









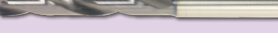
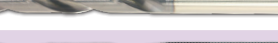


DRILLS

	SERIES	PAGE	COATING	DESCRIPTION
1160, 1180		17	ALUMASTAR	3 flute, High performance
1520, 1205		67	BRIGHT	2 flute, General purpose
1520H, 1205H		73	HARDLUBE	2 flute, General purpose
1800H		90	HARDLUBE	2 flute, Parabolic





END MILLS

	SERIES	PAGE	COATING	DESCRIPTION
A3		116	BRIGHT	High velocity, 3 flute, High metal removal rate
143M, 143R		125, 128	ALUMASTAR	High velocity, 3 flute, High metal removal rate
142B		124	ALUMASTAR	High velocity, 2 flute, High metal removal rate
142M, 142R		121, 122	ALUMASTAR	High velocity, 2 flute, High metal removal rate
242M, 842M		177	BRIGHT	High performance, 2 flute, For 3000-8000 RPM
ARC		112	BRIGHT	High performance, 3 flute, Staggered helix rougher
253M, 853M		180	BRIGHT	High performance, 3 flute, Profiling and finishing
253MC		182	TiCN	High performance, 3 flute, Profiling and finishing
220M, 820M		216	BRIGHT	2 flute, General purpose, Square end
220MC		219	TiCN	2 flute, General purpose, Square end
320M, 920M		228	BRIGHT	2 flute, General purpose, Ball end
320MC		231	TiCN	2 flute, General purpose, Ball end





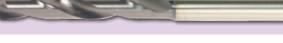
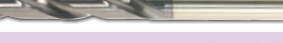

DRILLS

SERIES	PAGE	COATING	DESCRIPTION	
1510H		64	HARDLUBE	2 flute, General purpose, Slow spiral
1550H, 1250H, 1850H		23	AlTiN-Based	2 flute, High performance, Small diameter, 1/8" or 3mm shank
1580HD		29	AlTiN-Based	2 flute, High performance, Common shank
1580H, 1280H		32	AlTiN-Based	2 flute, High performance
1580KD, 1280KD, 1880KD		37	AlTiN-Based	2 flute, High performance, Coolant fed, Common shank
1580KH, 1280KH, 1880KH		47	AlTiN-Based	2 flute, High performance, Coolant fed
1520H, 1205H		73	HARDLUBE	2 flute, General purpose
1160, 1180		17	ALUMASTAR	3 flute, High performance







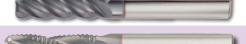
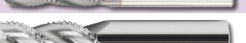
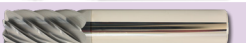









END MILLS

SERIES	PAGE	COATING	DESCRIPTION	
V4		139	AlCrN	High performance, 4 flute, Variable helix
V5		152	AlCrN	High performance, 5 flute, Variable helix
VX-7		160	AlCrN-Based	High performance, 7 flute, Staggered flute
VRX		164	AlTiN	High performance, 4 flute, Staggered flute
VRX-6		174	AlTiN	High performance, 6 flute, Staggered flute
TMS, TMR		132, 134	AlCrN	High performance, Multiple flute finisher
VHM		114	AlTiN	High performance, 4 flute, Staggered flute rougher
255MA, 855MA		184	AlTiN	High performance, 5 flute
255RA, 855RA		189	AlTiN	High performance, 5 flute, Corner radius
242M, 842M		177	BRIGHT	High performance, 2 flute, For 3000-8000 RPM
246MA, 846MA		191	AlTiN	High performance, 6 flute, Finisher
253MA, 853MA		178	AlTiN	High performance, 3 flute, Profiling and finishing
223MA, 823MA		220	TiAlN	3 flute, General purpose, Square end
230MA, 830MA		220	TiAlN	4 flute, General purpose, Square end
230RA, 830RA		225	TiAlN	4 flute, General purpose, Corner radius
323MA, 923MA		232	TiAlN	3 flute, General purpose, Ball end
330MA, 930MA		232	TiAlN	4 flute, General purpose, Ball end

DRILLS

SERIES	PAGE	COATING	DESCRIPTION	
1510H		64	HARDLUBE	2 flute, General purpose, Slow spiral
1550H, 1250H, 1850H		23	AlTiN-Based	2 flute, High performance, Small diameter, 1/8" or 3mm shank
1580HD		29	AlTiN-Based	2 flute, High performance, Common shank
1580H, 1280H		32	AlTiN-Based	2 flute, High performance
1580KD, 1280KD, 1880KD		37	AlTiN-Based	2 flute, High performance, Coolant fed, Common shank
1580KH, 1280KH, 1880KH		47	AlTiN-Based	2 flute, High performance, Coolant fed
1520H, 1205H		73	HARDLUBE	2 flute, General purpose

END MILLS

SERIES	PAGE	COATING	DESCRIPTION	
V4		139	AlCrN	High performance, 4 flute, Variable helix
V5		152	AlCrN	High performance, 5 flute, Variable helix
VX-7		160	AlCrN-Based	High performance, 7 flute, Staggered flute
VRX		164	AlTiN	High performance, 4 flute, Staggered flute
VRX-6		174	AlTiN	High performance, 6 flute, Staggered flute
253MA, 853MA		178	AlTiN	High performance, 3 flute, Profiling and finishing
255MA, 855MA		184	AlTiN	High performance, 5 flute, Square end
255RA, 855RA		189	AlTiN	High performance, 5 flute, Corner radius
VHM		114	AlTiN	High performance, 4 flute, Staggered flute rougher
ARC		112	BRIGHT	High performance, 3 flute, Staggered helix rougher
TMS, TMR		132, 134	AlCrN	High performance, Multiple flute finisher
253MC		182	TiCN	High performance, 3 flute, Profiling and finishing
246MA, 846MA		191	AlTiN	High performance, 6 flute, Finisher, Square end
223MA, 823MA		220	TiAlN	3 flute, General purpose, Square end
230MA, 830MA		220	TiAlN	4 flute, General purpose, Square end
230RA, 830RA		225	TiAlN	4 flute, General purpose, Corner radius
323MA, 923MA		232	TiAlN	3 flute, General purpose, Ball end
330MA, 930MA		232	TiAlN	4 flute, General purpose, Ball end

INCONEL, HIGH NICKEL ALLOYS

DRILLS

SERIES	PAGE	COATING	DESCRIPTION
1510H	64	HARDLUBE	2 flute, General purpose, Slow spiral
1550H, 1250H, 1850H	23	AlTiN-Based	2 flute, High performance, Small diameter, 1/8" or 3mm shank
1580HD	29	AlTiN-Based	2 flute, High performance, Common shank
1580H, 1280H	32	AlTiN-Based	2 flute, High performance
1580KD, 1280KD, 1880KD	37	AlTiN-Based	2 flute, High performance, Coolant fed, Common shank
1580KH, 1280KH, 1880KH	47	AlTiN-Based	2 flute, High performance, Coolant fed
1520H, 1205H	73	HARDLUBE	2 flute, General purpose

END MILLS







SERIES	PAGE	COATING	DESCRIPTION
V5	152	AlCrN	High performance, 5 flute, Variable helix
V4	139	AlCrN	High performance, 4 flute, Variable helix
VRX	164	AlTiN	High performance, 4 flute, Staggered flute
VRX-6	174	AlTiN	High performance, 6 flute, Staggered flute
VX-7	160	AlCrN-Based	High performance, 7 flute, Staggered flute
VHM	114	AlTiN	High performance, 4 flute, Staggered flute rougher
255MA, 855MA	184	AlTiN	High performance, 5 flute, Square end
255RA, 855RA	189	AlTiN	High performance, 5 flute, Corner radius
246MA, 846MA	191	AlTiN	High performance, 6 flute, Finisher, Square end
TMS, TMR	132, 134	AlCrN	High performance, Multiple flute finisher
230MA, 830MA	220	TiAlN	4 flute, General purpose, Square end
230RA, 830RA	225	TiAlN	4 flute, General purpose, Corner radius
330MA, 930MA	232	TiAlN	4 flute, General purpose, Ball end

Recommended tools for:




BRASS, BRONZE, COPPER, MAGNESIUM

RECOMMENDED
TOOLS

DRILLS

	SERIES	PAGE	COATING	DESCRIPTION
1160, 1180		17	ALUMASTAR	3 flute, High performance
1510H		64	HARDLUBE	2 flute, General purpose, Slow spiral
1520, 1205		67	BRIGHT	2 flute, General purpose
1520H, 1205H		73	HARDLUBE	2 flute, General purpose
1500H		59	HARDLUBE	2 flute, Straight flute
1800H		90	HARDLUBE	2 flute, Parabolic

END MILLS

	SERIES	PAGE	COATING	DESCRIPTION
143M, 143R		125, 128	ALUMASTAR	High velocity, 3 flute, High metal removal rate
142B		124	ALUMASTAR	High velocity, 2 flute, High metal removal rate
142M, 142R		121, 122	ALUMASTAR	High velocity, 2 flute, High metal removal rate
ARC		112	BRIGHT	High performance, 3 flute, Staggered helix rougher
242M, 842M		177	BRIGHT	High performance, 2 flute, For 3000-8000 RPM
253M, 853M		180	BRIGHT	High performance, 3 flute, Profiling and finishing
253MC		182	TiCN	High performance, 3 flute, Profiling and finishing
220M, 820M		216	BRIGHT	2 flute, General purpose, Square end
220MC		219	TiCN	2 flute, General purpose, Square end
320M, 920M		228	BRIGHT	2 flute, General purpose, Ball end
320MC		231	TiCN	2 flute, General purpose, Ball end









Recommended tools for:

HARDENED TOOL STEELS

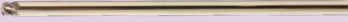








(generally over 45 Rc)

RECOMMENDED
TOOLS

DRILLS

	SERIES	PAGE	COATING	DESCRIPTION
1500H		59	HARDLUBE	2 flute, Straight flute
1510H		64	HARDLUBE	2 flute, General purpose, Slow spiral
1550H, 1250H, 1850H		23	AlTiN-Based	2 flute, High performance, Small diameter, 1/8" or 3mm shank
1580HD		29	AlTiN-Based	2 flute, High performance, Common shank
1580H, 1280H		32	AlTiN-Based	2 flute, High performance
1580KD, 1280KD, 1880KD		37	AlTiN-Based	2 flute, High performance, Coolant fed, Common shank
1580KH, 1280KH, 1880KH		47	AlTiN-Based	2 flute, High performance, Coolant fed
1520H, 1205H		73	HARDLUBE	2 flute, General purpose

END MILLS

	SERIES	PAGE	COATING	DESCRIPTION
H-45		195	AlTiN	High performance, High feed, Ball end
350MX, 950MX		196	AlTiN	High performance, High Rc finisher, Die mold
545MA		192	AlTiN	High performance, High Rc finisher, Square end
545RA		193	AlTiN	High performance, High Rc finisher, Corner radius
545BA		194	AlTiN	High performance, High Rc finisher, Ball end
VRX		164	AlTiN	High performance, 4 flute, Staggered flute
VRX-6		174	AlTiN	High performance, 6 flute, Staggered flute
230MA, 830MA		220	TiAlN	4 flute, General purpose, Square end
230RA, 830RA		225	TiAlN	4 flute, General purpose, Corner radius
330MA, 930MA		232	TiAlN	4 flute, General purpose, Ball end



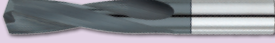



Recommended tools for:

COMPOSITE MATERIALS

(Graphite, Plastics, Carbon Fiber)

RECOMMENDED TOOLS

DRILLS

	SERIES	PAGE	COATING	DESCRIPTION
1160, 1180		17	ALUMASTAR	3 flute, High performance
154MA		109	TiAIN	4 flute, Center cutting angle
1510H		64	HARDLUBE	2 flute, General purpose, Slow spiral
1520H, 1205H		73	HARDLUBE	2 flute, General purpose
1800H		90	HARDLUBE	2 flute, Parabolic
1500H		59	HARDLUBE	2 flute, Straight flute

END MILLS

	SERIES	PAGE	COATING	DESCRIPTION
210D		197	DIAMOND	4 flute, Square end
310D		199	DIAMOND	4 flute, Ball end
210RD		198	DIAMOND	4 flute, Corner radius
143M, 143R		125, 128	ALUMASTAR	High velocity, 3 flute, High metal removal rate
142M, 142R		121, 122	ALUMASTAR	High velocity, 2 flute, High metal removal rate
142B		124	ALUMASTAR	High velocity, 2 flute, High metal removal rate
253M, 853M		180	BRIGHT	High performance, 3 flute, Profiling and finishing
253MC		182	TiCN	High performance, 3 flute, Profiling and finishing
255MC		188	TiCN	High performance, 5 flute, Profiling and finishing
220MC		219	TiCN	2 flute, General purpose, Square end
320MC		231	TiCN	2 flute, General purpose, Ball end
154M, 154MA		108, 109	BRIGHT/TiAIN	4 flute, Drill/Mill, Center cutting to a point
152M, 152MA		106, 107	BRIGHT/TiAIN	2 flute, Drill/Mill, Center cutting to a point






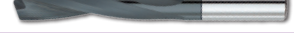

Recommended tools for:

CARBON STEELS, MEDIUM ALLOY STEELS




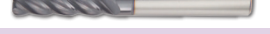

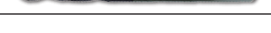
(generally under 45 Rc)

RECOMMENDED
TOOLS









DRILLS

SERIES		PAGE	COATING	DESCRIPTION
1580HD		29	AlTiN-Based	2 flute, High performance, Common shank
1550H, 1250H, 1850H		23	AlTiN-Based	2 flute, High performance, Small diameter, 1/8" or 3mm shank
1580H, 1280H		32	AlTiN-Based	2 flute, High performance
1580KD, 1280KD, 1880KD		37	AlTiN-Based	2 flute, High performance, Coolant fed, Common shank
1580KH, 1280KH, 1880KH		47	AlTiN-Based	2 flute, High performance, Coolant fed
1510H		64	HARDLUBE	2 flute, General purpose, Slow spiral
1520H, 1205H		73	HARDLUBE	2 flute, General purpose







END MILLS

SERIES		PAGE	COATING	DESCRIPTION
V4		139	AlCrN	High performance, 4 flute, Variable helix
V5		152	AlCrN	High performance, 5 flute, Variable helix
VX-7		160	AlCrN-Based	High performance, 7 flute, Staggered flute
VRX		164	AlTiN	High performance, 4 flute, Staggered flute
VRX-6		174	AlTiN	High performance, 6 flute, Staggered flute
VHM		114	AlTiN	High performance, 4 flute, Staggered flute rougher
255MA, 855MA		184	AlTiN	High performance, 5 flute
255RA, 855RA		189	AlTiN	High performance, 5 flute, Corner radius
253MA, 853MA		178	AlTiN	High performance, 3 flute, Profiling and finishing
230MA, 830MA		220	TiAlN	4 flute, General purpose, Square end
230RA, 830RA		225	TiAlN	4 flute, General purpose, Corner radius
330MA, 930MA		232	TiAlN	4 flute, General purpose, Ball end

DRILLS

SERIES	PAGE	COATING	DESCRIPTION	
1120H, 1100H		79	HARDLUBE	3 flute, General purpose
1520H, 1205H		73	HARDLUBE	2 flute, General purpose
1510H		64	HARDLUBE	2 flute, General purpose, Slow spiral
1580H, 1280H		32	AlTiN-Based	2 flute, High performance
1550H, 1250H, 1850H		23	AlTiN-Based	2 flute, High performance, Small diameter, 1/8" or 3mm shank
1580HD		29	AlTiN-Based	2 flute, High performance, Common shank
1580KH, 1280KH, 1880KH		47	AlTiN-Based	2 flute, High performance, Coolant fed
1580KD, 1280KD, 1880KD		37	AlTiN-Based	2 flute, High performance, Coolant fed, Common shank

END MILLS

SERIES	PAGE	COATING	DESCRIPTION	
VRX		164	AlTiN	High performance, 4 flute, Staggered flute
VRX-6		174	AlTiN	High performance, 6 flute, Staggered flute
V4		139	AlCrN	High performance, 4 flute, Variable helix
V5		152	AlCrN	High performance, 5 flute, Variable helix
VX-7		160	AlCrN-Based	High performance, 7 flute, Staggered flute
255MA, 855MA		184	AlTiN	High performance, 5 flute, Square end
255RA, 855RA		189	AlTiN	High performance, 5 flute, Corner radius
143M, 143R		125, 128	ALUMASTAR	High velocity, 3 flute, High metal removal rate
253MA, 853MA		178	AlTiN	High performance, 3 flute, Profiling and finishing
230MC		219	TiCN	4 flute, General purpose, Square end
230MA, 830MA		220	TiAlN	4 flute, General purpose, Square end
230RA, 830RA		225	TiAlN	4 flute, General purpose, Corner radius