TECHNICAL DATA SHEET

VANTABLACK® 310

Vantablack® 310 Ultra-black Aerospace Coating

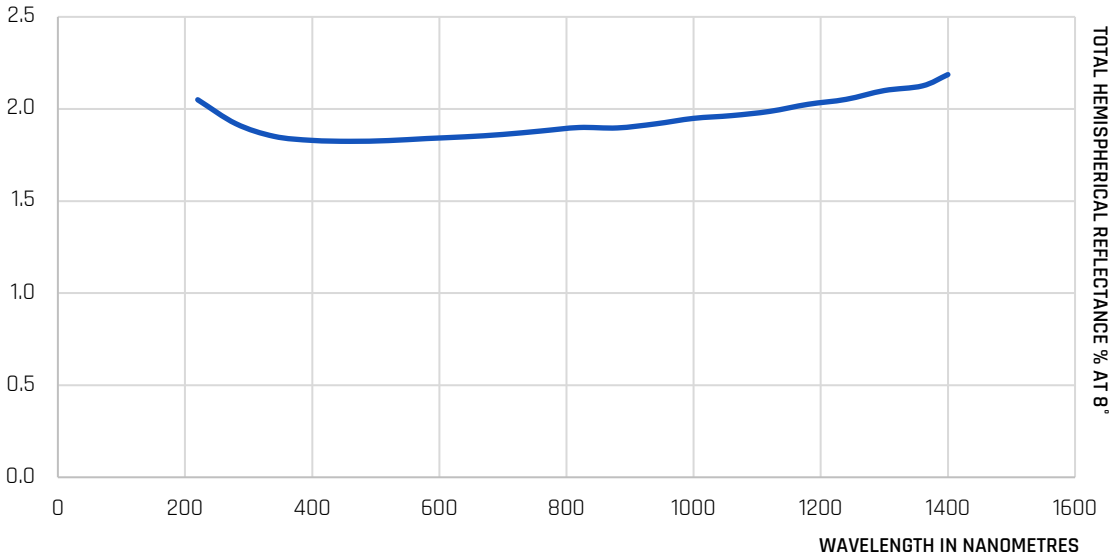
PRODUCT DESCRIPTION

Vantablack 310 is an ultra-black coating for terrestrial and space applications, offering 2% Total Hemispherical Reflectance. It is engineered for stray light suppression, thermal management, and optical shielding. Spray-applied coating suitable for both manual and automated systems. Handleable finish with a robust surface for integration and assembly.

Table 1: Typical Optical Properties of Vantablack 310

SURFACE APPEARANCE	Matte Ultra-black
TOTAL HEMISPHERICAL REFLECTANCE	
(220 – 1400nm)	~ 2%
(2 – 8 µm)	< 2%
BRDF	Near Lambertian
EMISSIVITY	0.98

Typical Vantablack 310 UV-Vis Spectrum



Typical Vantablack 310 IR Spectrum

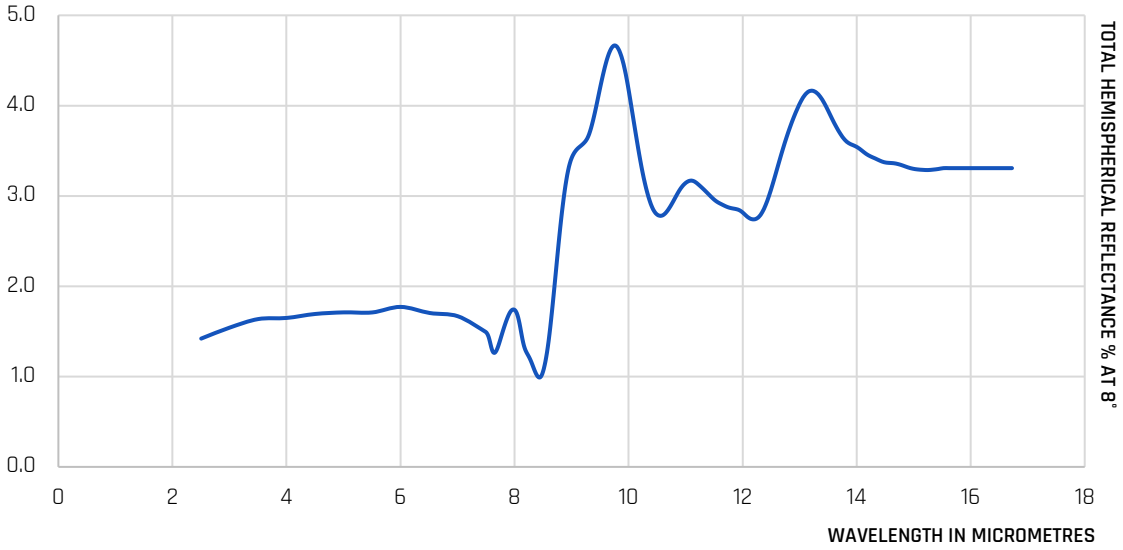


Table 2: Typical Physical Properties of Vantablack 310	
OUTGASSING (ASTM E595-77)	
%TML	**< 1.0**
%CVCM	**< 0.1**
ATOMIC OXYGEN (After equivalent of 3 years in LEO RAM facing*)	
%TML	**7.2**
%THR	**2.8**
SHEET RESISTANCE Ω/□	**10^3 - 10^4**
OPERATIONAL TEMPERATURE RANGE	**-196 - 200°C**
COATING MASS (mg/cm^2)	**< 3**
COATING THICKNESS (µm)	**15-25**
ADHESION (ISO 2409)	**Grade 1**
HARDNESS (ISO 15184)	**9H**

*Fluence 10^{21} atom/cm^2

PACKAGING INFORMATION

Available in 475mL (1 pint) and 4 litre (1.05 gallon) container. Also available as a 400mL aerosol.

SURFACE PREPARATION

Vantablack 310 should be applied to surfaces that are clean, dry and free from loosely adhering materials and grease. Vantablack 310 can be directly applied to most substrates. For some substrates the use of standard pre-treatments may be recommended.

Contact your Vantablack representative for additional information.

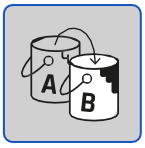
Table 3: Typical Properties of Vantablack 310	
THEORETICAL COVERAGE (100% Transfer efficiency @ 30µm DFT)	
m^2/l	**10**
VOLATILE ORGANIC COMPOUND (VOC)	
g/litre	**485**
SOLIDS CONTENT (ASTM D2369-87)	
% by weight	**43**
DENSITY (ASTM D1475-85)	
kg/litre	**0.97**
FLASH POINT (ASTM D3278-82 closed cup)	
310 Base	**-16˚C**
310 Catalyst	**40˚C**

MIXING

Vantablack 310 is a two-component paint system. The base requires agitation before catalyst addition. The base can be agitated on a paint shaker for 2 minutes or stirred/shaken vigorously until the paint is homogeneous and there is no settling.

The aerosol should be shaken until the rattle ball can be heard, then shake vigorously for 2 minutes prior to application.

Note: Ultra-black pigments settle quickly, insufficient shaking is the main cause of uneven coverage or streaking.

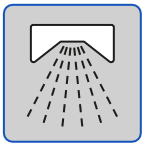


CATALYST ADDITION

Add Vantablack 310 catalyst to premixed Vantablack 310 base in a ratio 25mL catalyst to 1L base.

The catalyst must be thoroughly mixed into the base and then passed through a 125µm filter prior to application.

The aerosol is already pre-catalysed.



APPLICATION

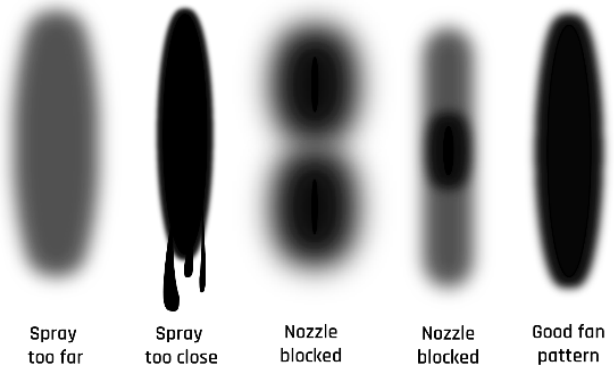
Vantablack 310 is typically applied using spray systems. It can be applied manually or via automated systems for high-volume components.

The product can be sprayed as supplied or thinned with Vantablack 001 Thinner at a maximum ratio of 3 parts paint to 1 part thinner.

Recommended dry film thickness is 25µm (1 mil).

SPRAY TECHNIQUE

1. Hold the spray gun or aerosol 15–20 cm from surface
2. Keep the gun/can vertical and start/stop spraying off the part
3. Apply 1 coat (2 passes over the surface.)
4. Use a minimum 50% overlap of the spray pattern for uniform coverage.
5. Solvent should flash off to a matte finish
6. After 10 minutes from application, additional paint must not be applied directly. Refer to the recoat section for guidance.



Note: Multiple thin coats are critical to avoid loss of matte effect or excessive build resulting in adhesion issues.

Below conditions should be used as a guide only.

SPRAYING PARAMETERS	
Spraying gas	Dry nitrogen or compressed dry air*
Spraying temperature	15 – 25°C
Spraying Humidity	RH ‹ 85%

Vantablack 310 can be applied by immersion coating and/or brush/roller application. Contact your Vantablack representative for additional information.

Clean equipment immediately after use with Vantablack 001 thinners.

CURING

Vantablack 310 will cure in ambient conditions. The cure is dependent on relative humidity (min. 40%) and temperature (min. 10°C).

	TIME	TEMPERATURE	RELATIVE HUMIDITY
Ambient cure	2 hours	21°C	50%
Accelerated cure	30 minutes	35°	50%

Vantablack 310 requires baking at 120 °C to achieve full cure, ensuring optimal outgassing performance and maximum solvent resistance

RECOAT

Before recoating Vantablack 310 must be cured and the surface prepared by abrading the surface and wiping with Vantablack 001 thinners. If cured at ambient temperature only, allow 48 hours prior to recoating.

Note: Reapplication over an uncured coating will cause crazing and wrinkling of the coating.

STORAGE/POT LIFE

Vantablack 310 Base
Unopened shelf life 6 months from manufacturing date kept within 0°C to +25°C. Store away from heat, sparks and flames.

Vantablack 310 Catalyst
Unopened shelf life 24 months from manufacturing date kept within 0°C to +25°C. Store away from heat, sparks and flames.

Catalysed paint has a 48-hour pot life if stored under nitrogen or clean dry air. **Contamination with moisture will initiate curing**.

Vantablack 310 Aerosol
Unopened shelf life 6 months from manufacturing date kept within 0°C to +25°C. Store away from heat, sparks and flames. For opened cans, invert the can and spray until the spray turns clear for 3–5 seconds, then wipe the nozzle clean prior to storage.

SAFETY INFORMATION

Before using any Vantablack product, refer to the Material Safety Data Sheet (MSDS) for safe use and handling instructions.

For industrial and commercial use only. Must be handled and applied by trained personnel.

CLEANING THE SURFACE

If the surface needs to be handled, we recommend the use of powder free nitrile/latex gloves. This avoids skin contamination of the ultra-black surface during the handling or assembly process.

Skin contact risks leaving fingerprints or residues that may impair the optical performance.

Once hot cured, the surface can be cleaned with solvent (acetone, ethyl acetate, or IPA) and gently wiped with a lint-free cloth

TECHNICAL SUPPORT

For further technical support please contact:

- technicalsupport@surreynanosystems.com