Material Hook or Rake Angles • Suggested Surface Treatments • Cutting Fluids and Cutting Speeds

(RECOMMENDATIONS ONLY)

MATERIAL TO BE TAPPED	HOOK OR RAKE ANGLE	SUGGESTED SURFACE TREATMENT*	LUBRICANT/COOLANT	SPEED=SFM
ALUMINUM (WROUGHT)	12° - 15° HOOK	TiN, TiCN	Soluble, Light Base, or Lard Oil	90 - 150 SFM
ALUMINUM DIE CASTING	8° - 10° RAKE	TiCN, TiN, CrN, TiAlN+WC/C	Soluble or Lard Oil	65 - 75 SFM
ALUMINUM BRONZE	0° - 3° RAKE	N, TiN	Mineral Oil w/Lard, or Light Oil	20 - 60 SFM
BAKELITE (HARD PLASTIC)	0° - 3° RAKE	TiCN	Dry or Air Jet	25 - 40 SFM
BERYLLIUM COPPER	12° - 14° HOOK	TiAlN+WC/C, CrN, N	Soluble Light Base Oil	50 - 90 SFM
BRASS	0° - 3° RAKE	None, TiCN	Soluble Light Base Oil	100 - 200 SFM
BRONZE (FREE-MACHINE)	2° - 6° HOOK	None, TiCN, N	Soluble Light Base Oil	80 - 150 SFM
CAST BRASS	2° - 5° RAKE	N, TiCN	Soluble Light Base Oil	100 - 200 SFM
CAST IRON (GRAY)	0° - 3° RAKE	N, TiCN	Dry or Soluble Oil	20 - 80 SFM
COPPER	18° HOOK	TiAlN+WC/C, CrN	Soluble Light Base Oil	80 - 150 SFM
COPPER - NICKEL	12° HOOK	N, TiCN	Soluble Light Base Oil	10 - 20 SFM
DELRIN	5° - 8° HOOK	TiAlN+WC/C, TiN, N	Dry, Air Jet, or Water Soluble	65 - 100 SFM
DUCTILE IRON	3° - 6° HOOK	N+O, TiN, TiCN	Soluble or Sulphur Based Oils	30 - 50 SFM
DURALUMIN	12° - 14° HOOK	TiAlN+WC/C, CrN	Soluble or Lard Oil	50 - 90 SFM
FERRO-TIC	0° - 3° NEG RAKE	None	Anti-Seize Compound	8 - 20 SFM
FIBERGLASS	0° - 3° RAKE	TiCN	Dry or Air Jet	25 - 40 SFM
HASTELLOY	12° - 15° HOOK	CrN	Sulphur Based Oils	8 - 20 SFM
INCONEL	12° - 15° HOOK	N, CrN	Sulphur Based Oils	8 - 20 SFM
MAGNESIUM	18° - 20° HOOK (MUST)	CrN	Soluble Light Base Oil	100 - 150 SFM
MALLEABLE IRON	3° RAKE	N+O, TiN, TiCN	Soluble or Sulphur Based Oils	30 - 50 SFM
MANGANESE	0° - 3° RAKE	TiCN	Sulphur Based Oils	8 - 20 SFM
MANGANESE BRONZE	0° - 3° RAKE	N, TiCN	Soluble Light Base Oil	20 - 60 SFM
MOLYBDENUM	12° - 14° HOOK	N, TiN, TiCN	Sulphur Based Oils	20 - 45 SFM
MONEL	12° - 15° HOOK	N, TiCN	Sulphur Based Oils	8 - 20 SFM
NAVAL BRASS	0° - 3° RAKE	N	Soluble Light Base Oil	100 - 200 SFM
NAVAL BRONZE	2° - 6° HOOK	None, TiCN	Soluble Light Base Oil	80 - 150 SFM
NICKEL SILVER	0° - 3° RAKE	N, TiCN	Sulphur Based Oils	20 - 60 SFM
NICKEL (PURE)	12° - 15° HOOK	N, TiCN	Soluble Light Base Oil	5 - 25 SFM
NITRALLOY	0° RAKE	N, TiCN	Sulphur Based Oils	8 - 20 SFM
NITRONIC (*NO GUARANTEE)	12° - 14° POS. RAKE	N, TiN, TiCN	Sulphur Based Oils	8 - 20 SFM
NYLON	5° - 8° HOOK	N, TiN	Dry, Air Jet or Water Soluble	65 - 100 SFM
PLASTICS:				
THERMOPLASTIC (SOFT) ABS, DELRIN, NYLON, PVC, ETC.	5° - 8° HOOK	N, TiN	Dry, Air Jet or Water Soluble	65 - 100 SFM
THERMOSETTING (HARD) BAKELITE, LAMINATES, PHENOLIC, POLYESTERS, ETC.	0° - 3° RAKE	TiCN	Dry or Air Jet	25 - 40 SFM
POWDERED METAL (Sintered)	0° RAKE	TiCN	Soluble Light Based Oil	25 - 80 SFM
RUBBER, HARD	0° - 3° RAKE	None	Dry	50 - 200 SFM
SILICON BRONZE	0° - 3° RAKE	N, TiCN	Soluble Light Base Oil	20 - 60 SFM
STEEL:				
CARBON STEEL	10° - 12° HOOK	O, N, TiN	Sulphur Based Oil	40 - 90 SFM
COLD-ROLLED STEEL (1018, ETC.)	10° - 12° HOOK	O, N, TiN	Sulphur Based Oil	40 - 90 SFM
FORGED	10° - 12° HOOK	O, N, TiN	Sulphur Based Oil	20 - 50 SFM
LEADED (12L14, ETC.)	12° HOOK	O, N, TiN	Sulphur Based Oil	40 - 90 SFM
STAINLESS				
FREE MACHINING	12° - 14° HOOK	N, TiN, TiCN	Sulphur Based Oil	20 - 40 SFM
PRECIP. HARDENING	12° - 14° HOOK	N, TiN, TiCN	Sulphur Based Oil	8 - 20 SFM
TOOL	12° - 14° HOOK	N, TiN, TiCN	Sulphur Based Oil	20 - 50 SFM
TITANIUM	15° - 20° HOOK	O, N, CrN	Sulphur Based Oil	20 - 50 SFM
TUNGSTEN	5° RAKE	TiN	Sulphur Based Oil	8 - 20 SFM
TURCITE (SOFT PLASTIC)	5° - 8° HOOK	N, TiN	Dry, Air Jet or Water Soluble	65 - 100 SFM
ZAMAK (ZINC DIE CAST)	10° - 12° RAKE	TiCN, TiN, CrN, TiAlN+WC/C	Soluble Light Based Oil	50 - 200 SFM
ZINC	10° - 12° RAKE	TiCN, TiN, CrN, TiAlN+WC/C	Soluble Light Based Oil	50 - 200 SFM

* If problems are encountered when tapping nitronic (or any other material), please consult North American Tool's Tool Designers.

** See page 99 for definitions of tool coating abbreviations.