Technical Data Sheet

COC ESD MCF20

Elect Nano COC ESD MCF20 is a next-generation, low-particle, electrostatic discharge (ESD) safe injection molding compound based on cyclic olefin copolymer (COC) and reinforced with 20 wt % milled carbon fiber for superior stiffness, dimensional stability, and molding precision. It leverages Elect Nano's patented discrete carbon-nanotube technology (dCNT) to ensure uniform electrical performance across all molded parts. The intrinsically low moisture uptake and ultra-low water-vapor-transmission rate (WVTR) of COC make this grade ideal for clean-room applications. Incorporation of milled carbon fibers delivers excellent specific mechanical strength and stiffness, low specific gravity, reduced surface roughness, high-contrast laser marking, and low warpage. Elect Nano COC ESD MCF20 is optimized for FOUPs and other semiconductor manufacturing fixtures where cleanliness, stability, and reliable ESD protection are paramount.

	Test Method	Unit	Values
Physical Properties			
Density	ASTM D792	g/cm³	1.18
Mold Shrinkage (Flow Direction)	ASTM D955	%	TBD
Mold Shrinkage (Transverse Direction)	ASTM D955	%	TBD
Tensile Strength	ASTM D638	MPa	TBD
Tensile Modulus	ASTM D638	GPa	TBD
Tensile Elongation at Break	ASTM D638	%	TBD
Flexural Strength	ASTM D790	MPa	115
Flexural Modulus	ASTM D790	GPa	6.57
Notched Izod Impact Strength	ASTM D256	J/m	TBD
Notched Izod Impact Strength	ASTM D256	kJ/m²	TBD
Heat Deflection Temperature (1.82 MPa)	ASTM E 2092	˚C	TBD
Surface Resistance	ANSI STM11.11	Ohm	1E+06 – 1E+10

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Processing Guidelines

Elect Nano COC ESD MCF20 has very 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 – 300
Drying Time	hrs	3	2 – 4
Drying Temperature	˚C	100	90 – 110
Processing Parameters			
Injection Pressure	MPa	100	60 – 150
Injection Holding Pressure	MPa	75	50 – 90
Back Pressure	MPa	5	5 – 15
Holding Time	s	5	2 – 8
Cooling Time	s	15	10 – 20
Injection Rate	cc/s	35	10 – 50
Injection Speed*	mm/s	70	20 – 100
Suck Back (Decompression)	mm	3	2 – 5
Melt Cushion	mm	4	2 – 6
Feed Zone Temperature	˚C	270	270 – 300
Compression Zone Temperature	˚C	290	275 – 310
Metering Zone Temperature	˚C	300	280 – 310
Nozzle Temperature	˚C	295	280 – 300
Melt Temperature	˚C	300	290 – 310
Mold Temperature	˚C	110	100 – 120
Screw Tangential Speed	mm/s	200	100 – 260
Screw Rotational Rate*	RPM	150	80 – 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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