

DuPont™ Tefzel® 280

fluoropolymer resin

Extrusion and Molding Resin

Description

DuPont™ *Tefzel*® 280 fluoropolymer is a premium resin available in translucent, 2.5-mm (0.1-in) pellets. Compared with other grades of *Tefzel*®, its most unique features are a relatively low flow rate, a greatly enhanced flex life, and resistance to environmental stress.

Tefzel® 280 and the other *Tefzel*® fluoropolymers are melt processible, modified copolymers of ethylene and tetrafluoroethylene. They are high-performance resins that can be processed at relatively high rates compared with fluorocarbon resins. They are mechanically tough and offer an excellent balance of properties.

Tefzel® 280 is preferred for applications where other thermoplastics are lacking in mechanical toughness, broad thermal capability, ability to meet unusual thermal, mechanical, and chemical environmental extremes, or limited by fabricating problems. Examples are components and linings for the chemical industry and molded parts with metal inserts of thick sections for use at high temperatures.

Properly processed products made from neat *Tefzel*® 280 are inert to most solvents and chemicals, hydrolytically stable, and weather resistant. Recommended upper service temperature is 150°C (302°F); useful properties are retained at cryogenic ranges. The level and stability of dielectric properties are excellent and the UL94 method flame rating is V-0. They are resistant to environmental stress cracking and have outstanding impact strength, cut-through and abrasion resistance. High-energy radiation resistance meets IEEE 383 and the resin is approved for nuclear power plant use.

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.

Typical End Products

Tefzel® 280 is ideal for many end products, including chemical service items, such as lined valves and fittings, pump housings and impellers, column packings and other abrasion resistant linings; high temperature electrical components and insulation; fasteners, corrugated tubing and duct work; and film.

Processing

Tefzel® 280 can be processed by conventional melt-extrusion techniques and by injection, compression, transfer, and blow molding processes. Compared with other grades of *Tefzel*®, processing will be at a slower rate. Also, the melt viscosity of all grades of *Tefzel*® is reduced with increasing shear rate, thus permitting the use of pressure extrusions through narrow dies without requiring appreciable draw-down. Reciprocating screw injection molding machines are preferred. Corrosion-resistant metals should be used in contact with molten resin. Extruder barrels should be long, relative to diameter, to provide residence time for heating the resin to approximately 340°C (640°F).

Safety Precautions

WARNING!

VAPORS CAN BE LIBERATED THAT MAY BE HAZARDOUS IF INHALED.

Before using *Tefzel*® 280, read the Material Safety Data Sheet and the detailed information in the "Guide to the Safe Handling of Fluoropolymer Resins," latest edition, published by the Fluoropolymers Division of The Society of the Plastics Industry—available from DuPont.



Open and use containers only in well-ventilated areas using local exhaust ventilation (LEV). Vapors and fumes liberated during hot processing, or from smoking tobacco or cigarettes contaminated with *Tefzel*[®] 280, may cause flu-like symptoms (chills, fever, sore throat) that may not occur until several hours after exposure and typically pass within about 24 hours. 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.

Storage and Handling

The properties of *Tefzel*[®] 280 resins are not affected by storage time. Ambient storage conditions should be designed to avoid airborne contamination and the formation of water condensation on the resin when it is removed from containers.

Packaging

Tefzel[®] fluoropolymer resins are packaged in 20.3-kg (45-lb) multilayer kraft bags with an integral polyethylene liner and in 149-kg (330-lb) drums with polyethylene liners.

Freight Classification

Tefzel[®], when shipped by rail or express, is classified "Plastics, Synthetic, O.T.L., NOIBN." Resin shipped by truck is classified "Plastics, Materials O.T.F.C.E. or S. Granules."

Table 1
Typical Property Data for DuPont™ Tefzel® Fluoropolymer Resin Grade 280

Property	Test Method	Unit	Nominal Value
Thermal			
Nominal Melting Point	ASTM D3159	°C (°F)	255–280 (491–536)
Flow Rate	ASTM D3159	g/10 min	4
Upper Service Temperature	UL746	°C (°F)	150 (302)
Mechanical			
Tensile Strength, 23°C (73°F)	ASTM D3159	MPa (psi)	47 (6,700)
Specific Gravity	ASTM D792	—	1.7
Ultimate Elongation, 23°C (73°F)	ASTM D3159	%	300
Flexural Modulus, 23°C (73°F)	ASTM D790	MPa (psi)	1,200 (170,000)
Impact Strength, 23°C (73°F)	ASTM D256	J/m (ft-lb/in)	No Break
Hardness Durometer	ASTM D2240	Shore D	72
Compressive Strength	ASTM D695	MPa (psi)	38 (5,500)
Linear Coefficient of Expansion, 0–100°C (32–212°F)	ASTM E831	mm/mm/°C (in/in/°F)	13.3 x 10 ⁻⁵ (7.4 x 10 ⁻⁵)
Electrical			
Dielectric Strength, 0.25 mm (0.010 in)	ASTM D149	kV/mm (V/0.001 in)	70 (1,800)
Dielectric Constant, 1 MHz, 23°C (73°F)	ASTM D1531	—	2.5–2.6
Dissipation Factor, 1 MHz, 23°C (73°F)	ASTM D1531	—	0.0072
Volume Resistivity	ASTM D257	ohm-m (ohm-cm)	1 x 10 ³ (1 x 10 ¹⁷)
Arc Resistance	ASTM D495	sec	122
General			
Water Absorption, 24 hr	ASTM D570	%	0.007
Weather and Chemical Resistance	—	—	Excellent
Limiting Oxygen Index	ASTM D2863	%	30–32

Note: Typical properties are not suitable for specification purposes.

Tefzel® 280 is ASTM D3159 Type I, Grade 1.

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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.

