

DuraForm[®] FR1200

A flame-retardant nylon 12 material with high accuracy and excellent surface finish. Ideally suited for direct 3D production in aerospace, transportation and consumer goods applications where reliable fire retardancy and reduced smoke and toxicity are required.

General Properties

MEASUREMENT	CONDITION	METRIC	U.S.
Sintered Part Density (g/cm ³ lb/in ³)	ASTM D792	1.02	.037
Water Absorption (%)	ASTM D570	0.29	0.29

Mechanical Properties

MEASUREMENT	CONDITION	METRIC	U.S.
Tensile Strength Ultimate (MPa psi)	ASTM D 638	41	6010
Tensile Modulus (MPa ksi)	ASTM D 638	2040	296
Elongation at Break (%)	ASTM D 638	5.9	5.9
Flexural Strength, Ultimate (MPa psi)	ASTM D 790	62	8940
Flexural Modulus (MPa ksi)	ASTM D 790	1770	257
Hardness, Shore D	ASTM D2240	76	76
Impact Strength @ 0.12" (J/m ft-lb/in)	ASTM D256	25	0.46
Notched Izod, 23°C		233	4.4
Unnotched Izod, 23°C			

Thermal Properties

MEASUREMENT	CONDITION	METRIC	U.S.
Heat Deflection Temperature @ 0.45 MPa @ 1.82 MPa	ASTM D638	180 °C	356 °F
		94 °C	201 °F
Coefficient of Thermal Expansion (0-145°C) (µm/m-°C µin/in-°F)	ASTM E831	140	78
Specific Heat Capacity (J/g-°C BTU/lb-°F)	ASTM E1269		
	@ 23°C	1.38	0.33
	@ 50°C	1.68	0.40
	@ 100°C	2.03	0.48
	@ 150°C	2.51	0.60
Thermal Conductivity (W/m-K BTU-in/hr-ft ² -°F)	ASTM E1530	0.22	1.53

The parts used to generate the above data were generated by building parts using 100% virgin powder using default parameters on an sPro[™] 60 HD-HS printer.

Features

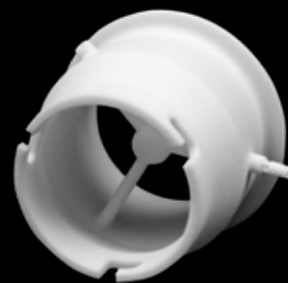
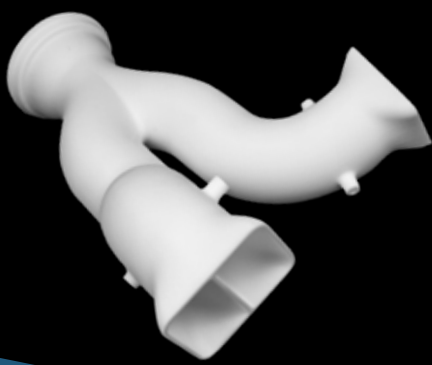
- FAR 25.853 compliant
- Passes AITM smoke density and toxicity requirements
- High accuracy and repeatability needed for manufacturing
- Non-halogenated formulation
- Excellent surface quality

Benefits

- Reduce fuel costs with weight optimized design enabled by additive manufacturing
- Accelerate changes in cabin designs for in service aircraft
- Eliminate tooling and minimize spare part stocking costs
- Excellent flame retardancy at 12 and 60 second exposures

Applications

- Direct 3D production of aircraft interior parts
- Parts requiring flame retardancy
- Automotive and transportation related parts where fire safety may be needed
- Consumer electronics and other goods



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Electrical Properties

MEASUREMENT	CONDITION	METRIC	U.S.
Volume Resistivity (ohm-cm ohm-in)	ASTM D257	5.97 x 10 ¹⁴	2.35 x 10 ¹⁴
Surface Resistivity (ohm)	ASTM D257	2.56 x 10 ¹³	2.56 x 10 ¹³
Dissipation Factor, 1 KHz	ASTM D150	0.038	0.038
Dielectric Constant, 1 KHz	ASTM D150	3.0	3.0
Dielectric Strength (kV/mm kV/in)	ASTM D149	22.6	575

Flammability Properties

MEASUREMENT	CONDITION	METRIC	U.S.
FAR 25.853 (a) and Appendix F Part I (b)(4) (mm in)	60 sec	43.0	0.16
FAR 25.853 (a) and Appendix F Part I (a)(1)(ii) (mm in)	12 sec	2	0.08
AITM 2.0007B Smoke Density	Flaming Mode	12 sec	pass
	Non Flaming Mode	3 sec	pass
AITM 3.0005 Combustion Toxicity	Flaming Mode	pass	pass
	Non Flaming Mode	pass	pass
AITM 2.0006 (kW/m ² BTU/s ft ²)	Maximum Heat Release Rate (HRR)	-	141.3
	Total Heat Release (HR)	2 min	105.2
Flammability (UL File #E494541)	UL 94 V	V2 @ 5.0 mm (0.2")	pass
		HB @ 1.5 mm (0.06")	pass



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