



# Teflon™ AF Solutions

## Amorphous Fluoropolymer Solutions

### Product Information

Product names may be followed by an X. Products labeled AF 1601 and AF 1601 X are equivalent, as are AF 2400 and AF 2400 X.

#### Description

Teflon™ AF is a family of amorphous fluoropolymers. These materials are similar to other amorphous polymers in optical clarity and mechanical properties, including strength, but also perform like fluoropolymers in their performance over a wide range of temperatures, outstanding electrical properties, and chemical resistance. Teflon™ AF solutions are made of Teflon™ AF amorphous fluoropolymer dissolved in Fluorinert® FC-40.

#### Applications

Teflon™ AF can be used as a low-refractive-index coating or covering for optical devices, including those that must operate over a wide temperature range and in chemically aggressive environments. Teflon™ AF offers a high level of transmission throughout the optical spectrum from infrared through ultraviolet.

In electronics, Teflon™ AF may be used in optoelectronic devices, where its optical clarity, temperature resistance, and dielectric properties are beneficial.

#### Processing

Teflon™ AF 1601 is supplied as a 6% and 18% solution in Fluorinert® FC-40 (boiling point, 155 °C [311 °F]). Teflon™ AF 2400 is supplied as a 1% solution in Fluorinert® FC-40. These solutions can be cast into thin or thick pinhole-free coatings by a variety of techniques, including spinning, spraying, brushing, and dipping.

Whichever coating methods are used, the coated product must be heated above the T<sub>g</sub> (160 °C [320 °F]) or (240 °C [464 °F]) to remove all solvent. This gives a smoother coating and improves the polymer's adherence to the surface. For additional information on adhesion, see the Chemours technical bulletin, "Adhesion Guide for Teflon™ AF"

#### Safety Precautions

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

Before using Teflon™ AF 1601 or Teflon™ AF 2400, read the Safety Data Sheet and the detailed information in the latest edition of the "Guide to the Safe Handling of Fluoropolymer Resins," published by the Fluoropolymers Division of The Society of the Plastics Industry ([www.plasticsindustry.org](http://www.plasticsindustry.org)) or by PlasticsEurope ([www.plasticseurope.org](http://www.plasticseurope.org)).

#### Handling Practices

Teflon™ AF resins may contain parts per million of residual hexafluoroacetone (HFA). Because HFA hydrates are readily absorbed through the skin, it is necessary to avoid skin contact with the resin during processing. Chemours recommends the use of protective gloves when handling resin during manufacturing operations.

Residual gases (including HF, COF<sub>2</sub>, CO, and HFA) that may be harmful diffuse from Teflon™ AF resins, even at room temperature. To avoid exposure, all resin containers should be opened and used only in well-ventilated areas using local exhaust ventilation (LEV).

#### Packaging and Storage

Developmental quantities of Teflon™ AF 1601 and Teflon™ AF 2400 solutions are packaged in 100 mL sealed glass containers with foamed/carton overpack. Packaging for production quantities will be designed to meet customer needs.

Teflon™ solutions are stable and do not have a shelf life. The solvent Fluorinert® FC-40 is thermally stable and resistant to hydrolysis. The boiling point of the solvent is 160 °C (320 °F). The polymer is thermally stable to very high temperatures and resistant to UV light. Package should be kept tightly closed at all times to prevent contamination from dust particles or other foreign substances.

**Table 1. Typical Property Data for Teflon™ AF Solution Grades**

Property	ASTM Method	Unit	Grade	
			1601	2400
<b>Electrical</b>				
Dielectric Constant	D150		1.93	1.90
Dissipation Factor	D150		0.0001–0.0002	0.0001–0.0003
<b>Optical</b>				
Optical Transmission	D1003	%	>95	>95
Refractive Index	D542		1.31	1.29
<b>Mechanical</b>				
Tensile Strength	D638	MPa		
23 °C (73 °F)			26.9 ± 1.5	26.4 ± 1.9
220 °C (428 °F)			7.7 ± 6.1	4.2 ± 1.8
Elongation at Break, 23 °C (73 °F)	D638	%	17.1 ± 5.0	7.9 ± 2.3
Tensile Modulus	D638	GPa	1.6	1.5
<b>Chemical</b>				
Contact Angle with Water	D570	Degrees	104	105
Critical Surface Energy		Dynes/cm	15.7	15.6
Chemical Resistance—Water Absorption		%	<0.01	<0.01
<b>Other</b>				
Glass Transition Temperature (T <sub>g</sub> )	D3418	°C (°F)	160 (320) ± 5	240 (464) ± 10
Specific Gravity	D792		1.78	1.67
Melt Flow Rate (5.0 kg)	D1238	g/10 min	6 ± 4 (at 225 °C [437 °F])	13 ± 4 (at 360 °C [680 °F])
Volume Coefficient of Thermal Expansion	E831	ppm/°C (°F)	260 (500)	301 (572)
Brookfield Viscosity in Fluorinert® FC-40		Pa-sec	0.19–0.22 at 6 wt%	0.09–0.1 at 1 wt%
Solubility in Fluorinert® FC-40 (at room temperature)		%	Up to 18 wt%	Up to 1 wt%

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For more information, visit [teflon.com/industrial](http://teflon.com/industrial)

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