

Quantum Dusk™

Elect Nano Quantum Dusk™ is an ultra-matte black inorganic refractory nanoparticle coating engineered for metals, plastics, and ceramics. Its proprietary ceramic-nanoparticle matrix delivers mission-critical protection—outstanding resistance to atomic-oxygen erosion, UV bombardment, and thermal cycling—while producing a deep-space black finish with near-zero reflectance. The predominantly water-based, non-toxic formulation ensures safe handling, rapid application, and fast cure times, yet cures to an exceptionally hard, tightly adherent film with industry-leading sloughing resistance. Fully silicone- and PFAS-free, Quantum Dusk™ meets the most stringent environmental regulations and cleanroom standards worldwide, providing satellite and spacecraft designers with a reliably durable coating that’s as easy to apply as it is robust in orbit.

| | Test Method | Unit | Values |
|----------------------------------|---------------|-------------------|--------|
| Physical Properties | | | |
| Density (dry) | ASTM D792 | g/cm ³ | 0.389 |
| Weight Percent Solids Content | ASTM D2369 | % | 8.0 |
| Zahn Cup Viscosity | ASTM D4212 | | TBD |
| Rotational Viscosity | ASTM D2196 | cP | 4.3 |
| Optical Properties | | | |
| Specular Gloss | ASTM D523 | | TBD |
| Hemispherical Reflectance | ASTM E1331 | % | 2.3 |
| BRDF | ASTM E2387 | | TBD |
| Mechanical Properties | | | |
| Pencil Hardness Gouge | ASTM D3363 | | 5H |
| Pencil Hardness Scratch | ASTM D3363 | | H |
| Crosscut Adhesion | ASTM D3359 | | 4B |
| Impact Resistance | ASTM D2794 | | TBD |
| Flexibility Conical Mandrel Bend | ASTM D522 | | TBD |
| Thermal | | | |
| Degradation Temperature | ASTM E1131 | °C | >200 |
| Electrical | | | |
| Surface Resistance | ANSI STM11.11 | Ohm | >1E12 |

Quantum Dusk™

Processing Guidelines

Before coating, thoroughly clean substrates with a mild detergent or solvent (IPA or ethanol) and dry completely; for polished metals, optional light abrasion enhances adhesion, followed by an oil-free air blast. Shake Quantum Dusk™ for at least two minutes, then strain through a 190-mesh filter. If needed, thin up to 20% with deionized water or alcohol to reach a Zahn #2 viscosity of 18 – 22 s. Use an HVLP gun fitted with a 1.2 – 1.4 mm tip, setting supply air to 30 – 40 psi and maintaining ≤10 psi at the cap (fluid pressure 1.5 – 3 psi), with a medium fan pattern. Hold the gun 8 – 12 inches from the part and apply two to three light coats in a cross-hatch pattern with 50% overlap, starting and ending each pass beyond the edges to avoid buildup. Allow parts to flash at room temperature until tacky (10 – 30 min), then cure either at 60 °C for one hour in a forced-air oven (ramping ~10 °C/min) or by ambient drying for 24 hours. After cure, verify hardness (ASTM D3363 ≥ H). Clean equipment immediately with warm water or solvent, and store unused paint in sealed containers below 25 °C, away from direct sunlight.

| | Unit | Recommended | Range |
|-----------------------------------------|-------------------|-------------|-----------|
| Coating Properties | | | |
| Wet film thickness | µm | 320 | 150 – 400 |
| Dry coating thickness | µm | 40 | 20 – 60 |
| Theoretical coverage @ rec. thickness | m ² /L | 5.1 | 3 – 7 |
| Coating application ambient temperature | °C | 23 | 15 – 30 |
| Coating application ambient humidity | %RH | 50 | 30 – 70 |
| Processing Parameters | | | |
| Strainer size | mesh | 190 | 150 – 200 |
| HVLP gun tip size | mm | 1.2 | 1.2 – 1.4 |
| HVLP gun supply pressure | psi | 35 | 30 – 40 |
| Curing Conditions | | | |
| Solvent flash | min | 15 | 10 – 30 |
| Oven cure time (optional) | min | 60 | 45 – 90 |
| Oven cure temperature | °C | 60 | 50 – 120 |
| Ambient cure time | hrs | 24 | 18 – 48 |