



# Teflon™ PFA 945HP Plus

## Molding and Extrusion Resin

### Product Information

For inventory control purposes, product name may be followed by an X.

Products labeled PFA 945HP Plus and PFA 945HP Plus X are equivalent, and all information in this document is applicable to both.

#### Typical Applications

With a typical MIT folding endurance of 800,000\* cycles, Teflon™ PFA 945HP Plus is designed to withstand repeated flexing and aggressive chemical stress-cracking agents. Applications for Teflon™ PFA 945HP Plus include fluid handling components for high-performance chemical delivery systems, as well as tubing, unsupported pipe linings for the production of ultra-pure chemicals, and semiconductor components where purity in the parts-per-billion range is critical.

#### Description

Teflon™ PFA 945HP Plus is a premium fluoroplastic resin available in pellet form. Teflon™ PFA 945HP Plus possesses the same exceptional chemical resistance, high purity, and protection against ionic contamination as Teflon™ PFA HP grades with the added benefits of improved flex life (typical MIT flex of 800,000\*) and chemical stress-crack resistance. Teflon™ PFA 945HP Plus meets the increasingly stringent requirements for ultra-reliable and non-contaminating parts, as well as unmatched HCl permeation resistance. The improved flex life and chemical resistance will reduce the cost of ownership of high purity fluid handling systems by reducing downtime caused by mechanical or chemical stresses. Additionally, parts molded with Teflon™ PFA 945HP Plus have improved clarity and a smooth finish, which can further help prevent buildup of microbial contamination in water handling systems. **Table 1** shows the typical property data for Teflon™ PFA 945HP Plus.

This special purpose resin has a mid-range melt flow rate (typical MFR of 7), which permits relatively high extrusion speed and easier processing. The enhanced resistance to environmental stress-cracking makes Teflon™ PFA 945HP Plus a preferred resin when extended service is required in hostile environments involving chemical, thermal, and mechanical stress. Additionally, the enhanced purity of Teflon™ PFA 945HP Plus makes it suitable for applications that require improved color, lower extractable fluorides, and freedom from other foreign materials. This product contains no additives and is designed for hostile chemical environments where purity in the parts-per-billion range is needed. Examples are in semiconductor manufacture, fluid handling systems for industry or life sciences, and instrumentation for precise measurements of fluid systems. Teflon™ PFA 945HP Plus combines the processing ease of conventional thermoplastics with the properties similar to those of polytetrafluoroethylene.

With Teflon™ PFA 945HP Plus, components can last longer under dynamic loads and resist damage caused by ozonated fluids and fluorosurfactants. Combined with excellent chemical, permeation, and stress-crack resistance, this durability leads to a reduced cost of ownership. The high purity and fully fluorinated molecule end groups of Teflon™ PFA HP Plus can reduce contamination to protect process yields.

Properly processed products made from neat Teflon™ PFA 945HP Plus resin provide the superior properties characteristic of fluoroplastic resins: chemical inertness, exceptional dielectric properties, heat resistance, toughness and flexibility, low coefficient of friction, non-stick

characteristics, negligible moisture absorption, low flammability, performance at temperature extremes, and excellent weather resistance.

In a flame situation, products of Teflon™ PFA 945HP Plus resist ignition and do not promote flame spread. When ignited by flame from other sources, their contribution of heat is very small and added at a slow rate with very little smoke.

#### Processing

Teflon™ PFA 945HP Plus can be processed by conventional melt extrusion, and by injection, compression, and transfer molding processes. High melt strength and heat stability permit the use of relatively large die openings and high temperature draw-down techniques that increase production rates. Reciprocating screw injection molding machines are preferred. Corrosion-resistant metals should be used in contact with molten fluoroplastic resin. Extruder barrel should be long, relative to diameter, to provide residence time for heating the resin to approximately 380 °C (716 °F). For more detailed processing information, including recommended draw-down ratios, consult your Chemours representative.

#### Safety Precautions

WARNING! VAPORS CAN BE LIBERATED THAT MAY BE HAZARDOUS IF INHALED.

Before using Teflon™ PFA 945HP Plus resin, 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 of Teflon™ PFA 945HP Plus should be exhausted completely from the work area. Contamination of tobacco with these polymers must be avoided. Vapors and fumes liberated during hot processing that are not properly exhausted, or from smoking tobacco or cigarettes contaminated with Teflon™ PFA 945HP Plus, may cause flu-like symptoms, such as chills, fever, and sore throat. This may not occur until several hours after exposure and will typically pass within about 24 hours. Mixtures with some finely divided metals, such as magnesium or aluminum, can be flammable or explosive under some conditions.

#### Food Contact Compliance

Properly processed products made from Teflon™ PFA 945HP Plus resin can qualify for use in contact with food in compliance with FDA Inventory of Effective Food Contact Substance (FCS) Notification # 948. For details and information, please contact your Chemours representative.

#### Storage and Handling

Special product isolation and packaging procedures are used by Chemours to eliminate external contamination of Teflon™ PFA 945HP Plus resin. Processors also must avoid contamination for successful production of high purity products. The properties of Teflon™ PFA 945HP Plus resin are not affected by storage time. Ambient storage conditions should be designed to avoid airborne contamination and water condensation on the resin when it is removed from containers.

#### Freight Classifications

Teflon™ PFA 945HP Plus resin is classified as "Plastics, Materials, Pellets."

#### Packaging

Teflon™ PFA 945HP Plus is supplied as pellets and is available in 25-kg multilayer bags with an integral polyethylene liner.



**Table 1: Typical Property Data for Teflon™ PFA 945HP Plus**

Property	Test Method		Unit	Typical Value
<b>GENERAL</b>				
Melt Flow Rate	ISO 12086	ASTM D3307	g/10 min	7
Melting Point	—	ASTM D4591	°C (°F)	290 (554)
Specific Gravity	—	ASTM D792	—	2.15
Critical Shear Rate, 372 °C (702 °F)	—	—	1/s	21
<b>MECHANICAL</b>				
Tensile Strength	ISO 12086	ASTM D3307	MPa (psi)	
23 °C (73 °F)				28 (4,100)
200 °C (392 °F)				13 (1,900)
Ultimate Elongation	ISO 12086	ASTM D3307	%	
23 °C (73 °F)				290
200 °C (392 °F)				450
Flexural Modulus	ISO 178	ASTM D790	MPa (psi)	
23 °C (73 °F)				600 (87,000)
200 °C (392 °F)				55 (8,000)
MIT Folding Endurance (0.20 mm, 8 mil film)	—	ASTM D2176 <sup>‡</sup>	Cycles	800,000*
Hardness Durometer	ISO 868	ASTM D2240	—	D55
<b>ELECTRICAL</b>				
Dielectric Strength, Short Time, 0.25 mm (0.010 in)	IEC 243	ASTM D149	kV/mm (V/mil)	80 (2,000)
Dielectric Constant, 1 MHz (10 <sup>6</sup> Hz)	IEC 250	ASTM D150	—	2.03
Dissipation Factor, 1 MHz (10 <sup>6</sup> Hz)	IEC 250	ASTM D150	—	<0.0002
Volume Resistivity	ISO 1325	ASTM D257	ohm-cm	10 <sup>18</sup>
<b>OTHER</b>				
Water Absorption, 24 hr	—	ASTM D570	%	<0.03
Weather and Chemical Resistance	—	—	—	Outstanding
Limiting Oxygen Index	ISO 4589	ASTM D2863	%	>95
Flammability Classification <sup>†</sup>	—	UL 94	—	V-0

\* Depending on fabrication conditions

‡ Historical standard

† These results are based on laboratory tests under controlled conditions and do not reflect performance under actual fire conditions; current rating is a typical theoretical value.

Note: Teflon™ PFA 945HP Plus meets the requirements of ASTM D3307, Type VI

Typical properties are not suitable for specification purposes.

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.

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