DuPont™ Tefzel® 200

fluoropolymer resin

Extrusion and Molding Resin

Description

DuPont™ *Tefzel*® fluoropolymer 200 is a general-purpose resin available in translucent, 2.5-mm (0.1-in.) pellets. Compared to other grades of *Tefzel*®, its most unique features are an intermediate flow rate and a balance of properties that make it suitable for a variety of processes and demanding end uses.

Tefzel® 200 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 to fluorocarbon resins. They are mechanically tough and offer an excellent balance of properties.

Tefzel® 200 can perform successfully in applications where other thermoplastics are lacking in mechanical toughness, broad thermal capability, ability to meet difficult environmental conditions, or limited by fabricating problems.

Properly processed products made from virgin *Tefzel*® 200 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 flame rating is V-0 by the UL94 method. Mechanical properties include 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® 200 is ideal for many end products, including electrical components, such as sleeving, coil forms, sockets, connectors and switches; lab ware, such as tubing, valves, containers and dishes; battery or instrument components that require chemical inertness; chemical service items, such as valve components, seal glands, pipe plugs and corrugated tubing; and film.

Processing

Tefzel® 200 can be processed by conventional, melt-extrusion techniques and by injection, compression, transfer and blow molding processes. Compared to other grades of *Tefzel*®, it provides intermediate processing rates. 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 345°C (650°F).

Safety Precautions

WARNING!

VAPORS CAN BE LIBERATED THAT MAY BE HAZARDOUS IF INHALED.

Before using *Tefzel*® 200, 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.

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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*® 200, 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*® 200 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 200

Property	Test Method	Unit	Value
Thermal Properties			
Nominal Melting Point	ASTM D3159	°C (°F)	255–280 (491–536)
Flow Rate	ASTM D3159	g/10 min	7
Upper Service Temperature	UL746	°C (°F)	150 (302)
Mechanical Properties			
Tensile Strength, 23°C (73°F)	ASTM D3159	MPa (psi)	45 (6,500)
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	67
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)	13.1×10^{-5} (7.3×10^{-5})
Electrical Properties			
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	—	0.00308
Volume Resistivity	ASTM D257	ohm·m (ohm·cm)	1×10^{3} (1×10^{17})
Arc Resistance	ASTM D495	seconds	122
General Properties			
Water Absorption, 24 h	ASTM D570	%	0.007
Weather and Chemical Resistance	—	—	Excellent
Limiting Oxygen Index	ASTM D2863	%	30–32

Typical properties are not suitable for specification purposes.

Tefzel® 200 is ASTM D3159 Type I, Grade 1.

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