



ULTRAC™ DLC COATINGS

Ultimate abrasive wear resistance

Overview

Entegris' DLC (diamond-like carbon) coatings are ultra-hard, extremely smooth, highly lubricious coatings that are ideal for plastic injection mold components. UltraC™ coatings will substantially enhance the durability of mold components, reduce friction, increase mold productivity, and reduce corrosion. The coatings are deposited using a low-temperature (<150°C) proprietary Plasma Enhanced Chemical Vapor Deposition (PECVD) process and can be uniformly deposited over large areas, on virtually all vacuum compatible substrates, including polymers, and is very conformal to the surface features.

The DLC coatings can be applied to existing tool designs without the need for design changes and modifications. Entegris can also refurbish DLC coated parts, lowering the cost of ownership (COO) while maximizing the life of these high value critical components.

UltraC-HT is an innovative, multi-layer, fully dense coating based on our UltraC hard carbon coating technology. This mono-dimensionally modulated (MDM) coating system, consisting of individual layers of the two materials differing in elastic modulus, has high strength, toughness and excellent resistance to erosion and wear.

The newest coating material innovation is UltraC-L, a "Lubricious" DLC grade modified for



additional polymer release. UltraC-L solves part sticking problems with even the stickier polymers like polypropylene while maintaining low friction, low wear, eliminating galling and corrosion. Core pins, cavities and die pins are examples of applications where UltraC-L can reduce polymer buildup, eliminate part sticking and improve productivity, utility and quality.

Typical Specifications

Property		UltraC Diamond	UltraC-HT	UltraC-L
Substrate:	Compatibility	Metals, ceramics (AlN, Al ₂ O ₃ , quartz, YSZ, Si, graphite, etc.), many polymers and anodized metals		
	Size	Up to 91 cm (36")	Up to 91 cm (36")	Up to 91 cm (36")
Structure:		Dense, amorphous, micro-conformal DLC	Dense, amorphous, MDM, multilayered	Dense, amorphous, micro-conformal DLC
Temperature:	Deposition	<150°C (302°F)	<150°C (302°F)	<150°C (302°F)
	Use	400°C (752°F)	-50 to 400°C (-58 to 752°F)	400°C (752°F)
Coating thickness:		1–10 µm	1–50 µm	1–10 µm
Electrical resistivity:		10 ⁵ –10 ⁷ Ω-cm	10 ⁸ Ω-cm	10 ⁵ –10 ⁷ Ω-cm
Coefficient of friction:		0.04–0.08	0.04–0.08	0.04–0.08
Hardness:		2450–2855 HV (24–28 GPa)	2040–2650 HV (20–26 GPa)	1835–2245 HV (18–22 GPa)
Wear resistance:		Excellent	Excellent	Excellent
Corrosion resistance:		Resistant to most acids and alkalis		

Applications

- Ejector pins
- Cores and sleeves
- Slides
- Guide pillars
- Thread cores
- Blow molds
- Aluminum metal forming tools and dies
- Cavity surfaces
- Wear plates
- Push out blocks



Features

- Extremely wear resistant
- Super hard
- Ultra low friction
- Corrosion resistant
- Eliminates the formation of macro and submicroscopic wear debris
- Highly conformal to surface features
- Thickness of 1–50 µm
- Deposited at low temperature
- Can be deposited on most substrates



For More Information

To learn more about how Entegris' high-purity specialty coatings help customers enhance yields, improve productivity and meet future technological needs, call Entegris at +1 781-538-8745.

To review Entegris' specialty coatings offering, visit Entegris' website at www.EntegrisSpecialtyCoatings.com.

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