



COATING SELECTION GUIDE

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PVD - voestalpine eifeler Coatings - Properties and Applications

	TiN	TiCN	ZrN	CrN	EXXTRAL® plus
Coating Material	Titanium Nitride	Titanium Carbo-Nitride	Zirconium Nitride	Chromium Nitride	Aluminum Titanium Nitride
	TiN	TiCN (ML)	ZrN	CrN	AlTiN (stacked)
Microhardness HV_{0.05}	2300±300	3500±500	2800±300	2000±200	3300±300
Friction Coefficient Against Steel (Dry)	0.6	0.2	0.5	0.3 - 0.4	0.7
Coating Thickness ¹⁾ (µm)	2-4	2-4	1-4	1-6	2-5
Thermal Threshold	500°C 900°F	400°C 750°F	600°C 1100°F	600°C 1100°F	800°C 1470°F
Color of the Coating	gold	blue gray	pale yellow	silver-gray	anthracite
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
Key Applications	Cutting Punching/Forming Medical	Cutting Punching/Forming Medical	Cutting Punching/Forming Medical	Forming	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 	<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) 	<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 	<ul style="list-style-type: none"> » machining of hardened steel work pieces » for use on round shank carbide tools » high speed operations, semi-dry or dry machining

¹⁾ depends on size of tools, for micro tools also smaller thicknesses 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

EXXTRAL® blue	CROSAL® -plus	SISTRAL®	TIGRAL®	VARIANTA®	VARIANTIC®
Aluminum Titanium Nitride (with additives)	Aluminum Chromium Nitride	Aluminum Titanium Nitride (with additives)	Aluminum Chromium Titanium Nitride	Titanium Aluminum	Titanium Aluminum Carbo-Nitride
AlTiN (nanostructured)	AlCrN	AlTiN (nanostructured)	AlCrTiN	TiAlN (ML)	TiAlCN (ML)
3500±500	3200±300	3500±500	3300±300	3500±500	3500±500
0.7	0.45	0.7	0.6	0.7	0.2
2-5	2-5	1-3	3-5	2-4	2-4
900°C 1650°F	1100°C 2012°F	900°C 1650°F	900°C 1650°F	800°C 1470°F	800°C 1470°F
blue-violet	slate-gray	anthracite	dark gray	anthracite	old rose
extreme wear resistance at high temperature, excellent oxidation resistance	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	high hardness, very good oxidation resistance	low friction, high oxidation resistance
Cutting	Cutting Punching/Forming	Cutting Punching/Forming	Cutting Forming	Cutting Forming Medical	Cutting Punching/Forming Medical
		ultrafine Available	Duplex Available	Biocompatible	Duplex Available Biocompatible

- » cutting abrasive or hard materials
- » machining of hardened steel (>55 HRC)
- » high performance machining, semi-dry or dry machining

- » cutting: high performance cutting, hobbing, dry broaching
- » forming/punching

- » excellent choice for cutting under extreme conditions (hard, abrasive materials, high speed, dry cutting)

- » machining under dry conditions
- » hot forming sheet metals
- » die casting

- » coating for a wide range of carbide, cermet and high speed steel tooling
- » machining of cast iron and nickel based high temperature alloys
- » high speed operations, semi-dry or dry machining

- » 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, forming tools for processing of high and low alloy steel

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ONE STEP AHEAD.