

# Tefzel™ ETFE HT-2181

## Fluoroplastic Resin

### Product Information

#### Description

Tefzel™ ETFE HT-2181 is a general-purpose fluoroplastic 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™ ETFE HT-2181.

Tefzel™ ETFE HT-2181 and the other Tefzel™ fluoroplastics 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™ ETFE 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™ ETFE 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.

#### Processing

Tefzel™ ETFE HT-2181 can be processed by conventional melt-extrusion techniques and 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).

#### Typical End Products

Tefzel™ ETFE 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.

#### Safety Precautions

Before using Tefzel™ ETFE HT-2181, refer to the Safety Data Sheet and the latest edition of "The Guide to the Safe Handling of Fluoropolymer Resins," published by The Society of the Plastics Industry, Inc. ([www.fluoropolymers.org](http://www.fluoropolymers.org)) or by PlasticsEurope ([www.plasticseurope.org](http://www.plasticseurope.org)).

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™ ETFE HT-2181, may cause flu-like symptoms (chills, fever, sore throat) that may not occur until several hours after exposure and typically pass within about 24 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.

## Storage and Handling

The properties of Tefzel™ ETFE 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.

## Packaging

Tefzel™ fluoroplastic resins are packaged in 20.3-kg (45-lb) plastic bags.

**Table 1. Typical Property Data for Tefzel™ ETFE HT-2181 Fluoroplastic Resin**

Property	Test Method*	Unit	Value
<b>Thermal</b>			
Nominal Melting Point	D3418	°C (°F)	255–280 (491–536)
Flow Rate	D3159	g/10 min	6
Upper Service Temperature	UL746	°C (°F)	155 (311)
<b>Mechanical</b>			
Tensile Strength, 23 °C (73 °F)	D638	MPa (psi)	40 (6,000)
Specific Gravity	D792	—	1.7
Ultimate Elongation, 23 °C (73 °F)	D638	%	300
Flexural Modulus, 23 °C (73 °F)	D790	MPa (psi)	1,000 (145,000)
Impact Strength, 23 °C (73 °F)	D256	J/m (ft-lb/in)	No Break
Linear Coefficient of Expansion, 0–100 °C (32–212 °F)	D696	mm/mm/°C (in/in/°F)	13.1 × 10 <sup>-5</sup> (7.3 × 10 <sup>-5</sup> )
<b>Electrical</b>			
Dielectric Strength, 0.25 mm (0.010 in)	D150	kV/mm (V/0.001 in)	70 (1,800)
Dielectric Constant, 1 MHz, 23 °C (73 °F)	D1531	—	2.5–2.6
Dissipation Factor, 1 MHz, 23 °C (73 °F)	D1531	—	0.0060
Volume Resistivity	D257	ohm·m (ohm·cm)	1 × 10 <sup>15</sup> (1 × 10 <sup>17</sup> )
<b>General</b>			
Water Absorption, 24 hr	D570	%	0.007
Weather and Chemical Resistance	—	—	Excellent
Limiting Oxygen Index	D2863	%	30–32
Bulk Density	Chemours	g/L	1,300
Hardness	D2240	Shore D	67
Compressive Strength, 23 °C (73 °F)	D695	MPa	17
Flame Rating	UL94	—	V-0
Arc Resistance	D495	sec	122

\*ASTM method, unless otherwise specified

Note: Typical properties are not suitable for specification purposes.

Tefzel™ ETFE HT-2181 meets the requirements of ASTM D3159, Type I, Grade 1.

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## For more information, contact us.

Shenzhen Chuangxin Plastic Technology Co., Ltd.

Tel : +86 18676057437 E-mail : [xl1797110736@163.com](mailto:xl1797110736@163.com)

[https://www.cxinplas.com](http://www.cxinplas.com)