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**PVD, Cathodic Arc Coatings of EIFELER COATINGS TECHNOLOGY - Properties and Applications**

	TiN	TiCN	ZrN ZrCN	CrN CrCN	EXXTRAL® rosé	EXXTRAL® plus	EXXTRAL® silver	SISTRAL®	TIGRAL	VARIANTA® SUPRAL	VARIANTIC® nanoVARIANTIC	WC/C
<b>Coating Designation</b>	Titanium Nitride	Titanium Carbo-Nitride	Zirconium Carbo-Nitride	Chromium Nitride Carbo-Nitride	Aluminum Titanium Carbo-Nitride	Aluminum Titanium Nitride	Aluminum Titanium Chromium Nitride	Aluminum Titanium Nitride (w/additions)	Aluminum Chromium Titanium Nitride	Titanium Aluminum Carbo Nitride	Titanium Aluminum Carbo-Nitride	Tungsten Carbide Carbon
	TiN	TiCN (ML)	ZrN ZrCN	CrN CrCN	AlTiCN (stacked)	AlTiN (stacked)	AlTiCrN (stacked)	AlTiN (nanostructured)	AlCrTiN	TiAlN (ML)	TiAlCN (ML)	a-C : Me
<b>Microhardness (Vickers)</b>	2300±300	3500±500	2800±300 2100±300	2000±200 2300±200	3000±300	3300±300	3000±300	3500±500	3300±300	3500±500	3500±500	1000-2200
<b>Friction Coefficient Against Steel (Dry)</b>	0.6	0.2	0.5	0.3 - 0.4 0.2 - 0.3	0.2	0.7	0.4	0.7	0.5	0.7 - 0.5	0.2	0.2 - 0.25
<b>Coating Thickness <sup>1)</sup> (m)</b>	2-4	2-4	1-4	2-6	2-4	1-3	1-4	2-4	2-4	2-4	2-4	1-2
<b>Thermal Threshold</b>	500° C 900° F	400° C 750° F	600° C 1100° F	600° C 1100° F	800° C 1470° F	800° C 1470° F	800° C 1470° F	900° C 1650° F	950° C 1740° F	800° C 1470° F	800° C 1470° F	400° C 750° F
<b>Color of the Coating</b>	gold	blue gray (anthracite)	pale yellow brassian silver	silver - gray	old rose	anthracite	silver	anthracite	dark gray	anthracite black	old rose	anthracite
<b>Key characteristics</b>	standard all-purpose coating	high hardness good wear resistance, enhanced toughness	decorative color, good wear and corrosion resistance	low stress / good adhesion, high toughness and corrosion resistance	high hardness and elasticity, low friction, high oxidation resistance	high hardness, very good oxidation resistance	high hardness, good oxidation resistance, low friction	extreme wear resistant at high temperature, excellent oxidation resistance	high warm hardness, very high oxidation resistance, high protection against abrasive wear	high hardness, very good oxidation resistance low friction	low friction, high oxidation resistance	high lubricity, low tendency for adhesive wear
<b>Primary Applications</b>	<input type="checkbox"/> machining / cutting of iron based materials <input type="checkbox"/> metal forming <input type="checkbox"/> plastic molding	<input type="checkbox"/> machining of difficult-to-machine alloy steels <input type="checkbox"/> high performance cutting where moderate temperatures are generated at the cutting edge <input type="checkbox"/> excellent for metal forming (stainless steel)	<input type="checkbox"/> cast aluminum and generally non-ferrous materials machining <input type="checkbox"/> machining of fiberglass, nylon and most polymer materials <input type="checkbox"/> forming and punching - reduced cold welding <input type="checkbox"/> medical applications - biocompatible & corrosion resistant <input type="checkbox"/> decorative industry	<input type="checkbox"/> machining copper and other non-ferrous materials <input type="checkbox"/> metal forming <input type="checkbox"/> plastic molding (improved mold release) <input type="checkbox"/> aluminum and magnesium die casting	<input type="checkbox"/> excellent for stainless steel and nickel-based high temperature alloys <input type="checkbox"/> hard and copy milling <input type="checkbox"/> interrupted cutting operations <input type="checkbox"/> lubricated, semi-dry or dry machining	<input type="checkbox"/> machining of hardened steel workpieces <input type="checkbox"/> for use on carbide end mills <input type="checkbox"/> high speed operations, semi-dry or dry machining	<input type="checkbox"/> machining of abrasive or sticking materials (stainless steel, cast iron, Si-rich Al-alloys) <input type="checkbox"/> cutting of Al-alloys & non-ferrous metals	<input type="checkbox"/> best choice for cutting under extreme conditions (hard, abrasive materials, high speed, dry cutting) <input type="checkbox"/> machining of hardened steel (>54 HRC) <input type="checkbox"/> inconel machining	<input type="checkbox"/> coating for milling with carbide, cermet and high speed steel tools <input type="checkbox"/> machining under dry conditions and high feeds	<input type="checkbox"/> coating for a wide range of carbide, cermet and high speed steel tooling <input type="checkbox"/> machining of cast iron and nickel based high temperature alloys <input type="checkbox"/> high speed operations, semi-dry or dry machining <input type="checkbox"/> excellent for drilling operations in steel (up to 45 HRC)	<input type="checkbox"/> coating for a wide range of carbide, cermet and high speed steel tooling <input type="checkbox"/> machining of all types of steel under dry as well as wet machining conditions <input type="checkbox"/> excellent for drilling in steel <input type="checkbox"/> drawing, stamping, punching, forming tools for processing of high and low alloy steel	<input type="checkbox"/> on top of hard coatings for reduction of friction

<sup>1)</sup> depends on size of tools, for micro tools a lower thickness may be necessary