DuPont™ Teflon® PTFE 62 fluoropolymer resin

Fine Powder Lubricated Extrusion Resin

Brand
Teflon® is a registered trademark of DuPont for its brand of fluoropolymer resins, which can only be licensed by DuPont for use in approved applications. Customers who wish to use the Teflon® trademark in connection with DuPont Fine Powder products under license from DuPont should contact (800) 262-2745. Without a license, customers may not identify their product as containing Teflon®, but may refer to the resin as PTFE 62.

Description
DuPont™ Teflon® PTFE 62 is a white powder composed of agglomerate particles. As with other grades of Teflon® polytetrafluoroethylene (PTFE) fine powders, it can be lubricated and extruded by pressure alone. This provides the capability for long lengths of products, such as tubing, and wire insulation, which cannot be melt extruded from PTFE resin.

Compared with other grades of PTFE fine powder, Teflon® PTFE 62 is a premium resin that has increased thermal stability, flex life, stress-crack resistance, and clarity. It is one of the most consistent processing resins, and can be used in the most demanding service conditions. It is most suitable for products with medium cross sections made by low- to medium-reduction ratio extrusions.

Properly processed products made from neat Teflon® PTFE 62 provide the superior properties typical of the fluoropolymer resins: retention of properties after service at 260°C (500°F), useful properties at −240°C (−400°F), chemical inertness to nearly all industrial chemicals and solvents, and low friction and antistick surfaces. Dielectric properties are outstanding and stable with frequency and temperature. Products have moderate stiffness and high ultimate elongation.

In a flame situation, products of Teflon® PTFE 62 resist ignition and do not themselves promote flame spread. When ignited by flame from other sources, their contribution of heat is small and with very little smoke.

Statements, or data, regarding behavior in a flame situation are not intended to reflect hazards presented by this or any other material when under actual fire conditions.

Teflon® PTFE 62 is ASTM D4895, Type I, Grade 4, Class B (ASTM D1457, Type III, Grade 2, Class B).

Typical End Products
Applications for Teflon® PTFE 62 include reinforced hose requiring the ultimate in reliability and performance in chemical service or with steam, hydraulic fluid, hydrocarbon fuel, or reactive gas; chemical linings for pipe and valves; and film and tape fabricated into products such as flexible tubing, ducts, or diaphragms for chemical service.

FDA Compliance
Properly processed products (sintered at high temperatures common to the industry) made from Teflon® PTFE 62 resin can qualify for use in contact with food in compliance with FDA Regulation 21 CFR 177.1550.
Processing

Teflon® PTFE 62 is prepared for extrusion by mixing with a liquid extrusion aid. The damp powder is compressed into a cylindrical preform slug and placed in the cylinder of a ram-type extruder. Under high pressure, the composition is forced through a finishing die to produce beading, tubing, or coatings. Dissimilar materials, such as metal wire or high-temperature fibers, can be coated by feeding them through the axis of the extruder barrel.

After extrusion, the product is a low-density, but coherent, fibrous structure. Teflon® PTFE 62 is usually processed further, with heat, into a solid resin product such as tubing.

Heat is applied in two steps, which may be taken in-line with extrusion or separately. The lubricant must be removed first, usually by heating within the range of 100–300°C (212–572°F). A sintering step follows to melt the neat resin above its crystalline melting point of approximately 342°C (648°F) and produce a void-free, solid product of PTFE resin. When performed in-line, the heating steps determine the maximum line speed.

Reduction ratio (RR) is the ratio of cross section of preform to that of extrudate; it is an extruder option also affecting the selection of resin grade.

Safety Precautions

WARNING!

VAPORS CAN BE LIBERATED THAT MAY BE HAZARDOUS IF INHALED


Open and use containers in well-ventilated areas using local exhaust ventilation (LEV). Vapors and fumes liberated during hot processing, or from smoking tobacco or cigarettes contaminated with Teflon® PTFE 62, may cause flu-like symptoms (chills, fever, sore throat) that may not occur until several hours after exposure and pass within 36 to 48 hr. Vapors and fumes liberated during hot processing should be exhausted completely from the work area; contamination of tobacco with polymers should be avoided. Mixtures with some finely divided metals, such as magnesium or aluminum, can be flammable or explosive under some conditions.

Flammable liquid extrusion aids can cause fires in ovens and in mixing areas. Before using, obtain manufacturer’s recommendations.

Storage and Handling

Teflon® PTFE 62 must be handled carefully to avoid shearing the powder prior to extrusion. Fibrillation by shearing is not reversible, and damaged particles can appear as defects in the finished product. As temperature is reduced, the powder becomes progressively less sensitive to mechanical damage or compaction in its containers.

Fine powder can withstand significantly more abuse when it is in the below room temperature transition state. For this reason, DuPont stores and delivers Teflon® PTFE 62 at or below 7°C (45°F). Teflon® PTFE 62 will remain in this cold transition state until it is warmed above 15°C (60°F). If this resin is allowed to go above 19°C (66°F) at any time, it must be cooled below about 8°C (47°F) to bring it back to the cold state.
### Table 1
Typical Property Data for DuPont™ Teflon® PTFE 62 Fluoropolymer Resin

<table>
<thead>
<tr>
<th>Property</th>
<th>ASTM Test Method</th>
<th>Unit</th>
<th>Nominal Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulk Density</td>
<td>D4895</td>
<td>g/L</td>
<td>465</td>
</tr>
<tr>
<td>Average Particle Size</td>
<td>D4895</td>
<td>µm</td>
<td>490</td>
</tr>
<tr>
<td>Standard Specific Gravity</td>
<td>D4895</td>
<td>—</td>
<td>2.15</td>
</tr>
<tr>
<td>Rheometer Pressure*</td>
<td>D4895</td>
<td>MPa(ksi)</td>
<td>26.9(3,900)</td>
</tr>
<tr>
<td>Melting, Peak Temperature</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial</td>
<td>D4895</td>
<td>°C (°F)</td>
<td>342 (648)</td>
</tr>
<tr>
<td>Second</td>
<td>D4895</td>
<td>°C (°F)</td>
<td>327 (621)</td>
</tr>
</tbody>
</table>

Typical properties are not suitable for specification purposes.

*Reduction Ratio 400:1

All processing steps prior to preforming are facilitated at reduced temperature, but ambient dew point must be controlled to prevent condensation on the resin.

Storage and handling facilities should be clean. The high sintering temperature causes even very small foreign particles to become visible or to make defects in finished products. Keep resin drums closed and clean. Good housekeeping and careful handling are essential.

**Freight Classification**

*Plaslon® PTFE 62, when shipped by rail or express, is classified “Plastics, Synthetic, O.T.L., NOIBN.” Resin shipped by truck is classified “Plastics, Materials Granules.”*

**Packaging**

*Plaslon® PTFE 62 resin is packaged in 25-kg (55.1-lb) plastic containers.*
The information set forth herein is furnished free of charge and is based on technical data that DuPont believes to be reliable. It is intended for use by persons having technical skill, at their own discretion and risk. The handling precaution information contained herein is given with the understanding that those using it will satisfy themselves that their particular conditions of use present no health or safety hazards. Because conditions of product use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information. As with any material, evaluation of any compound under end-use conditions prior to specification is essential. Nothing herein is to be taken as a license to operate under or a recommendation to infringe any patents.

CAUTION: Do not use in medical applications involving permanent implantation in the human body. For other medical applications, see “DuPont Medical Caution Statement,” H-50102.

Copyright © 2005 DuPont or its affiliates. All rights reserved. The DuPont Oval Logo, DuPont™, The miracles of science™ and Teflon® are registered trademarks or trademarks of DuPont or its affiliates.

NO PART OF THIS MATERIAL MAY BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM OR BY ANY MEANS ELECTRONIC, MECHANICAL, PHOTOCOPYING, RECORDING OR OTHERWISE WITHOUT THE PRIOR WRITTEN PERMISSION OF DUPONT.