød-e8	Ød-f7	Ød-g7	ØFHC
d ≤ 3	0	-0.014	-0.006	-0.002	0
	-0.004	-0.028	-0.016	-0.012	-0.025
3 < d ≤ 6	0	-0.020	-0.010	-0.004	0
	-0.005	-0.038	-0.022	-0.016	-0.030
6 < d ≤ 10	0	-0.025	-0.013	-0.005	0
	-0.006	-0.047	-0.028	-0.02	-0.036
10 < d ≤ 18	0	-0.032	-0.016	-0.006	0
	-0.008	-0.059	-0.034	-0.024	-0.043
18 < d ≤ 30	0	-0.040	-0.020	-0.006	0
	-0.009	-0.073	-0.041	-0.024	-0.052

∞ Remark ∞ means no collision in projection length area

Application data on page no 2.012

Cutting conditions

Centre cutting high performance ball nose 2 flute for 55-70 HRc

Material group	Hardness	Cutting speed	Coolant
		Vc m/min	
H3	55-60 HRc	150 - 220	min.lub.
H4	60-70 HRc	200 - 250	min.lub.

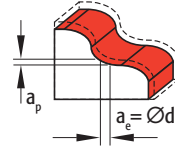
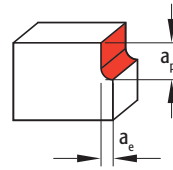
Advantages

- Consistency
- Higher Tool Life



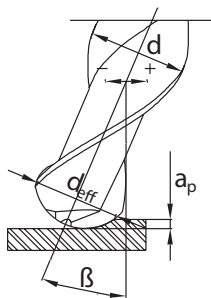
Tips:

- Use a rigid milling machine and clamping method
- Try to minimize entering and exiting the workpiece
- Use minimum lubrication or oil-mist-spray



Profiling

Ød (mm)	ap max. (mm)	ae max. (mm)	fz (mm/tooth)
0.1	< 0.02	< 0.003	0.002 - 0.007
0.2	< 0.04	< 0.006	0.004 - 0.010
0.4	< 0.08	< 0.012	0.006 - 0.013
0.5	< 0.10	< 0.015	0.007 - 0.015
0.6	< 0.12	< 0.018	0.009 - 0.018
0.8	< 0.16	< 0.024	0.012 - 0.021
1	< 0.20	< 0.030	0.015 - 0.025
1.5	< 0.30	< 0.045	0.020 - 0.035
2	< 0.40	< 0.060	0.030 - 0.050
2.5	< 0.50	< 0.075	0.035 - 0.055
3	< 0.60	< 0.090	0.040 - 0.060
4	< 0.80	< 0.120	0.050 - 0.080
5	< 1.00	< 0.150	0.060 - 0.110
6	< 1.20	< 0.180	0.065 - 0.125
8	< 1.60	< 0.240	0.080 - 0.130
10	< 2.00	< 0.300	0.085 - 0.135
12	< 2.40	< 0.360	0.100 - 0.140



For the cutting speed Vc calculation the effective cutting diameter d_{eff} has to be taken into account. See formula.

$$\beta \neq 0: d_{eff} = d \times \sin[\beta \pm \arccos(1 - 2a_p/d)]$$

FBK0503535

Workpiece material: 1.2379

Hardness: 62 HRc

	Competitor	Totem
Ø	6mm	6mm
z	2 flutes	2 flutes
vc	160 m/min	160 m/min
n	8400 rpm	8400 rpm
Fz	0.157 mm/t	0.157 mm/t
vf	2630 mm/min	2630 mm/min
ap	0.3 mm	0.3 mm
ae	1.2 mm	1.2 mm
Coolant	min. lubrication	min. lubrication

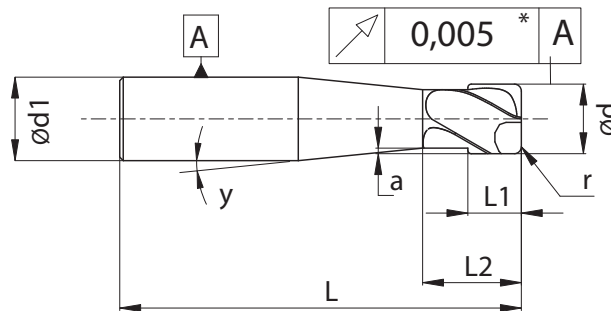
Q	0.95 mm ³ /min	0.95 mm ³ /min
Tool Life	30 mins	2 Hrs

4 Flute

Centre cutting high performance
torus 4 flute for 55-70 HRC



END MILLS



H3-H4

Unit : mm

Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle				EDP No
									0.5°	1.0°	2.0°	3.0°	
0.2	0.01	4	51	0.2	-	-	4	15	0.685	0.709	0.761	0.822	FBK0505720
0.2	0.01	4	51	0.2	0.4	0.01	4	15	0.724	0.749	0.804	0.869	FBK0505721
0.4	0.01	4	51	0.4	-	-	4	15	1.202	1.244	1.336	1.444	FBK0505722
0.4	0.01	4	51	0.4	0.9	0.01	4	15	1.241	1.284	1.379	1.490	FBK0505723
0.4	0.01	4	51	0.4	1.6	0.01	4	15	1.964	2.032	2.184	2.360	FBK0505724
0.5	0.03	4	51	0.5	-	-	4	15	1.305	1.349	1.448	1.563	FBK0505725
0.5	0.03	4	51	0.5	1	0.01	4	15	1.343	1.389	1.491	1.610	FBK0505726
0.5	0.03	4	51	0.5	2	0.01	4	15	2.377	2.459	2.641	2.853	FBK0505727
0.6	0.05	4	51	0.6	-	-	4	15	2.060	2.130	2.286	2.468	FBK0505728
0.6	0.05	4	51	0.6	1.6	0.02	4	15	2.138	2.210	2.372	2.561	FBK0505729
0.6	0.05	4	51	0.6	2.4	0.02	4	15	2.965	3.066	3.292	3.555	FBK0505730
0.8	0.05	4	51	0.8	-	-	4	15	2.267	2.344	2.516	2.716	FBK0505731
0.8	0.05	4	51	0.8	1.8	0.02	4	15	2.344	2.424	2.602	2.809	FBK0505732
0.8	0.05	4	51	0.8	3.2	0.02	4	15	3.791	3.922	4.212	4.550	FBK0505733
1	0.05	4	51	1	-	-	4	15	2.474	2.558	2.746	2.965	FBK0505734
1	0.05	4	51	1	2	0.02	4	15	2.551	2.638	2.832	3.058	FBK0505735
1	0.05	4	51	1	4	0.02	4	15	4.618	4.778	5.132	5.544	FBK0505736
1	0.05	4	51	1	6	0.02	4	15	6.686	6.917	7.432	8.030	FBK0505737
1	0.10	4	51	1	-	-	4	15	2.472	2.555	2.739	2.953	FBK0505738
1	0.10	4	51	1	2	0.02	4	15	2.549	2.635	2.825	3.046	FBK0505739
1	0.10	4	51	1	4	0.02	4	15	4.617	4.774	5.124	5.532	FBK0505740
1	0.10	4	51	1	6	0.02	4	15	6.684	6.913	7.424	8.018	FBK0505741
1.5	0.10	4	51	1.5	-	-	4	15	3.778	3.906	4.191	4.523	FBK0505742
1.5	0.10	4	51	1.5	3	0.025	4	15	3.874	4.006	4.299	4.639	FBK0505743
1.5	0.10	4	51	1.5	6	0.025	4	15	6.975	7.215	7.748	8.369	FBK0505744
1.5	0.10	4	51	1.5	9	0.025	4	15	10.076	10.424	11.198	12.098	FBK0505745
1.5	0.20	4	51	1.5	-	-	4	15	3.775	3.899	4.177	4.499	FBK0505746

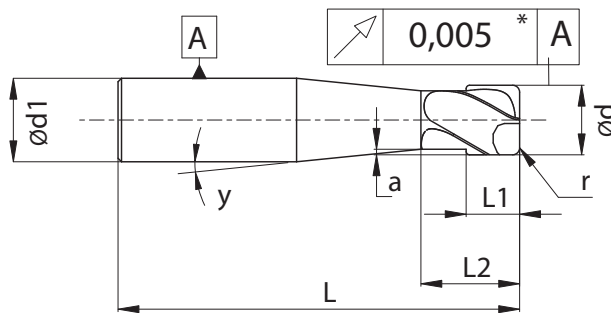
∞ Remark ∞ means no collusion in projection length area
Application data on page no 2.018

4 Flute

Centre cutting high performance torus 4 flute for 55-70 HRC



END MILLS



H3-H4

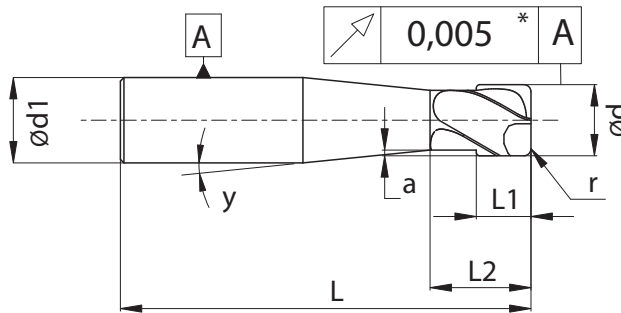
Unit : mm

Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle				EDP No
									0.5°	1.0°	2.0°	3.0°	
1.5	0.20	4	51	1.5	3	0.025	4	15	3.871	3.999	4.284	4.615	FBK0505747
1.5	0.20	4	51	1.5	6	0.025	4	15	6.972	7.208	7.733	8.345	FBK0505748
1.5	0.20	4	51	1.5	9	0.025	4	15	10.073	10.417	11.183	12.074	FBK0505749
2	0.10	4	51	2	-	-	4	15	4.295	4.441	4.766	5.145	FBK0505750
2	0.10	4	51	2	4	0.05	4	15	5.005	5.175	5.556	5.999	FBK0505751
2	0.10	4	51	2	8	0.05	4	15	9.139	9.454	10.155	10.971	FBK0505752
2	0.10	4	51	2	12	0.05	4	15	13.274	13.733	14.755	15.944	FBK0505753
2	0.30	4	51	2	-	-	4	15	4.288	4.427	4.736	5.096	FBK0505754
2	0.30	4	51	2	4	0.05	4	15	4.998	5.162	5.526	5.950	FBK0505755
2	0.30	4	51	2	8	0.05	4	15	9.133	9.440	10.125	10.923	FBK0505756
2	0.30	4	51	2	12	0.05	4	15	13.267	13.719	14.725	15.895	FBK0505757
2.5	0.10	4	51	2.5	-	-	4	15	4.812	4.976	5.341	5.767	FBK0505758
2.5	0.10	4	51	2.5	5	0.05	4	15	6.038	6.245	6.706	7.242	FBK0505759
2.5	0.10	4	51	2.5	10	0.05	4	15	11.207	11.594	12.455	13.457	FBK0505760
2.5	0.10	4	51	2.5	15	0.05	4	15	16.375	16.942	18.204	∞	FBK0505761
2.5	0.30	4	51	2.5	-	-	4	15	4.805	4.962	5.311	5.718	FBK0505762
2.5	0.30	4	51	2.5	5	0.05	4	15	6.032	6.231	6.676	7.193	FBK0505763
2.5	0.30	4	51	2.5	10	0.05	4	15	11.200	11.580	12.425	13.409	FBK0505764
2.5	0.30	4	51	2.5	15	0.05	4	15	16.368	16.928	18.174	∞	FBK0505765
3	0.20	4	51	3	-	-	4	15	5.325	5.504	5.901	6.364	FBK0505766
3	0.20	4	51	3	6	0.05	4	15	7.069	7.308	7.841	8.461	FBK0505767
3	0.20	4	51	3	12	0.05	4	15	13.271	13.726	14.740	∞	FBK0505768
3	0.20	4	51	3	18	0.05	4	15	19.473	20.144	∞	∞	FBK0505769
3	0.20	4	51	3	-	-	4	15	5.325	5.504	5.901	6.364	FBK0505770
3	0.50	4	51	3	6	0.05	4	15	7.058	7.287	7.796	8.388	FBK0505771
3	0.50	4	51	3	12	0.05	4	15	13.260	13.705	14.695	∞	FBK0505772
3	0.50	4	51	3	18	0.05	4	15	19.462	20.123	∞	∞	FBK0505773

∞ Remark ∞ means no collision in projection length area
Application data on page no 2.018

4 Flute

Centre cutting high performance torus 4 flute for 55-70 HRC



H3-H4

Unit : mm

Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	y (°)	Effective length compared with Inclined Angle				EDP No
									0.5°	1.0°	2.0°	3.0°	
0.2	0.01	6	64	0.2	-	-	4	15	0.685	0.709	0.761	0.822	FBK0505774
0.2	0.01	6	64	0.2	0.4	0.01	4	15	0.724	0.749	0.804	0.869	FBK0505775
0.4	0.01	6	64	0.4	-	-	4	15	1.202	1.244	1.336	1.444	FBK0505776
0.4	0.01	6	64	0.4	0.9	0.01	4	15	1.241	1.284	1.379	1.490	FBK0505777
0.4	0.01	6	64	0.4	1.6	0.01	4	15	1.964	2.032	2.184	2.360	FBK0505778
0.5	0.03	6	64	0.5	-	-	4	15	1.305	1.349	1.448	1.563	FBK0505779
0.5	0.03	6	64	0.5	1	0.01	4	15	1.343	1.389	1.491	1.610	FBK0505780
0.5	0.03	6	64	0.5	2	0.01	4	15	2.377	2.459	2.641	2.853	FBK0505781
0.6	0.05	6	64	0.6	-	-	4	15	2.060	2.130	2.286	2.468	FBK0505782
0.6	0.05	6	64	0.6	1.6	0.02	4	15	2.138	2.210	2.372	2.561	FBK0505783
0.6	0.05	6	64	0.6	2.4	0.02	4	15	2.965	3.066	3.292	3.555	FBK0505784
0.8	0.05	6	64	0.8	-	-	4	15	2.267	2.344	2.516	2.716	FBK0505785
0.8	0.05	6	64	0.8	1.8	0.02	4	15	2.344	2.424	2.602	2.809	FBK0505786
0.8	0.05	6	64	0.8	3.2	0.02	4	15	3.791	3.922	4.212	4.550	FBK0505787
1	0.05	6	64	1	-	-	4	15	2.474	2.558	2.746	2.965	FBK0505788
1	0.05	6	64	1	2	0.02	4	15	2.551	2.638	2.832	3.058	FBK0505789
1	0.05	6	64	1	4	0.02	4	15	4.618	4.778	5.132	5.544	FBK0505790
1	0.05	6	64	1	6	0.02	4	15	6.686	6.917	7.432	8.030	FBK0505791
1	0.1	6	64	1	-	-	4	15	2.472	2.555	2.739	2.953	FBK0505792
1	0.1	6	64	1	2	0.02	4	15	2.549	2.635	2.825	3.046	FBK0505793
1	0.1	6	64	1	4	0.02	4	15	4.617	4.774	5.124	5.532	FBK0505794
1	0.1	6	64	1	6	0.02	4	15	6.684	6.913	7.424	8.018	FBK0505795
1.5	0.1	6	64	1.5	-	-	4	15	3.778	3.906	4.191	4.523	FBK0505796
1.5	0.1	6	64	1.5	3	0.025	4	15	3.874	4.006	4.299	4.639	FBK0505797
1.5	0.1	6	64	1.5	6	0.025	4	15	6.975	7.215	7.748	8.369	FBK0505798

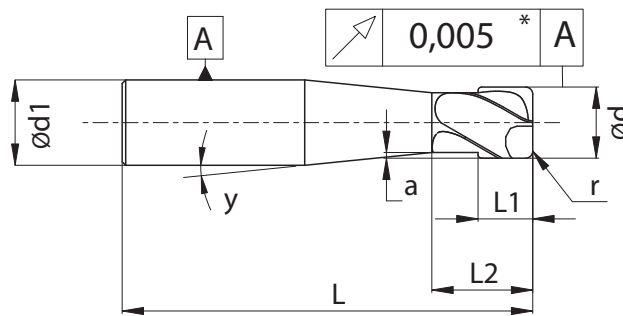
∞ Remark ∞ means no collusion in projection length area
Application data on page no 2.018

4 Flute

Centre cutting high performance torus 4 flute for 55-70 HRC



END MILLS



H3-H4

Unit : mm

Ød	r	Ød1	L	L1	L2	a	z	γ	Effective length compared with Inclined Angle				EDP No
									0.5°	1.0°	2.0°	3.0°	
1.5	0.1	6	64	1.5	9	0.025	4	15	10.076	10.424	11.198	12.098	FBK0505799
1.5	0.2	6	64	1.5	-	-	4	15	3.775	3.899	4.177	4.499	FBK0505800
1.5	0.2	6	64	1.5	3	0.025	4	15	3.871	3.999	4.284	4.615	FBK0505801
1.5	0.2	6	64	1.5	6	0.025	4	15	6.972	7.208	7.733	8.345	FBK0505802
1.5	0.2	6	64	1.5	9	0.025	4	15	10.073	10.417	11.183	12.074	FBK0505803
2	0.1	6	64	2	-	-	4	15	4.295	4.441	4.766	5.145	FBK0505804
2	0.1	6	64	2	4	0.05	4	15	5.005	5.175	5.556	5.999	FBK0504441
2	0.1	6	64	2	8	0.05	4	15	9.139	9.454	10.155	10.971	FBK0504442
2	0.1	6	64	2	12	0.05	4	15	13.274	13.733	14.755	15.944	FBK0504443
2	0.3	6	64	2	-	-	4	15	4.288	4.427	4.736	5.096	FBK0505805
2	0.3	6	64	2	4	0.05	4	15	4.998	5.162	5.526	5.950	FBK0504444
2	0.3	6	64	2	8	0.05	4	15	9.133	9.440	10.125	10.923	FBK0504445
2	0.3	6	64	2	12	0.05	4	15	13.267	13.719	14.725	15.895	FBK0504446
2.5	0.1	6	64	2.5	-	-	4	15	4.812	4.976	5.341	5.767	FBK0505806
2.5	0.1	6	64	2.5	5	0.05	4	15	6.038	6.245	6.706	7.242	FBK0505807
2.5	0.1	6	64	2.5	10	0.05	4	15	11.207	11.594	12.455	13.457	FBK0505808
2.5	0.1	6	64	2.5	15	0.05	4	15	16.375	16.942	18.204	19.673	FBK0505809
2.5	0.3	6	64	2.5	-	-	4	15	4.805	4.962	5.311	5.718	FBK0505810
2.5	0.3	6	64	2.5	5	0.05	4	15	6.032	6.231	6.676	7.193	FBK0505811
2.5	0.3	6	64	2.5	10	0.05	4	15	11.200	11.580	12.425	13.409	FBK0505812
2.5	0.3	6	64	2.5	15	0.05	4	15	16.368	16.928	18.174	19.625	FBK0505813
3	0.2	6	64	3	-	-	4	15	5.325	5.504	5.901	6.364	FBK0505814
3	0.2	6	64	3	6	0.05	4	15	7.069	7.308	7.841	8.461	FBK0504447
3	0.2	6	64	3	12	0.05	4	15	13.271	13.726	14.740	15.919	FBK0504448
3	0.2	6	64	3	18	0.05	4	15	19.473	20.144	21.639	23.378	FBK0504449

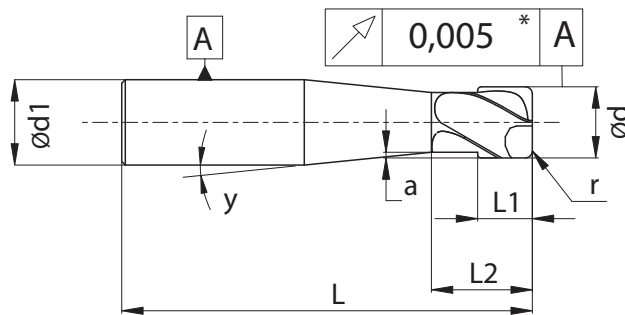
∞ Remark ∞ means no collision in projection length area
Application data on page no 2.018

4 Flute

Centre cutting high performance torus 4 flute for 55-70 HRC



END MILLS



H3-H4

Unit : mm

Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	y (°)	Effective length compared with Inclined Angle				EDP No
									0.5°	1.0°	2.0°	3.0°	
3	0.5	6	64	3	-	-	4	15	5.325	5.504	5.901	6.364	FBK0505815
3	0.5	6	64	3	6	0.05	4	15	7.058	7.287	7.796	8.388	FBK0504450
3	0.5	6	64	3	12	0.05	4	15	13.260	13.705	14.695	15.846	FBK0504451
3	0.5	6	64	3	18	0.05	4	15	19.462	20.123	21.594	23.305	FBK0504452
4	0.2	6	64	4	8	0.1	4	15	9.329	9.647	10.355	11.179	FBK0503544
4	0.2	6	64	4	16	0.1	4	15	17.598	18.204	19.554	∞	FBK0503545
4	0.2	6	64	4	24	0.1	4	15	25.867	26.762	28.753	∞	FBK0503546
4	0.5	6	64	4	8	0.1	4	15	9.319	9.626	10.310	11.106	FBK0503547
4	0.5	6	64	4	16	0.1	4	15	17.588	18.183	19.509	∞	FBK0503548
4	0.5	6	64	4	24	0.1	4	15	25.857	26.741	28.708	∞	FBK0503549
6	0.5	6	64	6	12	0.15	4	-	-	-	-	-	FBK0503550
6	0.5	6	64	6	24	0.15	4	-	-	-	-	-	FBK0503551
6	1	6	64	6	12	0.15	4	-	-	-	-	-	FBK0503538
6	1	6	64	6	24	0.15	4	-	-	-	-	-	FBK0503539
8	0.5	8	78	8	16	0.2	4	-	-	-	-	-	FBK0503554
8	0.5	8	78	8	32	0.2	4	-	-	-	-	-	FBK0503555
8	1	8	78	8	16	0.2	4	-	-	-	-	-	FBK0503556
8	1	8	78	8	32	0.2	4	-	-	-	-	-	FBK0503540
10	0.5	10	100	10	20	0.2	4	-	-	-	-	-	FBK0503558
10	0.5	10	100	10	40	0.2	4	-	-	-	-	-	FBK0503559
10	1	10	100	10	20	0.2	4	-	-	-	-	-	FBK0503560
10	1	10	100	10	40	0.2	4	-	-	-	-	-	FBK0503561
12	0.5	12	100	12	24	0.2	4	-	-	-	-	-	FBK0503562
12	0.5	12	100	12	48	0.2	4	-	-	-	-	-	FBK0503563
12	1	12	100	12	24	0.2	4	-	-	-	-	-	FBK0503564
12	1	12	100	12	48	0.2	4	-	-	-	-	-	FBK0503565

∞ Remark ∞ means no collusion in projection length area
Application data on page no 2.018

Cutting conditions

Centre cutting high performance torus 4 flute for 55-70 HRc

Material group	Hardness	Cutting speed	Coolant
		Vc m/min	
H3	50-60 HRc	150 - 220	min.lub.
H4	60-70 HRc	200 - 250	min.lub.

Advantages

- Consistency of cutting speeds.
- Optimized performance.
- High productivity
- Ideal chipflow geometry
- Optimized for hardened steels

FBK0503554

Workpiece material: 1.2162

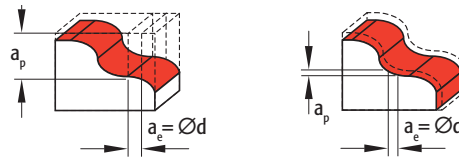
Hardness: 60 HRc

	Competitor	Totem
Ø	8mm	8mm
z	4 flutes	4 flutes
vc	25 m/min	200 m/min
n	995 rpm	7958 rpm
Fz	0.038 mm/t	0.079 mm/t
vf	150 mm/min	2500 mm/min
ap	3 mm	3 mm
ae	0.25 mm	0.1 mm
Coolant	air	air

Q	0.11 mm ³ /min	0.75 mm ³ /min
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Finishing application

6 times faster than competitor



Profiling

Ød (mm)	ap max. (mm)	ae max. (mm)	fz (mm/tooth)
0.2	< 0.15	< 0.005	0.004 - 0.010
0.4	< 0.30	< 0.010	0.006 - 0.013
0.5	< 0.38	< 0.013	0.007 - 0.015
0.6	< 0.45	< 0.015	0.009 - 0.018
0.8	< 0.60	< 0.020	0.012 - 0.021
1	< 0.75	< 0.025	0.015 - 0.025
1.5	< 1.13	< 0.038	0.020 - 0.035
2	< 1.50	< 0.050	0.030 - 0.050
2.5	< 1.88	< 0.063	0.035 - 0.055
3	< 2.25	< 0.075	0.040 - 0.060
4	< 3.00	< 0.100	0.050 - 0.080
5	< 3.75	< 0.125	0.060 - 0.110
6	< 4.50	< 0.150	0.065 - 0.125
8	< 6.00	< 0.200	0.080 - 0.130
10	< 7.50	< 0.250	0.085 - 0.135
12	< 9.00	< 0.300	0.100 - 0.140

FBK0505796

Workpiece material: Elmax hardened

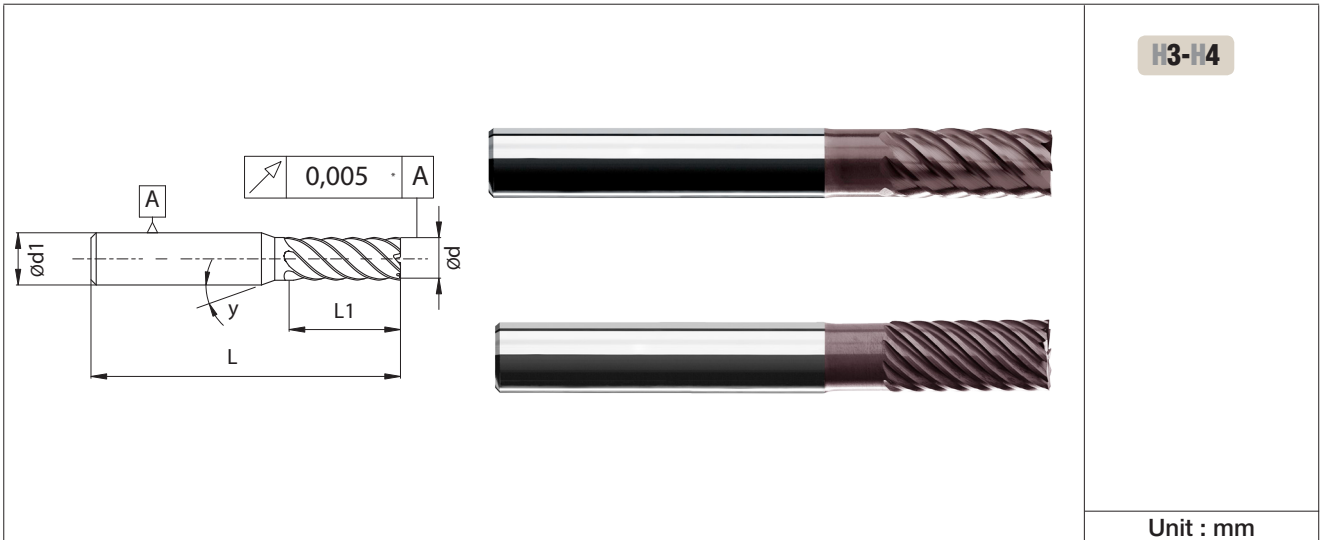
Hardness: 62 HRc

	Competitor	Totem
Ø	1.5 mm	1.5 mm
z	4 teeth	2 teeth
vc	85 m/min	85 m/min
n	18000 rpm	18000 rpm
Fz	0.02 mm/t	0.023 mm/t
vf	1440 mm/min	828 mm/min
ap	0.65 mm	0.65 mm
ae	0.04 mm	0.04 mm
Coolant	MMS	MMS

Q	21.52 mm ³ /min	37.44 mm ³ /min
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Finishing application

42% Higher MRR

Multi Flute
Centre cutting high performance multi flute finisher for 55-70 HRC

H3-H4
Unit : mm

Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	EDP No
3	-	6	64	8	15	0.05	6	15	FBK0503566
4	-	6	64	10	16	0.1	6	15	FBK0503567
5	-	6	64	12	18	0.15	6	15	FBK0503568
6	-	6	64	14	20	0.2	6	-	FBK0503569
8	-	8	78	18	25	0.2	6	-	FBK0503570
10	-	10	78	22	30	0.3	6	-	FBK0503571
12	-	12	89	26	35	0.3	6	-	FBK0503572
16	-	16	89	34	40	0.3	6	-	FBK0504453
20	-	20	102	42	48	0.3	8	-	FBK0504454

Also available with extra teeth for higher productivity

Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	EDP No
8	-	8	78	18	25	0.2	8	-	FBK0504455
10	-	10	78	22	30	0.3	10	-	FBK0504456
12	-	12	89	26	35	0.3	12	-	FBK0504457
16	-	16	89	34	40	0.3	16	-	FBK0504458

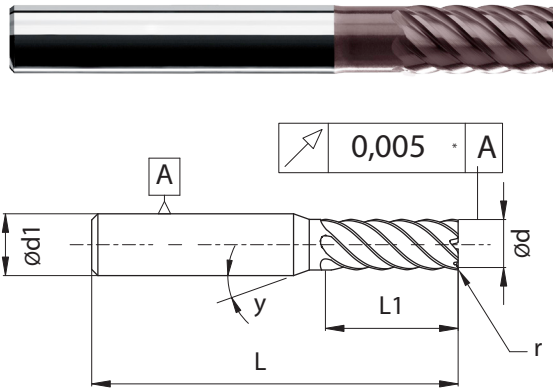
∞ Remark ∞ means no collision in projection length area
Application data on page no 2.021

Multi Flute

Centre cutting high performance multi flute finisher with corner radius for 55-70 HRC



END MILLS



H3-H4

Unit : mm

Ød	r	Ød1	L	L1	L2	a	z	γ	EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)	
3	0.3	6	64	8	15	0.05	6	15	FBK0504459
4	0.3	6	64	10	16	0.1	6	15	FBK0504460
5	0.3	6	64	12	18	0.15	6	15	FBK0504461
5	0.5	6	64	12	18	0.15	6	15	FBK0504462
6	0.5	6	64	14	20	0.2	6	-	FBK0504463
6	1	6	64	14	20	0.2	6	-	FBK0504464
8	0.5	8	70	18	25	0.3	6	-	FBK0504465
8	1	8	70	18	25	0.3	6	-	FBK0503542
10	0.5	10	78	22	30	0.3	6	-	FBK0504466
10	1	10	78	22	30	0.3	6	-	FBK0503543
10	1.5	10	78	22	30	0.3	6	-	FBK0504467
12	0.5	12	78	26	35	0.3	6	-	FBK0503573
12	1	12	78	26	35	0.3	6	-	FBK0504468
12	2	12	78	26	35	0.3	6	-	FBK0504469
16	1	16	89	34	40	0.3	6	-	FBK0504470
16	2	16	89	34	40	0.3	6	-	FBK0504471
20	1	20	102	42	48	0.3	8	-	FBK0504472
20	2	20	102	42	48	0.3	8	-	FBK0504473

Also available with extra teeth for higher productivity

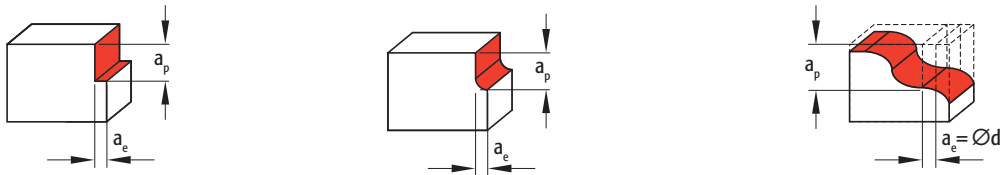
Ød	r	Ød1	L	L1	L2	a	z	γ	EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)	
8	0.5	8	78	18	25	0.2	8	-	FBK0504474
10	0.5	10	78	22	30	0.3	10	-	FBK0504475
12	0.5	12	89	26	35	0.3	12	-	FBK0504476
16	0.5	16	89	34	40	0.3	16	-	FBK0504477

∞ Remark ∞ means no collision in projection length area
Application data on page no 2.021

Cutting conditions

- Centre cutting high performance multi flute finisher for 55-70 HRc
- Centre cutting high performance multi flute finisher with corner radius for 55-70 HRc

Material group	Hardness	Cutting speed	Coolant
		Vc m/min	
H3	50-60 HRc	110 - 170	min.lub.
H4	60-70 HRc	80 - 140	min.lub.



Shoulder milling

Ød (mm)	ap max. (mm)	ae max. (mm)	fz (mm/tooth)
3	< 3.0	< 0.03	0.020 - 0.035
4	< 6.0	< 0.05	0.030 - 0.045
5	< 7.5	< 0.07	0.035 - 0.055
6	< 12.0	< 0.10	0.045 - 0.065
8	< 16.0	< 0.13	0.060 - 0.080
10	< 20.0	< 0.17	0.070 - 0.095
12	< 24.0	< 0.21	0.085 - 0.110
16	< 32.0	< 0.28	0.095 - 0.125
20	< 40.0	< 0.35	0.105 - 0.140



Multi flute finisher



Multi flute finisher with extra teeth



Multi flute finisher with corner radius



Multi flute finisher with corner radius and extra teeth