



# FDM Nylon 12

## PRODUCTION-GRADE THERMOPLASTIC FOR FORTUS 3D PRINTERS

FDM Nylon 12™ is the first material in Stratasys' family of nylon offerings, complementing the current portfolio of FDM® materials and enabling new applications requiring: repetitive snap fits, high fatigue resistance, strong chemical resistance and press (friction) fit inserts. FDM Nylon 12 is primarily used in aerospace, automotive and consumer goods industries to take on everything from tooling, jigs and fixtures to covers, panels and vibration resistant components. For use with Fortus 380mc™, 450mc™ and 900mc™ 3D Printers, FDM Nylon 12 offers unparalleled toughness and a simple, clean process – free of powders.

| CONDITIONED*  |             |              |              |           |           |
|---|-------------|--------------|--------------|-----------|-----------|
| MECHANICAL PROPERTIES <sup>1</sup>                    | TEST METHOD | ENGLISH      |              | METRIC    |           |
|   |             | XZ AXIS      | ZX AXIS      | XZ AXIS   | ZX AXIS   |
| Tensile Strength, Yield (Type 1, 0.125", 0.2"/min)    | ASTM D638   | 4,600 psi    | 4,100 psi    | 32 MPa    | 28 MPa    |
| Tensile Strength, Ultimate (Type 1, 0.125", 0.2"/min) | ASTM D638   | 6,650 psi    | 5,600 psi    | 46 MPa    | 38.5 MPa  |
| Tensile Modulus (Type 1, 0.125", 0.2"/min)            | ASTM D638   | 186,000 psi  | 165,000 psi  | 1,282 MPa | 1,138 MPa |
| Elongation at Break (Type 1, 0.125", 0.2"/min)        | ASTM D638   | 30%          | 5.4%         | 30%       | 5.4%      |
| Elongation at Yield (Type 1, 0.125", 0.2"/min)        | ASTM D638   | 2.4%         | 2.7%         | 2.4%      | 2.7%      |
| Flexural Strength (Method 1, 0.05"/min)               | ASTM D790   | 9,700 psi    | 8,800 psi    | 67 MPa    | 61 MPa    |
| Flexural Modulus (Method 1, 0.05"/min)                | ASTM D790   | 185,000 psi  | 171,000 psi  | 1,276 MPa | 1,180 MPa |
| Flexural Strain at Break                              | ASTM D790   | No Break     | >10%         | No Break  | >10%      |
| IZOD impact - notched (Method A, 23 °C)               | ASTM D256   | 2.5 ft-lb/in | 1 ft-lb/in   | 135 J/m   | 53 J/m    |
| IZOD impact - unnotched (Method A, 23 °C)             | ASTM D256   | 31 ft-lb/in  | 3.7 ft-lb/in | 1,656 J/m | 200 J/m   |
| Compressive Strength, Yield (Method 1, 0.05"/min)     | ASTM D695   | 7,400 psi    | 7,900 psi    | 51 MPa    | 55 MPa    |
| Compressive Strength, Ultimate (Method 1, 0.05"/min)  | ASTM D695   | 24,200 psi   | 800 psi      | 167 MPa   | 6 MPa     |
| Compressive Modulus (Method 1, 0.05"/min)             | ASTM D695   | 730,000 psi  | 155,000 psi  | 5,033 MPa | 1,069 MPa |

| UNCONDITIONED (DRY)**                              |             |                |              |            |           |
|--|-------------|----------------|--------------|------------|-----------|
| MECHANICAL PROPERTIES                              | TEST METHOD | ENGLISH        |              | METRIC     |           |
|  |             | XZ AXIS        | ZX AXIS      | XZ AXIS    | ZX AXIS   |
| Tensile Strength, Yield (Type 1, 0.125", 0.2"/min) | ASTM D638   | 7,700 psi      | 6,900 psi    | 53 MPa     | 48 MPa    |
| Tensile Modulus (Type 1, 0.125", 0.2"/min)         | ASTM D638   | 190,000 psi    | 180,000 psi  | 1,310 MPa  | 1,241 MPa |
| Elongation at Break (Type 1, 0.125", 0.2"/min)     | ASTM D638   | 9.5%           | 5%           | 9.5%       | 5%        |
| Elongation at Yield (Type 1, 0.125", 0.2"/min)     | ASTM D638   | 6.5%           | 5%           | 6.5%       | 5%        |
| Flexural Strength (Method 1, 0.05"/min)            | ASTM D790   | 10,000 psi     | 8,600 psi    | 69 MPa     | 60 MPa    |
| Flexural Modulus (Method 1, 0.05"/min)             | ASTM D790   | 190,000 psi    | 180,000 psi  | 1,300 MPa  | 1,250 MPa |
| Flexural Strain at Break                           | ASTM D790   | No Break       | >10%         | No Break   | >10%      |
| IZOD impact - notched (Method A, 23 °C)            | ASTM D256   | 2.8 ft-lb/in   | 0.9 ft-lb/in | 150 J/m    | 50 J/m    |
| IZOD impact - unnotched (Method A, 23 °C)          | ASTM D256   | >37.4 ft-lb/in | 5.1 ft-lb/in | >2,000 J/m | 275 J/m   |

STRATASYS.COM



A GLOBAL LEADER IN APPLIED ADDITIVE TECHNOLOGY SOLUTIONS



# FDM Nylon 12

## PRODUCTION-GRADE THERMOPLASTIC FOR FORTUS 3D PRINTERS

### At the core:

#### Advanced FDM Technology

FDM (fused deposition modeling) technology works with engineering-grade thermoplastics to build strong, long-lasting and dimensionally stable parts with the best accuracy and repeatability of any 3D printing technology. These parts are tough enough to be used as advanced conceptual models, functional prototypes, manufacturing tools and production parts.

#### Meet production demands

FDM systems are as versatile and durable as the parts they produce. Advanced FDM 3D Printers boast the largest build envelopes and material capacities in their class, delivering longer, uninterrupted build times, bigger parts and higher quantities than other additive manufacturing systems, delivering high throughput, duty cycles and utilization rates.

#### Opening the way for new possibilities

FDM 3D Printers streamline processes from design through manufacturing, reducing costs and eliminating traditional barriers along the way. Industries can cut lead times and costs, products turn out better and get to market faster.

#### No special facilities needed

FDM 3D Printers are easy to operate and maintain compared to other additive fabrication systems because there are no messy powders or resins to handle and contain, and no special venting is required because FDM systems don't produce noxious fumes, chemicals or waste.

| THERMAL PROPERTIES <sup>1</sup>            | TEST METHOD | ENGLISH | METRIC |
|--|-------------|---------|--------|
| Heat Deflection (HDT) @ 66 psi annealed    | ASTM D648   | 207 °F  | 97 °C  |
| Heat Deflection (HDT) @ 66 psi unannealed  | ASTM D648   | 167 °F  | 75 °C  |
| Heat Deflection (HDT) @ 264 psi annealed   | ASTM D648   | 180 °F  | 82 °C  |
| Heat Deflection (HDT) @ 264 psi unannealed | ASTM D648   | 131 °F  | 55 °C  |
| Melting Point                              | -----       | 352 °F  | 178 °C |

| OTHER            | TEST METHOD | VALUE |
|------------------|-------------|-------|
| Specific Gravity | ASTM D792   | 1.00  |



| SYSTEM AVAILABILITY | LAYER THICKNESS CAPABILITY | SUPPORT MATERIAL | COLOR   |
|---------------------|----------------------------|------------------|---------|
| Fortus 380mc        | 0.013 inch (0.330 mm)      | SR-110           | ■ Black |
| Fortus 450mc        | 0.010 inch (0.254 mm)      |                  |         |
| Fortus 900mc        | 0.007 inch (0.178 mm)      |                  |         |

<sup>1</sup>Conditioned = 20 °C and 50% RH for 72 hours  
<sup>\*\*</sup>Unconditioned (Dry) = Direct from FDM system  
— Annealed = 2 hours @ 140 °C  
— Unannealed = direct from FDM system

The information presented are typical values intended for reference and comparison purposes only. They should not be used for design specifications or quality control purposes. End-use material performance can be impacted (+/-) by, but not limited to, part design, end-use conditions, test conditions, etc. Actual values will vary with build conditions. Tested parts were built on Fortus 400mc™ @ 0.010" (0.254 mm) slice. Product specifications are subject to change without notice.

The performance characteristics of these materials may vary according to application, operating conditions, or end use. Each user is responsible for determining that the Stratasys material is safe, lawful, and technically suitable for the intended application, as well as for identifying the proper disposal (or recycling) method consistent with applicable environmental laws and regulations. Stratasys makes no warranties of any kind, express or implied, including, but not limited to, the warranties of merchantability, fitness for a particular use, or warranty against patent infringement.

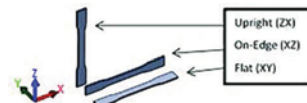
<sup>1</sup>Literature value unless otherwise noted.

Orientation: See Stratasys Testing white paper for more detailed description of build orientations.

XZ = X or "on edge"

XY = Y or "flat"

ZX = or "upright"



STRATASYS.COM  
ISO 9001:2008 Certified

#### HEADQUARTERS

7665 Commerce Way, Eden Prairie, MN 55344  
+1 888 480-3548 (US Toll Free)  
+1 952 937-3000 (Intl)  
+1 952 937-0070 (Fax)

1 Holtzman St., Science Park, PO Box 2496  
Rehovot 76124, Israel  
+972 74 745-4000  
+972 74 745-5000 (Fax)