

## **CHEMICAL RESISTANCE GUIDE FOR SURE-WELD™ TPO MEMBRANE SYSTEMS (11/97F)**

Sure-Weld Thermoplastic Polyolefin (TPO) roof membranes are not adversely affected by most common materials and chemicals encountered in a roof environment. Since the field seam is heat welded, it is as resistant to chemicals as the base sheet. The best course of action to take if unusual substances will contact the membrane, is to evaluate their effect on the membrane in the laboratory. Carlisle SynTec's Laboratory is equipped to perform this testing, interpret the results, and provide a recommendation.

Several factors can increase the affect of a chemical or combination of chemicals on Sure-Weld (and other single-ply roof membrane materials).

1. The higher the temperature the greater the affect of the chemical(s) on the membrane.
2. Increasing the concentration of the chemical(s) increases the affect on the membrane.
3. In most cases, continuous exposure is more severe than intermittent (occasional) exposure.
4. Combinations of chemicals are usually more severe than the sum of the affects of the individual chemicals (synergistic effect).

The use of common sense is required on circumstances where a roof (or portions thereof) become covered with a foreign material. A good example is fast food restaurants. Sure-Weld is recommended for use on fast food restaurants, providing that the membrane does not become covered with a thick layer (1/8 in. or greater) or a pond of fats/greases. The membrane will continue to be watertight, but swelling may occur that will cause puckering of the membrane.

The following chart rates the chemical resistance of Sure-Weld according to the following codes:

**A = NEGLIGIBLE EFFECT** - Sure-Weld membrane should be suitable for all applications where these environmental conditions exist.

**B = LIMITED ABSORPTION OR EFFECT** - Sure-Weld membrane should be suitable for most applications, but testing is recommended to determine the suitability of Sure-Weld in the particular environment.

**C = EXTENSIVE ABSORPTION AND/OR RAPID DEGRADATION POSSIBLE** - Sure-Weld may be suitable for applications where only intermittent contact is involved and contact with the membrane is for short periods of time (5 minutes or less). Testing must be performed to determine the suitability of TPO in the particular environment.

**D = EXTENSIVE ATTACK** - The membrane dissolves or disintegrates, Sure-Weld is not recommended.

**\*\* =** May produce cracking in material under stress.

**-- =** No data available.

**Note:** Where a concentration is not shown (blank) the substance is pure or concentrated. 11/97

Environment	Concentration %	Temperature °F (°C)	
		70 (21)	140 (60)
Acetic acid (glacial)	97	A	B
Acetic acid	50	A	A
Acetic acid	40	A	A
Acetic acid	10	A	A
Acetone		A	A
Acetophenone		B	B
Acriflavine (2% soln in H <sub>2</sub> O)	2	A	A
Acrylic emulsions		A	A
Aircraft exhaust (gas & jet - fully burned)		A	A
Airport environment fumes & gases		A	A
Aluminum chloride		A	A
Aluminum fluoride		A	A
Aluminum sulfate		A	A
Alums (all types)		A	A
Ammonia gas (dry)		A	A
Ammonia (aqueous)	30	A	--
Ammonium carbonate		A	A
Ammonium chloride		A	A
Ammonium fluoride	20	A	A
Ammonium hydroxide	10	A	A
Ammonium metaphosphate		A	A
Ammonium nitrate		A	A
Ammonium persulfate		A	A
Ammonium sulfate		A	A
Ammonium sulfide		A	A
Ammonium thiocyanate		A	A
Amyl acetate		B	C

Environment	Concentration %	Temperature °F (°C)	
		70 (21)	140 (60)
Amyl alcohol		A	B
Amyl chloride		C	C
Aniline		A	A
Animal fat / grease		A	B
Anisole		B	B
Antimony chloride		A	A
Aqua regia		**C	**C
Aviation gasoline (80 to 110 octane)		C	D
Aviation turbine fuel		C	D
Barium carbonate		A	A
Barium chloride		A	A
Barium hydroxide		A	A
Barium sulfate		A	A
Barium sulfide		A	A
Beer		A	A
Benzene		C	D
Benzoic acid		A	A
Benzyl alcohol		A	A
Bismuth carbonate		A	A
Borax		A	A
Boric acid		A	A
Brine		A	A
Bromine liquid		D	--
Bromine water		**C	--
Butyl acetate		C	C
Butyl alcohol		A	--

Environment	Concentration %	Temperature °F (°C)	
		70 (21)	140 (60)
Calcium carbonate		A	A
Calcium chlorate		A	A
Calcium chloride	50	A	A
Calcium hydroxide		A	A
Calcium hypochlorite bleach	20	A	B
Calcium nitrate		A	A
Calcium phosphate	50	A	--
Calcium sulfate		A	A
Calcium sulfite		A	A
Carbon dioxide (dry)		A	A
Carbon dioxide (wet)		A	A
Carbon disulfide		B	C
Carbon monoxide		A	A
Carbon tetrachloride		C	C
Carbonic acid		A	A
Castor oil		A	--
Cetyl alcohol		A	--
Chlorine (gas)		D	D
Chlorobenzene		C	C
Chloroform		C	D
Chlorosulfonic acid		D	D
Chrome alum		A	A
Chromic/sulfuric acid		D	D
Chromic acid	80	**B	--
Chromic acid	50	**B	**B
Chromic acid	10	**B	**B
Cider		A	A

Environment	Concentration %	Temperature °F (°C)	
		70 (21)	140 (60)
Citric acid	10	A	A
Copper Chloride		A	A
Copper cyanide		A	A
Copper nitrate		A	A
Copper fluoride		A	A
Copper sulfate		A	A
Cottonseed oil		A	B
Cuprous chloride		A	A
Cyclohexanol		A	B
Cyclohexanone		B	C
Decalin		C	C
Detergents	2	A	A
Developers (photographic)		A	A
Dibutyl phthalate		B	C
Dichloroethylene		C	--
Diethanolamine		A	A
Diisooctyl phthalate		B	C
Emulsifiers		A	A
Ethyl acetate		B	B
Ethyl alcohol	96	A	A
Ethylene glycol		A	A
Ethanolamine		A	A
Ethyl ether		C	--
Ethyl chloride		C	C
Ethylene dichloride		B	--
Ethylene oxide		B	--
Fatty acids (C <sub>6</sub> )		A	A

Environment	Concentration %	Temperature °F (°C)	
		70 (21)	140 (60)
Ferric chloride		A	A
Ferric nitrate		A	A
Ferric sulfate		A	A
Ferrous chloride		A	A
Ferrous sulfate		A	A
Fluorosilicic acid		A	A
Formaldehyde	40	A	A
Formic acid		A	--
Formic acid	10	A	A
Fructose		A	A
Fruit juices		A	A
Furfural		C	C
Gasoline (the higher the octane the greater the affect)		C	D
Gas liquor		C	--
Gear box oil		B	C
Gelatin		A	A
Glucose	20	A	A
Glycerin		A	A
Glycol		A	A
Grease - lubricating (petroleum based)		B	C
Hexane	100	C	D
Hydrobromic acid	50	**B	**C
Hydrochloric acid	30	A	A
Hydrochloric acid	20	A	A
Hydrochloric acid	10	A	A
Hydrochloric acid	2	A	A

Environment	Concentration %	Temperature °F (°C)	
		70 (21)	140 (60)
50-50 Hydrochloric - Nitric Acid		**B	**D
Hydrofluoric acid	40	A	--
Hydrofluoric acid	60	**B	**C
Hydrogen peroxide	30	A	B
Hydrogen peroxide	10	A	B
Hydrogen peroxide	3	A	A
Hydrogen chloride gas (dry)		A	A
Hydrogen sulfide		A	A
Hydroquinone		A	A
Inks		A	A
Iodine tincture		A	--
Isopropyl alcohol		A	A
Iso-octane		C	D
Jet Fuel (kerosene based)		C	D
Kerosene		C	D
Ketones		A	--
Lactic acid	20	A	A
Lanolin		A	A
Lead acetate		A	A
Linseed oil		A	A
Lubricating oil (petroleum based)		B	C
Magenta dye (aqu. solution)	2	A	A
Magnesium carbonate		A	A
Magnesium chloride		A	A
Magnesium hydroxide		A	A
Magnesium nitrate		A	A

Environment	Concentration %	Temperature °F (°C)	
		70 (21)	140 (60)
Magnesium sulfate		A	A
Magnesium sulfite		A	A
Meat juices		A	A
Mercuric chloride	40	A	A
Mercuric cyanide		A	A
Mercury		A	A
Mercurous nitrate		A	A
Methyl ethyl ketone		A	B
Methyl alcohol		A	A
Methylene chloride		A	--
Milk and its products		A	A
Mineral oil		B	C
Molasses		A	A
Motor oil (conventional)		B	C
Motor oil (synthetic)		B	C
Naphthalene		A	A
Nickel chloride		A	A
Nickel nitrate		A	A
Nickel sulfate		A	A
Nitric acid	Fuming	D	D
Nitric acid	70	**C	D
Nitric acid	60	**C	D
Nitric acid	10	A	A
50-50 Nitric - Hydrochloric Acid		**C	D
50-50 Nitric - Sulfuric Acid		**C	D
Nitrobenzene		A	A
Oleic acid		A	B



Environment	Concentration %	Temperature °F (°C)	
		70 (21)	140 (60)
Olive oil		A	A
Oxalic acid (aqueous)	50	A	B
Paraffin		A	B
Paraffin wax		A	A
Petrol (gasoline)		C	D
Phenol		A	A
Phosphoric acid	95	A	B
Plating solutions, brass		A	A
Plating solutions, cadmium		A	A
Plating solutions, chromium		A	A
Plating solutions, copper		A	A
Plating solutions, gold		A	A
Plating solutions, indium		A	A
Plating solutions, lead		A	A
Plating solutions, nickel		A	A
Plating solutions, rhodium		A	A
Plating solutions, silver		A	A
Plating solutions, tin		A	A
Plating solutions, zinc		A	A
Petroleum ether (B.P. 100-140EC)		C	D
Potassium bicarbonate		A	A
Potassium borate	1	A	A
Potassium bromate	10	A	A
Potassium bromide		A	A
Potassium carbonate		A	A
Potassium chlorate		A	A
Potassium chloride		A	A

Environment	Concentration %	Temperature °F (°C)	
		70 (21)	140 (60)
Potassium chromate	40	A	A
Potassium cyanide		A	A
Potassium dichromate	40	A	A
Potassium ferri/ferrocyanide		A	A
Potassium fluoride		A	A
Potassium hydroxide	50	A	A
Potassium hydroxide	10	A	A
Potassium nitrate		A	A
Potassium perborate		A	A
Potassium perchlorate	10	A	A
Potassium permanganate	20	A	A
Potassium sulfate		A	A
Potassium sulfide		A	A
Potassium sulfite		A	A
Propyl alcohol		A	A
Pyridine		A	--
Silicone oil		A	A
Soap solution (concentrated)		A	A
Sodium acetate		A	A
Sodium bicarbonate		A	A
Sodium bisulfate		A	A
Sodium bisulfite		A	A
Sodium borate		A	A
Sodium bromide oil solution		A	A
Sodium carbonate		A	A
Sodium chlorate		A	A
Sodium chloride		A	A

Environment	Concentration %	Temperature °F (°C)	
		70 (21)	140 (60)
Sodium chlorite	2	A	A
Sodium chlorite	5	A	A
Sodium chlorite	10	A	A
Sodium chlorite	20	A	A
Sodium cyanide		A	A
Sodium dichromate		A	A
Sodium ferricyanide		A	A
Sodium ferrocyanide		A	A
Sodium fluoride		A	A
Sodium hydroxide	50	A	A
Sodium hydroxide	10	A	A
Sodium hypochlorite	20	A	B
Sodium nitrate		A	A
Sodium nitrate		A	A
Sodium silicate		A	A
Sodium sulfate		A	A
Sodium sulfide	25	A	A
Sodium sulfite		A	A
Stannous chloride		A	A
Stannic chloride		A	A
Starch		A	A
Sulfates of calcium and magnesium		A	A
Sulfates of potassium and sodium		A	A
Sulfur		A	A
Sulfuric acid	98	**C	D
Sulfuric acid	60	B	C
Sulfuric acid	50	B	C

Environment	Concentration %	Temperature °F (°C)	
		70 (21)	140 (60)
Sulfuric acid	10	A	A
50-50 Sulfuric - Nitric Acid		**C	D
Sugars and syrups		A	A
Sulfamic acid		A	A
Tallow		A	B
Tannic acid	10	A	A
Tartaric acid		A	A
Tetrahydrofuran		C	D
Tetralin		C	C
Toluene		C	D
Transformer oil		B	C
Trichloroacetic acid	10	A	A
Trichloroethylene		C	C
Triethanolamine		A	A
Turpentine		C	C
Urea		A	A
Urine		A	A
Vaseline		A	A
Vegetable oils (general)		A	B
Vinegar		A	A
Water (distilled, soft, hard and vapor)		A	A
Wet chlorine gas		--	D
Whisky		A	A
White paraffin		A	B
White spirit		B	C
Wines		A	A

Environment	Concentration %	Temperature °F (°C)	
		70 (21)	140 (60)
Xylene		C	D
Yeast		A	A
Zinc chloride		A	A
Zinc oxide		A	A
Zinc sulfate		A	A