STEREOLITHOGRAPHY

ESD Resin

Static-Dissipative SLA Resin for Electronics Manufacturing



ESD Resin is a static-dissipative Formlabs photopolymer for jigs, fixtures, trays and housings that protect sensitive electronics. Post-cured parts reach a surface resistivity of 10^5 to 10^8 Ω/sq, with stiffness and impact strength that Formlabs rates similar to ABS and the fine detail and smooth surfaces of SLA.

SURFACE FINISHES



Standard Finish Natural

Parts are washed, post-cured and have their supports removed, leaving the smooth, finely detailed surface SLA is known for. Sharp edges, small text and fine features hold their shape, and the surface is ready for fit checks, assembly, presentation or paint.



Performance Paint Premium Finish

A highly durable, automotive-grade coating, hand-finished for smooth surfaces and applied with professional-grade equipment for exceptional adhesion. It comes in matte to semi-gloss, with custom colour matching for parts that need specific branding or visual impact.

BUILD VOLUME	LAYER HEIGHT	COLOUR	TOLERANCE
353 × 196 × 350 mm	0.05-0.1 mm	Black	±0.25% (min ±0.25 mm)

MECHANICAL PROPERTIES

Tensile and flexural modulus show how stiff the resin is, and elongation and impact strength show how it handles bending and knocks. ESD Resin is stiff, so trays, jigs and fixtures keep their shape through daily handling on the line.

The unnotched impact figure shows the toughness of a smooth part, and the much lower notched figure shows how a sharp corner concentrates stress. Generous fillets at inside corners, clip roots and screw bosses keep fixtures durable in service.

PROPERTY	VALUE	TEST STANDARD
Ultimate Tensile Strength	**44.2 MPa**	ASTM D638-14
Tensile Modulus	**1937 MPa**	ASTM D638-14
Elongation at Break	**12 %**	ASTM D638-14
Flexural Strength	**61 MPa**	ASTM D790-17
Flexural Modulus	**1841 MPa**	ASTM D790-17
Notched Izod Impact	**26 J/m**	ASTM D256-10
Unnotched Izod Impact	**277 J/m**	ASTM D4812-11

THERMAL PROPERTIES

Heat deflection temperature shows where a loaded part starts to soften. ESD Resin suits fixtures, trays and housings at room and assembly-line temperatures; keep it out of ovens and reflow and away from soldering-iron tips.

Thermal expansion is higher than in metals, so allow clearance where a fixture holds metal parts or boards across a wide temperature swing.

PROPERTY	VALUE	TEST STANDARD
HDT @ 0.45 MPa	**62.2 °C**	ASTM D648-18
HDT @ 1.8 MPa	**54.2 °C**	ASTM D648-18
Thermal Expansion	**123.7 ×10^{-6}/K**	ASTM E831-13

PHYSICAL PROPERTIES

Part density and Shore D hardness describe the cured material: a hard, rigid surface that keeps pocket edges and locating features crisp. Liquid density and viscosity describe the resin in the vat and guide handling and print setup, not the finished part.

PROPERTY	VALUE	TEST STANDARD
Density (post-cured part)	**1.116 g/cm^3**	ASTM D792
Hardness	**90 Shore D**	ASTM D2240
Resin Density (liquid, 25 °C)	**1.11 g/cm^3**	Formlabs SDS
Resin Viscosity (liquid, 25 °C)	**1600 cP**	Formlabs SDS

ELECTRICAL PROPERTIES

Surface resistivity shows how readily charge spreads across a part and drains to ground. The published range sits in the static-dissipative band, between conductive materials that can discharge too quickly and insulating plastics that hold their charge. Volume resistivity, measured through the thickness of a sample, is published alongside it.

Formlabs had both measured on post-cured samples at an external ESD test laboratory. Parts must be grounded, through an ESD mat or grounding cable, to drain charge. Unlike other Formlabs resins, ESD Resin is not an electrical insulator, so it is not used to insulate live conductors.

PROPERTY	VALUE	TEST STANDARD
Surface Resistivity	**10^5–10^8 Ω/sq**	ANSI/ESD 11.11
Volume Resistivity	**10^5–10^7 Ω·cm**	ANSI/ESD 11.11

CHEMICAL PROPERTIES

Formlabs immersed printed, post-cured cubes in 19 fluids for 24 hours and measured weight gain. Fuels, oils, water, salt water, bleach and dilute acids and bases leave almost no change, while isopropyl alcohol, diethylene glycol monomethyl ether and butyl acetate show moderate weight gain and acetone the highest.

Isopropyl alcohol is a common electronics cleaner, so keep wipe-downs brief and confirm cleaning agents with application-specific testing before production release.

CHEMICAL	24 H WEIGHT GAIN
Acetic acid 5%	**0.5%**
Acetone	**13.1%**
Bleach (~5% NaOCl)	**0.5%**

Butyl acetate	**3.8%**
Diesel fuel	**0.2%**
Diethylene glycol monomethyl ether	**3.6%**
Hydraulic oil	**0.2%**
Hydrogen peroxide 3%	**0.6%**
Isooctane (gasoline)	**< 0.1%**
Isopropyl alcohol	**2.6%**
Mineral oil (light)	**0.1%**
Mineral oil (heavy)	**0.1%**
Salt water (3.5% NaCl)	**0.6%**
Skydrol 5	**0.5%**
Sodium hydroxide 0.025% (pH 10)	**0.7%**
Strong acid (HCl, concentrated)	**1.4%**
Tripropylene glycol monomethyl ether	**0.6%**
Water	**0.7%**
Xylene	**1.6%**

COMPLIANCE

Formlabs' RoHS declaration covers all its resins, including ESD Resin, and its REACH statement finds no substances from the June 2024 ECHA candidate list of substances of very high concern in ESD Resin. Formlabs also lists ESD Resin on the US TSCA Active Inventory.

Formlabs publishes no UL 94, biocompatibility, food-contact or clean room statement for ESD Resin, so it is not used where a flame-rated, skin-contact or clean room material is required.

STANDARD	STATUS
RoHS Directives 2011/65/EU and (EU) 2015/863 Restricted substances not contained or intentionally added above the threshold limits (statement covers all Formlabs resins)	Formlabs declaration
REACH SVHC (EC 1907/2006) No substances on the ECHA candidate list dated 23 June 2024 (all Formlabs resins except Clear Resin)	Formlabs declaration
TSCA Active Inventory All substances used in ESD Resin are on the US TSCA Active Inventory	Formlabs statement

SUPPORTING DOCUMENTS

RoHS declaration