



DuraForm[®] ProX[®] FR1200

A flame-retardant PA12 material with high accuracy and excellent surface finish. Ideally suited for direct production of aerospace, transportation and consumer goods application 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 | 1.03 | .037 |
| Water Absorption (%) | ASTM D570 | 0.1 | 0.1 |

Mechanical Properties

| MEASUREMENT | CONDITION | METRIC | U.S. |
|----------------------------------------------------------------|------------|--------|------|
| Tensile Strength Ultimate (MPa psi) | ASTM D 638 | 45 | 6510 |
| Tensile Modulus (MPa ksi) | ASTM D 638 | 2010 | 291 |
| Elongation at Break (%) | ASTM D 638 | 8 | 8 |
| Flexural Strength, Ultimate (MPa psi) | ASTM D 790 | 61 | 8900 |
| Flexural Modulus (MPa ksi) | ASTM D 790 | 1720 | 249 |
| Hardness, Shore D | ASTM D2240 | 77 | 77 |
| Impact Strength @ 0.12" (J/m ft-lb/in) Notched Izod, 23°C | ASTM D256 | 24 | 0.5 |
| Unnotched Izod, 23°C | | 278 | 5.2 |

Thermal Properties

| MEASUREMENT | CONDITION | METRIC | U.S. |
|---------------------------------------------------------------------|------------------------------------------------------|------------------------------|------------------------------|
| Heat Deflection Temperature @ 0.45 MPa @ 1.82 MPa | ASTM D638 | 180 °C 94 °C | 356 °F 201 °F |
| Coefficient of Thermal Expansion (0-145°C) (µm/m-°C µin/in-°F) | ASTM E831 | 137 | 76 |
| Specific Heat Capacity (J/g-°C BTU/lb-°F) | ASTM E1269 @ 23°C @ 50°C @ 100°C @ 150°C | 1.63 1.98 2.35 2.85 | 0.39 0.47 0.56 0.68 |
| Thermal Conductivity (W/m-K BTU-in/hr-ft ² -°F) | ASTM E1530 | 0.25 | 1.73 |

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 | 3.61×10^{14} | 1.42×10^{14} |
| Surface Resistivity (ohm) | ASTM D257 | 1.11×10^{13} | 1.11×10^{13} |
| Dissipation Factor, 1 KHz | ASTM D150 | 0.032 | 0.032 |
| Dielectric Constant, 1 KHz | ASTM D150 | 3.0 | 3.0 |
| Dielectric Strength (kV/mm kV/in) | ASTM D149 | 17.4 | 442 |

Flammability Properties

| MEASUREMENT | CONDITION | METRIC | U.S. |
|------------------------------------------------------------------------------------------------------------------------|-----------------|----------------|---------------|
| FAR 25.853 (a) And Appendix F Part I (b)(4) (mm in) | 60 sec | 3.0 | 0.12 |
| FAR 25.853 (a) And Appendix F Part I (a)(1)(ii) (mm in) | 12 sec | 1.8 | 0.07 |
| AITM 2.0007B Smoke Density, Flaming Mode Non Flaming Mode | 12 sec 3 sec | pass pass | pass pass |
| AITM 3.0005 Combustion Toxicity Flaming Non Flaming Mode | | pass pass | pass pass |
| AITM 2.0006 (kW/m ² BTU/s ft ²) Maximum Heat Release Rate (HRR) Total Heat Release (HR) | - 2 min | 141.3 105.2 | 12.44 9.26 |
| Flammability (UL File #E494541) V2 @ 5.0 mm (0.2") HB @ 1.5 mm (0.06") | UL 94 V | pass pass | pass pass |



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The parts used to generate the above data were generated by building parts using 100% virgin powder using default parameters on a ProX® SLS 500 printer.