A WIDE RANGE OF POSSIBILITIES
Our thermally-stable selective laser sintering technology is designed to work with premium powders allowing for access to new applications with great promise for your industry and with impressive performance with regards to mechanical, physical and aesthetic properties.

INNOVATION AND EXPERTISE
Prodways has a team of experts with the knowledge and experience to push materials technology into new territory. In addition, strong partnerships with established materials developers has allowed Prodways to be even more effective at providing innovative solutions for rapid manufacturing applications.
### Laser sintering materials have been developed by Prodways and our partners to work in combination with ProMaker printers, offering an effective additive manufacturing solution for many applications, including functional prototyping and industrial needs.

#### Essential materials
- **PA11-SX 1350**
  - Fine granulometry
  - High burst resistance
  - Precise feature control
  - Excellent thermal distortion stability
  - High performance functional parts requiring high accuracy, strength and thermal distortion stability in automotive, aerospace, medical, motor components, air intake systems, door handles, etc.

- **PA11-SX 1450**
  - Fine granulometry
  - Simulated to injected Polyamide-6 or Polyamide-66
  - Resistance in extreme temperatures
  - Low shrinkage, adapted for big parts
  - High tensile modulus and strength
  - Excellent thermal distortion stability
  - Mechanical parts in the engine compartment, complex end-use parts for a wide range of applications from Automotive to Military Industries

- **PA11-GF 3450**
  - Fine granulometry
  - Resistance in extreme low and high temperatures
  - Low porosity, UV stable
  - High recyclability for lower operation costs
  - Mechanical parts in engine resisting temperature parts for pumps, complex end-use parts with improved strength properties for a wide range of applications.

- **Ultrastat PA6 - X028**
  - Excellent thermal distortion stability
  - High tensile modulus and strength
  - High burst resistance
  - Precise feature control
  - Processing at 220°C on Prodways high temperature printers.

#### Advanced materials
- **PP 1200**
  - High resolution
  - Precise feature control
  - Excellent surface finish
  - High tensile modulus and strength
  - Mechanical parts in the engine compartment, complex end-use parts for a wide range of applications from Automotive to Military Industries

- **PA12-L 1600**
  - Fine granulometry
  - High burst resistance
  - Precise feature control
  - Processing at 220°C on Prodways high temperature printers.

- **PA12-S 1550**
  - Fine granulometry
  - High burst resistance
  - Precise feature control
  - Processing at 220°C on Prodways high temperature printers.

- **PA12-GFX 2550**
  - High burst resistance
  - Precise feature control
  - Processing at 220°C on Prodways high temperature printers.

#### Typical Application Examples

<table>
<thead>
<tr>
<th>Specification</th>
<th>PA11-SX 1350</th>
<th>PA11-SX 1450</th>
<th>PA11-GF 3450</th>
<th>Ultrastat PA6 - X028</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical Application Examples</td>
<td>Mechanical parts in engine, fuel or oil tanks, complex end-use parts with snap fit and living hinges for a wide range of applications from Aerospace to Automotive industry</td>
<td>End-use parts for Medical and Dental industries: orthotics, prosthetics, surgical tools, drills, guides, etc...</td>
<td>Mechanical parts in the engine compartment, complex end-use parts for a wide range of applications from Automotive to Military Industries</td>
<td>High performance functional parts requiring high accuracy, strength and thermal distortion stability in automotive, aerospace, medical, motor components, air intake systems, door handles, etc.</td>
</tr>
</tbody>
</table>

#### Table

<table>
<thead>
<tr>
<th>Property</th>
<th>PA11-SX 1350</th>
<th>PA11-SX 1450</th>
<th>PA11-GF 3450</th>
<th>Ultrastat PA6 - X028</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Matte Black</td>
<td>Natural + mass coloring Black/Blue/Red/Grey</td>
<td>Light grey</td>
<td>White or black</td>
</tr>
<tr>
<td>Average particle size</td>
<td>50 µm</td>
<td>50 µm</td>
<td>N.A.</td>
<td>N.A.</td>
</tr>
<tr>
<td>Bulk Density</td>
<td>0.53 g/cm³</td>
<td>0.53 g/cm³</td>
<td>0.56 g/cm³</td>
<td>N.A.</td>
</tr>
<tr>
<td>Density of parts</td>
<td>1.02 g/cm³</td>
<td>1.02 g/cm³</td>
<td>1.04 g/cm³</td>
<td>N.A.</td>
</tr>
<tr>
<td>Moisture absorption</td>
<td>1.13% (ASTM D570)</td>
<td>1.12% (ASTM D570)</td>
<td>0.85% (ASTM D570)</td>
<td>N.A.</td>
</tr>
<tr>
<td>Melting Point</td>
<td>199 °C</td>
<td>200 °C</td>
<td>200 °C</td>
<td>210°C</td>
</tr>
<tr>
<td>Heat Deflection 1.8 MPa</td>
<td>46°C (ASTM D648)</td>
<td>47°C (ASTM D648)</td>
<td>153°C (ASTM D648)</td>
<td>100°C</td>
</tr>
<tr>
<td>Tensile Stress</td>
<td>45 MPa</td>
<td>45 MPa</td>
<td>33 MPa</td>
<td>78 MPa</td>
</tr>
<tr>
<td>Tensile Modulus</td>
<td>1350 MPa</td>
<td>1450 MPa</td>
<td>3450 MPa</td>
<td>3550 MPa</td>
</tr>
<tr>
<td>Elongation @ break (03)</td>
<td>45%</td>
<td>45%</td>
<td>12%</td>
<td>13%</td>
</tr>
<tr>
<td>Elongation @ break (05)</td>
<td>21%</td>
<td>21%</td>
<td>9%</td>
<td>5.2%</td>
</tr>
<tr>
<td>Flexural Stress</td>
<td>N.A.</td>
<td>N.A.</td>
<td>N.A.</td>
<td>N.A.</td>
</tr>
<tr>
<td>Flexural Modulus</td>
<td>1200 MPa</td>
<td>1300 MPa</td>
<td>2300 MPa</td>
<td>3300 MPa</td>
</tr>
<tr>
<td>Impact Strength (unnotched)</td>
<td>No break</td>
<td>No break</td>
<td>N.A.</td>
<td>12.6 kJ/m²</td>
</tr>
<tr>
<td>Shore Test</td>
<td>75 Shore D</td>
<td>74 Shore D</td>
<td>N.A.</td>
<td>N.A.</td>
</tr>
<tr>
<td>Resistivity domain</td>
<td>Insulator</td>
<td>Insulator</td>
<td>Antistatic</td>
<td>N.A.</td>
</tr>
<tr>
<td>Upper facing processed &amp; blasted, Surface Ra</td>
<td>9 µm</td>
<td>10 µm</td>
<td>11 µm</td>
<td>N.A.</td>
</tr>
<tr>
<td>Upper facing after finishing, Surface Ra</td>
<td>7 µm</td>
<td>8 µm</td>
<td>8 µm</td>
<td>N.A.</td>
</tr>
<tr>
<td>Testing standard / Certification</td>
<td>ISO</td>
<td>ISO / USP Class VI certification</td>
<td>ISO</td>
<td>ISO</td>
</tr>
<tr>
<td>By</td>
<td>Prodways Materials</td>
<td>Prodways Materials</td>
<td>Prodways Materials</td>
<td>Prodways Materials</td>
</tr>
</tbody>
</table>

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**Note:**
1. Performance characteristics of these materials may change according to product application, operating conditions, material combined or end use.
2. Reference reference inputs, void from reference.
3. Required composite printing PA11 mechanical properties.