Liedtke Kunststofftechnik
Siemensstr. 32a /42551 Velbert/Germany (DE) • Tel. +49 2051 605 105

What is Onyx ESD

Onyx ESD

Static-dissipative micro carbon fibre filled nylon, 3D printing (FDM)

Onyx ESD is a static-dissipative variant of Onyx for additive manufacturing using the FDM process. A specifically tuned carbon black loading keeps the surface resistance reliably within the dissipative range – for parts used around electrostatically sensitive assemblies that also need to withstand mechanical loads.

Material Character

Onyx ESD is based on a nylon matrix filled with microscopic carbon fibres plus additional carbon black. This combination provides a tightly controlled, static-dissipative surface resistance in the range of 10^5 to 10^7 Ω (tested per ANSI/ESD STM11.113), protecting electronic components from uncontrolled electrostatic discharge.

Mechanically, Onyx ESD clearly exceeds the standard material: tensile modulus and flexural modulus are noticeably higher, as are yield stress and flexural strength. This makes the material suitable for structurally loaded parts, not just purely antistatic covers or carriers.

The surface finish of printed parts is very good, which additionally makes Onyx ESD attractive for visible or close-fitting applications in electronics manufacturing.

Advantages and Limitations

Advantages

- Static-dissipative, tightly controlled surface resistance (10^5 … 10^7 Ω)
- Higher stiffness and strength than standard Onyx
- Very good surface finish
- Suitable for applications with strict ESD requirements

Disadvantages

- Hygroscopic – requires dry filament storage for consistent print quality
- Surface resistance can vary with humidity, part geometry and print orientation
- Not intended for food contact
- Higher material cost than standard Onyx

Processing

Onyx ESD is built up additively, layer by layer, from filament using the FDM process, in the same way as standard Onyx. The dissipative surface resistance depends on print orientation and layer build-up for the specific part and should be verified for the intended application.

Post-processing steps such as sanding or drilling generate fine, carbon-fibre- and carbon-black-laden plastic dust, which should be extracted.

Typical Properties

- Static-dissipative, tightly controlled surface resistance
- Higher stiffness and strength than standard Onyx
- Very good surface finish
- Suitable for applications with strict ESD requirements

Product Examples

- ESD protective fixtures
- Component carriers for electronics manufacturing
- Gripper and handling components in robotics
- Test and inspection fixtures

Typical Industries

- Electronics manufacturing
- Industrial robotics
- Process automation
- Semiconductor industry

Liedtke Kunststofftechnik, 42551 Velbert, Siemensstr. 32a, +49 2051 605 105, Info@liedtke-kunststofftechnik.de, www.liedtke-kunststofftechnik.de

Liedtke Kunststofftechnik
Siemensstr. 32a /42551 Velbert/Germany (DE) • Tel. +49 2051 605 105

	Test Method	Unit	Value
General Properties			
Density		g / cm³	1.2
Mechanical Properties			
Tensile modulus	ASTM D638	MPa	4200
Tensile stress at yield	ASTM D638	MPa	52
Tensile strain at break	ASTM D638	%	25
Flexural strength	ASTM D7901	MPa	83
Flexural modulus	ASTM D7901	MPa	3700
Thermal Properties			
Heat deflection temperature (0.45 MPa)	ASTM D648, Method B	°C	138
Electrical Properties			
Surface resistance	ANSI/ESD STM11.113	Ω	10^5 ... 10^7

The stated values are average values based on test specimens produced by the additive manufacturing process (FDM). They serve as information for material selection. Surface resistance can vary with humidity, part geometry and print orientation and should be confirmed for the specific part.

Liedtke Kunststofftechnik, 42551 Velbert, Siemensstr. 32a, +49 2051 605 105, Info@liedtke-kunststofftechnik.de, www.liedtke-kunststofftechnik.de