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PFTE, FEP, and PFA Specifications

Technical Description

Because of its molecular structure, traditional PFTE cannot be processed by melting, but must be compressed into shapes and heated under pressure (sintered). In contrast, FEP and PFA are melt-processable by conventional thermoplastic processing methods, including injection, transfer, blow, and compression molding and by extrusion.

FEP Description

TetraFluorEthylene-Perfluorpropylene (FEP) is produced by copolymerization of tetrafluoroethylene and hexafluorpropylene. It is a relatively soft thermoplastic with lower tensile strength, wear resistance, and creep resistance than many other engineering plastics. However, it is chemically inert and has a low resistance, a low coefficient of friction, exceptional dielectric properties, heat resistance, retention of properties after service at 400°F (240°C) with useful properties at -454°F (-270°C), and meets FDA 21CFR.177.1550.

FEP has high transparency (with good transmittance of Ultra Violet and visible wavelengths.) IT has long term weatherability and excellent resistance to ozone, sunlight and weather. FEP offers the lowest refractive index of all thermoplastics with low light reflection (the same as water.)

Important applications are linings for pipe and chemical processing equipment, roll covers, and numerous wire and cable applications, including aircraft wire, plenum cable, fire alarm cable, and well logging cable. Heat-shrinkable FEP tubing is available. FEP film is used as glazing in solar energy collectors.

Common FEP tradenames include Daikin Neoflon®, Dupont Teflon®, and Hoechst Hostaflon®.

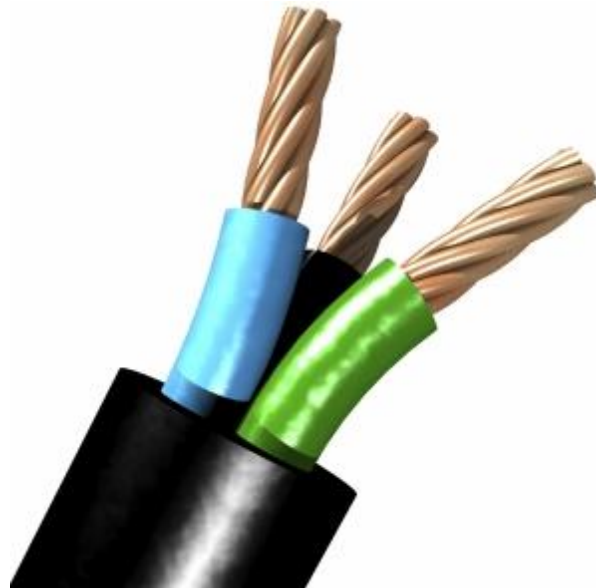
PFA Description

PerFluoroAlkoxy (PFA) offers similar properties to FEP, but is considered more of a premium resin; PFA is preferred when extended service is required in hostile environments involving chemical, thermal, and mechanical stress. PFA offer high melt strength, stability at high processing temperatures, excellent crack and stress resistance, a low coefficient of friction, and more than 10 times the Flex life of FEP.

It has high resistance to creep and retention of properties after service at 500°F (260°C), with useful properties at -320°F (-95°C). PFA also meets FDA 21CFR.177.1550.

PFA is used in the same types of applications as those listed above for FEP.

Common PFA tradenames include Daikin Neoflon®, Dupont Teflon®, Hoechst Hostaflon®, and Ausimont Hyflon®.



FEP	PFA	PTFE (unfilled)	Property	ASTM or UL Test
Physical				
0.078 2.15	0.078 2.15	0.078 2.16	Density (lb/in ³) (g/cm ³)	D792
< 0.01	< 0.03	< 0.01	Water Absorption, 24 hours (%)	D570
Mechanical				
3,400	3,600	3,900	Tensile Strength (psi)	D638
325	300	300	Tensile Elongation at Break	D638
No Break	No Break	No Break	Flexural Strength (psi)	D790
5-80 x 10 ³	50 – 500 x 10 ³	> 10 ⁶	Folding Endurance (cycles)	D2176
85,000	85,000	72,000	Flexural Modulus (psi)	D790
D56	D60	D50	Hardness, Shore D	D785
-	-	3.5	IZOD Notched Impact (ft-lb/in)	D256
Thermal				
500 / 260	582 / 305	635 / 335	Melting Temp (F° / C°)	D3418
400 / 204	500 / 260	500 / 260	Max Operating Temp (F° / C°)	-
V-0	V-0	V-0	Flammability Rating	UL94
Electrical				
2.1	2.1	2.1	Dielectric Constant at 1 MHz	D150
0.0007	0.0001	< 0.0002	Dissipation Factor at 1 MHz	D150
< 300	< 180	< 300	Arc Resistance (sec)	D495
> 10 ¹⁸	> 10 ¹⁸	> 10 ¹⁸	Volume Resistivity (ohm-cm) at 50% RH	D257

Note: The information contained herein is typical values intended for reference and comparison purposes only. They should NOT be used as a basis for design specifications or quality control. Contact us for manufacturers' complete material property datasheets.

All Values at 73°F (23°C) unless otherwise noted.

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NEOFLON® is a registered trademark of Daikin America.

HOSTAFLON® is a registered trademark of Hoechst Celanese.

HYFLON® is a registered trademark of Ausimont USA, Inc.