

## 2 Flutes Ball Nose Endmills EB2-PL



### SIDE MILLING

Work-piece	Cast iron, Carbon steel, Alloy steel		Carbon steel, Alloy steel		Alloy steel, Tool steel (Free-Cutting)		Alloy steel, Tool steel, Stainless steel		Hardened steel, Tool steel, Alloy steel	
Mill DIA $\phi$ D (mm)	HRC25 $\geq$		~HRC30		HRC30~HRC38		HRC38~HRC45		HRC46~HRC52	
	V=110~150m/min		V=90~120m/min		V=75~95m/min		V=50~75m/min		V=40~60m/min	
	N (rpm)	F mm/min	N (rpm)	F mm/min	N (rpm)	F mm/min	N (rpm)	F mm/min	N (rpm)	F mm/min
R1	19100	380	15900	315	12700	250	9550	150	7960	100
R1.5	12750	400	10600	370	8500	255	6370	150	5300	105
R2	9550	400	9550	475	6370	310	4770	170	3980	120
R2.5	7600	455	6400	510	5050	355	3800	180	3180	125
R3	6370	500	5300	530	4250	380	3150	190	2650	140
R4	4770	525	4000	480	3150	345	2400	175	1990	120
R5	3800	495	3150	440	2550	295	1900	160	1590	115
R6	3150	470	2650	400	2100	250	1590	150	1325	105
R8	2390	405	2000	310	1590	200	1200	130	995	95
R10	1900	380	1590	255	1250	175	955	115	795	85

Depth of cut	$a_p \leq 0.1D$	$p_f \leq 0.2D$		$a_p \leq 0.05D$ $p_f \leq 0.1D$
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1. These mill conditions are for a mill where the tool extension length is 5 times the diameter of the endmill. When length of the tool extension from the machines is long, reduce the speed and feed and milling depth.
2. Use high-stiffness and precise machine and holder; if the machine stiffness is low or the workpiece is not well installed, or chattering occurs, please reduce the speed and feed rate *proportionately*.
3. Reduce by 30% the above cutting parameters for uncoated endmills. The uncoated type endmills are not recommended for over HRC40.
4. High pressure coolant or air-jet to be supplied for good chip removal.

## 2 Flutes Ball Nose Endmills EB2-PL



### SIDE MILLING (High-speed)

Work-piece	Cast iron, Carbon steel, Alloy steel		Carbon steel, Alloy steel		Alloy steel, Tool steel (Free-Cutting)		Alloy steel, Tool steel, Stainless steel		Hardened steel, Tool steel, Alloy steel	
Mill DIA $\phi$ D (mm)	HRC25 $\geq$		~HRC30		HRC30~HRC38		HRC38~HRC45		HRC46~HRC52	
	V=230~260m/min		V=210~230m/min		V=190~210m/min		V=170~190m/min		V=120~160m/min	
	N (rpm)	F mm/min	N (rpm)	F mm/min	N (rpm)	F mm/min	N (rpm)	F mm/min	N (rpm)	F mm/min
R1	39000	1560	35000	1400	31850	1275	28650	1150	25470	1020
R1.5	26000	1820	23500	1635	21250	1485	19100	1350	16980	1185
R2	19500	1950	17500	1750	15920	1590	14350	1435	12730	1270
R2.5	15600	2025	14000	1820	12750	1655	11500	1500	10190	1220
R3	13250	2120	11950	1910	10880	1740	9800	1570	8490	1185
R4	9950	1890	8955	1750	8160	1600	7350	1470	6360	955
R5	7950	1600	7165	1450	6500	1300	5900	1180	5000	800
R6	6650	1350	5970	1200	5450	1100	4900	980	4246	765
R8	4950	1000	4480	900	4000	800	3700	740	3180	636
R10	3980	800	3580	715	3250	650	2950	590	2545	560

Depth of cut	$a_p \leq 0.1D$	$p_f \leq 0.2D$		$a_p \leq 0.05D$	$p_f \leq 0.1D$

1. These mill conditions are for a mill where the tool extension length is 5 times the diameter of the endmill. When length of the tool extension from the machines is long, reduce the speed and feed and milling depth.
2. Use high-stiffness and precise machine and holder; if the machine stiffness is low or the workpiece is not well installed, or chattering occurs, please reduce the speed and feed rate *proportionately*.
3. Reduce by 30% the above cutting parameters for uncoated endmills. The uncoated type endmills are not recommended for over HRC40.
4. High pressure coolant or air-jet to be supplied for good chip removal.

# 4 Flutes Ball Nose Endmills EB4-PL



## SIDE MILLING (High-speed)

Work-piece	Cast iron, Carbon steel, Alloy steel		Carbon steel, Alloy steel		Alloy steel, Tool steel (Free-Cutting)		Alloy steel, Tool steel, Stainless steel		Hardend steel, Tool steel, Alloy steel	
Mill DIA $\phi$ D (mm)	HRC25 $\geq$		~HRC30		HRC30~HRC38		HRC38~HRC45		HRC46~HRC52	
	V=230~260m/min		V=210~230m/min		V=190~210m/min		V=170~190m/min		V=120~160m/min	
	N (rpm)	F mm/min	N (rpm)	F mm/min	N (rpm)	F mm/min	N (rpm)	F mm/min	N (rpm)	F mm/min
R1	39000	2650	35000	2350	31850	2115	28650	1900	25470	1700
R1.5	26000	3000	23500	2750	21250	2450	19100	2250	16980	1950
R2	19500	3300	17500	2940	15920	2630	14350	2380	12730	2100
R2.5	15600	3425	14000	3050	12750	2750	11500	2485	10190	2000
R3	13250	3600	11950	3200	10880	2880	9800	2600	8490	1950
R4	9950	3200	8955	2950	8160	2650	7350	2400	6360	1575
R5	7950	2650	7165	2430	6500	2150	5900	1950	5000	1320
R6	6650	2250	5970	2000	5450	1800	4900	1625	4246	1265
R8	4950	1650	4480	1500	4000	1325	3700	1200	3180	1050
R10	3980	1350	3580	1200	3250	1080	2950	975	2545	925

Depth of cut	$a_p \leq 0.1D$ $p_f \leq 0.2D$		$a_p \leq 0.05D$ $p_f \leq 0.1D$
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1. These mill conditions are for a mill where the tool extension length is 5 times the diameter of the endmill. When length of the tool extension from the machines is long, reduce the speed and feed and milling depth.
2. Use high-stiffness and precise machine and holder; if the machine stiffness is low or the workpiece is not well installed, or chattering occurs, please reduce the speed and feed rate *proportionately*.
3. Reduce by 30% the above cutting parameters for uncoated endmills. The uncoated type endmills are not recommended for over HRC40.
4. High pressure coolant or air-jet to be supplied for good chip removal.