

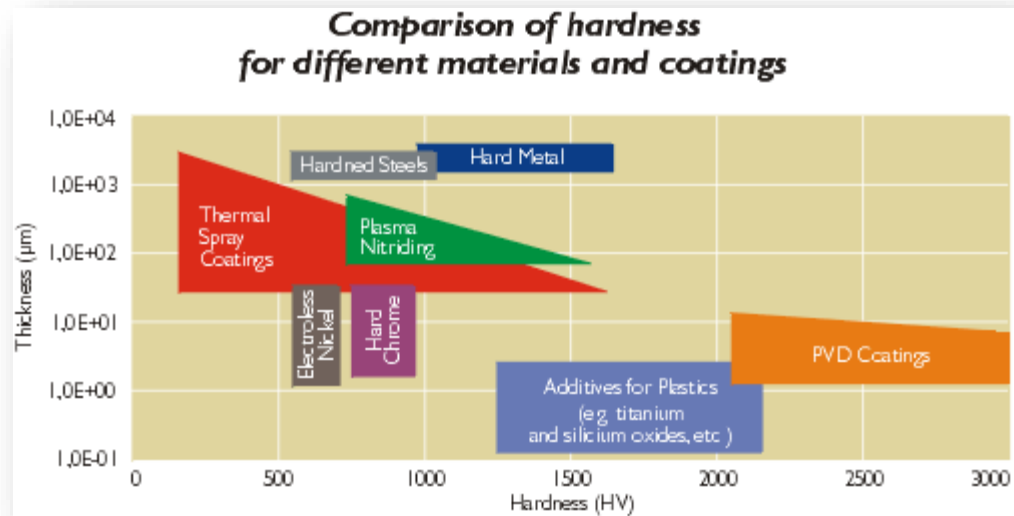
FUNCTIONAL PVD – TECHNICAL DATA

	Coating	HV Hardness	Oxidation Temp. °C	Roughness (Raµm)	Coef. Friction (dry)	Thickness (µm) *	Color	Characteristics	Applications
Titanium Nitride	(TiN)	2500±400	500±50	0.2	0.65 - 0.70	2 - 4	Gold	High hardness, good adhesion, dense micro structure, increases wear resistance, surface with low reactive potential, reduces tendency to cold welding, bio-compatible, chemically stable, resists to corrosion.	Machining of ferrous metals: cutting tools, rough and finishing mills, drills, taps, hard metal bits; Metal forming: punches and dies; Other: moulds for plastic, medical instruments and surgical implants, wear components.
Chromium Nitride	(CrN)	2100±300	700±50	0.2	0.50 - 0.60	2 - 6+	Silver Grey	High hardness at high temperature, excellent adhesion, low coefficient of friction, facilitates the release of plastics, good tenacity and ductility, increases resistance to abrasive wear, bio-compatible, excellent corrosion and oxidation resistance.	Machining: machining of copper, brass, titanium and titanium alloys; Metal shaping: medium and heavy gauges, rings and forming dies, shaping rolls, punches, drawing tools; Metal forming: hot stamping, injection moulds for metals, dies for aluminum; Other: printing tools, medical instruments, moulds for plastic.
Titanium Carbonitride	(TiCN)	2800±300	400±50	0.15	0.45 - 0.60	2 - 5	Brown Bronze	Higher hardness, excellent adhesion, low coefficient of friction, good tenacity, improves abrasive wear resistance.	Machining: materials difficult to machine, high speed steels, steels above 40 HRC, highly abrasive or adhesive materials, ductile cast iron, cast aluminum, copper alloys, brass, stainless steel, machining under severe load conditions, intermittent cutting, high speed cutting; Metal forming: punching, piercing, finish cutting; Other: wear components.
Zirconium Nitride	(ZrN)	2500±300	450±50	0.2	0.65 - 0.70	2 - 3	White Gold	Reduces abrasive wear and decreases the accumulation in cutting edges, coating with homogeneous structure, chemically resistant, regular surface.	Machining: tools for cutting wood, high-grade nickel alloys, aluminum alloys with <13% Si, titanium, waspalloy and resins reinforced with glass fiber. Other: protection of moulding surfaces against abrasion and chemical attack of the resins.
Aluminum Titanium Nitride	(AlTiN)	4000±500	800±50	0.15	0.40 - 0.55	2 - 3	Anthracite	Superior oxidation resistance and excellent hardness at high temperature, low thermal conductivity, good ductility, high adhesion to the substrate, smooth surface finish, higher wear resistance.	Machining: materials difficult to machine, aluminum (avoids buildup in the cutting edge), hard materials, high alloy carbon steels, cast iron, titanium alloys, stainless steels, dry cut or where the lubrication is reduced, high speed and high temperature cutting; Metal forming: hot stamping, forging, die casting, moulds for metals and high temperature tools; Other: surgical instruments and wear components.

* Reference values

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Some steels suitable for PVD coating	
Hot Work Steels (Die casting / Extrusion / Die forging)	
Material Nr	DIN
1.2343	X 38 CrMoV 5 1
1.2344	X 40 CrMoV 5 1
1.2367	X 38 CrMoV 5 3
1.2711	54 NiCrMoV 6
1.2714	56 NiCrMoV 7
Cold Work Steels (Cutting and Drawing tools / Moulds for plastics)	
Material Nr	DIN
1.2080	X 210 Cr 12
1.2083	X 42 Cr 13
1.2311	40 CrMnMo 7
1.2312	40 CrMnMoS 8 6
1.2343	X 38 CrMoV 5 1
1.2344	X 40 CrMoV 5 1
1.2367	X 38 CrMoV 5 3
1.2379	X 155 CrVMo 12 1
1.2380	X 220 CrVMo 13 4
1.2711	54 NiCrMoV 6
1.2714	56 NiCrMoV 7
1.2738	40 CrMnNiMo 8 6 4



Random arc technology used by PRIREV in its PVD coating process results in a superior ionization and allows the deposition of functional coatings at temperatures as low as 200°C. However, for better coating adhesion, standard deposition cycles are carried out at 450°C. Therefore, it is extremely important that the parts to be coated have been **previously tempered at 450°C minimum** in order to avoid deformation and/or loss of hardness.