

COATING SELECTION GUIDE



voestalpine eifeler Coatings - Properties and Applications

	TiN	TiCN	ZrN	CrN	EXXTRAL® plus	EXXTRAL® blue
Coating Material	Titanium Nitride	Titanium Carbo-Nitride	Zirconium Nitride	Chromium Nitride	Aluminum Titanium Nitride	Aluminum Titanium Nitride (with additives)
	TiN	TiCN (ML)	ZrN	CrN	AlTiN (stacked)	AlTiN (nanostructured)
Microhardness HV_{0.05}	2300±300	3500±500	2800±300	2000±200	3300±300	3500±500
Friction Coefficient Against Steel (Dry)	0.6	0.2	0.5	0.3 - 0.4	0.7	0.7
Coating Thickness¹ (µm)	2-4	2-4	1-4	1-6	2-5	2-5
Thermal Threshold	500°C 900°F	400°C 750°F	600°C 1100°F	600°C 1100°F	800°C 1470°F	900°C 1650°F
Color of the Coating	gold	blue gray	pale yellow	silver-gray	anthracite	blue-violet
Key Characteristics	standard, all-purpose coating	high hardness, excellent abrasive wear resistance, enhanced toughness	decorative color, good wear and corrosion resistance	low stress / good adhesion, high toughness, and corrosion resistance	high hardness, very good oxidation resistance	extreme wear resistance at high temperature, excellent oxidation resistance
Key Applications	Cutting Punching/Forming Medical	Cutting Punching/Forming Medical	Cutting Punching/Forming Medical	Forming	Cutting	Cutting
Ultrafine Duplex Biocompatible	ultrafine Available Biocompatible	ultrafine Available Biocompatible	Biocompatible	Duplex Available		
Primary Applications	<ul style="list-style-type: none"> » machining/cutting of iron based materials » metal forming » plastic molding » available in "ultrafine". 	<ul style="list-style-type: none"> » machining of difficult-to-machine alloy steels » high performance cutting where moderate temperatures are generated at the cutting edge » excellent for metal forming (stainless steel) » available in duplex treatment under duplex dumatic 	<ul style="list-style-type: none"> » cast aluminum and generally non-ferrous materials machining » machining of fiberglass, nylon and most polymer materials » forming and punching 	<ul style="list-style-type: none"> » metal forming » plastic molding » available in duplex treatment 	<ul style="list-style-type: none"> » machining of hardened steelwork pieces » for use on round shank carbide tools » high speed operations, semi-dry or dry machining 	<ul style="list-style-type: none"> » cutting abrasive or hard materials » machining of hardened steel (>55 HRC) » high performance-machining, semi-dry or dry machining

¹ Depends on size of tools, and for micro tools smaller thicknesses maybe necessary.

ADDITIONAL COATING SERVICES

voestalpine eifeler Coatings can service all coating requirements from new tooling programs to the refurbishment and recoating of existing tools. Our capabilities include:

- » Mechanical and Chemical Coating Removal
- » Polishing
- » Micro-Blasting
- » PVD Coating of Small to Large Tooling
- » Pick-up and Delivery

	CROSAL® plus	SISTRAL®	TIGRAL®	VARIANTIC®	CARBON-X®	SUCASLIDE®
Coating Material	Aluminum Chromium Nitride	Aluminum Titanium Nitride (with additives)	Aluminum Chromium Titanium Nitride	Titanium Aluminum Carbo-Nitride	Chrome Base Carbon Coating / DLC	Chrome Base Carbon Coating / DLC
	AlCrN	AlTiN (nanostructured)	AlCrTiN	TiAlCN (ML)		
Microhardness HV _{0.05}	3200±300	3500±500	3300±300	3500±500	2400 ± 400	1000 - 1200
Friction Coefficient Against Steel (Dry)	0.45	0.7	0.6	0.2	0.05 - 0.15	0.05-0.1
Coating Thickness ¹⁾ (µm)	2-5	1-3	3-5	2-4	1.5 - 2.5	1.5 - 2.5
Thermal Threshold	1100°C 2012°F	900°C 1650°F	900°C 1650°F	800°C 1470°F	325°C 617°F	400°C 732°F
Color of the Coating	slate-gray	anthracite	dark gray	old rose	dark grey	black
Key Characteristics	extreme hot hardness, high oxidation resistance and high adhesive strength	extreme wear resistance at high temperature, excellent oxidation resistance	high oxidation resistance, high protection against abrasive wear	low friction, high oxidation resistance	high wear resistance due to high hardness, very low friction, reduce sticking and top performance under tough condition	good adhesive strength, very hard, low friction coefficient, biocompatible
Key Applications	Cutting Punching/Forming	Cutting Punching/Forming	Cutting Forming	Cutting Punching/Forming Medical	Cutting Punching/Forming Plastic Injection Components	Tools Components
Ultrafine Duplex Biocompatible		ultrafine Available	Duplex Available	Duplex Available Biocompatible		
Primary Applications	<ul style="list-style-type: none"> » cutting: high performance cutting, hobbing, dry broaching » forming/punching » available in duplex treatment 	<ul style="list-style-type: none"> » excellent choice for cutting under extreme conditions (hard, abrasive materials, high speed, dry cutting) 	<ul style="list-style-type: none"> » machining under dry conditions » hot forming sheet metals » die casting » available in duplex treatment 	<ul style="list-style-type: none"> » coating for a wide range of carbide, cermet and high speed steel tooling » machining of all types of steel under dry as well as wet machining conditions » drawing, stamping, punching, and forming tools for processing of high and low alloy steel » available in duplex treatment 	<ul style="list-style-type: none"> » forming and fine blanking, injection molding tools and components, decorative applications, cutting of non-ferrous materials, food components, vacuum and cooling technology 	<ul style="list-style-type: none"> » molding of high abrasive plastic, metal forming, orthopedic, machining cutting of iron based materials