CHEMICAL RESISTANCE OF PUR (POLYURETHANE)

Substance	Concen-tration (%)	Classification of requirement
Aceton		○
Alums		○
Aluminium chloride	10	◕
Formic acid	30	○
Ammonia	10	●
Ammonium carbonate		○
Ammonium chloride		◕
Aniline		○
ASTM-Oil I		●
ASTM-Oil II		●
ASTM-Oil III		●
ASTM-Fuel No. I		●
ASTM-Fuel No. II		◑
ASTM-Fuel No. III		◑
Benzene		○
Brake fluid ATE		○
Butanol		○
Butyl acetate		○
Calcium chloride	40	◕
Chlorobenzene		○
Chloroform		○
Chloroprene		○
Chromic acid		○
Cyclohexan		◑
Cyclohexanon		○
Diethylether		●
Diethylprestone		●
Diesel oil		◕
Dimethylformamide		○
Ferric-III-chloride	10	◕
Acetic acid 20–80	10	◑
Ethanol	100	◑
Ethyl ether		◑
Ethylacetate		○
Ethylencloride		◕
Freon 12		◑
Freon 22		◑
Hydraulic oil SAE 90		◑*
Glycerin		●
Glycol		●
Isopropanol		○
Potash lye	10	●
Bichromate of potash		◕
Potassium nitrate		◕
Potassium permanganate		○
Kerosene		◑

Substance	Concen-tration (%)	Classification of requirement
Magnesium chloride	30	◕
Methanol	< 5	◑
Mythyl acetate		○
Mythyl chloride		○
Methylethylketon		◑
Mythylglycol		○
Mythylglycolacetate		○
Lactic acid	10	○
Mineral oil		◑*
Motor oil		○
Sodium chloride	10	◕
Sodium perchlorate solut.		○
Soda lye	10	●
Olive oil		●
Ozone		●
Paraffin oil		●
Perchlore ethylene		○
Petroleum ether		●
Petroleum		◕
Vegetable oils		●
Vegetable fats		●
Phosphoric acid	50	○
Nitric acid	30	○
Hydrochlorid acid, concen.		○
Cutting oil		◑*
Carbon disulfide		○
Sulfuric acid		○
Sea water		●
Silver salts	20	●
Tetrachloroethylene		○
Carbon tetrachloride	100	○
Tetrahydrofuran		○
Toluene		○
Trichlorethylene		○
Tataric acid	< 10	●
Xylon		○

resistant ●
vastly resistant ◕
conditionally resistant ◑
not resistant ○

*for individual case, please verify

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CHEMICAL RESISTANCE OF FLUORINATED POLYMERIC MATERIALS

● The **Fluorinated polymeric** is resistent against following chemical materials

Abietin acid
Acetone
Acetone phenon
Acetic anhydride
Acetic acid
Acryl hydride
Allylic acetate
Allylic metacrylacid
Aluminium chloride
Ammonia, liquid
Ammonium chloride
Aniline

Benzene chloride
Benzonitrile
Benzyl alcohol
Borax
Bromine
Butyl acetate
Butyl

Calcium chloride
Carbon bisulfide
Cetane
Chlorine
Chlorobenze
Chloroform
Chloroprene
Chlorosulfonic acid
Chromic acid
Cyclohexan
Cyclohexanon

Diethyl Carbonate
Dibutyl-Phthalide
Dibutyl-Sebacat
Di-isobutyl Adipt
Dimethyl ether
Dimethyl Formamide
Dimethyl hydrazine
Dioxane

Esachloroethane
Ethyl Exoate
Ethyl ether
Ethyl alcohol
Ethyl acetate
Ethylene bromide
Ethylene glycol

Ferric chloride
Fluoride naphthalene
Fluoride nitrobenzene
Fomaldehyde
Formic acid
Furan

Hexane hydrazine
Hydrochlorid acid
Hydrogen superoxide

Iron phosphide

Lead

Magnesium chloride
Mercury
Metacryl acid
Methanol
Methyl ethyl keton
Methyl metacryl acid
Methylenchloride

Naphtalene
Naphthole
N-Butylamine
Nitric acid
Nitromethane
Nitrogen tetroxyde
not synthetic nitrobenze
N-octadecyal alcohol
2-Nitro butanol
2-Nitro-Methyl propanol

Oils, from vegetables
Oils, from animals
Ozone

Pentachloro benzamide
Perchloro ethylene
Permanganate
Petrol Phenol
Phosphorus pentachloride
Phosphoric acid
Phthalic acid
Pinene
Piperidine
Potassium
Potassium acetate
Potassium hydroxide
Polyacryonitril
Pyridine

Stannous chloride
Sodium hydroxide
Sodium hydochloride
Sodium peroxide
Solvents
Soaps
Sulfur
Sulfuric acid

Tetra bromothane
Tetrachlorethane
Triethanolamine
Trichloracetic acid
Trichloroethylene
Tricresylic phosphate
Toluene

Vinylmetracrylate

Washing mediums
Water

Xylol

Zinc chloride

● The following chemical substance attack no **Fluorinated polymeric**

Ethyl alcohol
Vapour
Hydrofluoric acid
Aviation gasoline
Hydraulic liquid-Skydrol
Isopropyl alcohol
Carbon chlorid

Soda
Crude petroleum
Nitric acid concentr.
Sea water
Sulfuric acid (30%)
Transformer Oil
Turbine fuel JP 4

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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.

Fluorpolymere Werkstoffe sind: HELUFLON®-PTFE, HELUFLON®-FEP, HELUFLON®-PFA, HELUFLON®-ETFE

- 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) approx. 25000 h	Nominal temperature temporary (°C) (hours)	Break-down temperature, melting point (°C)	Dielectric number at 60 Hz (20°C)	Density 10^3 kg/ m^3 (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] x10^4 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

CHEMICAL RESISTANCE OF SILICONE

Substance	Test period 7 days Temperature °C	Classification of requirement
Acetamide	150	●
Acetone	20	◑
Aniline	100	●
Petrol	20	◑
Brake fluid AT	100	●
Butanol	117	◑
Butylacetate	20	◑
Calcium hydroxide, (saturated)	20	●
Chlorbenzene	20	◑
Cloroform	20	○
Clophene	150	●
Vapour up to 2,5 atü	138	●
Diphenyl	150	◑
Diesel oil	20	◑
Dinamo oil	150	◑
Mineral oil	20	◑
Acetic acid	20	●
Hydrofluor acid 5%	20	○
Gear oil DTE BB	150	●
Gear oil DTE HH	150	●
Gear oil DTE extra heavy	150	●
Gear oil Type SEA 90	150	●
Prestone	20	●
Glycerin	100	●
Hexa ethoxydisiloxane	20	◑
High pressure compressor oil	150	●
Isopropyl alcohol	82	◑
Potassium 20%	20	●
Potassium hydroxide 50%	20	●
Potassium permanganate solution	20	●
Carbolineum	20	●
Cooking salt solution 10%	20	●
Carbon tetrachloride	20	◑
Compressor oil, light	150	●
Ball bearing fat	150	●
Linseed oil	100	●

Substance	Test period 7 days Temperature °C	Classification of requirement
Methanol	65	◑
Methylen chloride	20	○
Mineral oil ASTM No. 1	150	●
Mineral oil ASTM No. 3	150	◑
Mineral oil SEA 10	150	●
Mineral oil SEA 20	150	●
Mineral oil SEA 30	150	●
Motor oil viscose static	150	●
Sodium 20%	20	●
Soda 50%	20	●
Nitrobenzene	20	●
Oleic acid	150	○
Olive oil	150	●
Perchlor	20	○
Petroleum ether	20	○
Petroleum	20	◑
Phenol	60	●
Phosphoric acid 30%	20	●
Pyridine	20	◑
Regulator oil	150	○
Castor oil	150	●
Hydrochlorid acid 10%	20	●
Nitric acid conc.	20	○
Nitric acid 10%	20	◑
Sulfuric acid, conc.	20	○
Sulfuric acid, 10%	20	●
Shock absorber oil	20	●
Styrol	20	◑
Turbentine oil	20	◑
Toluene	20	○
Transformer oil	150	◑
Tri	20	○
Tri glycol	20	●
Vaseline	150	●
Water	100	●

● Iresistant
◑ conditionally resistant
○ not resistant

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RESISTANCE OF SUBSTANCES AGAINST SOLVENTS, OILS AND FATS

Substance	PVC Y	PA 4 Y	PTFE 5 Y	FEP 6 Y	ETFE 7 Y
Alcohol, methylated spirit	○	◑	●	●	●
Brake fluid for vehicles	○	◑	●	●	●
Bromide chloridfluormethane	○	○	●	●	●
Jet gasoline IP4	○	◑	●	●	●
de-icing and icing protective agent	○	◑	●	●	●
Aircraft lubricating grease	◑	◑	●	●	◑
Hydraulic oil on bas of mineral oil	◑	●	●	●	◑
Hydraulic liquid (chlor-free silicone liquid)	○	○	●	●	●
Hydraulic liquid (synthetic)	○	◑	●	●	●
Methylethylketon	○	○	●	●	●
Otto-gasoline, diesel gasoline	○	◑	●	●	●
Lubricating oil for recebrocating engine SAE 10 W	◑	◑	●	●	◑
Lubricating oil for jet engine (synthetic)	◑	◑	●	●	◑
Toluene-Isooctane (Toluene 30%, Isooctane 70%)	○	◑	●	●	●
Trichlorethane	○	○	●	●	●
Urine	●	●	●	●	●

● Iresistant
◑ conditionally resistant
○ not resistant

PVC = Polyvinylchloride Y
PA = Polyamid 4 Y
PTFE = Polytetrafluorethylene 5 Y
FEP = Fluorethylenepropylene 6 Y
ETFE = Tetrafluorethylene 7 Y