

The background features several circular discs in various colors (gold, brown, blue, grey) arranged in a cluster. Below them, a faint, light blue image of mechanical gears is visible. The text 'POWER YOUR THIN FILM COATING' is written in a bold, dark blue, italicized font.

**POWER
YOUR
THIN FILM
COATING**

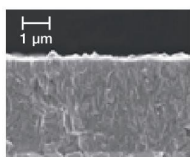
**WE INNOVATE TO MAKE
OUR CUSTOMER MORE SUCCESSFUL**

INNOBOLT coatings - an overview

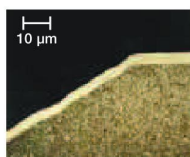
Introduction

PVD (physical vapor deposition) coating also known as thin-film coating, is a process in which a solid material is vaporized in a vacuum and deposited onto the surface of a part. PVD Coating guarantee benefits in a big variety of applications - from metal cutting, pressure die casting and stamping, to plastic injection and precision components. Staying competitive means low unitary costs, short fabrication times and high product quality. Our mission is to provide and to maintain our customers competitive edge. PVD Coating boost productivity, improve product quality and save material costs. We offer coating services, coating equipment and turnkey production lines.

Cross - Section of PVD Coating coated tools

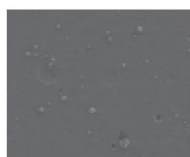


Tailor-made coating architecture

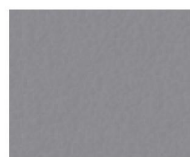


Topography of coated tool

Surface roughness of different coating technologies



Arc technology



Balzers evaporation technology

Chip formation - turning of steel



Uncoated



PVD coating - coated

Each manufacturing process has different requirements. The tailor-made architecture of PVD Coating guarantee optimal results in all applications.

Smooth surfaces reduce friction and the adhesion tendency of plastics - a crucial advantage for demoulding behaviour in injection and transfer moulding.

Through its hardness and low friction, PVD Coating coatings significantly reduce the wear of cutting tools and improve both chip formation and surface finish.

PVD Coating		Micro-Hardness (HV 0.05)	Friction Coefficient (dry)	Coating Thickness	Coating temp (°C)	Max.Service temp (°C)
TiN		2,300	0.4	1-4	500	600
AlCrN		3,200	0.35	1-4	500	1,100
TiCN		3,000	0.4	1-4	500	400
TiAlN		3,300	0.3-0.35	1-4	500	900
CrN		2,000	0.3-0.4	2-4	500	600
DLC-Ta-C		2,500-3,000	0.1	1-2	250	500
DIAMOND PLUS	Nanocrystalline diamond	10,000	0.15 - 0.2	6-12	850	600
FUTURA NANO	TiAlN	3,300	0.30 - 0.35	1- 4	500	900
HARD CARBON	ta-c	5,000	<0.15	<1.0	<150	500
HELICA	AlCrN - based	3,300	0.25	1- 4	500	1,100
LATUMA	AlTiN - based	3,300	0.35	1- 4	500	1,100

* steel against steel 0.7 ** Upon request

Wide range of applications

Metal Cutting

Today, coated tools are the state of the art in metal cutting technologies. The gains in manufacturing cannot be overlooked and current trends such as

- high speed cutting
- dry or minimal lubrication machining
- hard machining

are no longer conceivable without hard coatings. PVD coatings interact with the base material and the tool geometry to achieve superior tool performance. Worldwide, tool makers and end users rely on PVD hard coatings. The increased productivity, improved tool life and saving of lubrication guarantee your economical benefit.

Stamping/Forming

In Stamping/ Forming applications, PVD coating boosts productivity by increasing machine output (i.e. SPM). The functional surfaces, cutting edges and drawing radii get protected against abrasive wear, adhesion and cold welding. Due to reduced friction, tool surfaces suffer less thermal stress, which prevents cracks and fatigue. As a result, the tool life increases significantly while scrap rates and machine downtime are reduced. Low-friction PVD coatings reduce lubricants and in some cases even allow dry processing. Whatever the case may be, your production costs will be reduced.

Plastics Processing

PVD coating reduces both abrasive and corrosive wear of mould parts, eases demoulding, improves mould filling and inhibits mould deposits. Dry moulding is also possible. The net effects are better production yield, shorter cycle times and longer maintenance intervals.

IC Moulding

In IC moulding, frequent mould cleaning increases machine downtime and maintenance costs. PVD coating significantly reduces compound staining and sticking during production. The benefits are higher productivity, lower production cost and better surface quality of the moulded ICs.

Pressure Die Casting

In pressure die casting, the high hardness, thermal and chemical stability of PVD coating protects tools against erosion, heat checking and alloying. As a result, rework of parts is reduced or even eliminated, resulting in shorter manufacturing times and reduced production costs.

Precision Components

Friction is a key factor in the performance and service life of precision components. PVD coating enhances component performance, reliability, service life, and permit lighter and more compact designs.

DLC COATING

[Diamond Like Coating]

Application Example



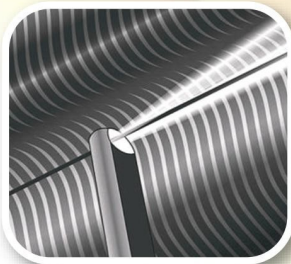
Piston Wear
& Tear Protection



Mechanical Seals



Spindle Shaft



Weaving
Reed Dents



Rotary Pumps



Spining Rings