



**SPI Connector Black** is a proprietary duplex layer; plating and blackening process for Electronic Connectors, Enclosures or other substrates that need to meet the stringent requirements of MIL-DTL-38999 or commercial specifications requiring Cadmium alternative coatings.

**SPI Connector Black** represents a breakthrough in Cadmium replacement technology. SPI Connector Black is a robust, deep black to matte black coating. Unlike electrodeposited coatings which are notorious for non-uniform build-up, **SPI Connector Black** is a conformal coating that deposits evenly on all surfaces, making it the perfect solution for intricate connector shells, small parts and larger parts with complex internal geometries.

The resulting **SPI Connector Black** surface, about 40 millionths of an inch thick, is a phosphorous enriched, complex black nickel oxide. Color wise, **SPI Connector Black** has been measured using a spectrophotometer and consistent readings between 25 and 28 are obtained. For reference, 1 is absolute black and 100 is total white.

### Typical Physical Properties

Top Layer Composition	Nickel:97-99% Phosphorous: 10-13%
Mid Layer Composition	Nickel:97-99% Phosphorous: 5-7%
Finish Layer Composition:	Nickel: 97-99% Phosphorus: 1-3%
Hardness:	700-800 HK100 (58—63 HRC)
Total Coating Thickness <sup>1</sup> :	0.001-0.0012 for best Salt Spray Results
Electrical Resistivity:	< 5 $\mu\Omega$ /in <sup>2</sup>
Absorption Rate:	94-96%
Appearance <sup>2</sup> :	Lusterless to Bright black
Reflectance:	0.91 (average, 250-2500nm)
Emissivity:	4-6%
Thermal Cycling:	Passed
Neutral Salt Spray Results:	No corrosion sites present at 500 hours





<sup>1</sup>The thickness of the coating can vary depending on the degree of protection needed. Thicknesses upwards of 0.0007 – 0.0010 inches are needed to ensure the coatings ability to pass 100 hours of salt spray, however, the coating can be as thin as 0.0003 inch.

<sup>2</sup>The resulting reflectivity and appearance of the SPI Connector Black finish is dependent on several factors including: (a) surface finish and type of base material, (b) basis metal preparation, (c) thickness and phosphorous content of the underlying electroless nickel, and (d) presence of a sealer intended to enhance corrosion resistance.



## Typical Applications

- Exterior military components requiring resistance to wear, corrosion, and CARC decontamination protocols.
- Connector shells, gun magazine clips, electronic enclosures, and linear motion actuation equipment.
- Laser and optical applications such as digital projection equipment and medical diagnostic instruments
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## Key Advantages

- Excellent coating uniformity on exterior as well as interior surfaces makes it a perfect candidate for intricate-shaped, highly precision machined components
- Superior abrasion resistance to electrodeposited black nickel
- Exceeds 100+ hours to corrosion resistance when salt spray tested per ASTM B 117
- Compliant with WEEE, RoHS, ELV and other European environmental sustainability initiatives
- Can be applied to ferrous, aluminum, and copper-based substrates among others.

