VaporTech® Performance Coatings

PROPERTIES AND APPLICATIONS

	CrN	TiN	TiCN	TiAlN	ZrN	ZrCN	ZrOC	a-C:H DLC	a-C:H:W DLC
NAME	Chromium Nitride	Titanium Nitride	Titanium Carbonitride	Titanium Aluminum Nitride	Zirconium Nitride	Zirconium Carbonitride	Zirconium Oxy-Carbide	Diamond-Like Carbon	W-DLC
COLOR	Metallic silver	Metallic gold	Gray	Brown to blue-black	Nickel to pale-gold brass	Bronze	Dark gray to black	Graphite to black	Various grays
CHARACTERISTICS	Excellent hardness/ toughness, reduced friction, resistant to sliding & impact wear, excellent resistance to corrosion & oxidation, good release properties.	Excellent hardness and toughness, biocompatible and non-toxic, reduced friction, compatible with acids/bases/ solvents.	High hardness, excellent abrasive wear resistance	High hardness and excellent wear resistance at high temperatures.	Excellent general purpose coating with high hardness/ toughness, good wear resistance, excellent corrosion resistance, biocompatible.	Excellent hardness, abrasion, and corrosion resistance.	Moderate hardness/ toughness and wear resistance, very good corrosion resistance.	An amorphous carbon coating with very low friction, high hardness, resistant to sliding wear, biocompatible, and an attractive appearance.	Tungsten doped hydrogenated amorphous carbon.
APPLICATIONS	Dies and molds, tooling for machining of Cu/Al, engine components, pump parts, and as a replacement for functional plated hard chrome.	Medical devices and surgical tools, food processing, cutting/punching tools, rotating shank tools, machining of iron alloys, and molds/ dies.	Cutting/punching tools, dies for plastic injection molding, high pressure, low speed machining.	Cutting tools, drilling and milling of high-strength steels.	Cutting and punching tools, tooling for machining Al & Ti, medical devices and dental instruments.	Cutting/punching/ forming tools particularly for aluminum alloys and medical devices and instruments.	Tooling and durable consumer products that require good wear resistance with corrosion resistance and an attractive graphite or black appearance.	Automotive components, medical devices, dies, molds, firearms, cutting tools, sporting goods, and other durable consumer goods.	Bearings, engine and transmission components. Durable consumer goods.
COATING HARDNESS	14-25 GPa 1400-2500 HV	20-30 GPa 2000–3000 HV	28-38 GPa 2800-3800 HV	25-30 GPa 2500-3000 HV	25-27 GPa 2500-2700 HV	24-26 GPa 2400-2600 HV	17-21 GPa 1700-2100 HV	15–23 GPa 1500–2300 HV	8-15GPa 800 to 1500HV
THICKNESS RANGE	Typical 1–10 microns	Typical 1–5 microns	Typical 1–5 microns	Typical 1-4 microns	Typical 1–5 microns	Typical 1-4 microns	Typical 1–4 microns	Typical 1–4 microns	Typical 1–4 microns
COEFFICIENT OF FRICTION (CoF)	0.5-0.7 (dry; against alumina) 0.5 (dry; against steel)	0.5-0.6 (dry; against alumina) 0.4 - 0.6 (dry; against steel)	0.3 (dry; against alumina) 0.2 – 0.3 (dry; against steel)	0.6 (dry; against steel)	0.3 – 0.4 (dry; against alumina)	0.5 (dry; against steel)	0.3 – 0.4 (dry; against alumina)	0.08–0.11 (dry; against alumina) 0.1-0.2 (dry; against steel)	0.2 (dry; against steel)
MAX TEMP	700 C	600 C	400 C	750 C	600 C	600 C	600 C	300 C	300 C
BIOCOMPATIBLE		Yes	Yes		Yes	Yes		Yes	Yes