

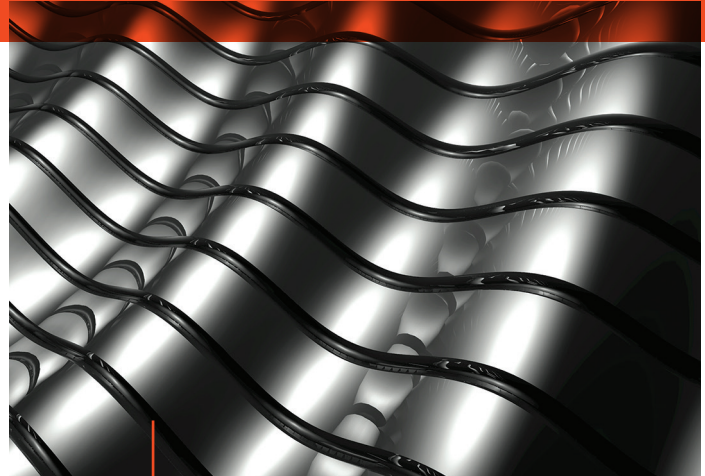
FORTIPHY™ XVD

CrN+



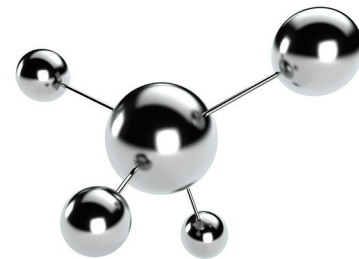
FortiPhy XVD CrN+ consists of a proprietary Plasma ion Nitride support layer beneath our Chromium Nitride which is deposited through Phygen's patented XVD (Xcelerated Vapor Deposition) process.

FortiPhy XVD goes beyond conventional cathodic arc technologies by utilizing magnetic fields to increase ionization efficiency. This increases plasma density while accelerating the enhanced plasma collectively by means of an electromagnetic force. Phygen's accelerated plasma process results in a large number of ions with a velocity within a specific range bombarding the substrate during coating deposition. Intense bombardment by ions of moderate energy ensures that crystalline configurations with weaker bonding can be minimized while preserving stronger bonds. As a result, Phygen coatings feature stronger adhesion, superb crystalline structure, denser coating with fewer defects and exceptional mechanical properties. Plasma ion Nitriding plus coating increases substrate material surface hardness, resistance to thermal fatigue and provides better mechanical support for the coating to resist higher contact loads.



FEATURING PATENTED
NANOPERFECTION™ TECHNOLOGY

Phygen's FortiPhy™ XVD process is based on our patented Nanoperfection™ technology, a revolutionary breakthrough in plasma acceleration science. FortiPhy™ XVD delivers smaller, more consistent nanoparticles while eliminating 90% of the macroparticle flaws and surface defects common to conventional PVD surface coatings.



FORTIPHY™ XVD



ADVANTAGES

- Superior abrasive wear resistance
- Excellent corrosion resistance
- Unprecedented adhesion strength
- Reduces friction and prevents galling
- Thin film coating preserves critical dimensions of tight tolerance parts
- Can be stripped and re-applied multiple times

INDUSTRIES

Automotive
 Medical
 Food Processing
 Military
 Others

APPLICATIONS

Metal Forming Tools
 Deep Drawing Punches and Dies
 Aluminum Die Casting Tools
 Plastic Injection Molds
 Precision Machine Components
 Out-of-the-box applications

COATING PROPERTIES

Composition	Plasma ion Nitride + CrN coating
Crystal structure	FCC (FACE CENTERED CUBIC)
Microstructure	Non-columnar, equiaxially grained
Average grain size, nm	16–25
Modulus of Elasticity, GPa	370–400
Nano-Indentation Hardness, GPa	22–30
Adhesion strength (scratch test critical load), N	115–120
Coefficient of Friction (CoF)	0.09–0.12 (DIESEL FUEL LUBRICATED)
	0.18–0.22 (DRY NITROGEN, WC BALL)
	0.28 ±0.02 (DRY AIR, ALUMINA BALL)
Coating Wear Rate, mm³/Nm	1.97 x 10 ⁻⁷
Coefficient of Thermal Expansion (CTE), x10⁻⁶/K	5.5–7 (20–600°C / 68–1112°F)
Oxidation Temperature (max. service temperature)	800–850°C / 1472–1562°F
Color	Bluish grey