Fluorinated polymeric materials: PTFE, FEP, PFA, ETFE

The chemical resistance of polymers with a high fluorine content is exceptionally high. The electrical insulating and dielectric properties of these materials are also very good.

- HELUFLON®-PTFE – Polytetrafluoroethylene (5Y)
- HELUFLON®-FEP – Tetrafluoroethylene – perfluoropropylene – copolymer (6Y)
- HELUFLON®-PFA – Tetrafluoroethylene – perfluoroalkoxy – copolymer (51Y)
- HELUFLON®-ETFE – Ethylene – tetrafluoroethylene – copolymer (7Y)

Fluorpolymere is resistant against nearly all known chemical compounds.
Fluorpolymere has a smooth surface of extremely low surface tension which is why virtually nothing adheres to this material.
Fluorpolymere is moisture rejecting, doesn't swell and is not be damaged by welding.
Fluorpolymere is used, where conventional material wouldn't resist the environmental conditions.
Fluorpolymere is applied in the civil and military sector as well as in the aviation- and astronautics technology.
Fluorcarbonresins have following important characteristics:

- high heat-resistance during permanent operation
  - HELUFLON®-FEP up to +205° C
  - HELUFLON®-PTFE up to +260° C
- outstanding resistant against dielectric strength
- constant dielectric characteristics
- no moisture absorption
- resistant against nearly all chemical products
- insensitive to environmental influences, weatherproof and resistant to irradiation from the sun and temperature fluctuations
- good mechanical characteristics, no formation of cracks, wear-resistant
- low coefficient of friction
- no action of light (also uv)

Characteristics

Insulation material	Material initial code	Nominal temperature permanent (° C) ca. 25 000 h	Nominal temperature temporary (° C) (hours)	Break-down temperature, melting point (° C)	Dielectric number at 60 Hz (20° C)	Density 10^3 kg/m³ (20° C)	Specific resistance Ohm • cm (20° C)	Break-down resistance kV/mm (20° C)	Tension MPa (20° C)	Breaking point % (20° C)	Porosity % (20° C)	Environmental resistance	Flammability	Resistance to chemicals	Radiation resistance[1] x 10^4 GY
ETFE	7Y	–100 +150	+180	+270	2,6	1,70	10^{16}	36	45	150 – 300	0,02	very good	n.e.f.	very good	200
FEP	6Y	–100 +205	+230	+290	2,1	2,15	10^{18}	25	20 – 25	250 – 300	0,01	very good	n.e.f.	very good	0,02
PTFE	5Y	–190 +260	+300	+327	2,0	2,18	10^{18}	20	35 – 45	350 – 400	0,01	very good	n.e.f.	very good	0,02
PFA	51Y	–190 +260	+280	+310	2,1	2,20	10^{16}	25	30	300	0,01	very good	n.e.f.	very good	0,02

[1] Values shown include high dosage and ca. 50% rest smoldering values

n.e.f. = no flammable

Insulation and jacket type abbreviations

DIN/VDE	Material
7Y	ETFE
6Y	FEP
5Y	PTFE
51Y	PFA