

# CHEMICAL RESISTANCE PROPERTIES OF TUBING

The ratings in the charts on pages 22 to 25 are based on the results of laboratory tests. They reflect the relative capabilities of various Saint-Gobain's tubing formulations to withstand specific chemicals. NOTE: The ratings in the charts DO NOT reflect the extent to which extraction may occur, or the extent to which fluids may undergo any physical changes in properties or composition, as a result of coming into contact with the tubing. Saint-Gobain makes no representation or warranty with respect to the susceptibility of any fluid to become contaminated or undergo changes in properties or composition as a result of possible extraction of tubing ingredients by the fluid to be transmitted. Certain corrosives that would be destructive to tubing with prolonged exposure can be satisfactorily handled for short periods of time if flushed with water after use. All ratings are based on room temperature (73°F). Chemical resistance will be adversely affected by elevated temperatures.

**IMPORTANT: It is the user's responsibility to ensure the suitability and safety of Saint-Gobain tubing for all intended uses, including establishing the compatibility of any fluid with the tubing through which it is transmitted. Laboratory, field or clinical tests must be conducted in accordance with applicable requirements in order to determine the safety and effectiveness for use of tubing in any particular application. If intended for medical use, it is the user's responsibility to ensure that the tubing to be used complies with all applicable medical regulatory requirements.**

KEY	
E	Excellent
G	Good
F	Fair
X	Not Recommended

  

Environment, % Conc.*	
w-Water	alc-Alcohol

	Tygon S3 <sup>™</sup> B-44-3	Tygon S3 <sup>™</sup> B-44-4X	Tygon S3 <sup>™</sup> B-44-4X I.B.	Tygon S3 <sup>™</sup> Silver	Tygon S3 <sup>™</sup> E-3603	Tygon S3 <sup>™</sup> E-LFL	Norprene <sup>®</sup> A-60-F	Norprene <sup>®</sup> A-60-F I.B.	Tygotprene <sup>®</sup> XL-60	Versilic <sup>®</sup> SPX-50	Versilic <sup>®</sup> SPX-70 I.B.	Tygon <sup>®</sup> 2375	Tygon <sup>®</sup> 2001	Tygothane <sup>®</sup> C-210-A	Tygothane <sup>®</sup> C-544-A I.B.	Norprene <sup>®</sup> A-60-G	Tygon <sup>®</sup> F-4040-A	Tygon <sup>®</sup> R-3400	Fluran <sup>®</sup> F-5500-A	Tygon <sup>®</sup> SE-200	Chemfluor <sup>®</sup> FEP	Chemfluor <sup>®</sup> PFA	Chemfluor <sup>®</sup> PTFE
Acetaldehyde	X	X	X	F	X	X	X	X	F	F	F	F	F	X	X	X	X	X	X	E	E	E	E
Acetamide, 67% in w	X	X	X	E	X	X	G	G	G	G	G	E	E	G	X	X	X	X	X	E	E	E	E
Acetate Solvents (general)	X	X	X	X	X	X	G	G	X	X	X	X	X	X	X	X	X	X	X	E	E	E	E
Acetic Acid, 10% in w	E	E	E	E	E	E	E	E	E	E	E	E	E	G	G	G	E	E	X	E	E	E	E
Acetic Acid, 50-60% in w	G	G	G	E	E	E	G	G	E	E	E	E	E	E	X	X	G	E	E	X	E	E	E
Acetic Acid, Glacial, 100%	F	F	F	F	F	F	G	G	F	X	X	E	E	G	X	X	G	X	X	F	E	E	E
Acetic Anhydride	X	X	X	E	X	X	E	F	E	F	F	F	F	F	X	X	F	X	X	E	E	E	E
Acetone	X	X	X	G	X	X	X	X	X	X	X	G	F	X	X	X	X	X	X	E	E	E	E
Acetonitrile	X	X	X	G	X	X	G	G	X	X	X	G	G	X	X	G	X	X	X	E	E	E	E
Acetyl Bromide	X	X	X	X	X	X	F	F	F	X	X	X	F	X	X	F	X	X	X	E	E	E	E
Acetyl Chloride	X	X	X	X	X	X	F	F	F	X	X	X	F	X	X	F	X	X	X	E	E	E	E
Acetylene Gas	E	E	E	E	E	E	E	E	E	F	F	E	E	E	E	E	E	E	E	E	E	E	E
Acrylonitrile	X	X	X	G	X	X	G	G	X	X	X	G	G	X	X	G	X	X	X	E	E	E	E
Adipic Acid, 100% in alc	X	X	X	X	X	X	G	G	F	X	X	X	G	X	X	G	F	X	X	E	E	E	E
Air	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Alcohols General	X	X	X	E	X	X	E	F	E	E	E	E	E	X	X	E	G	X	X	E	E	E	E
Aliphatic Hydrocarbons	X	X	X	X	X	X	X	X	X	X	X	X	X	X	G	G	X	G	F	G	E	E	E
Allyl Alcohol	X	X	X	E	X	X	F	F	F	X	X	E	E	X	X	F	X	X	E	E	E	E	E
Alum, 5% in w	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Aluminum Chloride, 53% in w	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Aluminum Hydroxide, 2% in w	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Aluminum Sulfate, 50% in w	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Aluminum Salts	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Amines	X	X	X	X	X	X	F	F	F	X	X	X	X	X	X	F	X	X	X	E	E	E	E
Ammonia Gas	E	E	E	E	E	E	E	E	E	X	X	E	E	G	G	E	E	X	E	E	E	E	E
Ammonia, Anhydrous Liquid	G	G	G	G	G	G	G	E	X	X	G	G	F	F	G	G	G	X	G	E	E	E	E
Ammonium Acetate, 45% in w	E	E	E	E	E	E	E	E	E	E	E	E	E	G	G	E	E	E	E	E	E	E	E
Ammonium Carbonate, 50% in w	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Ammonium Hydroxide, 5-10% in w	E	E	E	E	E	E	E	E	X	X	F	E	E	E	E	E	E	X	E	E	E	E	E
Ammonium Hydroxide, 30% in w	E	E	E	E	E	E	E	E	X	X	F	E	E	F	F	E	F	G	X	E	E	E	E
Ammonium Persulfate, 30% in w	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Ammonium Salts	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Ammonium Sulfate, 30% in w	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Amyl Acetate	X	X	X	X	X	X	G	G	X	X	X	E	X	X	X	G	X	X	X	E	E	E	E
Amyl Alcohol	X	X	X	E	X	X	X	X	X	X	X	E	E	F	F	X	E	X	E	E	E	E	E
Amyl Chloride	X	X	X	X	X	X	F	F	X	X	X	X	X	X	X	F	X	X	X	E	E	E	E
Aniline	X	X	X	X	X	X	F	F	X	X	X	X	X	X	X	F	X	X	X	E	E	E	E
Aniline Hydrochloride	X	X	X	X	X	X	F	F	X	X	X	X	X	X	X	F	X	X	X	E	E	E	E
Antimony Salts	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Aqua Regia	X	X	X	F	X	X	X	X	X	X	X	E	E	X	X	X	X	G	X	G	G	E	E
Aromatic Hydrocarbons	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	E	E	E	E
Arsenic Acid, 20% in w	E	E	E	E	E	E	F	F	F	X	X	F	E	E	E	F	E	E	E	E	E	E	
Arsenic Salts	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
ASTM Reference No. 1 Oil	X	X	X	X	X	X	F	F	X	G	G	X	X	E	E	F	E	X	E	E	E	E	E
ASTM Reference No. 2 Oil	X	X	X	X	X	X	X	X	X	G	G	X	X	F	E	X	E	X	E	E	E	E	E
ASTM Reference No. 3 Oil	X	X	X	X	X	X	X	X	X	X	X	X	X	E	E	X	E	X	E	E	E	E	E
Barium Carbonate, 1% in w	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Barium Hydroxide, 5% in w	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Beer	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Benzaldehyde	X	X	X	F	X	X	X	X	F	F	F	F	F	X	X	X	X	X	X	F	E	E	E
Benzene	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	E	E	E	E
Benzenesulfonic Acid	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	E	E	E	E
Benzoic Acid	X	X	X	X	X	X	G	G	X	X	X	X	X	X	X	G	F	X	X	E	E	E	E
Benzyl Alcohol	X	X	X	E	X	X	E	E	X	E	E	F	E	X	X	E	X	X	E	E	E	E	E
Bleach Liquor, 22% in w	G	G	G	G	F	F	E	E	G	G	E	E	G	G	E	E	E	E	E	E	E	E	E
Borax, 6% in w	E	E	E	E	E	F	E	E	G	G	E	E	E	E	E	E	E	E	E	E	E	E	E
Boric Acid, 4% in w	E	E	E	E	E	E	E	E	E	G	G	E	E	E	E	E	E	E	E	E	E	E	E
Bromine, Anhydrous Liquid	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Buradiene	E	E	E	G	E	E	E	E	E	E	E	G	G	E	E	F	E	E	E	E	E	E	E
Butane	E	E	E	G	E	E	E	E	E	E	E	G	G	E	E	E	E	E	E	E	E	E	E
Butyl Acetate	X	X	X	X	X	X	G	G	X	X	X	X	X	X	X	G	X	X	X	E	E	E	E
Butyl Alcohol	X	X	X	E	X	X	X	X	X	X	X	E	E	F	F	X	E	X	E	E	E	E	E
Butyric Acid	X	X	X	X	X	X	G	G	E	X	X	X	X	X	X	G	F	X	X	E	E	E	E
Calcium Carbonate, 25% in dilute acids	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Calcium Chloride, 30% in w	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Calcium Hydroxide, 10% in glycerol	F	E	E	E	E	E	E	E	E	G	G	E	E	X	X	E	X	E	E	E	E	E	E
Calcium Hypochlorite, 20% in w	E	E	E	E	E	E	E	E	E	G	G	E	E	G	G	E	E	E	E	E	E	E	E

Gas Grade Hose

Tygon<sup>®</sup> F-4040-A  
Tygon<sup>®</sup> R-3400  
Fluran<sup>®</sup> F-5500-A  
Tygon<sup>®</sup> SE-200  
Chemfluor<sup>®</sup> FEP  
Chemfluor<sup>®</sup> PFA  
Chemfluor<sup>®</sup> PTFE

\* If concentration is not indicated, assume 100% concentration or the maximum percent solubility in water.  
NOTE: Concentrations of room temperature liquids are given in % volume. Concentrations of room temperature solids are given in % weight.



KEY

- E Excellent
G Good
F Fair
X Not Recommended

Environment, % Conc.\*
w-Water alc-Alcohol

- Hydrofluoric Acid, 10% in w
Hydrofluoric Acid, 25% in w
Hydrofluoric Acid, 40-48% in w
Hydrogen Gas
Hydrogen Peroxide, 3% in w
Hydrogen Peroxide, 10% in w
Hydrogen Peroxide, 30% in w
Hydrogen Peroxide, 90% in w
Hydrogen Sulfide
Hydroquinone, 7% in w
Hypochlorous Acid, 25% in w
Iodine, 50 ppm in w
Isobutyl Alcohol
Isocetane
Isopropyl Acetate
Isopropyl Alcohol
Isopropyl Ether
Jet Fuel, JP8
Kerosene
Ketones
Lacquer Solvents
Lactic Acid, 3-10% in w
Lactic Acid, 85% in w
Lard, Animal Fat
Lead Acetate, 35% in w
Lead Salts
Lemon Oil
Limonene-D
Linolic Acid
Linseed Oil
Lubricating Oils, Petroleum
Magnesium Carbonate, 1% in w
Magnesium Chloride, 35% in w
Magnesium Hydroxide, 10% in dil. acid
Magnesium Nitrate, 50% in w
Magnesium Sulfate, 25% in w
Maleic Acid, 30% in w
Malic Acid, 36% in w
Manganese Salts
Mercuric Chloride, 6% in w
Mercuric Cyanide, 8% in w
Mercury
Mercury Salts
Methane Gas
Methyl Acetate
Methyl Bromide
Methyl Chloride
Methyl Ethyl Ketone
Methyl Isobutyl Ketone
Methylene Chloride
Methyl Methacrylate
Milk
Mineral Oil
Mineral Spirits
Molasses
Monoethanolamine
Motor Oil
Naphtha
Naphthalene
Natural Gas
Nickel Chloride, 40% in w
Nickel Nitrate, 75% in w
Nickel Salts
Nickel Sulfate, 25% in w
Nitric Acid, 10% in w
Nitric Acid, 35% in w
Nitric Acid, 68-71% in w
Nitrobenzene
Nitromethane
Nitrous Acid, 10% in w
Nitrous Oxide
Oils, Animal
Oils, Essential
Oils, Hydraulic (Phosphate Ester)
Oils, Hydrocarbon
Oils, Vegetable
Oleic Acid
Oleum, 25% in w
Ortho Dichlorobenzene
Oxalic Acid, 12% in w
Oxygen
Ozone, 300pphm
Palmitic Acid, 100% in ether
Paraffins

Table with 26 columns representing hose types and rows representing chemical compatibility. Hose types include Tygon S3, Tygon S3 Silver, Tygon S3 E-LFL, Norprene A-60-F, Norprene A-60-F I.B., Tygoprene XL-60, Versilic SPX-50, Versilic SPX-70 I.B., Tygon 2375, Tygon 2001, Tygothane C-210-A, Tygothane C-544-A I.B., Norprene A-60-G, Tygon F-4040-A, Tygon R-3400, Fluran F-5500-A, Tygon SE-200, Chemfluor FEP, Chemfluor PFA, and Chemfluor PTFE.

\* If concentration is not indicated, assume 100% concentration or the maximum percent solubility in water. NOTE: Concentrations of room temperature liquids are given in % volume. Concentrations of room temperature solids are given in % weight.

