

# MILLSTAR® Cutting Edge Solutions

## Aggressive Recommendations for Milling with Millstar Insert Ball Nose Tools (Metric)

1. Prerequisites: Maximum tool extension length to insert diameter L/D = 3/1. Use a of a rigid machine, part and set-up.
2. For finishing with small step-over (P), reduce feed to equal feed per tooth ( $f_z = P$ )
3. On longer tool extension, max. L/D = 7/1: reduce feed and speed to 60%
4. Use of coolant: For all stainless steel (SS) use through the spindle or flood coolant. For gray cast iron use air or coolant. For all other die/mold materials use air-mist (MQL) or air blow, air only over 40 HRC. We recommend a liquid coolant concentration of 9 - 10%, not the usual 3 - 4%. This will lubricate and not only cool the cutting edge for longer tool life and better finish. Vegetable based oil mist works best in MQL/mist use.
5. When using machines with a spindle taper SK #40 or equivalent, use maximum tool diameter D = 20mm (R 10).

The recommendations are for aggressive cutting with Millstar ball nose inserts and coatings as shown in the table and schematics of tool engagement shown below. When tip cutting only on flat surfaces, feed rate may be increased by up to 30%. For other materials or for specific application cases, contact the factory with as much detail as possible. Additional parameters of additional materials are in our data bank; please inquire.

Work Material Specifications USA / W.-Nr. / JIS	Material Hardness HRC	Cutting depth $a_p$ max.	Cutting width $a_e$ max.	Recom- mended Insert	Recom- mended Coating	Cut Speed $V_c$ at $\varnothing D$ m/minute	Aggressive Feed per Tooth ( $f_z$ ) at cutting insert $\varnothing D$ (mm)			
							6-8	10-12	16-20	25-32
H13 / 1.2344 / SKD61	< 41	0.10 D	0.45 D	RB-N/MB	TLN/XRN	244 - 365	0.12	0.3	0.35	0.4
H13 / 1.2344 / SKD61	41-54	0.06 D	0.40 D	RB-N	TLN/HSN	244 - 365	0.1	0.3	0.3	0.3
H13 / 1.2344 / SKD61	55 +	0.05 D	0.35 D	RB-N	TLN/HSN	185	0.1	0.3	0.3	0.25
Orvar Supreme/ H13	41-54	0.06 D	0.40 D	RB-N	TLN/HSN	244 - 365	0.1	0.3	0.3	0.3
A2 / 1.2363 / SKD12	< 41	0.10 D	0.40 D	MB	TLN/XRN	244 - 365	0.15	0.3	0.35	0.4
A2 / 1.2363 / SKD12	41-54	0.06 D	0.40.D	RB-N	TLN/HSN	183 - 244	0.1	0.3	0.3	0.3
A2 / 1.2363 /SKD12	55 +	0.05 D	0.35 D	RB-N	TLN/HSN	183 - 244	0.1	0.25	0.3	0.25
P 20 / 1.2330	< 41	0.10 D	0.45 D	RB-N/MB	TLN/XRN	244 - 365	0.15	0.3	0.35	0.4
P 20 / 1.2330	41-54	0.06 D	0.40 D	RB-N	TLN/HSN	183 - 244	0.1	0.3	0.35	0.4
D 2 / 1.2379 / SKD11	< 41	0.10 D	0.45 D	MB	TLN/XRN	183 - 244	0.1	0.3	0.35	0.4
D 2 / 1.2379 / SKD11	41-54	0.06 D	0.40 D	RB-N	TLN/HSN	183 - 244	0.1	0.3	0.35	0.35
D 2 / 1.2379 / SKD11	55 +	0.05 D	0.35 D	RB-N	TLN/HSN	105 - 140	0.1	0.25	0.25	0.25
NAK 55	40	0.10 D	0.45 D	RB-N/MB	TLN/XRN	244 - 365	0.15	0.3	0.35	0.4
NAK 80	40	0.10 D	0.40 D	RB-N	TLN/HSN	244 - 335	0.1	0.3	0.3	0.4
PX 5	32	0.12 D	0.45 D	MB	TLN/XRN	244 - 365	0.15	0.3	0.35	0.4
Finkl FX1 & 2	38 - 46	0.12 D	0.45 D	MB	TLN/XRN	365 - 455	0.15	0.3	0.35	0.4
SS 400 series/ 1.40xx	< 41	0.10 D	0.45 D	MB	TLN/XRN	244 - 915	0.15	0.3	0.35	0.4
SS 400 series/ 1.40xx	41 - 54	0.08 D	0.40 D	RB-N	TLN/HSN	244 - 550	0.15	0.3	0.35	0.4
Stavax ESR / 1.2083	< 45	0.10 D	0.40 D	MB	TLN/XRN	244 - 915	0.15	0.3	0.35	0.4
Ramax S/SUS420FMod	< 45	0.10 D	0.40 D	RB-N	TLN/XRN	183 - 244	0.15	0.3	0.35	0.4
SS 300 series/ 1.43xx	< 41	0.10 D	0.45 D	MB	TLN/XRN	105 - 244	0.15	0.3	0.35	0.4
CPM 9V & 10V	41 +	0.06 D	0.35 D	RB-N	TLN/HSN	105 - 244	0.15	0.3	0.3	0.3
Gray Cast Iron / GG	< 41	0.2 D	0.75 D	RB-N/MB	TLN/XRN	350 - 900	0.15	0.3	0.35	0.4
Cast Iron / GGG	41+	0.06D	0.40 D	RB-N	TLN/XRN	250-400	0.1	0.3	0.35	0.4
Aluminum		0.5 D	1.0 D	MB	NA / TCN	300-1000	0.2	0.3	0.6	0.7
Titanium (6Al 4V)		0.10 D	0.45 D	MB	TLN/XRN	183-365	0.15	0.25	0.3	0.35
Carbon Graphite		0.5 D	1.0 D	RB-N/MB	DMD/TLN	300-1000	0.2	0.3	0.6	0.7

Tip Cutting



Slope Cutting



Side Cutting

