TECHNICAL DATA SHEET

VANTABLACK® 230

Vantablack® 230 Ultra-black Coating

PRODUCT DESCRIPTION

Vantablack 230 is a two component, ultra black coating used to reduce the impact of stray or unwanted light. Vantablack 230 is supplied as a base and catalyst. The coating can be applied by conventional spray. The resulting film absorbs 99% of visible light and can also be used to create an infinite depth effect. Vantablack 230 has been formulated for use in optical instruments, automotive camera systems, LED Screens and by architects to create high impact visual effects.

Table 1: Typical Optical Properties of Vantablack 230

SURFACE APPEARANCE	Matte Ultra-black
TOTAL HEMISPHERICAL REFLECTANCE	
(220 – 1600nm)	~ 1%
BRDF	Near Lambertian
EMISSIVITY	0.99

Typical Vantablack 230 UV-Vis Spectrum

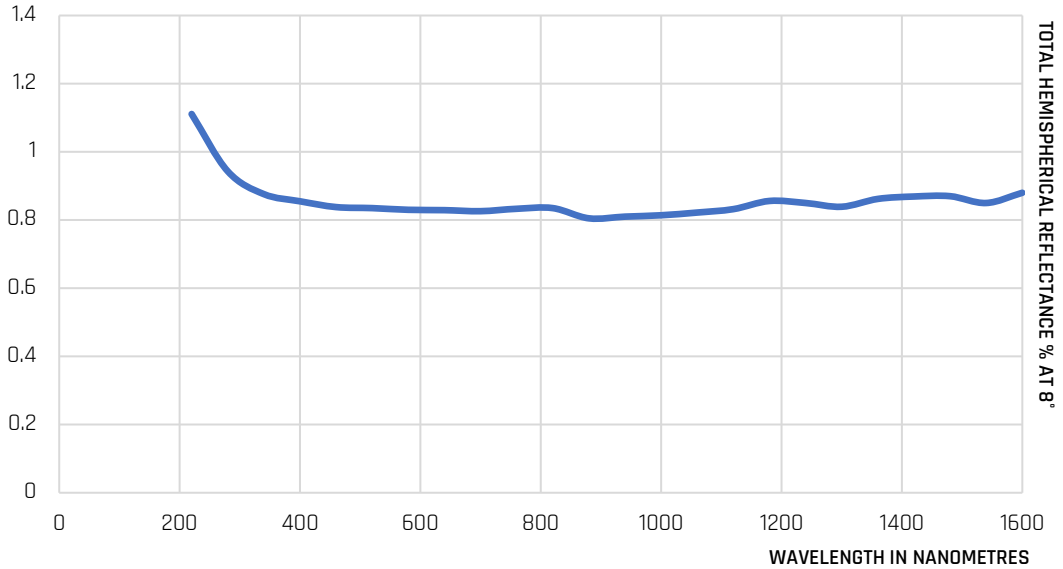


Table 2: Typical Physical Properties of Vantablack 230	
FOGGING (SAE J1756)	
%Fog Number	≥ 99
ΔHaze	< 0.34%
UV EXPOSURE (SAE J2421)	Pass
SHOCK AND VIBRATION (SAE J1211)	Pass
HUMIDITY RESISTANCE (IEC 60068-2-38)	Pass
OPERATIONAL TEMPERATURE RANGE	-70 - 200˚C
COATING MASS (mg/cm^2)	6
COATING THICKNESS (µm)	Average 100*
ADHESION (ISO 2409)	Grade 1

**The dry film is a carbon microstructure, not a standard film paint. Maximum height of film may exceed this*

PACKAGING INFORMATION

Available in 4 Litre and 20 Litre container.

SURFACE PREPARATION

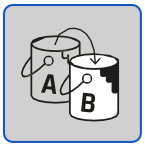
Vantablack 230 should be applied to surfaces that are clean, dry and free from loosely adhering materials and grease. Vantablack 230 can be applied to most engineering plastic (e.g. PC, PA, PBT), metals (e.g. aluminium, copper, stainless steel), plasterboard and concrete – in some applications a primer or plasma activation may be required. For specific advice contact: technicalsupport@surreynanosystems.com

Table 3: Typical Properties of Vantablack 230	
THEORETICAL COVERAGE (100% Transfer efficiency @ 100µm DFT)	
m^2/l	5.3
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)	
230 Base	-16˚C
230 Catalyst	40˚C

MIXING

Vantablack 230 base requires mixing before catalyst addition. Solvent evaporation should be minimised during mixing. Vantablack 230 base can be mixed using a paddle or gyroscopic mixer. Mixing must ensure the paint is homogeneous.

	4L	20L
Paddle Mixing time	5 minutes	10 minutes
Gyroscopic Mixing time	2 minutes	2 minutes

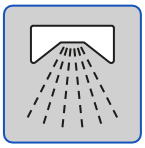


CATALYST ADDITION

Add Vantablack 230 catalyst to premixed Vantablack 230 base in a ratio 25mL catalyst to 1L base.

The catalyst must be thoroughly mixed through the base and passed through a 260 µm filter prior to application.

	4L	20L
Paddle Mixing time	5 minutes	10 minutes
Gyroscopic Mixing time	2 minutes	2 minutes



APPLICATION

Vantablack 230 is typically applied using conventional spray systems. It can be applied manually or using an automated system for high volume components. Vantablack 230 application is a two-step process consisting of a prime and functional layer. The prime layer provides full coverage and promotes adhesion. The functional layer provides the light absorbing properties. Both layers are sprayed using the same paint, but different spray conditions. Below conditions are a known starting configuration and should be used as a guide only.

PRESSURE POT SPRAYING PARAMETERS	
Needle/nozzle size	0.85mm
Air cap	TE10
Spray pressure	2-3 bar
Fluid flow	120mL/min
Spraying gas	Dry nitrogen or compressed dry air

Prime Layer

The Prime layer should be applied as a solid film achieving full coverage. This typically requires 1 pass applied perpendicular to the surface.

Distance to substrate	75mm
Traverse speed	40mm/min

Functional Layer
The solvent will flash off quickly. The structure is controlled through flow rate, spray distance and traverse speed. This typically requires 2-3 passes applied perpendicular to the surface.

Distance to substrate	120mm
Traverse speed	400mm/min

Please note: spray equipment must be compatible with long term acetone exposure. For repeatability, temperature and environmental conditions should be consistent.

CURING

Vantablack 230 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 230 will rapidly cure in 30 minutes at 50% humidity and 35°C. No baking is required under accelerated cure conditions.

STORAGE/POT LIFE

Once catalysed, Vantablack 230 can be stored in a sealed container and used within 48 hours. If stored under nitrogen or compressed dry air, pot life can be extended to 120 hours. **Contamination with moisture will initiate curing**. Temperature should not exceed 30°C. Leaving Vantablack 230 exposed to the atmosphere can cause skin formation that will need to be removed prior to application

Vantablack 230 Base
Unopened Shelf Life 6 months from manufacturing date kept within 0°C to +25°C. Store away from heat, sparks and flames. For shipping purposes, paint can withstand -30°C up to 2 months and +30°C up to 28 days.

Vantablack 230 Catalyst
Unopened Shelf Life 12 months from manufacturing date kept within 0°C to +25°C. Store away from heat, sparks and flames.

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.

HANDLING & CLEANING THE SURFACE

The surface should not be abraded or handled directly if possible. Processing and parts should be designed to avoid direct contact. Powder free gloves are recommended to avoid contaminating the coating.

Dust may be removed using dry compressed air or nitrogen at 1 bar pressure or lens cleaning puffer. The coating should not be washed with solvents or water to remove contamination.

TECHNICAL SUPPORT

For further technical support please contact:

- technicalsupport@surreynanosystems.com