

Expandable Polystyrene Chemical Resistance Tables

I. GENERAL INFORMATION

Chemical resistance of thermoplastic expanded polystyrene is dependent on time, temperature, and applied stress in functional use. Chemical attack usually results in the softening, cracking, and/or crazing of the plastic product. As the plastic product degrades from chemical exposure, the immediate effect is the percent of weight increase, while mechanical and physical properties reduce substantially.

The chemical resistance and permeability ratings and data in these tables were obtained from reliable published sources. This information should be used as a preliminary guide however, and not as the basis for a final decision. The specific service conditions and part design involved in a new projected use may grossly affect the performance of the article in a chemical environment. It is normally advisable to run laboratory tests employing specimens resembling the actual parts and exposed to conditions of the end-use environment your product must encounter.

II. RATING SYMBOLS

In the following tables, overall chemical exposure performance is evaluated through the use of three rating symbols — **S**, **M** and **U** — which have the following significance:

- S Satisfactory:** Little or no noticeable effect, with no indication that serviceability is impaired.
- M Marginal:** Noticeable effect, but not necessarily indicating a lack of serviceability or useful life. Further testing is recommended in the specific application.
- U Unsatisfactory:** Severe effect and not recommended for service applications.

REAGENT (Solids in saturated solution unless indicated otherwise)	Exposure		Chemical Exposure Performance S = Satis. M = Marginal U = Unsatis.	Permeability (gm./24 hr./100 sq. in/mil)
	Temp., °F	Time, days		
Acetic Acid 5%	77	365	S	
Acetic Acid 10%	77	365	M	
Acetic Acid 100%	77	365	U	
Acetone			U	
Acetophenone			U	
Adrenalin Hydrochloride			S	

REAGENT (Solids in saturated solution unless indicated otherwise)	Exposure		Chemical Exposure Performance S = Satis. M = Marginal U = Unsatis.	Permeability (gm./24 hr./ 100 sq. in/mil)
	Temp., °F	Time, days		
Adrenalin in oil			M	
Allyl Alcohol			U	
Aluminum Chloride (Sat.)	122	365	S	
Aluminum Sulphate (Sat.)	122	365	S	
Ammonia			S	
Ammonium Hydroxide	122	365	S	
Amyl Alcohol			U	
Amyl Acetate-n			U	X
Amyl Phthalate			U	
Amseed Oil			U	
Aspirin (powder)			S	
Atropine Sulphate			S	
Barium Carbonate (powder)	122	365	S	
Beef			S	
Benzaldehyde			U	
Benzedrine			S	
Benzene			U	X
Benzoic Acid	122	365	S	
Benzyl Acetate			U	
Borax (Sat.)	122	365	S	
Boric Acid	122	365	S	
Bromine Liquid			U	
Butter			U	
Butyl Acetate iso			U	X
Butyl Acetate n			U	X
Butyl Alcohol iso	77	365	S	
Butyl Alcohol n			S	
Butyl Phthalate			U	
Caffeine			S	

REAGENT (Solids in saturated solution unless indicated otherwise)	Exposure		Chemical Exposure Performance S = Satis. M = Marginal U = Unsatis.	Permeability (gm./24 hr./ 100 sq. in/mil)
	Temp., °F	Time, days		
Calcium Hypochloride 15%			M	
Calcium Hypochlorite			U	
Camphor			M	
Carbon Tetrachloride			U	X
Carbolic Acid 50%			M	
Carbolic Acid 100%			U	
Cassia Oil			U	
Castor Oil			S	
Cedarwood Oil			U	
Cellosolve			U	
Cellulose Acetate	122	365	U	
Cetyl Alcohol	77	365	S	
Cherries Processed			S	
Chlorobenzene			U	X
Chloroform			U	X
Chlorine			U	
Chromic Acid 20%			S	
Citric Acid 10%	77	365	S	
Citric Acid 20%			M	
Cocoa Butter			M	
Cod Liver Oil			M	
Coconut Oil			M	
Coffee Solution	122	365	S	
Copper Sulphate	77	10	M	
Corn Oil			M	
Cottonseed Oil			M	
Cyclohexanol	77	365	S	
Cyclohexanone			U	X
Decalin			U	X

REAGENT (Solids in saturated solution unless indicated otherwise)	Exposure		Chemical Exposure Performance S = Satis. M = Marginal U = Unsatis.	Permeability (gm./24 hr./ 100 sq. in/mil)
	Temp., °F	Time, days		
Detergents			M	
Diacetone			M	
Dibutyl Sebacate			U	
Dichlorobenzene-o			U	X
Dichlorobenzene-p			U	
Diethylene Glycol	122	365	S	
Diethylketone	122	365	S	X
Dimethyl Phthalate			U	
Ethyl Acetate 98%			U	X
Ethyl Alcohol 95%	77	365	M	
Ethyl Benzene			U	X
Ethyl Benzoate			U	
Ethyl Chloride (Gas and Liquid)			U	
Ethyl Ether			U	
Ethyl Lactate			U	
Ethylene Dichloride			U	X
Ethylene Glycol			S	
Ethylene Oxide			U	
Ferrous Chloride	122	365	S	
Formaldehyde			U	
Formic Acid 90%			M	
Furfuryl Alcohol			U	
Gasoline			U	
Glucose 30%			S	
Glycerine	77	240	S	
Heptyl Alcohol-n			S	
Hexane			U	
Hexyl Alcohol-n			S	
Horseradish			M	

REAGENT (Solids in saturated solution unless indicated otherwise)	Exposure		Chemical Exposure Performance S = Satis. M = Marginal U = Unsatis.	Permeability (gm./24 hr./ 100 sq. in./mil)
	Temp., °F	Time, days		
Honey			S	
Hydrochloric Acid 10%	77	365	S	
Hydrochloric Acid 38%			M	
Hydrochloric Acid 100%			U	
Hydrogen Peroxide 30%			S	
Hydroquinone			M	
Iodine Tincture			M	
Isopropyl Alcohol	77	365	M	
Kerosene			U	
Lactic Acid 10%			U	
Lanolin	77	375	S	
Lard			U	
Lauryl Alcohol			S	
Lead Arsenate			M	
Lead Nitrate	122	365	S	
Lemon Juice			U	
Lime Water			S	
Lipstick			M	
Magnesium Carbonate	122	365	S	
Maleic Acid 10%	77	365	S	
Mercuric Chloride 5%	122	365	S	
Mesityl Oxide			U	X
Methyl Acetate			U	
Methyl Alcohol			M	
Methyl Chloride			U	
Methyl Ethyl Ketone			U	X
Methyl Isobutyl Ketone			U	X
Methyl Propyl Ketone			U	X
Methyl Salicylate (Oil of Wintergreen)			U	

REAGENT <i>(Solids in saturated solution unless indicated otherwise)</i>	Exposure		Chemical Exposure Performance <i>S = Satis. M = Marginal U = Unsatis.</i>	Permeability <i>(gm./24 hr./100 sq. in/mil)</i>
	Temp., °F	Time, days		
Methylene Chloride			U	
Milk	77	14	S	
Mineral Oil			S	
Mono-Chloro Benzene			U	X
Motor Oil			M	
Mustard			M	
Nitric Acid 20%			U	
Nitroglycerine			S	
Nonyl Alcohol			S	
Octyl Alcohol			S	
Oils-Essential			U	
Oleic Acid 100%	7	365	M	
Orange Juice Fresh			M	
Orange Juice Concentrate			S	
Oxalic Acid 10%	122	365	S	
Ozone (absence of light)			S	
Palm Oil			M	
Palmitic Acid	77	365	M	
Peanut Oil			U	
Pectin (Sat.)			S	
Petroleum Jelly	122	365	S	
Phenol 5%			M	
Phosphoric Acid 50%	122	365	S	
Phosphorous (white)			M	
Potassium Hydroxide 30%	77	365	S	
Potassium Hydroxide 35%	77	365	M	
Potassium Bromide 3%	77	365	M	
Potassium Ferricyanide	122	365	S	
Potassium Iodide (Sat.)	122	365	S	

REAGENT (Solids in saturated solution unless indicated otherwise)	Exposure		Chemical Exposure Performance S = Satis. M = Marginal U = Unsatis.	Permeability (gm./24 hr./ 100 sq. in/mil)
	Temp., °F	Time, days		
Potassium Permanganate	122	365	M	
Propyl Alcohol (iso)	77	365	M	
Propylene Dichloride			U	X
Propylene Glycol	122	365	S	
Pyrogallic Acid	77	365	M	
Resorcinol Crystals			S	
Rubber			S	
Salicylic Acid (sat.)	122	365	S	
Silver Nitrate (sat.)	122	365	S	
Sodium Acetate (sat.)	122	365	S	
Sodium Benzoate	122	365	S	
Sodium Bicarbonate	122	365	S	
Sodium Bisulphite (sat.)	122	365	M	
Sodium Borate			S	
Sodium Bromide	122	365	S	
Sodium Carbonate (sat.)	122	365	M	
Sodium Chloride (sat.)	122	365	M	
Sodium Dichromate 10%			M	
Sodium Fluoride 5%			M	
Sodium Hydroxide 40%	77	30	S	
Sodium Hypochlorite 15%			S	
Sodium Tetraborate (Borax)	122	365	S	
Stannic Chloride			S	
Stearic Acid (powder)	122	365	S	
Sucrose 30%			S	
Sulphur			S	
Sulphuric Acid 50%			S	
Sulphuric Acid 96%			U	
Tannic Acid 2%			U	

REAGENT (Solids in saturated solution unless indicated otherwise)	Exposure		Chemical Exposure Performance S = Satis. M = Marginal U = Unsatis.	Permeability (gm./24 hr./ 100 sq. in/mil)
	Temp., °F	Time, days		
Tea (Sol.)			S	
Tetrahydrofurfuryl Alcohol			U	
Tetralin			U	X
Titanium Tetrachloride			U	
Toluene			U	X
Trichloroethylene			U	X
Triethylene Glycol			S	
Triethylene Tetramine			M	
Turpentine			U	X
Water			S	
Water Carbonated			S	
Witch Hazel Distilled			S	
Worcestershire Sauce			S	
Zinc Carbonate	122	365	S	
Zinc Chloride 50%	122	365	S	
Zinc Stearate	122	365	S	
Xylene			U	X

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