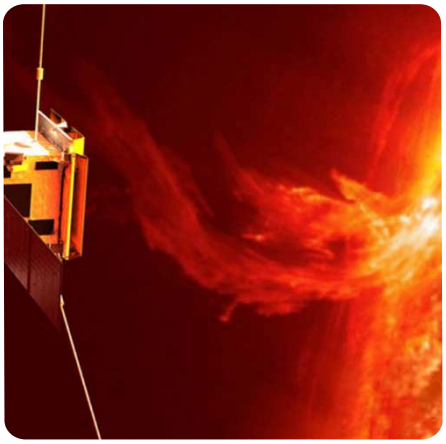
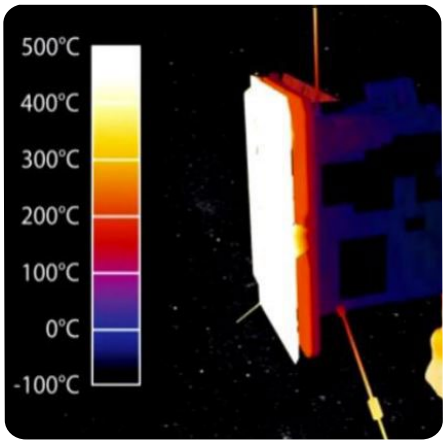
ASTRO BLACK®

The Astro Black® coating is a thin dark highly adherent film deposited by Physical Vapor Deposition. It is a stable ceramic coating that won't be affected by the extreme conditions and vacuum of space, as it can withstand temperatures as high as 500 ºC or as low as -180 ºC and Sun's radiation.

Its high emmisivity and absortance values guarantees an appropriate thermal control of the coated parts, allowing a high fraction of the heat of the coated parts to be radiated back to space.

The PVD coating technology is a process highly compatible with the requirements for space applications. It guarantees extreme adhesion levels, cleanliness and minimum outgassing levels. The deposition process takes place inside reactors in which parts are heated above 450 ºC under high vacuum, after a plasma cleaning step metallic elements in plasma phase and reacting gases are used to grow the Astro Black coating on the parts. The process involves the use of raw materials safe for both health and environment.





Coating and process information

Application	Thermo optical protection
Emissivity (ε)	0.72 - 0.76
Absortance (α)	0.88 - 0.90
α/ ε ratio	1.18 - 1.20
Use Temperature Range (ºC)	-180 to 500
TIS (%)	10 - 14

Appearance	Black-violet, homogeneous and even appearance
Typical Thickness (µm)	3 - 8
Coatable substrates	Titanium, super alloys, steels. Aluminium (restrictions apply)
Adhesion Grade	ASTM D3359A tape test: no evidence of delamination VDI 3198 test: better than HF3
Outgassing	No volatilization of compounds even at 500 °C
Qualified Extreme UV Stability	8000 h equivalent UV radiation resistant
Ra Roughness (µm)	0.4 - 0.5
Resistivity [Ohm/square]	Average: 6000, Std. dev.: 3200
Aging Resistance	Inert in contact with titanium at 450 °C for at least 2000 h
REACH Compliance	Process unaffected
Environmental and Safety Concerns	Clean, high vacuum deposition process, no toxic raw materials or products involved
Thermal Shock Resistance	Coating adhesion unaffected after cyclic LN2 immersion
Protection of Tight Tolerance Areas or Selective Coating	Possible by masking
Coating Process Control	Automated and fully computer controlled for maximum reproducibility. Traceability of all process parameters which enable repeatable batches.
Cleanability	Compatible with ultrasonic cleaning, isopropyl alcohol and some detergents.
Coatable Geometries	Wide range of parts may be coated, including cavities of tubular parts. Maximum part dimensions of 650 mm in diameter per 1200 mm in length. Larger parts may be coated after careful examination.

APPLICATIONS

www.metalestalki.com

Linkedin: Metal Estalki

SPAIN

Pol. Ind. Ugaldeguren II Parc. 16, Nave 2,
48170 Zamudio (Vizcaya)

+34 944 544 798

info@metalestalki.com

FRANCE

2 Rue Amanieu d'Albret,
33430 Bazas (France)

+33 979 255 789

contact@metalestalki.com

Metal Estalki, advanced PVD coatings