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Flourocpolymers

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Fluoropolymers were “discovered” by “accident” by a DuPont researcher in 1938, when he noticed a residue build up at the exit port of a Freon container. Following some further experimentation, it was determined that this material had some unique and useful properties combinations. This was the birth of “Teflon®” PTFE, the first fluorocarbon.

Fluorocarbons offer a unique combination of high temperature resistance, good chemical resistance, extremely low coefficient of friction and excellent electrical properties. Fluorocarbons are divided into several “families”, each offering distinct differences and/or advantages. Among these are: PTFE, FEP, PFA and PVDF

PTFE - Polytertrafluoroethylene

PTFE is extremely dense, basically inert to most chemicals, non permeable, has excellent electrical properties, and the lowest known coefficient of friction of any solid material. Impact strength is high, but due to its basic “softness”, PTFE has relatively poor abrasion / wear resistance, tensile strength and creep resistance. Filled and custom formulations have been developed to provide enhanced mechanical and wearing properties and greatly increased compressive strength. PTFE has a continuous service temperature to 550 degrees F. Unlike most true thermoplastics PTFE must be molded, pressed and sintered to produce useful shapes and products. Applications are numerous and include chemical process equipment, electronics, labware, and with filled formulations, many high performance wear strip and bearing applications.

Tensile Strength:	2500 psi
Dielectric Strength - Volts / Mil:	500
Continuous Service Temperature:	350F - 500F
Elongation % at Break - DAM:	300
Comparative Cost:	High

FEP - Fluorinated Ethylene Propylene

FEP has the same basic properties of PTFE, with two major exceptions. FEP's continuous service temperature is @ 392 degrees and FEP can be produced by conventional extrusion techniques. FEP is widely used in shrinkable and fractional tubing applications - for medical, laboratory, chemical processing. pharmaceutical electrical / electronics, aircraft, roll covers and many other applications. FEP is also produced in stock shapes for machining into a variety of components.

Tensile Strength:	2500 psi
Dielectric Strength - Volts / Mil:	500
Continuous Service Temperature:	350F - 500F
Elongation % at Break - DAM:	300
Comparative Cost:	High

PVDF - Polyvinylidene Fluoride

PVDF is a “toughened” fluoropolymer with high molecular weight, exhibiting greater strength, abrasion, wear and creep resistance than PTFE and FEP. PVDF has excellent electrical, chemical and weathering properties. Typical applications include chemical tank linings, pumps, valves and fittings for chemical process industries and electrical insulation.

Tensile Strength - ASTMD 790:	7000-9000 psi
Dielectric Strength - ASTM D149:	1.5 KV / Mil
Continuous Service Temperature:	325F
Elongation % at Break:	50
Comparative Cost:	High - Premium

PFA - Perfluoroalkoxy

As is the case with FEP, PFA is a melt processible fluoroplastic, but unlike PTFE and FEP. PFA is optically clear. PFA has a continuous service temperature near to that of FEP. Many of the applications for PFA are derived from its clarity. These include roll covers, shrinkable tubing and film for electrical wire insulation.

Tensile Strength:	2500 psi
Dielectric Strength - Volts / Mil:	500
Continuous Service Temperature:	350F - 500F
Elongation % at Break - DAM:	300
Comparative Cost:	High