DuraForm® HST Composite

Selective Laser Sintering (SLS)

A fiber-reinforced material with an ideal mix of stiffness, strength and high temperature resistance.

General Properties

MEASUREMENT	CONDITION	METRIC	U.S.
Specific Gravity (g/cm3)	ASTM D792	1.20	1.20

MEASUREMENT	CONDITION	METRIC	U.S.
Tensile Strength Ultimate (MPa | psi)	ASTM D 638	48–51	7050–7350
Tensile Modulus (MPa | ksi)	ASTM D 638	5475–5725	795–831
Elongation at Break (%)	ASTM D 638	4.5	4.5
Flexural Strength, Ultimate (MPa | psi)	ASTM D 790	83–89	12000–12900
Flexural Modulus (MPa | ksi)	ASTM D 790	4400–4550	638–660
Hardness, Shore D	ASTM D2240	75	75
Impact Strength (J/m | ft-lb/in) (notched Izod, 23°C)	ASTM D256	37.4	0.7
Impact Strength (J/m | ft-lb/in) (unnotched Izod, 23°C)	ASTM D256	310	5.8
Gardner Impact (J | ft-lb)	ASTM D5420	5	3.7

Data was generated by building parts using 100% virgin powder under typical default parameters. DuraForm HST Composite was processed on a Sinterstation® HiQ™ + HS SLS System at 25 watts laser power, 10 m/sec [400 inches/sec] scan speed, and a powder layer thickness of 0.1 mm [0.004 inches].

Features

- High specific stiffness
- Elevated temperature resistance
- Anisotropic mechanical properties just like fiber-filled, injection molded materials
- Non-conductive and RF transparent
- Easy-to-finish surface

Benefits

- Functional prototypes can be tested in "real life" environments
- Complex end-use parts can be economically manufactured in low-to-medium volumes
- Excels in load-bearing applications at higher temperatures
- Attractive surface finish

Applications

- Functional prototypes and end-use parts that require high stiffness and/or elevated thermal resistance
- Typical Applications include:
  - UAV structural components
  - Housings and enclosures
  - Impellers
  - Connectors
  - Consumer sporting goods

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Thermal Properties

MEASUREMENT	CONDITION	METRIC	U.S.
Heat Deflection Temperature	ASTM D 648 @ 0.45 MPa @ 1.82 MPa	 184 °C 179 °C	 363 °F 355 °F
Coefficient of Thermal Expansion (µm/m-°C | µm/in-°F)	ASTM E 831 0-50 °C 85-145 °C	 138.3 267.2	 76.8 148.4
Specific Heat Capacity (J/g-°C | BTU/lb-°F)	ASTM E1269	1.64	0.392
Thermal Conductivity (W/m-K | BTU-in/hr-ft$_2$-°F)	ASTM E1225	0.29	2.0
Flammability	UL 94	HB	HB

Electrical Properties

MEASUREMENT	CONDITION	METRIC	U.S.
Volume Resistivity (ohm-cm)	ASTM D257	6.7 X 10_{15}	6.7 X 10_{15}
Surface Resistivity (ohm)	ASTM D257	5.2 X 10_{15}	5.2 X 10_{15}
Dissipation Factor, 1 KHz	ASTM D150	0.028	0.028
Dielectric Constant, 1 KHz	ASTM D150	3.14	3.14
Dielectric Strength (kV/mm | kV/in)	ASTM D149	18.5	470

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