

DuraForm[®] PA Plastic

Durable polyamide (nylon) material for real-world physical testing and functional use



General Properties

| MEASUREMENT | CONDITION | METRIC | U.S. |
|--------------------------------|-----------|------------------------|------------------------|
| Specific Gravity | ASTM D792 | 1.00 g/cm ³ | 1.00 g/cm ³ |
| Moisture Absorption - 24 hours | ASTM D570 | 0.07% | 0.07% |

Mechanical Properties

| MEASUREMENT | CONDITION | METRIC | U.S. |
|--|------------|---------|--------------|
| Tensile Strength Ultimate (MPa/PSI) | ASTM D 638 | 43 | 6237 |
| Tensile Modulus (MPa/KSI) | ASTM D 638 | 1586 | 230 |
| Elongation at Break (%) | ASTM D 638 | 14 | 14 |
| Flexural Strength, Ultimate (MPa/PSI) | ASTM D 790 | 48 | 6962 |
| Flexural Modulus (MPa/KSI) | ASTM D 790 | 1387 | 201 |
| Hardness, Shore D | ASTM D2240 | 73 | 73 |
| Impact Strength (notched Izod, 23°C) | ASTM D256 | 32 J/m | 0.6 ft-lb/in |
| Impact Strength (unnotched Izod, 23°C) | ASTM D256 | 336 J/m | 6.3 ft-lb/in |
| Gardner Impact | ASTM D5420 | 2.7 J | 2.0 ft-lb |

Data was generated by building parts under typical default parameters. DuraForm[®] PA Plastic was processed on a base-level HiQ[™] SLS System at 13 watts laser power, 5 m/sec [200 inches/sec] scan speed, and a powder layer thickness of 0.1 mm [0.004 inches].

Features

- Excellent surface resolution and feature detail
- Easy-to-process
- Compliant with USP Class-VI testing
- Compatible with autoclave sterilization
- Good chemical resistance and low moisture absorption

Benefits

- Nicely balanced mechanical properties and processability
- Build prototypes that withstand functional testing
- Produce durable end-use parts without tooling
- Create accurate and repeatable parts as demanded by manufacturers
- Machinable and paintable for demonstration parts

Applications

- Complex, thin-wall ductwork
- Functional prototypes that approach end-use performance properties
- Appropriate for low- to mid-volume rapid manufacturing
- Medical applications requiring USP Class-VI compliance, or biocompatibility
 - Motorsports
 - Aerospace
- Housing and enclosures
- Impellers and connectors
- Consumer sporting goods
- Vehicle dashboards and grilles
- Snap-fit designs
- Parts requiring machining or joining with adhesives

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Thermal Properties

| MEASUREMENT | CONDITION | METRIC | U.S. |
|--|--|-----------------|------------------------------------|
| Heat Deflection Temperature | ASTM D 648 @ 0.45 MPa @ 1.82 MPa | 180 °C 95 °C | 356 °F 203 °F |
| Coefficient of Thermal Expansion ($\mu\text{m}/\text{m}\cdot^{\circ}\text{C}$ / $\mu\text{m}/\text{in}\cdot^{\circ}\text{F}$) | ASTM E 831 0-50 °C 85-145 °C | 82.6 179.2 | 45.9 99.6 |
| Specific Heat Capacity | ASTM E1269 | 1.64 J/g·°C | 0.392 BTU/lb·°F |
| Thermal Conductivity | ASTM E1225 | 0.70 W/m-K | 4.86 BTU-in/hr-ft ² ·°F |
| Flammability | UL 94 | HB | HB |

Electrical Properties

| MEASUREMENT | CONDITION | METRIC | U.S. |
|----------------------------|-----------|-------------------------------|-------------------------------|
| Volume Resistivity | ASTM D257 | 5.9 X 10 ¹³ ohm-cm | 5.9 X 10 ¹³ ohm-cm |
| Surface Resistivity | ASTM D257 | 7.0 X 10 ¹² ohm | 7.0 X 10 ¹² ohm |
| Dissipation Factor, 1 KHz | ASTM D150 | 0.044 | 0.044 |
| Dielectric Constant, 1 KHz | ASTM D150 | 2.73 | 2.73 |
| Dielectric Strength | ASTM D149 | 17.3 kV/mm | 439 kV/in |

Data was generated by building parts under typical default parameters. DuraForm[®] EX Plastic was processed on a base-level HiQ[™] SLS System at 13 watts laser power, 5 m/sec [200 inches/sec] scan speed, and a powder layer thickness of 0.1 mm [0.004 inches].

RAPIDAPPLICATIONGROUP.COM

+1(833)-RAP-APP1
(+1-833-727-2771)

Location:

405 SOUTH 9TH ST.
BROKEN ARROW, OK. 74012 USA
