















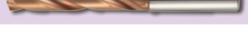
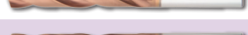
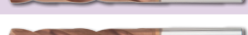




DRILLS

SERIES	PAGE	COATING	DESCRIPTION
1180 	14	ALUMASTAR	Jobber length, 3 flute, High performance
1520 	52	BRIGHT	Stub length, 2 flute, General purpose
1520H 	55	HARDLUBE	Stub length, 2 flute, General purpose
1205 	66	BRIGHT	Jobber length, 2 flute, General purpose
1205H 	69	HARDLUBE	Jobber length, 2 flute, General purpose
1800H 	82	HARDLUBE	Taper length, 2 flute, Parabolic

END MILLS

SERIES	PAGE	COATING	DESCRIPTION
143M 	108	ALUMASTAR	High velocity, 3 flute, High metal removal rate
143R 	110	ALUMASTAR	High velocity, 3 flute, High metal removal rate, Corner radius
142M 	106	ALUMASTAR	High velocity, 2 flute, High metal removal rate
142B 	107	ALUMASTAR	High velocity, 2 flute, High metal removal rate
242M / 842M 	112	BRIGHT	High performance, 2 flute, For 4000-8000 RPM
253M / 853M 	115	BRIGHT	High performance, 3 flute, Profiling and finishing
253MC 	117	TiCN	High performance, 3 flute, Profiling and finishing
160M / 860M 	150	BRIGHT	Stub length, 2 flute, General purpose
180M / 980M 	153	BRIGHT	Stub length, 2 flute, General purpose
220M / 820M 	159	BRIGHT	Standard length, 2 flute, General purpose
220MC 	162	TiCN	Standard length, 2 flute, General purpose
320M / 920M 	170	BRIGHT	Standard length, 2 flute, General purpose
320MC 	173	TiCN	Standard length, 2 flute, General purpose
620M / 640M 	185	BRIGHT	Extra length, 2 flute, General purpose
620MC 	187	TiCN	Extra length, 2 flute, General purpose
720M / 740M 	196	BRIGHT	Extra length, 2 flute, General purpose
720MC 	198	TiCN	Extra length, 2 flute, General purpose





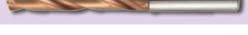
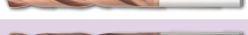
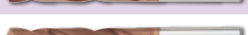
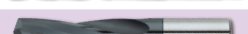



DRILLS

SERIES	PAGE	COATING	DESCRIPTION
1580HD 	18	HELICA	Stub length, 2 flute, High performance, Common shank
1580H 	21	HARDLUBE	Stub length, 2 flute, High performance
1280H 	31	HARDLUBE	Jobber length, 2 flute, High performance
1580KD 	29	HELICA	Stub length, 2 flute, High performance, Coolant fed, Common shank
1280KD 	36	HELICA	Jobber length, 2 flute, High performance, Coolant fed, Common shank
1580KH 	24	HELICA	Stub length, 2 flute, High performance, Coolant fed
1280KH 	34	HELICA	Jobber length, 2 flute, High performance, Coolant fed
1880KH 	39	HELICA	Taper length, 2 flute, High performance, Coolant fed
1520H 	55	HARDLUBE	Stub length, 2 flute, General purpose
1205H 	69	HARDLUBE	Jobber length, 2 flute, General Purpose
1180 	14	ALUMASTAR	Jobber length, 3 flute, High performance



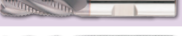

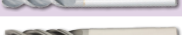




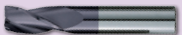


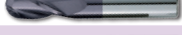
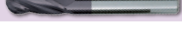

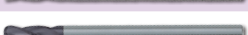




END MILLS

SERIES	PAGE	COATING	DESCRIPTION
V4 	128	AlCrN	High performance, 4 flute, Variable helix
V5 	132	AlCrN	High performance, 5 flute, Variable helix
VRX 	135	X.CEED	High performance, 4 flute, Variable flute rougher/finisher,
253MA / 853MA 	113	X.CEED	High performance, 3 flute, Profiling and finishing
255MA / 855MA 	118	X.CEED	High performance, 5 flute
255RA / 855RA 	123	X.CEED	High performance, 5 flute, Corner radius
242M / 842M 	112	BRIGHT	High performance, 2 flute, For 4000-8000 RPM
170MA / 870MA 	152	FUTURA	Stub length, 4 flute, General purpose
190MA / 990MA 	154	FUTURA	Stub length, 4 flute, General purpose
223MA / 823MA 	163	FUTURA	Standard length, 3 flute, General purpose
230MA / 830MA 	163	FUTURA	Standard length, 4 flute, General purpose
230RA / 830RA 	167	FUTURA	Standard length, 4 flute, General purpose, Corner radius
323MA / 923MA 	174	FUTURA	Standard length, 3 flute, General purpose
330MA / 930MA 	174	FUTURA	Standard length, 4 flute, General purpose
623MA / 643MA 	188	FUTURA	Extra length, 3 flute, General purpose
630MA / 650MA 	188	FUTURA	Extra length, 4 flute, General purpose
630RA 	193	FUTURA	Extra length, 4 flute, General purpose, Corner radius
723MA / 743MA 	199	FUTURA	Extra length, 3 flute, General purpose
730MA / 750MA 	199	FUTURA	Extra length, 4 flute, General purpose





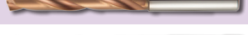
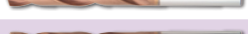
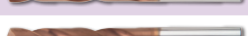






DRILLS

SERIES	PAGE	COATING	DESCRIPTION
1580HD 	18	HELICA	Stub length, 2 flute, High performance, Common shank
1580H 	21	HARDLUBE	Stub length, 2 flute, High performance
1280H 	31	HARDLUBE	Jobber length, 2 flute, High performance
1580KD 	29	HELICA	Stub length, 2 flute, High performance, Coolant fed, Common shank
1280KD 	36	HELICA	Jobber length, 2 flute, High performance, Coolant fed, Common shank
1580KH 	24	HELICA	Stub length, 2 flute, High performance, Coolant fed
1280KH 	34	HELICA	Jobber length, 2 flute, High performance, Coolant fed
1880KH 	39	HELICA	Taper length, 2 flute, High performance, Coolant fed
1510H 	49	HARDLUBE	Stub length, 2 flute, 15° helix, General purpose
1520H 	55	HARDLUBE	Stub length, 2 flute, General purpose
1205H 	69	HARDLUBE	Jobber length, 2 flute, General Purpose

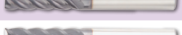



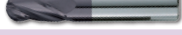


END MILLS

SERIES	PAGE	COATING	DESCRIPTION
V4 	128	AlCrN	High performance, 4 flute, Variable helix
VRX 	135	X.CEED	High performance, 4 flute, Variable flute rougher/finisher
VHM 	127	X.CEED	High performance, 4 flute, Variable flute hog mill rougher
253MA / 853MA 	113	X.CEED	High performance, 3 flute, Profiling and finishing
253MC 	117	TiCN	First choice for 304/304L, High performance, 3 flute, Profiling and finishing
V5 	132	AlCrN	High performance, 5 flute, Variable helix
255MA / 855MA 	118	X.CEED	High performance, 5 flute
255RA / 855RA 	123	X.CEED	High performance, 5 flute, Corner radius
170MA / 870MA 	152	FUTURA	Stub length, 4 flute, General purpose
190MA / 990MA 	154	FUTURA	Stub length, 4 flute, General purpose
223MA / 823MA 	163	FUTURA	Standard length, 3 flute, General purpose
230MA / 830MA 	163	FUTURA	Standard length, 4 flute, General purpose
230RA / 830RA 	167	FUTURA	Standard length, 4 flute, General purpose, Corner radius
323MA / 923MA 	174	FUTURA	Standard length, 3 flute, General purpose
330MA / 930MA 	174	FUTURA	Standard length, 4 flute, General purpose
623MA / 643MA 	188	FUTURA	Extra length, 3 flute, General purpose
630MA / 650MA 	188	FUTURA	Extra length, 4 flute, General purpose
630RA 	193	FUTURA	Extra length, 4 flute, General purpose, Corner radius
723MA / 743MA 	199	FUTURA	Extra length, 3 flute, General purpose
730MA / 750MA 	199	FUTURA	Extra length, 4 flute, General purpose

DRILLS

SERIES	PAGE	COATING	DESCRIPTION
1580HD 	18	HELICA	Stub length, 2 flute, High performance, Common shank
1580H 	21	HARDLUBE	Stub length, 2 flute, High performance
1280H 	31	HARDLUBE	Jobber length, 2 flute, High performance
1580KD 	29	HELICA	Stub length, 2 flute, High performance, Coolant fed, Common shank
1280KD 	36	HELICA	Jobber length, 2 flute, High performance, Coolant fed, Common shank
1580KH 	24	HELICA	Stub length, 2 flute, High performance, Coolant fed
1280KH 	34	HELICA	Jobber length, 2 flute, High performance, Coolant fed
1880KH 	39	HELICA	Taper length, 2 flute, High performance, Coolant fed
1510H 	49	HARDLUBE	Stub length, 2 flute, Slow helix, General purpose
1520H 	55	HARDLUBE	Stub length, 2 flute, General purpose
1205H 	69	HARDLUBE	Jobber length, 2 flute, General Purpose
1120H 	64	HARDLUBE	Stub length, 3 flute, General purpose
1100H 	80	HARDLUBE	Jobber length, 3 flute, General Purpose

END MILLS







SERIES	PAGE	COATING	DESCRIPTION
V4 	128	AlCrN	High performance, 4 flute, Variable helix
VRX 	135	X.CEED	High performance, 4 flute, Variable flute rougher/finisher
VHM 	127	X.CEED	High performance, 4 flute, Variable flute hog mill rougher
V5 	132	AlCrN	High performance, 5 flute, Variable helix
545MA 	141	X.CEED	High performance, High Rc finisher
545RA 	142	X.CEED	High performance, High Rc finisher, Corner radius
545BA 	143	X.CEED	High performance, High Rc finisher
255MA / 855MA 	118	X.CEED	High performance, 5 flute
255RA / 855RA 	123	X.CEED	High performance, 5 flute, Corner radius
170MA / 870MA 	152	FUTURA	Stub length, 4 flute, General purpose
190MA / 990MA 	154	FUTURA	Stub length, 4 flute, General purpose
230MA / 830MA 	163	FUTURA	Standard length, 4 flute, General purpose
230RA / 830RA 	167	FUTURA	Standard length, 4 flute, General purpose, Corner radius
330MA / 930MA 	174	FUTURA	Standard length, 4 flute, General purpose
630MA / 650MA 	188	FUTURA	Extra length, 4 flute, General purpose
630RA 	193	FUTURA	Extra length, 4 flute, General purpose, Corner radius
730MA / 750MA 	199	FUTURA	Extra length, 4 flute, General purpose

Recommended tools for:




BRASS, BRONZE, COPPER, MAGNESIUM

RECOMMENDED
TOOLS

DRILLS

SERIES	PAGE	COATING	DESCRIPTION
1180 	14	ALUMASTAR	Jobber length, 3 flute, High performance
1520 	52	BRIGHT	Stub length, 2 flute, General purpose
1520H 	55	HARDLUBE	Stub length, 2 flute, General purpose
1205 	66	BRIGHT	Jobber length, 2 flute, General purpose
1205H 	69	HARDLUBE	Jobber length, 2 flute, General purpose
1800H 	82	HARDLUBE	Taper length, 2 flute, Parabolic





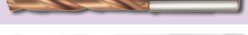
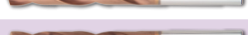
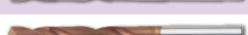




END MILLS

SERIES	PAGE	COATING	DESCRIPTION
143M 	108	ALUMASTAR	High velocity, 3 flute, High metal removal rate
143R 	110	ALUMASTAR	High velocity, 3 flute, High metal removal rate, Corner radius
142M 	106	ALUMASTAR	High velocity, 2 flute, High metal removal rate
142B 	107	ALUMASTAR	High velocity, 2 flute, High metal removal rate
242M / 842M 	112	BRIGHT	High performance, 2 flute, For 4000-8000 RPM
253M / 853M 	115	BRIGHT	High performance, 3 flute, Profiling and finishing
253MC 	117	TiCN	High performance, 3 flute, Profiling and finishing
160M / 860M 	150	BRIGHT	Stub length, 2 flute, General purpose
180M / 980M 	153	BRIGHT	Stub length, 2 flute, General purpose
220M / 820M 	159	BRIGHT	Standard length, 2 flute, General purpose
220MC 	162	TiCN	Standard length, 2 flute, General purpose
320M / 920M 	170	BRIGHT	Standard length, 2 flute, General purpose
320MC 	173	TiCN	Standard length, 2 flute, General purpose
620M / 640M 	185	BRIGHT	Extra length, 2 flute, General purpose
620MC 	187	TiCN	Extra length, 2 flute, General purpose
720M / 740M 	196	BRIGHT	Extra length, 2 flute, General purpose
720MC 	198	TiCN	Extra length, 2 flute, General purpose

HARDENED TOOL STEELS

(generally over 45Rc)

DRILLS

SERIES	PAGE	COATING	DESCRIPTION
1580HD 	18	HELICA	Stub length, 2 flute, High performance, Common shank
1580H 	21	HARDLUBE	Stub length, 2 flute, High performance
1280H 	31	HARDLUBE	Jobber length, 2 flute, High performance
1580KD 	29	HELICA	Stub length, 2 flute, High performance, Coolant fed, Common shank
1280KD 	36	HELICA	Jobber length, 2 flute, High performance, Coolant fed, Common shank
1580KH 	24	HELICA	Stub length, 2 flute, High performance, Coolant fed
1280KH 	34	HELICA	Jobber length, 2 flute, High performance, Coolant fed
1880KH 	39	HELICA	Taper length, 2 flute, High performance, Coolant fed
1500H 	60	HARDLUBE	Stub length, 2 flute, straight flute hard metal
1510H 	49	HARDLUBE	Stub length, 2 flute, 15° helix, General purpose
1520H 	55	HARDLUBE	Jobber length, 2 flute, General purpose
1205H 	69	HARDLUBE	Jobber length, 2 flute, High performance

END MILLS









SERIES	PAGE	COATING	DESCRIPTION
545MA 	141	X.CEED	High performance, High Rc finisher
545RA 	142	X.CEED	High performance, High Rc finisher, Corner radius
545BA 	143	X.CEED	High performance, High Rc finisher
VRX 	135	X.CEED	High performance, 4 flute, Variable flute rougher/finisher
350MX / 950MX 	144	X.CEED	High performance, High Rc finisher
170MA / 870MA 	152	FUTURA	Stub length, 4 flute, General purpose
190MA / 990MA 	154	FUTURA	Stub length, 4 flute, General purpose
230MA / 830MA 	163	FUTURA	Standard length, 4 flute, General purpose
230RA / 830RA 	167	FUTURA	Standard length, 4 flute, General purpose, Corner radius
330MA / 930MA 	174	FUTURA	Standard length, 4 flute, General purpose
630MA / 650MA 	188	FUTURA	Extra length, 4 flute, General purpose
630RA 	193	FUTURA	Extra length, 4 flute, General purpose, Corner radius
730MA / 750MA 	199	FUTURA	Extra length, 4 flute, General purpose

Recommended tools for:

COMPOSITE MATERIALS

(Graphite, Plastics, Carbon Fiber)

DRILLS

SERIES	PAGE	COATING	DESCRIPTION
1180 	14	ALUMASTAR	Jobber length, 3 flute, High performance
1520H 	55	HARDLUBE	Stub length, 2 flute, General purpose
1205H 	69	HARDLUBE	Jobber length, 2 flute, General purpose
1120H 	64	HARDLUBE	Stub length, 3 flute, General purpose
1100H 	80	HARDLUBE	Jobber length, 3 flute, General purpose
1800H 	82	HARDLUBE	Taper length, 2 flute, Parabolic
1500H 	48	HARDLUBE	Stub length, 2 straight flutes, Hard Metal
152D / 152DA 	104-105	BRIGHT/TIALN	Standard length, 2 flute, Drill/Mill, 120° 4-facet drill point

END MILLS

SERIES	PAGE	COATING	DESCRIPTION
210D 	145	DIAMOND	Standard length, 4 flute
310D 	147	DIAMOND	Standard length, 4 flute
210RD 	146	DIAMOND	Standard length, 4 flute, Corner radius
610D 	148	DIAMOND	Extra length, 4 flute
710D 	149	DIAMOND	Extra length, 4 flute
143M 	108	ALUMASTAR	High velocity, 3 flute, High metal removal rate
143R 	110	ALUMASTAR	High velocity, 3 flute, High metal removal rate, Corner radius
142M 	106	ALUMASTAR	High velocity, 2 flute, High metal removal rate
142B 	107	ALUMASTAR	High velocity, 2 flute, High metal removal rate
253M / 853M 	115	BRIGHT	High performance, 3 flute, Profiling and finishing
253MC 	117	TiCN	High performance, 3 flute, Profiling and finishing
255MC 	122	TiCN	High performance, 5 flute, Profiling and finishing
220MC 	162	TiCN	Standard length, 2 flute, General purpose
320MC 	173	TiCN	Standard length, 2 flute, General purpose
620MC 	187	TiCN	Extra length, 2 flute, General purpose
720MC 	198	TiCN	Extra length, 2 flute, General purpose
154M / 154MA 	102-103	BRIGHT/TIALN	Standard length, 4 flute, Drill/Mill, Center cutting to a point
152M / 152MA 	100-101	BRIGHT/TIALN	Standard length, 2 flute, Drill/Mill, Center cutting to a point





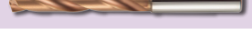
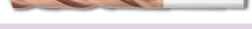
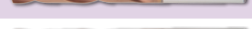
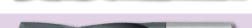






Check out the inside back cover to see a variety of non-stock specials that we offer specifically designed for use in composite materials.







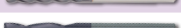
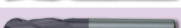









CARBON STEELS, MEDIUM ALLOY STEELS

(generally under 45Rc)

DRILLS

SERIES	PAGE	COATING	DESCRIPTION
1580HD 	18	HELICA	Stub length, 2 flute, High performance, Common shank
1580H 	21	HARDLUBE	Stub length, 2 flute, High performance
1280H 	31	HARDLUBE	Jobber length, 2 flute, High performance
1580KD 	29	HELICA	Stub length, 2 flute, High performance, Coolant fed, Common shank
1280KD 	36	HELICA	Jobber length, 2 flute, High performance, Coolant fed, Common shank
1580KH 	24	HELICA	Stub length, 2 flute, High performance, Coolant fed
1280KH 	34	HELICA	Jobber length, 2 flute, High performance, Coolant fed
1880KH 	39	HELICA	Taper length, 2 flute, High performance, Coolant fed
1510H 	49	HARDLUBE	Stub length, 2 flute, 15° helix, General purpose
1520H 	55	HARDLUBE	Stub length, 2 flute, General purpose
1205H 	69	HARDLUBE	Jobber length, 2 flute, General Purpose
152D / 152DA 	104-105	BRIGHT/TIAlN	Standard length, 2 flute, Drill/Mill, 120° 4-facet drill point

END MILLS

SERIES	PAGE	COATING	DESCRIPTION
V4 	128	AlCrN	High performance, 4 flute, Variable helix
VRX 	135	X.CEED	High performance, 4 flute, Variable flute rougher/finisher
VHM 	127	X.CEED	High performance, 4 flute, Variable flute hog mill rougher
253MA / 853MA 	113	X.CEED	High performance, 3 flute, Profiling and finishing
V5 	132	AlCrN	High performance, 5 flute, Variable helix
255MA / 855MA 	118	X.CEED	High performance, 5 flute
255RA / 855RA 	123	X.CEED	High performance, 5 flute, Corner radius
170MA / 870MA 	152	FUTURA	Stub length, 4 flute, General purpose
190MA / 990MA 	154	FUTURA	Stub length, 4 flute, General purpose
230MA / 830MA 	163	FUTURA	Standard length, 4 flute, General purpose
230RA / 830RA 	167	FUTURA	Standard length, 4 flute, General purpose, Corner radius
330MA / 930MA 	174	FUTURA	Standard length, 4 flute, General purpose
630MA / 650MA 	188	FUTURA	Extra length, 4 flute, General purpose
630RA 	193	FUTURA	Extra length, 4 flute, General purpose, Corner radius
730MA / 750MA 	199	FUTURA	Extra length, 4 flute, General purpose
154M / 154MA 	102-103	BRIGHT/TIAlN	Standard length, 4 flute, Drill/Mill, Center cutting to a point
152M / 152MA 	100-101	BRIGHT/TIAlN	Standard length, 2 flute, Drill/Mill, Center cutting to a point