



TTI Group Ltd

0121 3272020

PVD Coatings available from TTI Group Ltd

Properties and Applications of coatings suitable for **Stamping / Forming**

(please note also our coatings for **Cutting** and our **Duplex PVD** coating range)



	TiN	TiCN	EXXTRAL® PLUS	SISTRAL®	VARIANTIC	CrN / CrCN	TIGRAL	TOPMATIC	DUMATIC
Description	Titanium Nitride	Titanium Carbonitride	Aluminum Titanium Chromium Nitride	Aluminum Titanium Nitride (with additives)	Titanium Aluminum Carbonitride	Chromium Nitride / Chromium Carbonitride	Aluminum Chromium Titanium Nitride	Titanium Aluminum Nitride	Titanium Carbide (with additives)
Material	TiN	TiCN (multilayer)	AlTiCrN (stacked)	AlTiN (nanostructured)	TiAlCN (multilayer)	Cr(C)N (multilayer)	AlCrTiN (nanolayer)	TiAlN	TiN/TiC (multilayer)
Microhardness, HV_{0.05}	2300±200	3500±500	3200±300	3400±500	3500±500	2000±200 (2300±200)	3300±300	2800±200	3700±200
Coeff. of friction against 100Cr6 steel	0.6	0.2	0.4	0.7	0.2	0.2 - 0.3	0.6	0.4	0.3
Coating thickness (µm)	2 - 4	2 - 4	2 - 4	2 - 4	2 - 4	2 - 6	3-5	5-9	3 - 5
Max. temp. of operation	500°C	400°C	800°C	900°C	800°C	600°C	900°C	800°C	400°C
Colour	gold	blue-grey	anthracite	anthracite	old-rose	silver-grey	anthracite	aubergine	silver-grey
General characteristic	Allround coating, bio-compatible	High hardness, excellent wear resistance, improved toughness	High hardness, high oxidation resistance, low coeff. of friction	Extremely high oxidation resistance; high warm hardness, high wear resistance	Low friction, high oxidation resistance	Low inner stress, high adhesive force on tool, very high resistance against corrosion	High oxidation resistance, high warm-hardness, high wear resistance	Very high toughness, good oxidation resistance, high wear resistance	Very high hardness, very high adhesive force, high thermal conductivity, low coeff. of friction
Recommended applications	<ul style="list-style-type: none"> Punching and forming of iron-based materials 	<ul style="list-style-type: none"> Punching and forming of abrasive materials and stainless steel 	<ul style="list-style-type: none"> Ideal for punching, drawing, forming and pressing of abrasive or sticking material (stainless steel, Si-rich Al alloys) Universal as well for standard steel 	<ul style="list-style-type: none"> High performance coating for extremely high demands in punching, drawing, stamping and forming. For very high process temperatures Very fine for fine blanking of steel 	<ul style="list-style-type: none"> High performance universal coating; for drawing, punching, pressing and forming of high- and low-alloyed steel 	<ul style="list-style-type: none"> Especially suitable for operating non-ferrous metals 	<ul style="list-style-type: none"> For all applications in machining of steel, if temp. are high and abrasive wear is dominant 	<ul style="list-style-type: none"> For applications in massive forming of steel where higher thicknesses are needed 	<ul style="list-style-type: none"> For highest demands in drawing, pressing and forming of high alloyed CrNi-steels and similar material with high strength Punching of thick steel foils and massive forming of steel, e.g. C15

For further information and contact details please check our web-site: www.ttigroup.co.uk

contact email: keithlaing@ttigroup.co.uk

