

MILLSTAR® Cutting Edge Solutions

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

1. Prerequisites: Maximum tool extension length to insert diameter L/D = 4/1. Use a rigid machine, part and set-up.
2. For finishing with small pick feed/step-over (P), reduce the feed rate so feed per tooth equals pick feed ($f_z = P$)
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. 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. For all other die/mold materials use air-mist / minimum quantity lubrication (MQL) or high-pressure air blow. Vegetable based oil mist works best in MQL / mist use.
5. When using a spindle taper CAT-40 / HSK 63 or equivalent instead of CAT-50/HSK 100, use max. Tool diameter D = 3/4".

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. More 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.	Recommended Insert	Recommended Coating	Cut Speed V_c at $\varnothing D$ m/minute	Aggressive Feed per Tooth (f_z) at cutting insert $\varnothing D$			
							6-8	10-12	16-20	25-32
H13	< 41	0.10 D	0.45 D	RB-N/MB	TLN/XRN	600-1200	.006	.010	.012	.014
H13	41-54	0.06 D	0.40 D	RB-N	TLN/HSN	600-1200	.006	.010	.012	.012
H13	55 +	0.05 D	0.35 D	RB-N	TLN/HSN	450-600	.006	.010	.010	.010
Orvar Sup. / H13	41-54	0.06 D	0.40 D	RB-N	TLN/HSN	600-1200	.006	.010	.012	.012
A2	< 41	0.10 D	0.40 D	MB	TLN/XRN	600-1200	.006	.010	.012	.014
A2	41-54	0.06 D	0.40 D	RB-N	TLN/HSN	600-800	.006	.010	.012	.012
A2	55 +	0.05 D	0.35 D	RB-N	TLN/HSN	450-800	.006	.010	.010	.010
P 20	< 41	0.10 D	0.45 D	RB-N/MB	TLN/XRN	600-1200	.006	.010	.012	.014
P 20	41-54	0.06 D	0.40 D	RB-N	TLN/HSN	450-800	.006	.010	.012	.012
NAK 55	< 41	0.10 D	0.45 D	RB-N	TLN/HSN	600-1200	.006	.010	.012	.014
NAK 80	< 41	0.10 D	0.40 D	RB-N	TLN/HSN	600-1200	.006	.010	.012	.012
PX5	32	0.12 D	0.45 D	MB	TLN/XRN	1200-1500	.006	.010	.018	.020
D 2	< 41	0.10 D	0.45 D	MB	TLN/XRN	450-800	.006	.010	.012	.012
D 2	41-54	0.06 D	0.40 D	RB-N	TLN/HSN	450-800	.006	.008	.010	.010
D 2	55 +	0.05 D	0.35 D	RB-N	TLN/HSN	345-460	.006	.008	.010	.010
CPM 9V & 10V	< 41	0.10 D	0.40 D	RB-R	TLN/XRN	600-1200	.006	.010	.012	.012
CPM 9V & 10V	41 +	0.06 D	0.35 D	RB-N	TLN/HSN	350 - 800	.006	.008	.010	.010
Titan. 6Al4V		0.10 D	0.45 D	MB	TLN/XRN	600-1200	.006	.010	.012	.012
4130-4150	< 41	0.10 D	0.45 D	MB	TLN/XRN	600-1200	.006	.010	.012	.012
Finkl FX1 & 2		0.12 D	0.45 D	MB	TLN/XRN	800-1500	.006	.010	.012	.012
Gray Cast Iron	< 41	0.02 D	0.75 D	RB-N/ MB	TLN/XRN	800-3000	.006	.010	.014	.015
400 series SS	< 41	0.10 D	0.45 D	MB	TLN/XRN	600-3000	.006	.010	.014	.016
400 series SS	41-54	0.08 D	0.40 D	RB-N	TLN/HSN	600-1200	.006	.010	.014	.016
STAVAX ESR	< 45	0.10 D	0.45 D	MB	TLN/XRN	600-3000	.006	.010	.014	.016
RAMAX S	< 45	0.10 D	0.40 D	RB-N	TLN/XRN	600-1200	.006	.010	.014	.016
300 series SS	< 41	0.10 D	0.45 D	MB	TLN/XRN	345-800	.006	.010	.012	.012
S7	< 41	0.10 D	0.45 D	RB-N/MB	TLN/XRN	600-1200	.006	.010	.012	.014
S7	41-54	0.06 D	0.40 D	RB-N	TLN/HSN	600-1200	.006	.010	.012	.012
S7	55 +	0.05 D	0.35 D	RB-N	TLN/HSN	450-600	.006	.010	.010	.010
Aluminum		0.50 D	1.00 D	MB	NA or TCN	1000-3000+	.006	.010	.025	.028
Carbon Graphite		0.50 D	1.00 D	RB-N/MB	DMD / TLN	1000-3000+	.006	.010	.025	.028

Tip Cutting



Slope Cutting



Side Cutting

