DuPont™ Teflon® PFA

FLUOROPLASTIC FILM

Properties Bulletin

Description

DuPont™ Teflon® PFA film is a transparent, thermoplastic film that can be heat sealed, thermoformed, vacuum formed, heat bonded, welded, metallized, laminated (combined with dozens of other materials), and used as an excellent hot-melt adhesive. This wide variety of fabrication possibilities combines with the following important properties to offer a unique balance of capabilities not available in any other plastic film.

Chemical Compatibility

DuPont™ Teflon® PFA film is chemically inert and solvent resistant to virtually all chemicals, except molten alkali metals, gaseous fluorine, and certain complex halogenated compounds, such as chlorine trifluoride at elevated temperatures and pressures. It also has low permeability to liquids, gases, moisture, and organic vapors.

Electrical Reliability

- Superior reliability and retention of properties over large areas of film
- High dielectric strength, over 260 kV/mm for 0.025-mm film (6500 V/mil for 1-mil film)
- No electric tracking, nonwettable, and noncharring
- Very low power factor and dielectric constant, only slight change over wide ranges of temperature and frequency

Wide Thermal Range

- Continuous service temperature: -240 to 260°C (-400 to 500°F)
- Melting range: 300 to 310°C (572 to 590°F)
- Heat sealable

Mechanical Toughness

- Superior anti-stick and low frictional properties
- High resistance to impact and tearing
- Useful physical properties at cryogenic temperatures

Long Time Weatherability*

- Inert to outdoor exposure
- High transmittance of ultraviolet and all but far infrared

Reliability

- PFA film contains no plasticizers or other foreign materials.
- Conventional equipment and techniques can be used for processing; basic composition and properties will not be influenced.
- Rigid quality control by DuPont ensures uniform gauge, void-free film.

DuPont™ Teflon® PFA Film

The convenience of Teflon® PFA fluoroplastic in easy-to-use film facilitates the design and fabrication of this low friction thermoplastic for all sorts of high performance jobs. It is transparent and can be *heat sealed, thermoformed, welded,* and *heat bonded*. Superior anti-stick properties make it an ideal release film for many applications. A *cementable* type with an invisible surface treatment is available for bonding to one or both sides with adhesives. This versatility is augmented by the superior properties of a true melt-processible fluoroplastic and by the wide choice of product dimensions available from DuPont.

* Type C film not recommended for outdoor use.

Table 1: Types and Gauges of DuPont™ Teflon® PFA Fluoroplastic Film

Gauge	**50**	**100**	**200**	**300**	**500**	**1000**	**2000**	**6000**
Thickness, mil	0.5	1	2	3	5	10	20	60
Thickness, µm	12.5	25	50	75	125	250	500	1500
Approx. area factor, ft^2/lb	180	90	45	30	18	9	4.5	1.5
Approx. area factor, m^2/kg	36	18	9	6.4	2.5	1.2	0.6	0.2
Availability								
Type LP - PFA, general-purpose	X	X	X	X	X	X	X	X
Type CLP - PFA, one side cementable	X	—	X	—	—	—	—	—
Type CLP-20 - PFA, both sides cementable	X	X	X	X	X	—	—	—

Note: Each roll of DuPont film is clearly identified as to resin type, film thickness, and film type.

PFA	**200**	**CLP**
Resin type	Film thickness, 200 gauge, 2 mil	Film type, cementable one side

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Table 2: Typical Properties of DuPont™ Teflon® PFA Fluoroplastic Film

Property	Test Method[1]	Typical Value*	
		SI Units	English Units
Mechanical			
Tensile Strength at Break	D 882	21 MPa	3000 psi
Elongation at Break	D 882	300 %	
Yield Point	D 882	12 MPa	1700 psi
Elastic Modulus	D 882	480 MPa	70,000 psi
Impact Resistance	DuPont Pneumatic Impact tester	6.2×10^4 J/m	14 in. lb/mil
Folding Endurance (MIT)	D 2176	100,000 cycles	
Tear Strength—Initial (Graves)	D 1004	4.90 N	500 g
Tear Strength—Propagating (Elmendorf)	D 1922	0.74 N	75 g
Thermal			
Melt Point	D 3418	302–310°C	575–590°F
Thermal Conductivity	Cenco-Fitch	0.195 W/(m.K)	1.35 BTU.in/(h.ft^2.°F)
Specific Heat	—	1172 J/(kg.K)	0.28 BTU/(lb. °F)
Dimensional Stability	30 min at 150°C (302°F)	MD = 1% shrinkage TD = 1% shrinkage	
Oxygen Index	D 2863	95%	
Electrical			
Dielectric Strength, short-time, in air at 23°C (73°F), 6.35 mm (1/4 in) diameter electrode, 0.79 mm (1/32 in) radius, 60 Hz, 500 V/s rate of rise: 0.025 mm (1 mil) film	D 149 Method A	260 kV/mm	6500 V/mil
Dielectric Constant, 25°C (77°F), 100 Hz to 1 MHz	D 150	2.0	
Dissipation Factor, 25°C (77°F), 100 Hz to 1 MHz	D 150	0.0002–0.0007	
Volume Resistivity, –40 to 240°C (–40 to 464°F)	D 257	$>1 \times 10^{17}$ ohm.cm	
Chemical			
Moisture Absorption	—	<0.02%	
Permeability, Gas: Carbon Dioxide Nitrogen Oxygen	D 1434	cm^3/(m^2.24 h.atm)** 14×10^3 2.0×10^3 6.7×10^3	
Permeability, Vapors: Water	E 96	g/(m^2.d) 2	g/(100 in^2 .24 h) 0.13
General			
Density	D 1505	2150 kg/m^3	134 lb/ft^3
Coefficient of Friction Kinetic (Film-to-Steel)	D 1894	0.1–0.3	
Refractive Index	D 542	1.350	
Solar Transmission	E 424	96%	

Notes: 1) ASTM method unless otherwise specified

* For 0.050-mm (2-mil) film at 25°C (77°F), unless otherwise specified

** To convert to cm^3/(100 in^2.24 h.atm), multiply by 0.0645

HOW TO USE THE DUPONT™ TEFLON® BRAND NAME WITH YOUR PRODUCT

Teflon® is a registered trademark of DuPont for our brand of fluoroplastic resins. Customer use of the Teflon® brand name must be licensed by DuPont in association with approved applications. Without a license, customers may not identify their product with the DuPont™ Teflon® brand name.

Unlicensed customers may refer to the DuPont product offering when used as an ingredient in their products by the DuPont product code number and generic descriptor. In this instance, when the product offering is to be sold and used without a license, the customer may refer to the ingredient as **DUPONT™ PFA film**.

If you are interested in applying for a trademark licensing agreement for the DuPont™ Teflon® brand, please contact us at (800) 207-0756 in the US or (302) 996-7906 (outside of the US).

This product is manufactured with technology that meets the goals of the U.S. Environmental Protection Agency (EPA) 2010/15 PFOA stewardship program. See www.fluoropolymers.dupont.com for more details.

For more information, visit www.teflon.com/industrial
For sales and technical support contacts, visit www.teflon.com/industrialglobalsupport

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K-26944 5/13

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