Technical Data Sheet

PPSUper Tough™ ESD

Elect Nano PPSUper Tough™ ESD is a high-performance, ESD-safe injection molding material engineered for applications demanding exceptional toughness, ductility, and impact resistance. Built on a PPSU base resin, this advanced formulation offers high strength, outstanding resistance to environmental stress cracking, and superior thermal stability, with high heat deflection temperatures and inherent flame retardancy. Utilizing Elect Nano's patented discrete carbon nanotube (dCNT) technology, PPSUper Tough™ ESD delivers nano-uniform surface and volume resistivity, ensuring precise static charge control for sensitive electronics and cleanroom environments. Designed for semiconductor manufacturing, defense, and spacecraft applications, this material provides unmatched reliability in critical, high-performance settings.

	Test Method	Unit	Values
Physical Properties			
Density	ASTM D792	g/cm³	1.33
Mold Shrinkage (Flow Direction)	ASTM D955	%	0.78
Mold Shrinkage (Transverse Direction)	ASTM D955	%	0.75
Mechanical Properties			
Tensile Strength	ASTM D638	MPa	77.1
Tensile Modulus	ASTM D638	GPa	2.62
Tensile Elongation at Break	ASTM D638	%	23.5
Flexural Strength	ASTM D790	MPa	134
Flexural Modulus	ASTM D790	GPa	2.82
Unnotched Izod Impact Strength	ASTM D256	J/m	No Break
Notched Izod Impact Strength	ASTM D256	J/m	119.3
Notched Izod Impact Strength	ASTM D256	kJ/m²	11.4
Thermal			
Heat Deflection Temperature (1.82 MPa)	ASTM E 2092	˚C	207
Electrical			
Surface Resistance	ANSI STM11.11	Ohm	1E+10
Volume Resistance	ANSI STM11.11	Ohm	1E+10

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Processing Guidelines

Elect Nano PPSUper Tough™ ESD is generally noted to have low moisture absorption at equilibrium, but properly drying material prior to injection molding is critical in achieving high quality molded parts. Drying should be carried out in a desiccant or membrane dryer that can maintain a dew point of < -40˚C. Proper mold cavity design is critical for achieving high strength, defect-free parts. Ensure cavities have uniform wall thickness where possible and smooth transitions in areas with varying wall thickness to avoid jetting. Maximize the injection speed until flow instabilities or surface defects are observed. Increase venting at the end of flow patterns and weld lines until flash appears.

	Unit	Recommended	Range
Drying Conditions			
Max Moisture Content	ppm	<100	0 – 500
Drying Time	hrs	4	3 – 5
Drying Temperature	˚C	170	140 – 180
Processing Parameters			
Injection Pressure	MPa	110	80 – 160
Injection Holding Pressure	MPa	85	70 – 100
Back Pressure	MPa	3	1 – 4
Holding Time	s	10	5 – 15
Cooling Time	s	25	10 – 30
Injection Rate	cc/s	60	40 – 80
Injection Speed*	mm/s	120	70 – 130
Suck Back (Decompression)	mm	1	0 – 4
Melt Cushion	mm	4	3 – 5
Feed Zone Temperature	˚C	340	330 – 345
Compression Zone Temperature	˚C	380	370 – 390
Metering Zone Temperature	˚C	390	380 – 395
Nozzle Temperature	˚C	390	380 – 395
Melt Temperature	˚C	390	380 – 395
Mold Temperature	˚C	160	150 – 165
Screw Tangential Speed	mm/s	180	160 – 200
Screw Rotational Rate*	RPM	140	100 – 200

**Note: Linear injection speed (mm/s) and screw rotational rate (RPM) values depend on screw diameter. Values shown are calculated from the injection rates and screw tangential speed ranges for a 25mm diameter screw.*

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Extended Temperature Data

Test Temperature	-90˚C	-25˚C	+23˚C	+40˚C	+105˚C	+170˚C
Tensile Property						
Tensile Strength (MPa)	118.6	96.6	77.1	75.9	58.4	37.0
Tensile Modulus (GPa)	3.33	2.73	2.62	2.48	2.14	1.91
Elongation at Break (%)	7.2	12.4	23.5	12.4	22.6	45.0