

PROPERTY	CrN Chromium Nitride	TiN Titanium Nitride	TiCN Titanium Carbonitride	ZrN Zirconium Nitride	ZrOC Zirconium Oxy-Carbide	a-C:H DLC Diamond-Like Carbon	a-C:H:W DLC W-DLC
Color	 Metallic silver	 Metallic gold	 Gray	 Nickel to pale gold/brass	 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.	Excellent general purpose coating with high hardness/toughness, good wear resistance, excellent corrosion resistance, biocompatible.	Moderate hardness/toughness and wear resistance, very good corrosion resistance.	Amorphous carbon coating with very low friction, high hardness, resistant to sliding wear, biocompatible, attractive appearance.	Tungsten doped hydrogenated amorphous carbon.
Applications	Dies & molds, tooling for Cu/Al machining, engine components, pump parts, replacement for functional plated hard chrome.	Medical devices & surgical tools, food processing, cutting/punching tools, rotating shank tools, machining of iron alloys, molds/dies.	Cutting/punching tools, dies for plastic injection molding, high pressure, low speed machining.	Cutting & punching tools, tooling for Al & Ti machining, medical devices and dental instruments.	Tooling & durable consumer products requiring wear resistance with corrosion resistance and graphite/black appearance.	Automotive components, medical devices, dies, molds, firearms, cutting tools, sporting goods, durable consumer goods.	Bearings, engine & 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	25–27 GPa 2500–2700 HV	17–21 GPa 1700–2100 HV	15–23 GPa 1500–2300 HV	8–15 GPa 800–1500 HV
Thickness Range	Typical 1–10 µm	Typical 1–5 µm	Typical 1–5 µm	Typical 1–5 µm	Typical 1–5 µm	Typical 1–4 µm	Typical 1–4 µm
Coeff. of Friction	0.5–0.7 (alumina) 0.5 (steel)	0.5–0.6 (alumina) 0.4–0.6 (steel)	0.3 (alumina) 0.2–0.3 (steel)	0.3–0.4 (alumina)	0.3–0.4 (alumina)	0.08–0.11 (alumina) 0.1–0.2 (steel)	0.2 (steel)
Max Temp.	700°C	600°C	400°C	600°C	600°C	300°C	300°C
Bio-compat.	—				—		

* COF values are approximate and depend on substrate, counterpart material, surface finish, and lubrication. Contact KDF Technologies for application-specific recommendations.