

PVD COATING FOR COLD WORK APPLICATION



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OUR PVD COATING SERVICE

A German based PVD coating technology from voestalpine eifeler Coating GmbH helps to support our Indian customer in various application to increase the tooling performance.

To achieve best performance in Cold Work application it is a must to choose the suitable Tool Steel & PVD coating based on the application & failure pattern. The high performance PVD coating improves the tool life by protecting against the tool abrasive wear and adhesive wear by e.g. a reduced coefficient of friction.

BENEFITS

- Improved Part Quality
- Higher Productivity
- Less Down Time
- Lower Tooling Costs
- Longer Tooling Life
- Reduced Lubricant Consumption

FEATURES

- High Hardness
- Wear Resistance
- Toughness
- Low Coefficient of Friction
- Galling Resistance
- Corrosion Resistance
- High Temperature Stability

voestalpine Eifeler Duplex Coating FOR COLD WORK APPLICATION

The combination of plasma nitriding and a subsequent deposition of PVD coating in an non-interrupted process is called voestalpine Eifeler Duplex Coating.

With Plasma nitriding, the surface hardness of the steel substrate is increased. Thus the ability to withstand pressure loads is significantly increased.



Nitriding Cross Section

ADVANTAGES

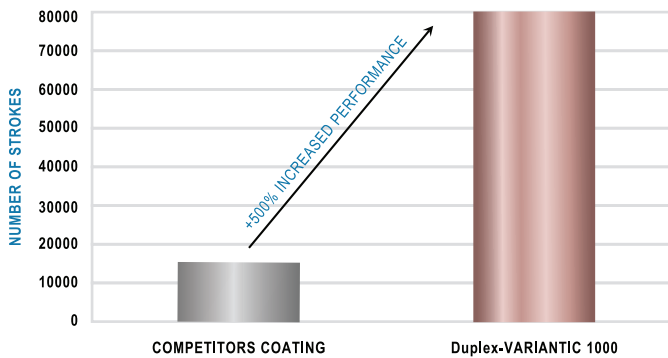
- No compound layer in steel
- Increased surface hardness
- Polished surface is preserved
- Excellent adhesive strength
- No change in dimension
- Increased load capacity
- Low plasma nitriding temperature (<480°C)

THE MOST FREQUENT FAILURE MECHANISMS IN COLD WORK APPLICATION

Failure Mechanisms	Wear	Chipping	Plastic deformation	Cracking/total failure	Galling
Primary Solution	PVD Coating	Tool Steel + HT	Tool Steel + HT	Tool Steel + HT	PVD Coating
Secondary Solution	Tool Steel + HT	PVD Coating	PVD Coating	PVD Coating	Tool Steel + HT

Note: Above are generic recommendation & solution depending on application, substrate, tool design, surface finish, tool manufacturing conditions.

CASE STUDY - COMPARISON OF NUMBER OF STROKES



Tool: Through-punch
Tool Material: 1.2379 (58 HRC)
Workpiece: DP800 with 3.2 mm plate thickness
Lubricant: Oil-free, water based lubricant

COATING PROPERTIES

Coating	TiN	TiCN	EXXTRAL®	VARIANTIC®	VARIANTIC® 1000	VARIANTIC® 1400	CrCN	SUBLIME®	CROSAL®-plus	TIGRAL	TOPMATIC
Material	TiN	TiCN (Multilayer)	AlTiN	TiAlCN (Multilayer)	TiAlCN (Multilayer)	Al(Cr-Ti) N Based	CrCN (Multilayer)	AlCrN Based	AlCrN Based	AlCrTiN (Nanolayer)	TiAlN
Micro-hardness HV0.05	2300±200	3500±500	3300±300	3500±500	4000±200	3000±200	2300±200	3300 ± 200	3300±300	3300±300	2800±300
Coeff. of friction vs. steel	0.6	0.2	0.7	0.2	0.05-0.015	0.6-0.7	0.2-0.3	0.7-0.8	0.45	0.6	0.4
Coating thickness [µm]	2-4	2-4	2-5	4-5	8-10	5-7	2-6	2-5	2-5	4-8	5-10
Max. Operating temperature	500°C	400°C	800°C	800°C	800°C	800°C	600°C	1100°C	1100°C	900°C	800°C
Colour	Gold	Blue-Grey	Anthracite	Old-Rose	Old-Rose	Gold	Silver-Grey	Grey	Slate-Grey	Grey	Aubergine

COATING RECOMMENDATION

Coating Recommendation		Sheet Material							
		Standard	Upto 700 Mpa	700 to 1000Mpa	1000 to 1400Mpa	Non Ferrous	Stainless Steel	Aluminium	Zn Plated
Stamping / Cutting / Blanking / Fine Blanking / Piercing / Coining / Knife	TiN	X				X			XX
	TiCN	XX					XXX		
	EXXTRAL	XX	XX	X					XX
	CrCN					XXX		XXX	
	VARIANTIC	XXX	XXX	XXX	XX		XXX		XXX
	CROSAL-plus	XXX	XXX	XX		XX	XXX		
	SUBLIME®	XXX	XXX	XX	XX	XX	XXX		
	TIGRAL	XX	XX	X			XX		
	TOPMATIC	XX		X					
Forming / Bending / Deep Drawing / Roller / Forging / Extrusion / Sintering	Duplex-VARIANTIC	XXX	XXX	XX	X		XXX		XXX
	Duplex-VARIANTIC 1000	XXX	XXX	XXX	XX		XXX		XXX
	Duplex-VARIANTIC 1400				XXX				
	Duplex CrCN					XXX		XXX	
	Duplex TIGRAL	XX	XX	X			XX		
	Duplex-CROSAL-plus					XX	XX		
	Duplex-SUBLIME®	XX	XX	X	X	XX	XXX		
	Duplex TOPMATIC	XX	XX						

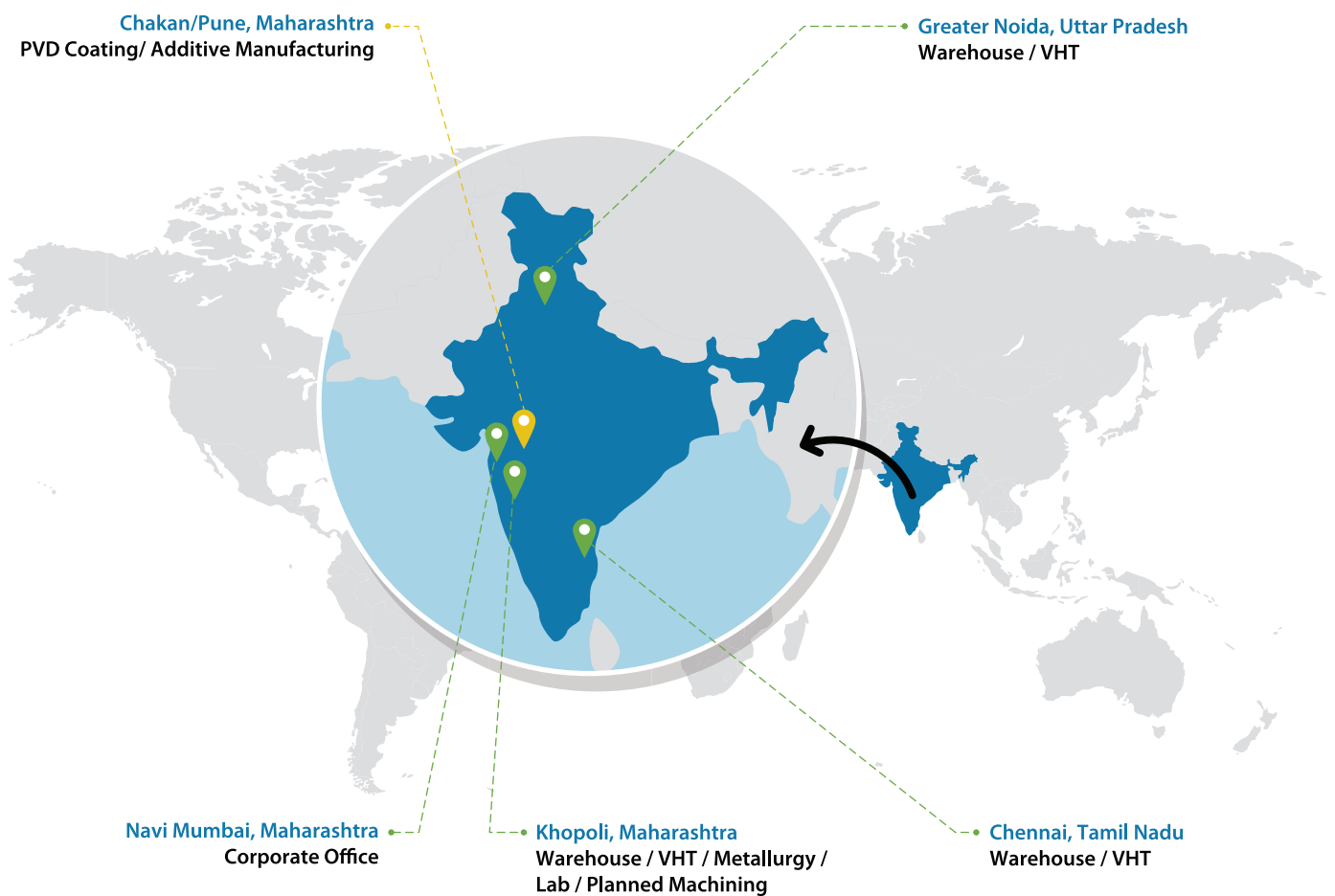
XXX - Most Recommended | XX - Recommended | X - Can be used

Note: Above are generic recommendation & solution depending on application, substrate, tool design, surface finish, tool manufacturing conditions. Contact Technical Team for suitable recommendations.

ABOUT voestalpine HIGH PERFORMANCE METALS INDIA

Incorporated in 2008, voestalpine High Performance Metals India Pvt. Ltd. was formerly known as Böhler-Uddeholm India. Pvt. Ltd. It is now a 100% subsidiary of voestalpine High Performance Metals GmbH, which is part of voestalpine AG, a leading technology and capital goods group.

voestalpine High Performance Metals India is the market leader for supplying tool steel & high speed steel of premium quality and providing value added services to automotive, electronics, home appliance, packaging and construction industry sector. To meet the demand of tooling performance, we have a wide range of special steel in our product portfolio which covers cold work, plastic mould, hot work and cutting tool applications along with the Value Added Services like Vacuum Heat Treatment, Cryogenic Process, ABP Process, Components and PVD Coating Services.



Visit our website



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