Fluorinated Ethylene Propylene (FEP)

This material is widely used due to its processing characteristics and wide range of applications. It is also highly flame resistant. Improved data transmission can also be achieved when FEP is foamed. Pricing and processing are also being improved.

FEP is commonly used in plenum cable and military applications.

ETFE Tefzel and ECTFE Halar

These materials are stronger and more flexible than PFA or FEP and can become thermoset through irradiation. Foaming ECTFE and ETFE improves data transmission and reduces weight.

ETFE and ECTFE lack many of the electrical advantages of FEP.

Polytetrafluoroethylene (PTFE)

PTFE is a thermoplastic material that can be used across a wide temperature range of -73°C to 204°C. It is extremely flexible, as well as, water, oil, chemical, and heat resistant.

The mechanical properties of PTFE are low compared to other plastics.

Polyvinylidene Fluoride (PVDF)

PVDF is flexible, lightweight, and thermally stable, as well as chemical, heat, weather, abrasion, and fire resistant. It is also a relatively low cost insulation option.

This insulation is used in a wide range of industries and applications. It is often found in cables meeting the UL Standard 910 Plenum Cable Flame Test, deeming the cables suitable for use in a building's space for air circulation, typically behind dropped ceilings or raised floors.

PVDF is also commonly called Kynar, a registered trademark of Arkema Inc.

Thermoplastic Elastomers (TPE)

Thermoplastic elastomers consist of a mix of polymers, typically a plastic and a rubber, to combine the benefits of each material into one insulating product. TPE can be molded, extruded, and reused, similar to a plastic, while maintaining the flexibility and stretch of rubber.

TPE is commonly used in applications where conventional elastomers are unable to provide the necessary range of physical properties. They are found increasingly in automotive applications and household appliances.

Disadvantages of TPE include poor chemical and heat resistance, low thermal stability, and higher cost than other types of insulation.

COMPARATIVE PROPERTIES OF FLUOROPOLYMER INSULATIONS

	FEP	ETFE	PTFE	PVDF	ECTFE	TPE
Oxidation Resistance	O	E	O	O	O	E
Heat Resistance	O	E	O	O	O	E
Oil Resistance	O	E	E-O	E	O	G
Low Temperature Flexibility	O	E	O	F	O	E
Ozone Resistance	E	E	O	E	E	E
Weather (Sun Resistance)	O	E	O	E-O	O	E
Abrasion Resistance	E	E	O	E	E	F-G
Electrical Properties	E	E	E	G-E	E	E
Flame Resistance	O	G	E	E	E-O	F-G
Nuclear Radiation Resistance	P-G	E	P	E	E	G
Water Resistance	E	E	E	E	E	G-E
Acid Resistance	E	E	E	G-E	E	G
Alkali Resistance	E	E	E	E	E	G-E
Alcohol Resistance	E	E	E	E	E	G
Aliphatic Hydrocarbons Resistance (Gasoline, Kerosene)	E	E	E	E	E	P
Aromatic Hydrocarbons Resistance (Benzol, Toluol)	E	E	E	G-E	E	P
Halogenated Hydrocarbons Resistance (Degreaser Solvents)	E	E	E	G	E	-
Underground Burial	E	E	E	E	E	P

P = POOR **F = FAIR** **G = GOOD** **E = EXCELLENT** **O = OUTSTANDING**

These ratings are based on average performance of general purpose compounds. Any given property can usually be improved by the use of selective compounding.