



"We Tame The Tough Ones"

LINING TECHNOLOGIES, INC.

30150 EDEN CHURCH ROAD - DENHAM SPRINGS, LOUISIANA 70726

PHONE: 225/664-9936 FAX: 225/664-9938

Website: www.utibuoy.com

KYNAR® LININGS

KYNAR® Dispersion Lining as applied by Lining Technologies, Inc. is a dispersion of vinylidene fluoride resin in a non-reactive medium. **KYNAR®** is a registered trademark of Pennwalt Corporation who manufactures the **KYNAR®** material. **KYNAR®** is blended into a dispersion by the Whitford Corporation and marketed under the tradename **DYKOR®**. The **KYNAR®** Dispersion is spray applied in multiple coats and heat cured. Each coat is applied at a film build of 4 to 5 mils on a cured film basis. The cure temperature after each coat varies between 485° and 525° F and is regulated to cure that coat and fuse it to the previous coats. These cure cycles result in a single monolithic lining with a thickness of 25 to 30 mils. Lining Technologies, Inc. also applies glass, **KEVLAR®** or carbon cloth reinforced **KYNAR®** laminates in thicknesses of 45 mils and 60 mils (Thicker laminates are also available from Lining Technologies). Sheet applied **KYNAR®** linings are also available.

KYNAR® linings combine a high degree of mechanical strength, impact resistance and abrasion resistance with excellent chemical resistance over a broad temperature range. It is used as a lining or coating in pipe, fittings, valves, pumps, process vessels, tanks, agitators, etc. It is also utilized as a base in exterior finishes and in many other applications in the chemical process and related industries. Due to the fact that graphite filled **KYNAR®** dispersions and carbon steel have very similar coefficients of thermal expansion; **KYNAR®** is physically a very sound lining for carbon steel vessels, tanks, and piping.

The information on chemical resistance is derived from laboratory tests, actual industrial applications and careful judgment. The chemicals included do not represent the exclusive applications for **KYNAR®**, nor does the absence of data necessarily indicate lack of serviceability. Satisfactory service over the range from well below 0° to 275° F. can be expected in many of the environments listed. The information on this chart represents the basic chemical resistance of the **KYNAR®** resin. For detailed information on what thickness and/or type of **KYNAR®** lining is most suitable for a particular service, please contact Lining Technologies.

The information contained herein is intended as a guide for the potential use of **KYNAR®** and should not be interpreted as a guarantee of performance. The following corrosion chart (as all corrosion charts) has the major weakness of not addressing permeation, thermal shock, or the linings ability to maintain its bond to a substrate. Whenever a doubt exists as to the utility of **KYNAR®** for a particular application, as a chemically resistant material and as a barrier to corrosive environments, appropriate environmental tests should be conducted.

KYNAR® is resistant to most acids and bases. Some exceptions are fuming sulfuric, fuming nitric, oleum and other sulfonating agents. Concentrated caustic has some effect at higher temperatures. In the organics family; nearly complete resistance is shown to aliphatics, aromatics, alcohols, acids and chlorinated solvents. Strong reducing agents such as the primary amines have an effect depending upon temperature. Strong polar solvents such as ketones and esters cause partial solvation, particularly at elevated temperatures.

In particular reference to our **KYNAR®** linings, we offer the following:

1. 25-30 Mil (Nominal) **KYNAR®** Dispersion
2. 40-50 Mil (Nominal) **KYNAR®**/Glass Reinforced Laminate
3. 55-65 Mil (Nominal) **KYNAR®**/Glass Reinforced Laminate
4. 85-95 Mil (Nominal) **KYNAR®**/Glass Reinforced Laminate



5. 45-55 Mil (Nominal) **KYNAR**[®]/Carbon Cloth or **KEVLAR**[®] Reinforced Laminate
6. 65-75 Mil (Nominal) **KYNAR**[®]/Carbon Cloth or **KEVLAR**[®] Reinforced Laminate
7. 65-75 Mil (Nominal) **KYNAR**[®]/Carbon Cloth/Glass Reinforced Laminate
8. Other Special Laminates on Request.

These **KYNAR**[®] linings in general perform satisfactorily within the 0° F. to 260° F. temperature range; however, this will vary with the particular chemical service conditions that you may require. Under some chemical service conditions, a range of -80° F. to 275° F., can be obtained.

KYNAR[®] LAMINATE vs. **KYNAR**[®] DISPERSION:

It is advisable to embed a reinforcement medium in **KYNAR**[®] resin that is to be applied in thicknesses that are generally in excess of 35 mils. The most common reasons for selecting a **KYNAR**[®] laminate over a **KYNAR**[®] dispersion are:

1. Permeation: All materials become more permeable as temperature increases. To combat this **KYNAR**[®] is usually applied in thicknesses over 40 mils in environments that operate above 180° F. for long periods of time - thus requiring a laminate construction.
2. Abrasion Resistance: The addition of a reinforcement medium (particularly glass to a **KYNAR**[®] resin) greatly enhances it's resistance to impinging abrasion.
3. Thermal Shock: The addition of a reinforcement medium to **KYNAR**[®] gives additional control over the materials thermal expansion; thus helping it to withstand wider ranging sudden temperature changes.

KYNAR[®] LAMINATE REINFORCEMENT MEDIUMS:

I. Glass Roving -

Advantages: Most economical reinforcement - has an excellent tensile strength and tear resistance when saturated with **KYNAR**[®] resin and baked.

Disadvantages: Subject to severe attack from Hydrofluoric acid and similar compounds that attach silica. Can swell slightly in hot caustic environments.

II. **KEVLAR**[®] Roving -

Advantages: Not effected by hydrofluoric acid. Extremely high strength - stronger than the forelisted glass reinforcement.

Disadvantages: Cost - Depending on the laminate composition it will result in a 13-20% higher lining cost over glass reinforcement. The affinity of the resin for **KEVLAR**[®] is not as good as for glass; as such blistering can occur around the reinforcement layer(s). **KEVLAR**[®] is not resistant to HCL.

III. Carbon Cloth Roving -

Advantages: Not effected by hydroflouric acid.

Disadvantages: Although carbon cloth has good physical properties (strength) before it is impregnated with **KYNAR**[®] and baked; it has a very poor tear resistance when it becomes a part of the lining.
Cost - Depending on the laminate composition it will result in a 15-



25% higher lining cost over glass reinforcement. Carbon cloth should be used only in a few unusual cases where Glass or **KEVLAR**[®] are not acceptable.

KEY TO RATING

- 1** - Little or no effect.
- 2** - Some effect, but not necessarily indicative of impaired serviceability*
- 3** - Noticeable effect, although possible serviceability.
- NR** - Not Recommended.

The forelisted ratings consider the presence of the specified chemical only - Careful consideration must be given combinations of chemicals.

* *The rating Number "2" usually indicates a softening effect on **KYNAR**[®] which may significantly increase its permeability. This may drastically limit the service life of the lining.*

Example: Service Condition - 120° F. Operating Temperature
20% Hydrochloric Acid
1% Methylene Chloride

Result: The methylene chloride will soften the **KYNAR**[®] lining allowing the HCL to permeate the membrane to the steel in a relatively short period of time. A 25-30 mil lining will have blisters or bubbles in it within one Year. The lining will remain serviceable until one or more of these blisters rupture or cause further disbonding.

*Kynar[®] - Trade Name of Pennwalt Corporation (Pennwalt is currently part of ATOCHEM).
Kevlar[®] - Trade Name of E. I. Dupont. It is a super high strength aramid fiber with a generally excellent temperature and chemical resistance.
Dykor[®] - Trade Name of Whitford Corporation.*



DATA TAKEN FROM PENNWALT CHEMICAL
CORPORATION BULLETIN KC-65A

(Modified By Subsequent Testing And Field Experience)

CHEMICAL RESISTANCE OF KYNAR® POLYVINYLIDENE FLUORIDE

	70 F	120 F	150 F	212 F	230 F	250 F	275 F
A							
Acetic Acid, (Glacial)	2	2	3	NR			
Acetic Acid, Dilute (50% H ₂ O) [<i>vinegar acid</i>]	1	1	1	1	1		
Acetic Anhydride [<i>acetyl oxide</i>]	2	3	NR				
Acetone [<i>dimethyl keytone</i>]	3	NR					
Acetone (50% H ₂ O)	2	3	NR				
Acetonitrile [<i>methyl cyanide</i>]	1	1	2				
Acetophenone [<i>phenyl methyl keytone</i>]	2	3	3	NR			
Acetyl chloride [<i>ethynol chloride</i>]	1	1					
Acrylonitrile [<i>vinyl cyanide</i>]	1	2					
Allyl Chloride [<i>3-chloropropene</i>]	1	1	1	1			
Aluminum Ammonium Sulfate [<i>alum</i>]	1	1	1	1	1	1	1
Aluminum Chloride	1	1	1	1	1	1	1
Aluminum Fluoride	1	1	1	1	1	1	1
Aluminum Hydroxide [<i>alumina trihydrate</i>]	1	1	1	1	1	1	1
Aluminum Nitrate	1	1	1	1	1	1	1
Aluminum Potassium Sulfate [<i>potash alum</i>]	1	1	1	1	1	1	1
Ammonia (Anhydrous)	1	1	1	1	1	1	1
Ammonium Aqua (30%)	1	1	1	1			
Ammonium Bifluoride	1	1	1	1	1	1	1
Ammonium Carbonate [<i>hartshorn</i>]	1	1	1	1	1	1	1
Ammonium Chloride [<i>sal ammoniac</i>]	1	1	1	1	1	1	1
Ammonium Fluoride (25%)	1	1	1	1	1	1	1
Ammonium Hydroxide	1	1	1	1	1	1	1
Ammonium Nitrate [<i>norway saltpeter</i>]	1	1	1	1	1	1	1
Ammonium Phosphate	1	1	1	1	1	1	1
Ammonium Sulfate	1	1	1	1	1	1	1
Ammonium Sulfide	1	1	1	1	1	1	1
Amyl Acetate [<i>banana oil; pear oil</i>]	1	1	2	3	NR		
Amyl Alcohol [<i>1-pentanol</i>]	1	1	1	1	1	1	1
Amyl Chloride [<i>1-chloropentane</i>]	1	1	1	1	1	1	1
Aniline [<i>aminobenzene</i>]	1	2	2	3			
Antimony Trichloride [<i>caustic antimony</i>]	1						
Aqua Regia [<i>nitrohydrochloric acid</i>]	1						
Arsenic Acid	1	1	1	1	1	1	1
B							
Barium Carbonate	1	1	1	1	1	1	1
Barium Chloride	1	1	1	1	1	1	1
Barium Hydroxide	1	1	1	1	1	1	1
Barium Sulfide [<i>black ash</i>]	1	1	1	1	1	1	1
Benzaldehyde [<i>benzoic aldehyde</i>]	1	2					
Benzene	1	2	2				
Benazene Sulfonic Acid [<i>phenylsulfonic acid</i>]	2	3	NR				
Benzoic Acid [<i>phenylformic acid</i>]	1	1	1	1	1	1	
Benzyl Alcohol [<i>phenylmethanol</i>]	1	1	1	1	1	1	1



DATA TAKEN FROM PENNWALT CHEMICAL
CORPORATION BULLETIN KC-65A

(Modified By Subsequent Testing And Field Experience)

CHEMICAL RESISTANCE OF KYNAR® POLYVINYLIDENE FLUORIDE

	70 F	120 F	150 F	212 F	230 F	250 F	275 F
Benzyl Chloride [<i>alpha</i> -chlorotoluene]	1	1	1	1	1	1	1
Black Liquor	1	1	1	1	1	1	1
Bleach [<i>Sodium Hypochlorite/Sodium Hydroxide</i>] **	1	1	1				
Borax	1	1	1	1	1	1	1
Boric Acid	1	1	1	1	1	1	1
Brine	1	1	1	1	1	1	1
Bromic Acid	1	1	1	1	1		
Bromine (Dry)	1	1	1				
Bromine Water	1	1	1	1			
Butadiene [<i>vinyl ethylene</i>]	1	1	1	1	1		
Butyl Acetate	1	2	3	NR			
Butyl Acrylate	1	2	3	NR			
n-Butyl Alcohol [<i>1-butanol</i>]	1	1	1	1	1	1	1
sec-Butyl Alcohol [<i>2-butanol</i>]	1	1	1	1	1	1	1
tert-Butyl Alcohol [<i>2-methyl-2-propanol</i>]	1	1	1	1	1	1	1
n-Butylamine [<i>1-amino butane</i>]	2	NR					
sec-Butylamine [<i>2-amino butane</i>]	1	2	3	NR			
tert-Butylamine	1	2	2	3			
Butylene [<i>butene</i>]	1	1	1	1	1	1	1
Butyl Bromide [<i>bromobutane</i>]	1	1	1	1	1	1	1
Butyl Chloride [<i>chlorobutane</i>]	1	1	1	1	1	1	1
n-Butyl Mercaptan [<i>2-methyl-2-butanethiol</i>]	1	1	1	1	1	1	1
Butyl Phenol	1	1	1	1			
Butyric Acid [<i>ethylacetic acid</i>]	1	1	1	1			

C

Calcium Bisulfate	1	1	1	1	1	1	1
Calcium Bisulfide [<i>calcium hydrosulfide</i>]	1	1	1	1	1	1	1
Calcium Carbonate	1	1	1	1	1	1	1
Calcium Chlorate	1	1	1	1	1	1	1
Calcium Chloride	1	1	1	1	1	1	1
Calcium Hydroxide [<i>shaked lime</i>]	1	1	1	1	1	1	1
Calcium Hypochlorite	1	1	1	1	1	1	1
Calcium Nitrate	1	1	1	1	1	1	1
Calcium Sulfate	1	1	1	1	1	1	1
Caprylic Acid [<i>octanoic acid</i>]	1	1	1	2			
Carbon Dioxide (Wet)	1	1	1	1	1	1	1
Carbon Dioxide (Dry)	1	1	1	1	1	1	1
Carbon Disulfide [<i>carbon bisulfide</i>]	1						
Carbon Tetrachloride [<i>perchloromethane</i>]	1	1	1	1	1	1	1
Castor Oil [<i>ricinus oil</i>]	1	1	1	1	1	1	1
Cellosolve [<i>ethylene glycol monobutyl ether</i>]	1	1	1	1	1	1	1
Chlorine (Dry Gas)	1	1	1	1			
Chlorine (Wet Gas)	1	1	1	1			
Chlorine Dioxide	1	1	1	1			
Chlorine, Liquid	1	1	1	1			

** Sodium Hydroxide can embrittle KYNAR® at warmer temperatures.



DATA TAKEN FROM PENNWALT CHEMICAL
CORPORATION BULLETIN KC-65A

(Modified By Subsequent Testing And Field Experience)

CHEMICAL RESISTANCE OF KYNAR® POLYVINYLIDENE FLUORIDE

	70 F	120 F	150 F	212 F	230 F	250 F	275 F
Chlorine Water	1	1	1	1			
Chlorine (5% in CC1 ₄)	1	1	1	1			
Chloroacetic Acid (50% H ₂ O)	1	1	1	1			
Chlorobenzene [<i>phenyl chloride</i>]	1	1	1	2			
Chloroform [<i>trichloromethane</i>]	1	1	1	1			
Chlorosulfonic Acid [<i>sulfuric chlorohydrin</i>]	3	NR					
Chromic Acid (50%) [<i>chromic anhydride</i>]	1	1	2				
Chromyl Chloride [<i>chlorochromic anhydride</i>]	1	1					
Citric Acid	1	1	1	1	1	1	
Coconut Oil	1	1	1	1	1	1	1
Coal Gas	1	1	1	1			
Copper [<i>cupric</i>] Chloride	1	1	1	1	1	1	1
Copper [<i>cupric</i>] Cyanide	1	1	1	1	1	1	1
Copper [<i>cupric</i>] Fluoride	1	1	1	1	1	1	1
Copper [<i>cupric</i>] Nitrate	1	1	1	1	1	1	1
Copper [<i>cupric</i>] Sulfate [<i>bluestone</i>]	1	1	1	1	1	1	1
Corn Oil [<i>maize oil</i>]	1	1	1	1	1	1	1
Cottonseed Oil	1	1	1	1	1	1	1
Cresol [<i>methyl phenol</i>]	1	1	1	2			
Cresylic Acid	1	1	1	2			
Crotonaldehyde [<i>crotonic aldehyde</i>]	1	1	2	3			
Crude Oil	1	1	1	1	1	1	1
Cyclohexane [<i>hexamethylene</i>]	1	1	1	1	1	1	1
Cyclohexanol [<i>hexahydrophenol</i>]	1	1	1	2			
Cyclohexanone [<i>pimelic keytone</i>]	1	3	3	NR			

D

Dextrin [<i>starch gum</i>]	1	1	1	1	1		
Diacetone Alcohol	1	2	3	NR			
Diesel Fuels	1	1	1	1	1	1	1
Diethylamine	1	3	3				
Diethyl Cellosolve	1	1	1	1	1	1	1
Diethyl Ether [<i>sulfuric ether</i>]	1	2					
Diethylene Triamine	1	1	2	3			
Diglycolic Acid	1						
Diisobutyl Ketone	1	2	2	2	NR		
Diisobutylene [<i>2,4,4-triethylene</i>]	1	1	1	1	1	1	1
Dimethylamine	2	3	3	3			
Dimethylaniline	1	2	3	3	NR		
Dimethyl phthalate	2	2	3	NR			
p-Dioxane [<i>diethylene ether</i>]	3	3	NR				

E

Epichlorohydrin [<i>chloropropylene oxide</i>]	3	NR					
Esters	1	2	3	NR			
Ether	1	2					
Ethyl Acetate [<i>acetic ether; vinegar naptha</i>]	1	2	2				



DATA TAKEN FROM PENNWALT CHEMICAL
CORPORATION BULLETIN KC-65A

(Modified By Subsequent Testing And Field Experience)

CHEMICAL RESISTANCE OF KYNAR® POLYVINYLIDENE FLUORIDE

	70 F	120 F	150 F	212 F	230 F	250 F	275 F
Ethylacetoacetate [<i>acetoacetic ester</i>]	1	2	3	NR			
Ethyl Acrylate	1	2	3	NR			
Ethyl Alcohol [<i>ethanol; grain alcohol</i>]	1	1	1	1	1	1	1
Ethyl Chloride [<i>chloroethane</i>]	1	1	1	1	1	1	1
Ethylene Bromide [<i>1,2-dibromoethane</i>]	1	1	1	1	1	1	1
Ethylene Chloride [<i>dichloroethane; dutch oil</i>]	1	1	1	1	1	1	1
Ethylene Chlorohydrin [<i>2-chloroethyl alcohol</i>]	1	2	3	NR			
Ethylene Diamine [<i>1,2-diaminoethane</i>]	2	NR					
Ethylene Glycol [<i>ethylene alcohol</i>]	1	1	1	1	1	1	1
Ethylene Oxide [<i>epoxy ethane; oxirane</i>]	1	1	1	1	1	1	1
F							
Fatty Acids	1	1	1	1	1	1	1
Ferric [<i>iron</i>] Chloride (50% in H ₂ O)	1	1	1	1	1	1	1
Ferric [<i>iron</i>] Nitrate	1	1	1	1	1	1	1
Ferric [<i>iron</i>] Sulfate	1	1	1	1	1	1	1
Ferrous Chloride [<i>iron dichloride</i>]	1	1	1	1	1	1	1
Ferrous Nitrate	1	1	1	1	1	1	1
Ferrous Sulfate [<i>green vitriol; copperas</i>]	1	1	1	1	1	1	1
Fluorine	1						
Formaldehyde (37% in H ₂ O) [<i>formic anhydride</i>]	1	1					
Formic Acid [<i>methanoic acid</i>]	1	1	1	1	1	1	1
Fuel Oil	1	1	1	1	1	1	1
Furan [<i>furfuran; tetrol</i>]	3	NR					
Furfural [<i>furyl carbinol</i>]	2	2	3	NR			
G							
Gallic Acid [<i>3,4,5-trihydroxybenzoic acid</i>]	1	2					
Gas - Manufactured	1	1	1	1	1	1	1
Gas - Natural	1	1	1	1	1	1	1
Gasoline - Leaded	1	1	1	1	1	1	1
Gasoline - Unleaded	1	1	1	1	1	1	1
Gasoline - Sour	1	1	1	1	1	1	1
Glucose [<i>dextrose</i>]	1	1	1	1	1	1	1
Glycerol [<i>glycerin; glycol alcohol</i>]	1	1	1	1	1	1	1
Glycolic Acid [<i>hydroacetic acid</i>]	2	2	3	NR			
Glycol [<i>ethylene glycol</i>]	1	1	1	1	1	1	1
Green Liquor	1	1	1	1			
H							
Heptane [<i>dipropylmethane</i>]	1	1	1	1	1	1	1
Hexane	1	1	1	1	1	1	1
Hydriodic Acid (48% + 12% I ₂)	1	1	1	1	1	1	1
Hydrobromic Acid (50%)	1	1	1	1	1		
Hydrochloric Acid (20%) [<i>muriatic acid</i>]	1	1	1	1	1	1	
Hydrochloric Acid (Conc.)	1	1	1	1	1	1	
Hydrochloric Acid (Gas)	1	1	1	1	1	1	



DATA TAKEN FROM PENNWALT CHEMICAL CORPORATION BULLETIN KC-65A

(Modified By Subsequent Testing And Field Experience)

CHEMICAL RESISTANCE OF KYNAR® POLYVINYLIDENE FLUORIDE

	70 F	120 F	150 F	212 F	230 F	250 F	275 F
Hydrocyanic Acid [<i>prussic acid; formonitrile</i>]	1	1	1	1	1	1	1
Hydrofluoric Acid (35%)	1	1	1	1	1	1	
Hydrofluoric Acid (70%)	1	1	1	1			
Hydrofluoric Acid (100%)	1	1	1	1			
Hydrofluosilicic Acid [<i>sand acid</i>]	1	1	1	1	1	1	1
Hydrogen	1	1	1	1	1	1	1
Hydrogen Cyanide	1	1	1	1	1	1	1
Hydrogen Peroxide (30%)	1	1	1	1	1	1	
Hydrogen Peroxide (90%)	1						
Hydrogen Phosphide [<i>phosphine</i>]	1	1					
Hydrogen Sulfide (Dry)	1	1	1	1	1	1	1
Hydrogen Sulfide (Wet)	1	1	1	1	1	1	1
Hypochlorous Acid	1	1	1	1	1	1	1

I

Iodine (Dry)	1	1	1				
Iodine (Wet)	1	1	1				
Iodoform [<i>triiodomethane</i>]	1	1	1	1			
Isopropyl Alcohol [<i>isopropanol</i>]	2	2	2	3	NR		

J

Jet Fuel - JP4	1	1	1	1			
Jet Fuel - JP5	1	1	1	1			

K

Kerosene	1	1	1	1	1	1	1
Ketones*		see note					

L

Lactic Acid [<i>milk acid</i>]	1	2	3	NR			
Lard Oil	1	1	1	1	1	1	1
Lauric Acid [<i>dodecanoic acid</i>]	1	1	1	1	1		
Lauryl Chloride	1	1	1	1	1	1	
Lead Acetate [<i>sugar of lead</i>]	1	1	1	1	1	1	1
Lemon Oil	1	1	1	1	1	1	
Linoleic Acid [<i>linolic acid</i>]	1	1	1	1	1	1	
Linseed Oil [<i>flaxseed oil</i>]	1	1	1	1	1	1	1
Lubricating Oil	1	1	1	1	1	1	1

M

Magnesium Carbonate [<i>magnesia alba</i>]	1	1	1	1	1	1	1
Magnesium Chloride	1	1	1	1	1	1	1
Magnesium Hydroxide [<i>milk of magnesia; magnesia magma</i>]	1	1	1	1	1	1	1
Magnesium Nitrate	1	1	1	1	1	1	1
Magnesium Sulfate [<i>epsom salts</i>]	1	1	1	1	1	1	1

* Many ketones have a severe effect on Kynar® at 70 F. and lower temperature. All ketones will soften Kynar at 120 F. or higher.



DATA TAKEN FROM PENNWALT CHEMICAL CORPORATION BULLETIN KC-65A

(Modified By Subsequent Testing And Field Experience)

CHEMICAL RESISTANCE OF KYNAR® POLYVINYLIDENE FLUORIDE

	70 F	120 F	150 F	212 F	230 F	250 F	275 F
Maleic Acid [<i>malainic acid</i>]	1	1	1	1	1	1	
Malic Acid [<i>hydroxysuccinic acid</i>]	1	1	1	1	1	1	
Mercaptan, n-Butyl [<i>thiol</i>]	1	1	1	1	1	1	1
Mercuric Chloride	1	1	1	1	1	1	
Mercuric Cyanide	1	1	1	1	1	1	
Mercuric Nitrate	1	1	1	1	1	1	1
Mercury [<i>quick silver</i>]	1	1	1	1	1	1	1
Methane	1	1	1	1	1		
Methane Sulfonic Acid (50%)	1	1	1	1			
Methyl Alcohol	1	1	1	1	1	1	1
Methyl Bromide [<i>bromomethane</i>]	1	1	1	1	1	1	1
Methyl Cellosolve [<i>ethylene glycol monomethyl ether</i>]	1	1	1	1	1	1	1
Methyl Chloride [<i>chloromethane</i>]	1	1	1	1	1	1	1
Methyl Chloroform [<i>1,1,1-trichloroethane</i>]	1	1					
Methylene Chloride [<i>dichloromethane</i>]	2	2					
Methyl Ethyl Ketone [<i>2-butanone</i>]	3	3	3				
Methyl Isobutyl Ketone [<i>hexone</i>]	1	2	3	NR			
Methyl Styrene	1	2	3	NR			
Methyl Sulfuric Acid [<i>methyl hydrogen sulfate</i>]	1	1					
Milk	1	1	1	1			
Mineral Oil	1	1	1	1	1	1	1
Monochlorobenzene	1	1	1	2			
Monoethanolamine	3	NR					
Morpholine [<i>tetrahydro-1,4-oxazine</i>]	2	3	NR				
N							
Naphtha	1	1	1	1	1	1	1
Naphthalene [<i>tar camphor</i>]	1	1	1	1	1	1	1
Nickel Chloride	1	1	1	1	1	1	1
Nickel Nitrate	1	1	1	1	1	1	1
Nickel Sulfate [<i>blue salt</i>]	1	1	1	1	1	1	1
Nicotine	1	2	2				
Nicotonic Acid [<i>niacin</i>]	1	1	1	1	1	1	
Nitric Acid - Conc. [<i>aqua fortis; azotic acid</i>]	1	1					
Nitric Acid - Fuming	2	2					
Nitric Acid - Sulfuric Acid 50/50	1	1	2				
Nitrobenzene [<i>oil of mirbane</i>]	1	2	2				
Nitrogen Dioxide	1	1	1	1			
Nitromethane	1	1					
Nitrous Acid	1	1	1	1			
O							
Octane	1	1	1	1	1	1	1
Octanoic Acid [<i>caprylic acid</i>]	1	1	1	1	1	1	1
Octene [<i>caprylene</i>]	1	1	1	1	1	1	1
Oleic Acid [<i>red oil</i>]	1	1	1	1	1	1	
Oleum [<i>super concentrated sulfuric acid</i>]				NR			



DATA TAKEN FROM PENNWALT CHEMICAL CORPORATION BULLETIN KC-65A

(Modified By Subsequent Testing And Field Experience)

CHEMICAL RESISTANCE OF KYNAR® POLYVINYLIDENE FLUORIDE

	70 F	120 F	150 F	212 F	230 F	250 F	275 F
Oxalic Acid	1	1	2	3			
Oxygen	1	1	1	1	1	1	1
Ozone	1	1	1	1	1	1	1

P

Palmitic Acid [<i>cetylic acid; hexadecanoic acid</i>]	1	1	1	1	1	1	1
Perchloric Acid (72%)	1	1					
Perchloric Acid (10%)	1	1	1	1			
Perchlroethylene [<i>tetrachloroethylene</i>]	1	1	1	1	1	1	1
Phenol (100%)	1	1	1	2			
Phenol (10%)	1	1	1	1			
Phenylhydrazine	1	1					
Phosphoric Acid (30%)	1	1	1	1	1	1	1
Phosphoric Acid (85%)	1	1	1	1	1		
Phosphorus Pentoxide	1	1	1	1			
Phosphorus Trichloride	1	1	1	1			
Phthalic Acid [<i>ortho-benzene-dicarboxylic acid</i>]	1	1	1	1			
Picric Acid [<i>carbazotic acid; phenoltrinitrate</i>]	1						
Polyvinyl Acetate	1	1	1	1	1	1	1
Potassium Bromide	1	1	1	1	1	1	1
Potassium Carbonate [<i>potash</i>]	1	1	1	1	1	1	1
Potassium Chlorate	1	1	1	1	1	1	1
Potassium Chloride	1	1	1	1	1	1	1
Potassium Cyanide	1	1	1	1	1	1	1
Potassium Dichromate	1	1	1	1	1	1	1
Potassium Ferrocyanide [<i>yellow potassium prussiate</i>]	1	1	1	1	1	1	1
Potassium Hydroxide [<i>caustic potash</i>]	1	1	1	1			
Potassium Nitrate [<i>saltpeter</i>]	1	1	1	1	1	1	1
Potassium Permanganate	1	1	1	1	1	1	1
Potassium Sulfate	1	1	1	1	1	1	1
Potassium Sulfide	1	1	1	1	1	1	1
Propane [<i>dimethylmethane</i>]	1	1	1	1	1	1	1
Propyl Alcohol [<i>propanol</i>]	1	2	2	3	NR		
Propylene Oxide	3	NR					
Pyridine	3	3	NR				
Pyrogallol [<i>1,2,3-trihydroxybenzene</i>]	1	1					

R

Refrigerant 11 [<i>freon 11</i>]	1	1	1	1			
Refrigerant 12 [<i>freon 12</i>]	1	1	1	1			
Refrigerant 22 [<i>freon 22</i>]	1	1	1	1			

S

Salicylic Acid [<i>ortho-hydroxybenzoic acid</i>]	1	1	1	1			
Salicyl-aldehyde [<i>ortho-hydroxybenzaldehyde</i>]	1	1	2	3			
Sea Water	1	1	1	1	1	1	1



**DATA TAKEN FROM PENNSALT CHEMICAL
CORPORATION BULLETIN KC-65A**

(Modified By Subsequent Testing And Field Experience)

CHEMICAL RESISTANCE OF KYNAR® POLYVINYLIDENE FLUORIDE

	70 F	120 F	150 F	212 F	230 F	250 F	275 F
Tartaric Acid [<i>dihydroxysuccinic acid</i>]	1	1	1	1	1	1	
Tetraethyl Lead	1	1	1	1	1	1	1
Tetrahydrofuran	2	3					
Tetramethyl Ammonium Hydroxide (50%)	1	1	1	1			
Toluene [<i>methylbenzene</i>]	1	1	1	1			
Tributyl Phosphate	1	2	NR				
Trichloroacetic Acid	1	2	3	NR			
Trichlorethylene	1	1	1	1	1	1	1
Triethylamine	1	1	2	3			
Trisodium Phosphate	1	1	1	1	1	1	1
Turpentine	1	1	1	1	1	1	1
U							
UDMH-Hydrazine (50-50)	1	2					
Urea (50% H ₂ O) [<i>carbamide</i>]	1	1	1	1	1	1	
V							
Varsol	1	1	1	1	1	1	
Vinyl Acetate	1	1	1	1	1	1	
W							
Water*	1	1	1	1	1	1	1
White Acid	1	1	1	1	1	1	
White Liquor	1	1	1	1			
X							
Xylene [<i>dimethylbenzene</i>]	1	1	1	1			
Z							
Zinc Chloride	1	1	1	1	1	1	1
Zinc Nitrate	1	1	1	1	1	1	1
Zinc Sulfate	1	1	1	1	1	1	1