

PSP[®]

PermaShield Pipe

Chemical Compatibility Charts



Fab-Tech, Inc.
A Critical Process Systems Company

Reliable Service

With nearly three decades of proven service in highly corrosive environments, PSP® has demonstrated its reliability for the removal of hazardous exhaust fumes. Facility engineers recognize the strength of PSP® to support their manufacturing lines, with no surprises.

PermaShield Fluoropolymer Barrier Coating is the premier chemical and impact resistant coating for applications under 300°F available today. The PSP® product line has never had a reported failure due to chemical attack of the coating. Many of the chemicals and solvents that are easily contained by PermaShield Fluoropolymer Barrier Coating can cause rapid deterioration of other plastics and all but the most exotic metal alloys.

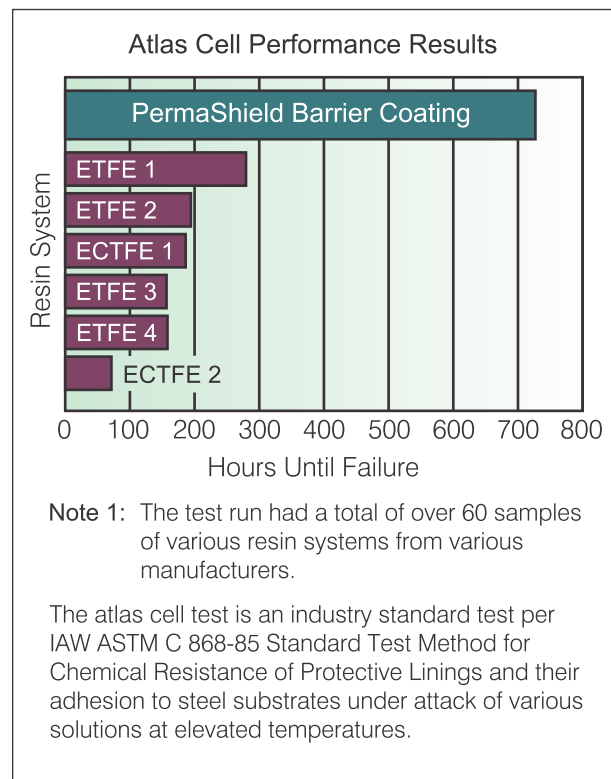
Field proven so there are no surprises!



Research And Testing

Fab-Tech engineers conducted a comprehensive research and testing program of fluoropolymers available on the market to determine the attributes of compatible coatings. Working closely with resin manufacturers, a base formula was selected and then modified to enhance permeation resistance and tested under Fab-Tech's unique coating methodology. Exhaustive tests of virtually all duct coatings available confirmed that this new formula proved to have much better adhesion and permeation resistance than standard ETFE or ECTFE. Test results also showed samples exhibited no observed blisters, peels or delamination.

This coating has better permeation resistance than any other fluoropolymer coating. Independent test results show PSP® has three times greater permeation resistance than the next best coating found in the marketplace (see Atlas Cell Test graph). The elasticity and bond to the substrate enables smaller diameter duct to be cut to length in the field and a new flange to be turned. This provides the installation contractor with the flexibility needed to address unexpected changes.



Applied using an electrostatic process, PermaShield Fluoropolymer Barrier Coating is integrally bonded to a stainless steel substrate. This process allows the coating to be applied to virtually any fitting, regardless of size or configuration, thus allowing engineers unlimited system design capabilities.

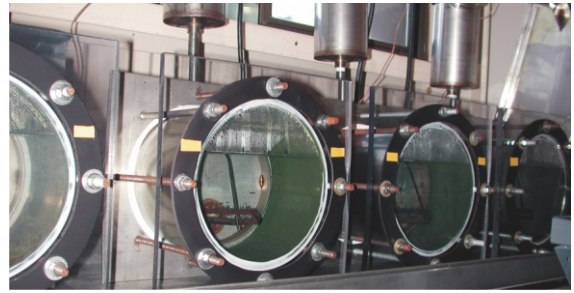
FM Approved

PermaShield Pipe with PermaShield Fluoropolymer Barrier Coating is FM 4922 approved for use as a fume exhaust product without internal fire suppression systems. This covers the maximum approval range of 4" to 60" diameter and a coating thickness up to .012". This product does not burn as certified in ASTM E-84 test with "0" flame spread and a smoke generation index of less than "20". These tests were performed as part of the Factory Mutual approval process.

Desirable Coating Attributes

Besides its high level of chemical resistance, PermaShield Fluoropolymer Barrier Coating possesses the following desirable attributes for years of worry free service:

- Mechanically tough with excellent cut through and abrasion resistance
- Low cold flow
- High tensile strength and good elongation properties
- Dimensionally stable
- Excellent impact resistance at room temperature and down into the cryogenic
- Continuous use to 300°F in most applications
- Excellent release properties
- Very smooth surface



Atlas cell test.



FM 4922 test.

Facility engineers love the fact that PSP® is easy to install, easy to maintain and does not burn.

Chemical Compatibility Charts

Table 1 - Chemical Compatibility Comparison

Table 1 lists over 500 chemicals whose corrosive characteristics create problems that can often be solved by specifying PermaShield Pipe (PSP®). The maximum use temperature for each chemical service is suggested as a guide only and are not necessarily upper limits of usability but are limits of data available. Little or no chemical attack is indicated at the temperature listed with less than 10% swelling or dimensional change and less than 15% loss of tensile strength at a concentration of 100%, concentrated, or saturated solution. It is recommended that tests be conducted under actual or simulated use conditions whenever possible to determine the suitability of PermaShield Fluoropolymer Barrier Coating or any other material for a specific application. This guide is based on controlled tests of representative chemicals, field applications, experience, and engineering judgement with regard to the suitability of PermaShield Fluoropolymer Barrier Coating in these chemical environments.

Table 2 - PTFE Sealant Compatibility Data

Table 2 was assembled from known compatibility data for PTFE materials and should be used only as a general guide for determining the suitability of PermaShield Gasket™ sealants for specific applications.

TABLE 1 - Chemical Compatibility Comparison (Maximum Use Temperatures °F)

CHEMICAL	PSP ¹	FRP ²	CPVC ³	PP ⁴	PVC ⁵	CHEMICAL	PSP ¹	FRP ²	CPVC ³	PP ⁴	PVC ⁵
Acetaldehyde	100			120	NR	Aluminum Nitrate	300	160	185	180	140
Acetamide	200	NR		73		Aluminum Oxychloride	300				140
Acetic Acid Vapors	212	NR	73	180	140	Aluminum Sulfate	300	140		225	150
Acetic Acid (10%)	212*	210		70	70	Ammonia, Gas	212*				
Acetic Acid (20%)	212*	210		70	70	Ammonia (Anhydrous)	200				
Acetic Acid (50%)	212*	175		70	70	Ammonia (Aqueous 30%)	200	NR		73	NR
Acetic Acid (80%)	300	175		70	70	Ammonium Acetate	122*				
Acetic Acid (90%)	300	100		70	70	Ammonium Bifluoride	300		185		140
Acetic Acid (Glacial)	212*	NR	NR	120	73	Ammonium Bisulfide	300				
Acetic Anhydride	200*	NR		75	NR	Ammonium Carbonate	300	150**		180	140
Acetone	212		NR	73	NR	Ammonium Chloride	300	210	185	180	140
Acetone Cyanohydrin	122					Ammonium Dichromate	250*				73
Acetonitrile	300	NR		70	NR	Ammonium Fluoride 10%	300	150**			
Acetophenone	200	NR		120	NR	Ammonium Fluoride 25%	300	140		212	73
Acetyl Chloride	122*					Ammonium Hydroxide (30%)	300	150**	185	180	140
Acetylene	212*			73	140	Ammonium Metaphosphate	300				
Acrylonitrile	212*	NR	NR	120	NR	Ammonium Nitrate	300	180	185	180	140
Acrylic Acid	212					Ammonium Persulphate	122*	180	73	150	140
Adipic Acid	122*	70	185	140	140	Ammonium Phosphate	300	210		225	140
Alcohols General	200	100	NR	170	NR	Ammonium Sulfate	300	210	185	180	140
Alcohols, Amyl	300	200	185	170	140	Ammonium Sulfide	300	120			
Alcohol, Benzyl	300					Amyl Acetate	122	NR		NR	NR
Alcohol, Butyl, Primary	300	120		70	70	Amyl Chloride	300	120		NR	NR
Alcohol, Butyl, Secondary	300	120		70	70	Aniline	212*		NR	180	NR
Alcohol, Diacetone	122					Anisole	122				
Alcohol, Ethyl (Ethanol)	300	100		140	70	Anthraquinone	122*				140
Alcohol, Hexyl	70*					Anthraquinone Sulfonic Acid	122*				140
Alcohol, Isopentyl	122					Antimony Trichloride	70*	220		180	140
Alcohol, Isopropyl	300					Aqua Regia	212*		73		NR
Alcohol, Menthyl	300					Aqua Regia (Fumes)	212	150		70	100
Alcohol, Propyl	300					Arsenic Acid	300	80	185	225	140
Allyl Alcohol	212	140		140	73	Barium Carbonate	300	210		225	140
Allyl Chloride	300	80		80	NR	Barium Chloride	300	210		212	140
Alum	300					Barium Hydroxide	300	160		212	140
Alum, Ammonium	300					Barium Nitrate	300			70	70
Alum, Chrome	212*					Barium Sulfate	300	210	185	70	140
Alum, Potassium	300					Barium Sulfide	300	180		225	140
Aluminum Chloride	300	210	185	180	140	Beer	300				
Aluminum Fluoride	300	80**		225	73	Beet Sugar Liquors	300	180		140	150
Aluminum Hydroxide	300	180	185		140	Benzaldehyde 10%	200			70	73

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CHEMICAL	PSP ¹	FRP ²	CPVC ³	PP ⁴	PVC ⁵	CHEMICAL	PSP ¹	FRP ²	CPVC ³	PP ⁴	PVC ⁵
Benzaldehyde above 10%	122	NR		70	NR	Calcium Chloride Saturated	300	210	185	180	140
Benzene	200	NR	NR	NR	NR	Calcium Hydroxide Saturated	300	180	185	180	140
Benzene Sulfonic Acid	200	210		70	70	Calcium Hypochlorite	300	160**		140	140
Benzene Sulfonic Acid 10%	200			180	40	Calcium Nitrate	300	300		180	140
Benzoic Acid	250*	210		73	140	Calcium Oxide	300				
Benzyl Alcohol	200	NR		150	NR	Calcium Sulfate	300	210		225	140
Benzyl Chloride	100	80		250	70	Cane Sugar Liquors	212*				
Benzonitrile	200					Caprylic Acid	122*	180			
Bismuth Carbonate	300				140	Carbolic Acid (Phenol)	212	NR		140	70
Black Liquor	300		185		140	Carbon Dioxide (Dry)	300		185	150	140
Bleach 12.5% Active Cl ₂	300		185	120	140	Carbon Dioxide (Wet)	300		185	150	140
Bleach 5.5% Active Cl ₂	300					Carbon Dioxide (Gas)	300	210			
Borax	300	210		180	140	Carbon Disulfide	200*	NR		NR	NR
Boric Acid	300	210	185	180	140	Carbon Monoxide	300	210	185	225	140
Brine Acid	300					Carbon Tetrachloride (Liquid)	300	100		70	NR
Bromine, Liquid	122	NR				Carbon Tetrachloride (Vapor)	300	175		70	NR
Bromine, Vapor 25%	122	NR		NR	NR	Carbonic Acid	300	210	185		140
Bromine, Water	212*			NR		Castor Oil	300		185		140
Bromobenzene	122				NR	Caustic Potash (10% & 50%)	300	150	185	140	140
Bromotoluene	122			NR	NR	Caustic Soda (10% & 50%)	212	210	210	180	100
Butadiene	250*		73	NR	140	Cellosolve®	300	210		70	NR
Butane	250*			73	140	Cellosolv Acetate	212				
Butanol n	250					Chloracetic Acid 50%	212*				
Butyl Acetate	100	NR	73	NR	NR	Chloral Hydrate	121*				140
Butyl Alcohol	300	120	73	180	140	Chloramine	70*				
Butylaldehyde	122					Chlorine Dioxide	212*				
Butyl Acrylate	122					Chlorine Gas, Dry	212*	210		NR	73
Butyl Amine	122	NR		70	NR	Chlorine Gas, Wet	212*	210		NR	NR
Butyl Cellosolve	70*					Chlorine, Liquid	212*	NR			
Butyl Lactate	122					Chlorine (Dry)	212	210		NR	73
Butylene	300				140	Chlorinated Water Saturated	212	195		150	140
Butyl Phenol	212*				73	Chlorobenzene	122	NR		73	NR
Butyl Phthalate	212*	190		180	NR	Chlorobenzyl Chloride	70				
Butyl Stearate	212*					Chloroethanol	200	100		NR	NR
Butyric Acid	250*	100		180	73	Chloroform	200*	NR	NR	NR	NR
Cadmium Cyanide	122*					Chlorosulfonic Acid 5%	200	NR		NR	73
Calcium Bisulfide	300	180				Chlorotoluene	122				
Calcium Bisulfite	300	140		212	150	Chromic Acid 10%	212*				
Calcium Carbonate	300	180**	185	180	140	Chromic Acid 30%	212*				
Calcium Chlorate	300	210			140	Chromic Acid 40%	212*				

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Chromic Acid 50%	212*	NR	210	180	NR	Dichloropropane	212				
Citric Acid	300	140		225	150	Dichlorotoluene a, a	250				
Coconut Oil	300					Diesel Fuels	300	180		200	140
Coke Oven Gas	212*					Diethyl Cellosolve	300				
Copper Carbonate	300					Diethylene Glycol	70	140		225	70
Copper Chloride	300	210	185		140	Diethylamine	122	NR		120	NR
Copper Cyanide	300	210**	185	225	140	Diethylene Glycol					
Copper Fluoride	300	210**		225	150	Butyl Ether Acetate	122				
Copper Nitrate	300	210		225	150	Meno Butyl Ether	122				
Copper Sulfate	300	210	185	120	140	Diethylene Triamine	122				
Corn Syrup	300					N, N Diethylethanolamine	122				
Cottonseed Oil	300			225	150	Diethyl Ether	200*	NR		NR	73
Creosote Hot (wood & coal tar)	212			NR	70	Diethyl Hydroxy Amine 85%	86				
Cresol (crude)	212	140		73	NR	Diethyl Phthalate	122				
Cresylic Acid 50%	70	NR		NR	140	Diglycolic Acid	70*				140
Croton Aldehyde	70					Diisobutyl Ketone	122*				
Crude Oil	300	210	185	150	150	Diisopropyl Acetate	70				
Cupric Chloride	300	140		140	150	Diisopropyl Ketone	212				
Cupric Fluoride	300					Dimethyl Acetamide N, N	212				
Cupric Sulfate	300					Dimethylamine	70			120	140
Cuprous Chloride	300					Dimethyl Aniline	200			NR	NR
Cyclohexane	212	120	NR	NR	NR	Dimethyl Formamide	100	NR	NR	120	NR
Cyclohexanol	122		NR	120	NR	Dimethyl Hydrazine	70				
Cyclohexanone	200	85	NR	NR	NR	Dimethyl Phthalate	212*	150		NR	NR
Cyclohexylamine	122					Dimethyl Sulfoxide	212*	NR		125	NR
Detergents General	300	140		200	140	Dioctyl Phthalate	200	180	NR	NR	NR
Detergent Solution (Heavy Duty)	300					Dioxane 1,4-	122				
Dexron (Trans Fluid)	300					Dioxane 2,4	212				
Dexron II (Auto Trans Fluid)	300					p-Dioxane	200	NR		73	NR
Dextrin	300				140	Dipropylene Glycol Methyl Ether	122				
Dextrose	300					Disodium Phosphate	300				
Diacetone Alcohol	122		NR	120	NR	Divinylbenzene	70				
Dibutyl Sebacate	212*					Dow Therm	200	150		NR	NR
Dibutyl Phthalate	122	180		120	NR	Epichlorhydrin Dry	200	NR		120	70
Dichlorobenzene	122	100		70	NR	Epsom Salt	300				
Dichloropropane	70					Ethanol	284				
Dichlorotoluene	70					Ethers	212	180		NR	NR
Dichlorodifluoro Methane (F-12)	70			80	80	2 Ethoxy-ethanol 99%	122				
Dichloroethane	70	80		70	NR	Ethyl Acetate	200	NR		120	NR
Dichloroethylene	100	NR		NR	NR	Ethyl Acetoacetate	72*				

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Ethyl Acrylate	212					Gelatin	212*	120		225	150
Ethyl Chloride	300	NR		73	NR	Gin	300				
Ethyl Ether	200*	NR		73	NR	Glucose	300	220		225	150
Ethyl Formate	212					Glycerine, Glycerol	300	220		225	125
Ethylene Bromide	300	NR		NR	NR	Glycol (Ethylene Glycol)	200	140	185	225	140
Ethylene Chlorohydrin	72	200		NR	NR	Glycolic Acid (Hydroxy Acetic)	122*	100	73	225	140
Ethylene Diamine	72	100		120	NR	Glycolis	300				
Ethylene Dichloride	200	NR	140	NR	NR	Heptane	300	140		NR	140
Ethylene Glycol	300	140	185	120	140	Hexane	250	100		70	70
Ethylene Oxide	212*			NR	NR	Hydrobromic Acid (20%)	300	140		70	NR
Fatty Acids	300	210	73	120	140	Hydrobromic Acid (50%)	300	100		120	
Ferric Chloride	300	210	185	180	140	Hydrochloric Acid (up to 37%)	300	180	210	150	140
Ferric Nitrate	300	210	140	180	140	Hydrochloric Acid (Conc.)	200				
Ferric Sulfate	300	210		180	140	Hydrochloric Acid (Gas)	200	210			
Ferrous Chloride	300	210	185	180	140	Hydrocyanic Acid	300	150		225	150
Ferrous Nitrate	300	210	140	140	73	Hydrocyanic Acid, 10%	300	180		73	140
Ferrous Sulfate	300	210	185	180	140	Hydrofluoric Acid (35%)	300	100**		125	70
Fluorine Gas, Wet	72*		73	NR	73	Hydrofluoric Acid (50%)	300	NR	NR	73	73
Fluoroboric Acid	250*	180**	73	73	140	Hydrofluosilicic Acid	300	180**		225	70
Fluorosilicic Acid	300		73		140	Hydrogen Gas	300	250	73	73	140
Formaldehyde (Formalin)	200*	150		140	70	Hydrogen Cyanide	300			225	140
Formic Acid	250	100	73	73	73	Hydrogen Peroxide (50%)	140*	100	185	150	140
Freon Dry	200			NR		Hydrogen Peroxide (90%)	140*	100		70	140
Freon Wet	200			70	NR	Hydrogen Phosphide	122*				140
Freon F-11	122*	75	73		140	Hydrogen Sulfide (Dry)	300	210	185	150	140
Freon F-12	122*		73	73	140	Hydrogen Sulfide (Wet)	200*	210			140
Freon F-21	122*					Hydroquinone	212*				140
Freon F-22	122*			73	NR	4 Hydroxybenzene Sulfonic Acid	158				
Freon F-113	122*					Hypochlorous Acid	300	140	140	73	140
Freon F-114	122*					Iodine (Dry)	212*	150			
Fruit Juices, Pulp	300					Iodine Solution 10%	212*	150		170	70
Fuel Oils	300	70		80	150	Isopropyl Ether	122*				
Fuming Sulfuric Acid	122					Isooctane	300				
Furan	100					Isopentyl Alcohol	122*				
Furfural (Furfuraldehyde)	212	NR		NR	NR	Isophorone	122				
Gallic Acid	122*		73	225	140	Isopropyl Alcohol	230	100		225	70
Gas-Natural	300	210		80	150	Jet Fuel-JP4	300	120	73	70	140
Gasoline, Leaded Refined	300	140		NR	140	Jet Fuel-JP5	300	120	73	70	140
Gasoline, Unleaded Refined	300	140		NR	140	Kerosene	300	150	73	150	140
Gasoline, Sour	300					Keytones	200	NR		70	NR

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Lactic Acid	300	210		150	73	Methyl Acetate	122			70	NR
Laquers & Laquer Solvents	70			NR	NR	Methyl Acrylate	122				
Lard Oil	300		185	73	140	Methyl Alcohol (Methanol)	70	100		180	140
Lauric Acid	212*				140	Methylamine	70	NR		70	NR
Lauryl Chloride	212*					Methyl Bromide	300			NR	NR
Lead Acetate	300	210	185	180	140	Methyl Cellosolve	300	NR		70	NR
Lead Chloride	300					Methyl Chloride	300	NR		NR	NR
Lead Nitrate	300	220		125	140	Methyl Chloroform	122		NR		
Lead Sulfate	300					Methyl Ethyl Keytone	122	NR	NR	NR	NR
Lemon Oil	300					Methyl Formate	212				
Lime Sulfur	122*			225	150	5 Methyl 2 Hexanone	122				
Linoleic Acid	212*	210		80	140	Methyl Isobutyl Keytone	122		NR	NR	NR
Linoleic Oil	250*					Methyl Methacrylate	122				73
Linseed Oil	300	210		225	150	Methyl Sulfate	300				
Linseed Oil, Blue	300					Methyl Sulfuric Acid	122*				
Lithium Bromide	212*	210				1 Methyl 2 Pyrrolidinone	70				
Lithium Hydroxide Saturated	300			70	140	Methylene Bromide	122				NR
LPG (Propane)	70	44		120	140	Methylene Chloride	122	NR		70	NR
Lubricating Oil, ASTM #1	300	200		70	140	Methylene Iodine	70				NR
Lubricating Oil, ASTM #2	300	200		70	140	Milk	300	140		212	150
Lubricating Oil, ASTM #3	300	200		70	140	Mineral Oil	300	210	185	120	140
Lye						Molasses	300	140		225	150
Calcium Hydroxide 50%	200	180		140	70	Monochlorobenzene	100	NR	73		
Potassium Hydroxide 50%	200	180		140	70	Monochlorodifluoromethane (F-22)	70			70	NR
Sodium Hydroxide 50%	200	180		140	70	Monoethanolamine	150	75		175	NR
Magnesium Carbonate	300	180			140	Morpholine	200	80		150	
Magnesium Chloride	300	210	185	180	140	Motor Oil	300	220		140	150
Magnesium Hydroxide	300	210	185	180	140	N, N Dimethyldodecylamine	167				
Magnesium Nitrate	300	210	185	180	140	Naphtha	300	200	73	120	140
Magnesium Sulfate	300	210	185	180	140	Naphthalene	300	180			NR
Maleic Acid	250*	200	185	180	140	Natural Gas	122				
Malic Acid	250*	140	185	150	140	Nickel Chloride	300	210	185	180	140
Mercuric Chloride	250*	210	140	180	140	Nickel Nitrate	300	210			140
Mercuric Cyanide	250*	140		225	140	Nickel Sulfate	300	210	185	180	140
Mercuric Sulfate	250*					Nicotine	122*				140
Mercurous Nitrate	250*	140			140	Nicotinic Acid	212*				140
Mercury	300	210	185	150	140	Nitric Acid 10%	250*				
Mesityloxide	122					Nitric Acid 30%	212*				
Methane	300			70	140	Nitric Acid 40%	212*				
Methane Sulfuric Acid 50%	151					Nitric Acid 50%	122*	NR	73	NR	100

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Nitric Acid 70%	122					Photographic Solutions					
Nitric Acid 90%	122					Developers	300	70		150	140
Nitrobenzene	122	100		73	NR	Picric Acid	70*	120		70	NR
Nitrogen Gas					70	Potash	300				
Nitrous Acid 10%	212*	150		NR	73	Potassium Alum	300				
Nitrous Oxide	122*			70	70	Potassium Aluminum Sulfate	300	210		225	150
Nitromethane	200					Potassium Acetate	70			70	150
N Methylpyrrolidinone	70					Potassium Bichromate	250*	210		225	150
Nonyl Phenol	122					Potassium Bisulfate	250*				
2 Octanol	122					Potassium Borate	250*				140
Oils, Crude	200	210		70	150	Potassium Bromide	250	210		180	140
Oils, Mineral	300	210		140	70	Potassium Carbonate Saturated	300	150		225	150
Oils, Vegetable	300	210		140	140	Potassium Chlorate Aqueous	300				
Oleic Acid	250*	210		170	150	Potassium Chloride	300	210	185	180	140
Oleum 30%	72			NR	NR	Potassium Chromate	300	140		225	140
Oleum 30% in Sulfuric Acid	72			NR	NR	Potassium Chlorate	300	140		180	140
Oxalic Acid	122	210		140	70	Potassium Cyanide	300	140	185	225	140
Oxalic Acid 50%	122		185	180	140	Potassium Dichromate	300	210	185	225	140
Oxygen, Gas	300					Potassium Ferricyanide	300	210		225	140
Ozone	212*	220		NR	NR	Potassium Ferrocyanide	300	210		140	150
Palmitic Acid, 10%	250	210	73	180	140	Potassium Hydroxide (50%)	300	150**	185	150	140
Paraffin	300	150		70	140	Potassium Iodide	250*	200		176	140
Pentanedione 2, 4	212					Potassium Nitrate	300	210		225	140
Pentyl Acetate	122					Potassium Perchlorate	122*				140
Perchloroethylene	200	100		NR	NR	Potassium Permanganate 10%	300	210		150	140
Perchloric Acid (10%)	200*	150		NR	NR	Potassium Permanganate 25%	300	210		150	140
Perchloric Acid (72%)	200*			200*	200*	Potassium Persulfate	122*	210		140	
Perchloric Acid (up to 30%)	200	80		80	80	Potassium Sulfate	300	210		225	150
Petroleum Oils, Sour	212*	200		70	150	Propane	300	44	73	70	70
Petroleum Oils, Refined	212*	200		70	150	Propyl Acetate	122				
Phenol	122		NR	NR	NR	Propyl Alcohol (Propanol)	122	100		225	
Phenylhydrazine	122*				NR	Pydravl	70				70
Phosphoric Acid 10%	300					Pyridine	200	NR		140	NR
Phosphoric Acid 30%	300					Pyrogallic Acid	122*			70	140
Phosphoric Acid 50%	300					Pyrolygneous Acid	100				
Phosphoric Acid 85%	300	210	73	180	140	Pyrolygneous Acid 10%	200	100		70	70
Phosphorous Oxychloride	122					Salicyclic Acid	250*	160		70	140
Phosphorous Pentoxide	212*		73	73	73	Salicylaldehyde	122				NR
Phosphorous Trichloride	212*	NR		NR	NR	Salt Brine 10%	250	210		225	140
Phosphorous Yellow	70*					Sea Water	250	210		225	140

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 NR = Not Recommended by Manufacturer, Blank = No Data Available or Other Relevant Data Prevails

TABLE 1 - Chemical Compatibility Comparison (Maximum Use Temperatures °F)

CHEMICAL	PSP ¹	FRP ²	CPVC ³	PP ⁴	PVC ⁵	CHEMICAL	PSP ¹	FRP ²	CPVC ³	PP ⁴	PVC ⁵
Silicic Acid	300					Sodium Sulfide	300	210	185	150	140
Silicone Oil	300			150	70	Sodium Sulfite	300	210	185	150	140
Silver Nitrate	300	210		70	70	Sodium Tetraborate (Borax)	300	210		140	150
Silver Sulfate	300					Sodium Thiosulfate (Hypo)	300	70		150	150
Soap Solutions	300	140		225	140	Sour Crude Oil	300	210			140
Skydrol 500 & 7000	70				70	Stannic Chloride	300	180	185	225	150
Sodium Acetate	300	210	185	180	140	Starch	300				
Sodium Alum	300					Stearic Acid	300	210	185	73	140
Sodium Benzoate	300	180	140	170	140	Stearoyl Chloride	250				
Sodium Bicarbonate	300	210	185	180	140	Steam	300	220	185		NR
Sodium Bichromate	212*	210		140	70	Stoddard's Solvent	300	210		70	125
Sodium Bisulfate	300	210		180	140	Succinic Acid	212*				
Sodium Bisulfite	300	210	185	180	140	Sulfate Liquors	212*				
Sodium Borate (Borax)	300	210		140	150	Sulfite Liquor	212*				
Sodium Bromide	300	210	180	180	140	Sulfolane	200				
Sodium Carbonate Saturated	300	150	185	180	140	Sulfur	300	250		225	140
Sodium Chlorate	300	210		180	70	Sulfur Chloride	70*	NR		NR	70
Sodium Chloride	300	200	210	225	150	Sulfur (Molten)	250			NR	NR
Sodium Chlorite Saturated	250*					Sulfur Dioxide Gas Wet & Dry	300	210	NR	73	73
Sodium Chromate 10%	100	210		140		Sulfuric Acid 10%	300				
Sodium Cyanide	300	210**	185	180	140	Sulfuric Acid 50%	300	180	210	150	140
Sodium Dichromate	212*	210		140	70	Sulfuric Acid 90%	300	NR	210	73	140
Sodium Fluoride	300	180	140	185	140	Sulfuric Acid 93%	300				
Sodium Hydrosulfide 50%	300					Sulfuric Acid 96%	300				
Sodium Hydroxide 15%	300	150**				Sulfuric Acid 98%	300				
Sodium Hydroxide 30%	250					Sulfuric Acid (Conc.)	300	NR		NR	NR
Sodium Hydroxide 50%						Sulfuric Acid (Fuming-Oleum)	300				
Caustic Soda	250	180**	210	180	100	Sulfurous Acid	212*	120		225	150
Sodium Hypochlorite 5%	250	150**	185	120	73	Tall Oil	300	150		175	140
Sodium Iodide	300					Tannic Acid	300	210	185	180	140
Sodium Metaphosphate	300			70	150	Tanning Liquors	250*			225	150
Sodium Nitrate	300	210		225	150	Tar	300			70	70
Sodium Nitrite	300	210	185	180	140	Tartaric Acid	250*	210		150	140
Sodium Perchlorate	250*		170		140	Tetrachloroethylene	200	120		70	70
Sodium Peroxide	300	80		212	120	Tetraethyl Lead	300			150	140
Sodium Phosphate, Alkaline	300	210		225	70	Tetrahydrofuran	100		NR	NR	NR
Sodium Phosphate, Acid	300	210		180	70	Tetramethyl Ammonium Hydroxide	212				
Sodium Phosphate, Neutral	300	210		225	70	Thionyl Chloride	122*	NR		120	70
Sodium Silicate	300	210**		180	150	Thread Cutting Oils	300				
Sodium Sulfate	300	210	185	150	140	Toluene (Tolvol)	200	140	NR	NR	NR

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TABLE 1 - Chemical Compatibility Comparison (Maximum Use Temperatures °F)

CHEMICAL	PSP ¹	FRP ²	CPVC ³	PP ⁴	PVC ⁵	CHEMICAL	PSP ¹	FRP ²	CPVC ³	PP ⁴	PVC ⁵
Toluenesulfonic Acid (sol. sat.)	158					Water, Deionized	100	210		225	150
Tomato Juice	212*	210	185	180	70	Water, Demineralized	100	210		225	150
Transformer Oil	212*	210		150	70	Water, Distilled or Fresh	100	210		225	150
Tricresyl Phosphate	212*	140		150	70	Water, Salt	100	210		225	150
Tributyl Phosphate	122				NR	Water, Sea	100	210		225	150
Trichloroacetic Acid	122			150	140	Water, Sewage	100				
Trichlorobenzene	122					Whiskey	300	80		225	150
Trichloroethylene	100		NR	NR	NR	White Liquor	212*	180		140	150
Trichloroethylene 1, 1, 1	70	140		125	70	Wines	212*	180		225	150
Trichloroethylene and Nitric Acid	122					Xylene (Xylol Xylole)	200	70	NR	NR	NR
Trichloroethylene in Methanol	122					Zinc Chloride	300	210	185	225	140
Trichlorotrifluoroethane (F-113)	70			70	73	Zinc Nitrate	300	210		225	140
Triethanolamine	75	120		170	140	Zinc Sulfate	300	210	185	225	140
Triethylamine	122										
Triethylene Tetramine	122					Plating Solutions					
Triethyl Phosphate	212*					Plating Solutions, Brass	212*	180	185	180	140
Triphenyl Phosphite	100					Plating Solutions, Cadmium	212*	220	185	180	140
Trisodium Phosphate	300	210	185	225	150	Plating Solutions, Chrome	212*	140	210	180	140
Turpentine	300	100	73	NR	125	Plating Solutions, Copper	212*	120	210	180	120
Urea	212*	140	185	225	70	Plating Solutions, Gold	212*	180	185	180	125
Vaseline	300					Plating Solutions, Lead	212*	160		225	140
Vinegar	212*	210		225	150	Plating Solutions, Nickel	212*	180		225	140
Vinyl Acetate	122	NR		NR	NR	Plating Solutions, Rhodium	212*				
Water	100	210	210	180	140	Plating Solutions, Silver	212*	180		225	150
Water, Acid Mine	100	210		225	150	Plating Solutions, Tin	212*	210		225	150
Water, Brackish	100					Plating Solutions, Zinc	212*	180		225	150

ANNOTATIONS: * = No Data Available Above Temperature Listed, ** = Synthetic Fiber Surfacing Mat Recommended by Manufacturer
 NR = Not Recommended by Manufacturer, Blank = No Data Available or Other Relevant Data Prevails

1 PermaShield Fluoropolymer Barrier Coating. From Fab-Tech, Inc. Colchester, VT.

2 Vinyl Ester. From Koppers Company, Inc. Pittsburgh, PA.

3 Chlorinated Polyvinyl Chloride. Class 23447-B.

4 Polypropylene. Type 1. Polyolefin.

5 Polyvinyl Chloride. Class 12454-B.

Maximum use temperatures listed for PermaShield Fluoropolymer Barrier Coating are based on tests of the resin with representative chemicals in valid laboratory or field tests. PermaShield Pipe products treated with such coating may exhibit different properties and therefore no guarantee is expressed or implied as to the results obtained by the user. Coatings formulated from this resin, and finished products treated with such coatings may exhibit different properties. These data are intended for use by persons having technical skill and at their own discretion and risk. Fab-Tech Incorporated makes no warranties, expressed or implied, and assumes no liability in connection with the use of this information.

TABLE 2 - Chemical Compatibility of 100% PTFE PermaShield Gasket™ Sealants

CHEMICAL	PTFE RATING	CHEMICAL	PTFE RATING
Abietic Acid	1	Black Sulfate Liquor	1
Acetic Acid, Crude	1	Bleach (Sodium Hypochlorite)	1
Pure	1	Borax	1
Vapors	1	Boric Acid	1
Acetic Anhydride	1	Brine	1
Acetone	1	Bromine	1
Acetophenone	1	Bromine Trifluoride	N
Acetylene	1	Butadiene	1
Acrylic Anhydride	1	Butane	1
Allyl Acetate	1	Butyl Acetate	1
Allyl Methacrylate	1	Butyl Alcohol, Butanol	1
Aluminum Chloride	1	N-Butyl Amine	1
Aluminum Fluoride	1	Butyl Methacrylate	1
Aluminum Hydroxide (Solid)	1	Calcium Bisulphate	1
Aluminum Nitrate	1	Calcium Chloride	1
Aluminum Sulfate	1	Calcium Hypochlorite	1
Alums	1	Capolactam	1
Ammonia, Liquid	1	Carbolic Acid, Phenol	1
Ammonia, Gas, 150°F & Below	1	Carbon Dioxide, Dry	1
Above 150°F	1	Wet	1
Ammonium Chloride	1	Carbon Disulfide	1
Ammonium Hydroxide	1	Carbon Monoxide	1
Ammonium Nitrate	1	Carbon Tetrachloride	1
Ammonium Phosphate		Carbonic Acid	1
Monobasic	1	Cetane (Hexadecane)	1
Dibasic	1	Chlorine, Dry	1
Tribasic	1	Wet	1
Ammonium Sulfate	1	Chlorine Dioxide	1
Amyl Acetate	1	Chlorine Trifluoride	1
Aniline, Aniline Oil	1	Chlorazotic Acid (Aqua Regia)	1
Aniline Dyes	1	Chloronitrous Acid (Aqua Regia)	1
Aqua Regia	1	Chlorinated Solvents, Dry	1
Barium Chloride	1	Wet	1
Barium Hydroxide	1	Chloroacetic Acid	1
Barium Sulfide	1	Chloroethylene	1
Benzaldehyde	1	Chloroform	1
Benzene, Benzol	1	Chlorosulfonic Acid	1
Benzonitrile	1	Chromic Acid	1
Benzoyl Chloride	1	Chromic Anhydride	1
Benzyl Alcohol	1	Chromium Trioxide	1

1 = Recommended (little or no effect)

O = Insufficient Data

N = Not Recommended

TABLE 2 - Chemical Compatibility of 100% PTFE PermaShield Gasket™ Sealants

CHEMICAL	PTFE RATING	CHEMICAL	PTFE RATING
Citric Acid	1	Green Sulfate Liquor	1
Copper Chloride	1	Heptane	1
Copper Sulfate	1	Hexachloroethane	1
Cresols, Cresylic Acid	1	Hexane	1
Cyclohexane	1	Hydrazine	1
Cyclohexanone	1	Hydrobromic Acid	1
Dibutyl Phthalate	1	Hydrochloric Acid	1
Dibutyl Sebacate	1	Hydrofluoric Acid, less than 65%	1
Diethyl Carbonate	1	150°F and Below	1
Dimethyl Ether	1	Above 150°F	1
Dimethyl Hydrazine, Unsymmetrical	1	65% To Anhydrous	1
Dimethyl Formamide	1	Hydrofluoric Acid, Anhydrous	1
Dioxide	1	Hydrofluorosilicic Acid	1
Dow Therm A	1	Hydrofluosilicic Acid	1
Dow Therm E	1	Hydrogen Gas, +150°F To -350°F	1
Ethane	1	Above 150°F	1
Ethers	1	Hydrogen Fluoride	1
Ethyl Acetate	1	Hydrogen Peroxide 10-90%	1
Ethyl Alcohol	1	Hydrogen Sulfide	1
Ethyl Cellulose	1	Dry, 150°F and Below	1
Ethyl Chloride	1	Dry, Above 150°F	1
Ethyl Ether	1	Wet, 150°F and Below	1
Ethyl Hexoate	1	Wet, Above 150°F	1
Ethylene	1	Iodine Pentafluoride	1
Ethylene Bromide	1	Isobutane	1
Ethylene Glycol	1	Isopropyl Alcohol	1
Ethylene Oxide	1	Jet Fuels	1
Ferric Chloride	1	Kerosene	1
Ferric Phosphate	1	Lactic Acid, 150°F and Below	1
Ferric Sulfate	1	Above 150°F	1
Fluorine, Gas	N	Lime Saltpeter (Calcium Nitrates)	1
Liquid	1	Lubricating Oils, Sour	1
Fluorine Dioxide	1	Refined	1
Formaldehyde	1	Lye	1
Formic Acid	1	Magnesium Chloride	1
Freon	1	Magnesium Hydroxide	1
Furfural	1	Magnesium Sulfate	1
Glycerine, Glycerol	1	Mercuric Chloride	1
Glycol	1	Mercury	1
Grain Alcohol	1	Methane	1

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TABLE 2 - Chemical Compatibility of 100% PTFE PermaShield Gasket™ Sealants

CHEMICAL	PTFE RATING	CHEMICAL	PTFE RATING
Methanol, Methyl Alcohol	1	Pentachlorophenol	1
Methylacrylic Acid	1	Perchloric Acid	1
Methyl Chloride	1	Perchloroethylene	1
Methyl Ethyl Keytone	1	Petroleum Oils, Crude	1
Methyl Methacrylate	1	Refined	1
Mineral Oils	1	Phenol	1
Molten Alkali Metals	N	Phosphoric Acid, Crude	1
Muriatric Acid	1	Pure, Less Than 45%	1
Naphthalene	1	Above 45%, 150°F and Below	1
Naphthas	1	Above 45%, Above 150°F	1
Naphthols	1	Phosphorus Pentachloride	1
Natural Gas	1	Phthalic Acid	1
Nickel Chloride	1	Picric Acid, Molten	O
Nickel Sulfate	1	Water Solution	1
Nitric Acid, Crude	1	Pinene	1
Less Than 30%	1	Piperidine	1
Above 30%	1	Polyacrylonitrile	1
Red Fuming	1	Potash, Potassium Carbonate	1
Nitrobenzene	1	Potassium Acetate	1
2-Nitro-Butanol	1	Potassium Bichromate	1
Nitrocalcite (Calcium Nitrate)	1	Potassium Chromate, Red	1
Nitrogen Tetroxide	1	Potassium Cyanide	1
Nitromethane	1	Potassium Dichromate	1
2-Nitro-2-Methal-Propanol	1	Potassium Hydroxide	1
Nitromuriatic Acid (Aqua Regia)	1	Potassium Permanganate	1
Nitrohydrochloric Acid	1	Potassium Sulfate	1
(Aqua Regia)	1	Producer Gas	1
Norge Nitter (Calcium Nitrate)	1	Propane	1
Norwegian Saltpeter	1	Propylene	1
(Calcium Nitrate)	1	Propyl Nitrate	1
N-Octadecyl Alcohol	1	Prussic Acid, Hydrocyanic Acid	1
Oleic Acid	1	Pyridine	1
Oleum	1	Saltpeter, Potassium Nitrate	1
Oxalic Acid	1	Silver Nitrate	1
Oxygen, Gas, 150°F and Below	1	Soda Ash, Sodium Carbonate	1
Gas, Above 150°F	1	Sodium Bicarbonate, Baking Soda	1
Liquid, Down to -350°F	O	Sodium Bisulfate	1
Liquid, Below -350°F	O	Sodium Chloride	1
Ozone	1	Sodium Cyanide	1
Palmitic Acid	1	Sodium Dioxide	1

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TABLE 2 - Chemical Compatibility of 100% PTFE PermaShield Gasket™ Sealants

CHEMICAL	PTFE RATING	CHEMICAL	PTFE RATING
Sodium Hydroxide	1	10-75%, 150°F & Below	1
Sodium Hypochlorite	1	75-95%, 150°F & Below	1
Sodium Metaphosphate	1	75-95%, Above 150°F	1
Sodium Metaborate Peroxyhydrate	1	Fuming	1
Sodium Nitrate	1	Sulfurous Acid	1
Sodium Perborate	1	Tannic Acid	1
Sodium Peroxide	1	Tartaric Acid	1
Sodium Phosphate, Monobasic	1	Tetrabromoethane	1
Dibasic	1	Toluene	1
Tribasic	1	Trichloroacetic Acid	1
Sodium Silicate	1	Trichloroethylene	1
Sodium Sulfate	1	Tricresyl Phosphate	1
Sodium Sulfide	1	Triethanolamine	1
Sodium Thiosulfate, "Hypo"	1	Turpentine	1
Sodium Superoxide	1	Varnish	1
Stannic Chloride	1	Vinegar	1
Steam	1	Vinyl Chloride	1
Stearic Acid	1	Vinyl Methacrylate	1
Styrene	1	Water, Mild Acid, With Oxidizing Salt	1
Sulfur Chloride	1	No Oxidizing Salts	1
Sulfur Trioxide, Dry	1	Whiskey And Wines	1
Sulfuric Acid		Wood Alcohol	1
10%, 150°F and Below	1	Ylenes	1
10%, Above 150°F	1	Zinc Chloride	1

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This chemical compatibility guide was assembled from known compatibility data for PTFE materials and should be used only as a general guide for determining the suitability of PermaShield Gasket™ sealants for specific applications. An independent study of the compatibility with your specific fluids is advised for confirmation of chemical compatibility. When immersion tests are performed with PermaShield Gasket™ sealants, the test sample must be first precompressed at 250psi minimum. Immersion test samples are available for your use, free of charge from our Colchester, Vermont facility.

About Fab-Tech

The success of any company is dependent on its workforce. This has certainly been the case with Fab-Tech. From dedicated office personnel to skilled and motivated craftsmen, the work environment is one of exceptional teamwork. This business approach has earned Fab-Tech the distinction as one of the most responsive and innovative companies in the metal fabrication industry. Fab-Tech takes great pride in its workforce and boasts the finest forming, fabricating, welding and coating facilities in North America, totaling over 78,000 square feet.

Customer Service

Fab-Tech is fully dedicated to complete customer service. Since each exhaust fitting is essentially manufactured to order, communication is critical. We work very closely with contractors, engineers and end-users to assure the finished product is consistent with prints, shop drawings and cut sheets. In addition, our professional engineering staff is also available to evaluate and design your custom fabrication as well as provide installation supervision and training upon request. Constantly aware of valuable lead time and the need for minimal delays, Fab-Tech is capable of round-the-clock manufacturing and expedited turn around. Fab-Tech continues to strive for new and better ways to serve our customers, from initial order to final installation.



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