

PVD-Coatings of the EIFELER-GROUP - Properties and Applications



	TiN	TiCN	ZrN	CrN CrCN	EXXTRAL ^{rosé}	EXXTRAL [®] EXXTRAL ^{® plus}	SISTRAL	VARIANTA [®] SUPRAL	VARIANTIC nanoVARIANTIC	WC/C
Coating Material	Titanium Nitride	Titanium Carbo-Nitride	Zirconium Nitride	Chromium Nitride, Carbo-Nitride	Aluminium Titanium Carbo-Nitride	Aluminium Titanium Nitride	Aluminium Titanium Nitride (with additions)	Titanium Aluminium Carbo-Nitride	Titanium Aluminium Carbo-Nitride	Tungsten Carbide - Carbon
	TiN	TiCN (ML)	ZrN	CrN CrCN	AlTiCN (stacked)	AlTiN (monolayer) AlTiN (stacked)	AlTiN (nanostructured)	TiAlCN (ML)	TiAlCN (ML)	a-C : Me
Technology	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
Microhardness HV_{0,05}	2300 ± 300	3500 ± 500	2800 ± 300	2000 ± 200 2300 ± 200	3000 ± 300	3300 ± 300	3500 ± 500	3500 ± 500	3500 ± 500	1000 - 2200
Friction Coefficient Against Steel (Dry)	0.6	0.2	0.5	0.3 - 0.4 0.2 - 0.3	0.2	0.7	0.7	0.7 <0.5	0.2	0.2 - 0.25
Coating Thickness¹⁾ [µm]	2 - 4	2 - 4	1 - 4	2 - 6	2 - 4	1 - 3	1 - 3	2 - 4	2 - 4	1 - 2
Thermal Threshold	500°C 900°F	400°C 750°F	600°C 1100°F	600°C 1100°F	800°C 1470°F	800°C 1470°F	900°C 1650°F	800°C 1470°F	800°C 1470°F	400°C 750°F
Colour of the Coating	gold	blue gray (anthracite)	pale yellow	silver - gray	old rose	anthracite	anthracite	anthracite black	old rose	anthracite
Key Characteristics	standard, all-purpose coating, biocompatible	high hardness, good wear resistance, enhanced toughness	decorative color, good wear and corrosion resistance, biocompatible	low stress / good adhesion, high toughness and corrosion resistance	high hardness and elasticity, low friction, high oxidation resistance	high hardness, very good oxidation resistance	extreme wear resistant at high temperature, excellent oxidation resistance	high hardness, very good oxidation resistance low friction	low friction, high oxidation resistance	high lubricity, low tendency for adhesive wear
Primary Applications	<ul style="list-style-type: none"> machining / cutting of iron based materials metal forming plastic moulding 	<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 aluminium and generally non-ferrous materials machining machining of fibreglass, nylon and most polymer materials forming and punching - reduced cold rewelding medical applications - biocompatible & corrosion resistant decorative industry 	<ul style="list-style-type: none"> machining copper and other non-ferrous materials metal forming plastic moulding (improved demoulding) aluminium and magnesium die casting 	<ul style="list-style-type: none"> excellent for stainless steel and nickel-based high temperature alloys hard and copy milling interrupted cutting operations, lubricated, semi-dry or dry machining roughing (stocking) with specially adapted EXXTRAL^{rosé} coating (up to 7µm) 	<ul style="list-style-type: none"> machining of hardened steel work pieces for use on carbide end mills high speed operations, semi-dry or dry machining metal cutting tasks where other coatings reach their limits of thermal and mechanical load 	<ul style="list-style-type: none"> best choice for cutting under extreme conditions (hard , abrasive materials, high speed, dry cutting) machining of hardened steel (> 54 HRc) inconel machining 	<ul style="list-style-type: none"> 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 excellent for drilling operations in steel (up to 45 HRC) 	<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 excellent for drilling in steel drawing, stamping, punching, forming tools for processing of high and low alloy steel 	<ul style="list-style-type: none"> precision components punching & forming, minimal lubrication or dry plastic injection & moulding moving parts, dry
<small>¹⁾ depends on size of tools, for micro tools also smaller thicknesses necessary</small>										

Eifeler Coatings + Technology

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