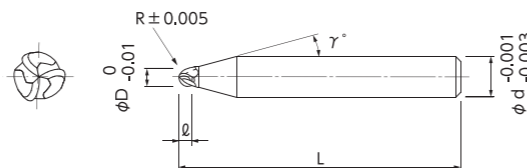


MUGEN COATING PREMIUM Plus 3-Flute Ball End Mill for 5-axis machining Total 8 sizes

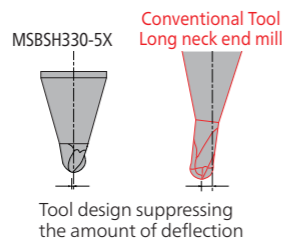
Recommended Milling Conditions

3-flute high rigidity ball design conforms features of 5-axis machine to reduce total manufacturing cost with high precision and high efficiency machining

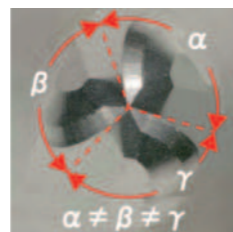


Leaflet

- 3-flute high rigidity ball design conforms features of 5-axis machine to reduce total manufacturing cost with high precision and high efficiency machining.
- Even hardened steel of 45 to 70HRC can be machining with long tool life and high efficiency.
- By adopting positive cutting edge for carbide material emphasized breakage resistance that suppresses chattering by 3-flute and unequal flute.
- R accuracy is  $\pm 0.005$ mm (R accuracy is based on a half value of actual diameter).
- Shank diameter tolerance, high accuracy type, is  $-0.001 \sim -0.003$ .



Tool design suppressing the amount of deflection



Unequal spacing suppresses chattering even high feed rate machining



Machining case

Work Material	Hardened Steels STAVAX·SKD11 (~60HRC)				High Speed Steels SKH51·HAP40 (~65HRC)				High Speed Steels SKH57·HAP72 (~70HRC)			
	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
	$a_p$ mm	$a_e$ mm	mm/min	$\text{min}^{-1}$	$a_p$ mm	$a_e$ mm	mm/min	$\text{min}^{-1}$	$a_p$ mm	$a_e$ mm	mm/min	$\text{min}^{-1}$
R0.1	0.005 ~ 0.007	0.005	400	40,000	0.003 ~ 0.005	0.003	300	40,000	0.003 ~ 0.005	0.003	220	40,000
R0.15	0.005 ~ 0.007	0.007	450	40,000	0.003 ~ 0.005	0.005	400	40,000	0.003 ~ 0.005	0.005	270	40,000
R0.2	0.02 ~ 0.03	0.03	1,100	40,000	0.008 ~ 0.012	0.02	850	40,000	0.008 ~ 0.012	0.02	650	35,000
R0.25	0.02 ~ 0.03	0.03	1,300	40,000	0.01 ~ 0.015	0.02	1,000	35,000	0.01 ~ 0.015	0.02	700	30,000
R0.3	0.03 ~ 0.045	0.06	1,500	40,000	0.02 ~ 0.03	0.05	1,100	30,000	0.02 ~ 0.03	0.05	800	25,000
R0.5	0.1 ~ 0.15	0.2	3,000	30,000	0.08 ~ 0.12	0.1	2,000	25,000	0.05 ~ 0.075	0.1	1,500	20,000
R0.75	0.1 ~ 0.15	0.3	3,800	30,000	0.1 ~ 0.15	0.2	3,000	25,000	0.06 ~ 0.09	0.2	2,200	20,000
R1	0.2 ~ 0.3	0.5	3,800	25,000	0.15 ~ 0.22	0.3	3,000	20,000	0.1 ~ 0.15	0.3	2,200	16,000

Notes

- ※1 Depth of cut  $a_p$  indicates Axial Depth of Cut,  $a_e$  indicates Radial Depth of Cut.
- ※2 Adjust milling condition according to machine rigidity and clamp condition of work material.
- ※3 Since the neck angle is  $15^\circ$ , please be careful to set the inclined angle to avoid interfering.
- ※4 Adjust milling condition with necessity when high cutting load occurred by angle of tool or work material and feed direction.
- ※5 The depth of cut  $a_p$  is a guideline value according to the inclined angle of the tool or work material.
- ※6 In case of chattering etc., please adjust cutting conditions if necessary.
- ※7 At point where cutting load is high such as at corners, pay attention to setting cutting conditions and tool paths particularly.
- ※8 Adjust both spindle speed and feed at the same rate.
- ※9 Attention to a risk of chipping and breakage when insufficient chip flow.
- ※10 We recommend using oil mist coolant.

Unit : mm

Code No.	Radius (R)	Length of Cut (L)	Dia. (D)	Neck Taper Angle ( $\gamma$ )	Shank Dia. (d)	Overall Length (L)
08-00610-00100	R0.1	0.12	0.2	$15^\circ$	6	50
08-00610-00150	R0.15	0.18	0.3	$15^\circ$	6	50
08-00610-00200	R0.2	0.24	0.4	$15^\circ$	6	50
08-00610-00250	R0.25	0.3	0.5	$15^\circ$	6	50
08-00610-00300	R0.3	0.36	0.6	$15^\circ$	6	50
08-00610-00500	R0.5	0.6	1	$15^\circ$	6	50
08-00610-00750	R0.75	0.9	1.5	$15^\circ$	6	50
08-00610-01000	R1	1.2	2	$15^\circ$	6	50

**How to Order** When you order, indicate MSBSH330-5X(R). ※( $\gamma$ ) is reference value.

**Machining case** S-017

