



AMCL

ADVANCED MATERIALS AND COATINGS LABORATORY

SIX DECADES OF EXPERIENCE IN ADVANCED THERMAL SPACE COATINGS SCIENCE AND CHEMISTRY

Hill's Advanced Materials and Coatings Laboratory (AMCL) conforms to NASA's strict specifications, considering custom data about orbital patterns, environmental factors like temperature and radiation level, and more. Our coatings help control the external temperature of spacecraft and limit UV radiation absorption, which allows instruments to operate more effectively.

STATE-OF-THE-ART PRODUCTION FACILITIES

With a complete inventory of optical testing, mixing and application equipment in state-of-the-art facilities, we can tailor thermal control coatings to fill our customers' specific needs.

Our large-scale production facilities include three cryo-freezers; a high bay with a 23' x 18' x 11' climate-controlled, OSHA-compliant spray booth and preparation area; and both inorganic and organic spray laboratories. Each lab space is devoted to specific Thermal Control Material Systems (TCMS) to limit cross-contamination and is equipped with a wide variety of spray equipment including a turbine sprayer with Croix spray gun, binks spray guns and airbrushes.



TEST EQUIPMENT ON SITE

- Lambda 9 UV/VIS/NIR spectrophotometer with integrating sphere for measuring solar absorptance (α)
- Gier Dunkel DB-100 total infrared reflectometer used to determine total emittance of materials (E)
- Surface Optics 410-solar portable reflectometer and ET-100 thermal handheld emissometer
- Wet film and eddy current dry film thickness measuring equipment
- Grind test, viscosity, density measuring equipment, surface, and volume resistivity meters
- TML, CVCM per ASTM-E-595 tests (element materials technology)
- Thermal shock and adhesion testing per ASTM standards



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Hill is a global, all-domain defense provider. Hill's mission is to deliver the world's most powerful ships and all-domain solutions in service of the nation, creating the advantage for our customers to protect peace and freedom around the world. As the nation's largest military shipbuilder, and with a more than 135-year history of advancing U.S. national security, Hill delivers critical capabilities extending from ships to unmanned systems, cyber, ISR, AI/ML and synthetic training. Headquartered in Virginia, Hill's workforce is 43,000 strong. For more information, visit Hill.com.

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PERFORMANCE OF AEROSPACE COATINGS

THERMAL CONTROL COATINGS

Coating	Composition / Temperature Capability	Typical Optical Properties	
		$\alpha \pm 0.02$	$E_N \pm 0.05$
Z-93P	White Inorganic 800°C	0.15	0.92
S13GP:6N/LO-1	White Organic 200°C	0.16	0.90
S13NT:6N/LO-1	Off-White Organic Flexible 200°C	0.29	0.89
MH21:6N/LO	Black Organic Flexible 200°C	0.98	0.90

CONDUCTIVE THERMAL CONTROL COATINGS

Coating	Composition / Temperature Capability	Typical Optical Properties		Typical Surface Resistivity
		$\alpha \pm 0.02$	$E_N \pm 0.05$	(Ω/\square)
Z93C55	White Inorganic 500°C	0.15	0.91	10^6 to 10^8
DS13N:6N/LO-HP	White organic flexible 200°C	0.15	0.91	10^6 to 10^{10}
MH21:6NC/LO	Black organic flexible 200°C	0.98	0.90	10^6 to 10^8

Notes:

α = solar absorbance

E_N = total normal emittance

Ω/\square = ohms per square

Application by gas spraying: all

Curing at room temperature: all

Good thermal shock resistance: all

Atomic oxygen (AO) resistant: all

Outgassing: inorganic, total mass loss (TML) = 0.10 to 0.25 and collectable volatile condensable material (CVCM) = 0.00 to 0.01

Outgassing: organic, TML \leq 1.00 and CVCM \leq 0.10%

For questions or pricing, contact TheAMCL@hii-tds.com



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