PP•3D
Advanced materials
Repsol. A global multi-energy company

Over 8 decades of experience in the world of energy

One of the largest energy companies worldwide and one of the biggest private oil & gas companies.

Repsol is committed to our customers’ global strategy putting our entire organization at their disposal to achieve a common goal: to create long-term relationships which enable us to rise to the common challenges our business presents.

Over 90 countries where we market our products

Repsol has a diverse workforce of over 25,000 employees, marketing products in over 90 countries and reaching 10 million customers. Repsol’s highly integrated Chemical Division focuses its strategy on the continuous generation of value through differentiated products and services.

Repsol Campus, Corporate Headquarters in Madrid
LEED® Platinum certificate, awarded by the prestigious U.S. Green Building Council (USGBC), for new buildings construction

Chemicals
Over 1,500 references
Repsol manufactures a wide variety of products, ranging from base petrochemicals to derivatives

Base petrochemicals: ethylene, propylene, butadiene and benzene.

Intermediate products: styrene, propylene oxide, polyether polyols, and propylene glycols.

Polyolefins: polypropylene (PP) and PP compounds, both high and low-density polyethylene (HDPE and LDPE), metallocene linear low density polyethylene (mLLDPE), ethylene vinyl acetate (EVA) and ethylene butyl acrylate (EBA) copolymers.

I+D

Over 100 scientists and researchers working for you

Including qualified personnel specialised on Product Stewardship.

Repsol's commitment to R&D is an evidence of the company’s aim to attain business excellence to meet future horizons.

Added value
Repsol’s Chemicals Division, with a high degree of integration, focuses its strategy in the constant generation of value through differentiated products and services.
We revolve around our customers and we innovate with them in mind

Repsol advances in its commitment to innovation by developing new materials for 3D printing. The new range encompasses three materials that cover the primary needs of the FDM application and are available in pellet format.

Food contact grades

Our polymers meet most relevant EU and FDA regulations

Excellence is intrinsic to Repsol’s values. It infuses our daily work and helps guide our decisions and actions, contributing to achieve the commitment made to our customers, stakeholders, employees, suppliers, partners and society to build a better future.

We are the first polyolefin producer to have all our complexes certified according to the FSSC 22000 food safety standard.
3D printing FFF and FGF Technology

Recommended printing settings

<table>
<thead>
<tr>
<th>Nozzle temperature (°F)</th>
<th>Bed Temperature (°C)</th>
<th>Printing speed (mm/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>220-250</td>
<td>40-65</td>
<td>30-65</td>
</tr>
</tbody>
</table>

The new Repsol 3D printing FFF and FGF grades have been specifically developed to cover the highest requirements of the sectors that use filament technology FFF (Fused Filament Fabrication, also known as FDM) and FGF (Fused Granular Fabrication), and stand out for their excellent mechanical properties, processability, and stability.

This new range of modified polymers extends the possibilities of the additive technologies, and the manufacture of both prototypes and functional parts.
## 3D printing FFF and FGF Technology

### Portfolio

<table>
<thead>
<tr>
<th>Grade</th>
<th>Melt Flow</th>
<th>Flexural Modulus</th>
<th>Charpy</th>
<th>Key properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>P3D630FV</td>
<td>6,5</td>
<td>6200</td>
<td>16</td>
<td>30% chemically coupled fiber glass reinforced compound.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Very high stiffness, keeping good impact strenght</td>
</tr>
<tr>
<td>NEW</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3D820FM</td>
<td>20</td>
<td>2500</td>
<td>3</td>
<td>20% mineral load and high processability</td>
</tr>
<tr>
<td>NEW</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3D800F</td>
<td>20</td>
<td>950</td>
<td>62</td>
<td>Excellent impact resistance, nucleated and antistatic formulation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3D750FM</td>
<td>16</td>
<td>900</td>
<td>61</td>
<td>Excellent stiffness/impact balance, mineral fillers reinforced</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3D800FG</td>
<td>20</td>
<td>800</td>
<td>60</td>
<td>High impact resistance, excellent processability</td>
</tr>
</tbody>
</table>

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Repsol P3D630FV
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### 3D printing FFF and FGF Technology

**Repsol P3D630FV**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Melt Flow</th>
<th>Flexural Modulus</th>
<th>Charpy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NEW P3D630FV</strong></td>
<td>6,5</td>
<td>6200</td>
<td>16</td>
</tr>
<tr>
<td><strong>NEW P3D630FV (x-y)</strong></td>
<td>6,5</td>
<td>2800</td>
<td>13</td>
</tr>
<tr>
<td><strong>NEW P3D630FV (z)</strong></td>
<td>6,5</td>
<td>1100</td>
<td>4</td>
</tr>
</tbody>
</table>

The Repsol P3D630FV is 30% chemically coupled fiber–glass reinforced compound specifically indicated for applications that require excellent impact resistance, high rigidity, and low deformation and contraction behavior in which the main requirements are:

- Very high stiffness
- Good impact strength
- Low warpage and shrinkage behavior
- UV stabilization for outdoor applications

**Repsol P3D630FV** is suitable for technical pieces, functional prototypes, jigs, and fixtures for the automotive sector, among others.
3D printing FFF and FGF Technology

Repsol P3D820FM

<table>
<thead>
<tr>
<th>Grade</th>
<th>Melt Flow</th>
<th>Flexural Modulus</th>
<th>Charpy</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEW P3D820FM</td>
<td>20</td>
<td>2500</td>
<td>3</td>
</tr>
<tr>
<td>NEW P3D820FM (x-y)</td>
<td>20</td>
<td>2000</td>
<td>1.8</td>
</tr>
<tr>
<td>NEW P3D820FM (z)</td>
<td>20</td>
<td>1000</td>
<td>1.1</td>
</tr>
</tbody>
</table>

The Repsol P3D820FM with 20% mineral fillers is a reinforced polypropylene with medium melt flow rate, that offers high rigidity and very high dimensional stability and warping control maintaining a good level of impact and an optimal surface appearance. It contains UV stabilization and excellent scratch resistance, making it ideal for outdoor use.

Repsol P3D820FM is suitable for prototyping, tools, toys, footwear, automotive components, jewelry, and entertainment.
3D printing FFF and FGF Technology

Repsol P3D800F

<table>
<thead>
<tr>
<th>Grade</th>
<th>Melt Flow</th>
<th>Flexural Modulus</th>
<th>Charpy</th>
</tr>
</thead>
<tbody>
<tr>
<td>P3D800F</td>
<td>20</td>
<td>950</td>
<td>44</td>
</tr>
<tr>
<td>P3D800F (x-y)</td>
<td>20</td>
<td>800</td>
<td>66</td>
</tr>
<tr>
<td>P3D800F [z]</td>
<td>20</td>
<td>600</td>
<td>4</td>
</tr>
</tbody>
</table>

The Repsol P3D800F is a nucleated grade with excellent impact resistance designed for FDM technology. It provides high stability to the constructed parts such as:

- Automotive: prototypes, aesthetic parts, specific tools, etc.
- Aerospace: prototypes
- Technical components: toys, textiles, footwear, jewelery, leisure, etc.

Repsol P3D800F is specially indicated when main requirement is mechanical strength with good processability and aesthetic properties.

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3D printing FFF and FGF Technology

Repsol P3D750FM

<table>
<thead>
<tr>
<th>Grade</th>
<th>Melt Flow (ISO 1133)$^{(g/10')}$</th>
<th>Flexural Modulus (ISO 178 Mpa)</th>
<th>Charpy (ISO 179 [kJ/m²] at 23ºC notched)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P3D750FM</td>
<td>16</td>
<td>900</td>
<td>61</td>
</tr>
<tr>
<td>P3D750FM (x-y)</td>
<td>16</td>
<td>900</td>
<td>61</td>
</tr>
<tr>
<td>P3D750FM (z)</td>
<td>16</td>
<td>425</td>
<td>4</td>
</tr>
</tbody>
</table>

Repsol P3D750FM with mineral fillers reinforced and medium melt flow rate shows excellent stiffness/impact balance and good processability and stability.

Repsol P3D750FM is suitable for prototypes, tools, toys, jewelry and leisure.
Repsol P3D800FG
3D printing FFF and FGF Technology

Repsol P3D800FG

The Repsol P3D800FG grade is a high-performance thermoplastic with a fluidity of 20 g/10’, low density, high elasticity and high resistance to fatigue.

- Excellent flow properties
- Excellent processability and stability
- High impact strength
- High stiffness

<table>
<thead>
<tr>
<th>Grade</th>
<th>Melt Flow (ISO 1133 [g/10’])</th>
<th>Flexural Modulus (ISO 178 Mpa)</th>
<th>Charpy (ISO 179 [kJ/m²])</th>
</tr>
</thead>
<tbody>
<tr>
<td>P3D800FG</td>
<td>20</td>
<td>800</td>
<td>60</td>
</tr>
<tr>
<td>P3D800FG [x-y]</td>
<td>20</td>
<td>600</td>
<td>52</td>
</tr>
<tr>
<td>P3D800FG [z]</td>
<td>20</td>
<td>450</td>
<td>4</td>
</tr>
</tbody>
</table>

The Repsol P3D800FG mechanical properties make it an ideal material for 3D-printing applications which have to endure high stress or strain.
### 3D printing FFF and FGF Technology

**Repsol P3D800FG**

The P3D800FG grade is a **high-performance** with a **fluidity of 20 g/10'**, low density, high elasticity and high resistance to fatigue.

**Applications:**
- Prototypes
- Technical components
- Specific tools
- Toys

<table>
<thead>
<tr>
<th>Property</th>
<th>Commercial PP for FDM 1</th>
<th>Commercial PP for FDM 2</th>
<th>Repsol PP for FDM</th>
</tr>
</thead>
<tbody>
<tr>
<td>MFI, g/10' (230°C/2.16 kg)</td>
<td></td>
<td></td>
<td><strong>20</strong></td>
</tr>
<tr>
<td>Flexural Modulus (Mpa)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charpy Impact 23°C notched (KJ/m²)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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