

DuPont™ Tefzel® HT-2181

fluoropolymer resin

Description

DuPont™ *Tefzel*® HT-2181 fluoropolymer resin is a general-purpose resin available in translucent, 2.5-mm (0.1-in) pellets. Compared with 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. **Table 1** shows typical property data for *Tefzel*® HT-2181.

Tefzel® HT-2181 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 other fluorocarbon resins. They are mechanically tough and offer an excellent balance of properties.

Tefzel® HT-2181 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 neat *Tefzel*® HT-2181 are inert to most solvents and chemicals, hydrolytically stable, and weather-resistant. The recommended upper service temperature is 155°C (311°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.

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® HT-2181 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® HT-2181 can be processed by conventional melt-extrusion techniques and by injection, compression, transfer, and blow-molding processes. Compared with 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 340°C (640°F).

Safety Precautions

WARNING!

VAPORS CAN BE LIBERATED THAT MAY BE HAZARDOUS IF INHALED.

Before using *Tefzel*® HT-2181, 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*® HT-2181, may cause flu-like symptoms (chills, fever, sore throat) that may not occur until several hours after exposure and that 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*® HT-2181 resins are not affected by storage time. Ambient storage conditions should be designed to avoid airborne contamination and formation of water on the resin when it is removed from containers.

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."

Packaging

Tefzel® fluoropolymer resins are packaged in 20.3-kg (45-lb) multilayer, kraft bags with an integral polyethylene liner.



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Table 1
Typical Property Data for DuPont™ Tefzel® Fluoropolymer Resin Grade HT-2181

Property	Test Method	Unit	Value
Thermal			
Nominal Melting Point	ASTM D3418	°C (°F)	255–280 (491–536)
Flow Rate	ASTM D3159	g/10 min	6
Upper Service Temperature	UL746	°C (°F)	155 (311)
Mechanical			
Tensile Strength, 23°C (73°F)	ASTM D638	MPa (psi)	40 (6,100)
Specific Gravity	ASTM D792	—	1.7
Ultimate Elongation, 23°C (73°F)	ASTM D638	%	300
Flexural Modulus, 23°C (73°F)	ASTM D790	MPa (psi)	1,000 (145,000)
Impact Strength, 23°C (73°F)	ASTM D256	J/m (ft-lb/in)	No Break
Linear Coefficient of Expansion 0–100°C (32–212°F)	ASTM D696	mm/mm/°C (in/in/°F)	13.1 x 10 ⁻⁵ (7.3 x 10 ⁻⁵)
Electrical			
Dielectric Strength, 0.25 mm (0.010 in)	ASTM D150	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	—	0.0060
Volume Resistivity	ASTM D257	ohm-m (ohm-cm)	1 x 10 ³ (1 x 10 ¹⁷)
General			
Water Absorption, 24 hr	ASTM D570	%	0.007
Weather and Chemical Resistance	—	—	Excellent
Limiting Oxygen Index	ASTM D2863	%	30–32
Bulk Density	DuPont	g/L	1,300
Hardness	ASTM D2240	Shore D	67
Compressive Strength, 23°C (73°F)	ASTM D695	MPa	17
Flame Rating	UL94	—	V-0
Arc Resistance	ASTM D495	sec	122

Note: Typical properties are not suitable for specification purposes.

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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.



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