SERFILCO® TECHNICAL BULLETIN

KYNAR CHEMICAL RESISTANCE DATA

BULLETIN T-105 JAN.1985

The key to performance ratings of KYNAR PVDF is as follows:

MEDIUM – ▩ Satistactory

WHITE – □ Caution, requires testing

DARK – ■ Unsatisfactory

CHEMICAL	°C	21	49	77	100	110	121	135
	°F	70	120	170	212	230	250	275
(2) BASES								
Ammonium Hydroxide, 30%		▩	▩	▩	▩	□	■	■
Aniline		▩	▩	□	■	■	■	■
Barium Hydroxide		▩	▩	▩	▩	▩	▩	▩
Calcium Hydroxide		▩	▩	▩	▩	▩	▩	▩
Hexamethylene Diamine		■	■	■	■	■	■	■
Magnesium Hydroxide		▩	▩	▩	▩	▩	▩	▩
Propyl Amine		■	■	■	■	■	■	■
Sodium Carbonate		▩	▩	▩	▩	▩	▩	▩
Sodium Hydroxide, 10%		▩	▩	▩	□	■	■	■
Sodium Hydroxide, 50%		▩	▩	□	■	■	■	■
(3) HALOGENS								
Bromine, Liquid		▩	▩	▩	□	■	■	■
Chlorine, Liquid		▩	▩	▩	▩	□	■	■
Iodine, Liquid		▩	▩	▩	□	■	■	■
(4) OXIDANTS								
Benzoyl Peroxide		▩	▩	▩	□	■	■	■
Chlorine Dioxide, 15%		□	□	□	▩	□	■	■
Hydrogen Peroxide, 30%		□	□	□	□	□	■	■
Nitrogen Dioxide		□	□	□	□	■	■	■
Ozone		□	□	□	□	□	□	■
Potassium Chlorate		□	□	□	□	□	■	■
Potassium Permanganate		□	□	□	□	▩	□	□
Sodium Hypochlorite, 17%		□	□	□	□	□	■	■
Sulfur Dioxide		▩	▩	▩	□	■	■	■
(5) ALIPHATIC HYDROCARBONS								
Acetylene		▩	▩	▩	▩	▩	▩	□
Butadiene		▩	▩	▩	▩	▩	▩	□
Butylene		▩	▩	▩	▩	▩	▩	▩
Gasoline		▩	▩	▩	▩	▩	▩	▩
Kerosene		▩	▩	▩	▩	▩	▩	▩
Hexane		▩	▩	▩	▩	▩	▩	▩
Mineral Oil		▩	▩	▩	▩	▩	▩	▩
Naphtha		▩	▩	▩	▩	▩	▩	▩
(6) AROMATIC HYDROCARBONS								
Benzene		▩	▩	▩	□	■	■	■
Naphthaline		▩	▩	▩	▩	□	■	■
Toluene		▩	▩	▩	□	■	■	■

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	°F	70	120	170	212	230	250	275
(7) HALOGENATED HYDROCARBONS								
Allyl Chloride		▩	▩	▩	▩	□	■	■
Carbon Tetrachloride		▩	▩	▩	▩	▩	▩	▩
Chlorobenzene		▩	▩	▩	□	■	■	■
Chloroform		▩	▩	▩	▩	□	■	■
Dichloroethylene		▩	▩	▩	▩	▩	□	■
Ethylene Bromide		▩	▩	▩	▩	▩	□	■
Refrigerant 113		▩	▩	▩	▩	□	■	■
(8) OXYGENATED SOLVENTS & ESTERS								
Acetone, 10%		▩	▩	□	■	■	■	■
Acetone, 100%		■	■	■	■	■	■	■
Acetophenone		■	■	■	■	■	■	■
Dimethyl Formamide		■	■	■	■	■	■	■
Ethyl Ether		▩	▩	□	■	■	■	■
Ethyl Acetate		■	■	■	■	■	■	■
Ethylene Oxide		▩	▩	▩	▩	□	■	■
Ethylene Glycol		▩	▩	▩	▩	▩	▩	▩
Glycerine		▩	▩	▩	▩	▩	▩	▩
Methyl Cellosolve		▩	▩	▩	▩	▩	▩	▩
Methyl Ethyl Ketone		■	■	■	■	■	■	■
Triethyl Phosphate		■	■	■	■	■	■	■
(9) SALTS								
Ammonium Nitrate		▩	▩	▩	▩	▩	▩	▩
Calcium Phosphate		▩	▩	▩	▩	▩	▩	▩
Calcium Sulfate		▩	▩	▩	▩	▩	▩	▩
Ferrous Chloride		▩	▩	▩	▩	▩	▩	▩
Sodium Acetate		▩	▩	▩	▩	▩	▩	▩
Sodium Chlorate		▩	▩	▩	▩	▩	▩	▩
Sodium Chloride		▩	▩	▩	▩	▩	▩	▩
(10) GASES								
Ammonia, Annydrous		■	■	■	■	■	■	■
Carbon Dioxide		▩	▩	▩	▩	▩	▩	▩
Hydrogen		▩	▩	▩	▩	▩	▩	▩
Hydrogen Sulfide		▩	▩	▩	▩	▩	▩	▩
Methane		▩	▩	▩	▩	▩	▩	▩

*KYNAR® is a registered trademark of Pennwalt Corporation for its polyvinylidene fluoride resin.

Chemical Resistance of KYNAR PVDF

Many factors can affect the chemical resistance of materials. These include, but are not limited to: exposure time, extremes of temperature and pressure, frequency of temperature and/or pressure cycling, attrition due to abrasive particles, and the type of mechanical stress imposed. The fact that certain combinations of chemicals and mechanical loads can induce stress cracking in many otherwise chemically resistant materials, both metallic and nonmetallic, is of particular significance.

The chemical/temperature ratings presented are based on well processed or well-fabricated test specimens being essentially resistant to either chemical attack and/or severe swelling which would normally impair their performance under moderate mechanical stresses.

Since such factors as permeability and adhesion are not included in this rating system, this type of data is not applicable to KYNAR PVDF ratings.

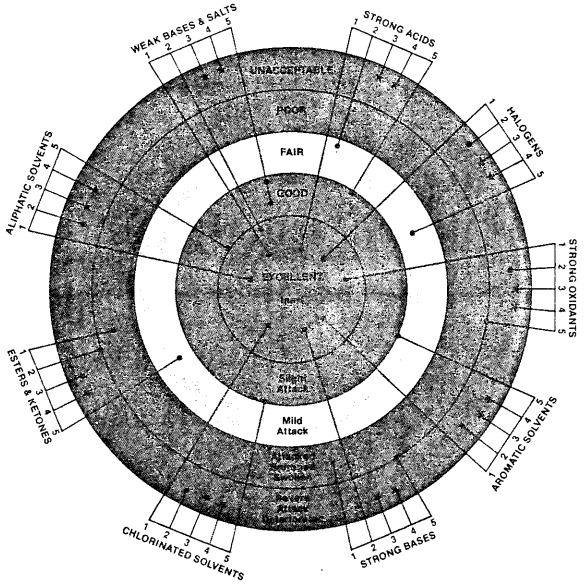
Operating parameters are dependent upon the part and/or application of KYNAR PVDF and may differ from those experienced in either laboratory testing or apparently similar field service. Because corrosive fluids or vapors are often mixtures of various individual chemicals, it is strongly recommended that final installations be evaluated under actual service conditions.

For example, immersion testing in individual chemicals at a specific operating temperature doesn't predict the performance of KYNAR PVDF should an exothermic reaction take place when mixtures of chemicals are involved.

The ratings given in the following pages are a guide and do not constitute a warranty of any kind, expressed or implied, with respect to the performance of KYNAR PVDF in any specific application.

The chemical resistance of KYNAR PVDF is indicated in two ways: with a bull's-eye chart and with a series of charts color-coded according to performance ratings at given temperatures.

In the bull's-eye chart, KYNAR PVDF is compared with other well known plastics at 93°C (200°F) in nine general chemical species with the rating system ranging from severe attack in the outer segment of the circle to inert in the bull's-eye.



Chemical resistance of KYNAR PVDF vs. other materials at 93°C (200°F)

1 KYNAR PVDF
2 Polypropylene
3 Polyvinylidene chloride
4 Polyvinyl chloride – Type1
5 Polyester (glass fiber reinforced) Polytetrafluoroethylene – excellent in all categories

★ Above recommended operating temperature of plastic

Chemical Resistance of KYNAR vs. other materials at various temperatures.

CHEMICAL	°C	21	49	77	100	110	121	135
	°F	70	120	170	212	230	250	275
(1) ACIDS								
Acetic, 50%								
Acetic, Glacial								
Benzoic								
Benzene Sulfonic								
Chlorosulfonic								
Chromic, 50%								
Citric								
Formic								
Hydrobromic, 50%								
Hydrochloric, 10%								
Hydrochloric, 35%								
Hydrofluoric, 30%								
Hydrofluoric, 70%								
Nitric, 10%								
Nitric, 50%								
Nitric, Fuming								
Oxalic								
Phenol, 10%								
Phenol, 100%								
Phthalic								
Phosphoric, 30%								
Phosphoric, 85%								
Succinic								
Sulfuric, 50%								
Sulfuric, 85%								
Sulfuric, 98%								
Sulfuric, Fuming								

The key to performance ratings of KYNAR PVDF is as follows:

MEDIUM
Satisfactory

WHITE
Caution, requires testing

DARK
Unsatisfactory