



Chemical Resistance of Single Ply Membranes

The performance of a roofing membrane over the service life of a roof depends on many factors. In predicting performance, often the un-compromised laboratory physical properties of the roof membrane are used to determine suitability of the membrane for the roof. However, many roof failures are the result of roof top contaminants that adversely affect the physical properties of the material.

The roof environment may consist of exhausted liquids, industrial chemical, fumes, hot air, debris plus other building materials. Most single-ply membranes are not adversely affected by most common materials and chemicals encountered in the roof environment, especially those at low temperatures and or with low chemical concentrations. However, all membranes are vulnerable to something and many roofs are exposed to unusual environments. The degree of deterioration from contact with these substances will depend on the duration of exposure of them, temperatures, concentration, and resistant properties of the membrane. Where any known incompatible chemicals or unusual substance will contact the roof, the service condition should be evaluated by pre-service testing.

One can specify the correct membrane on the basis of both chemical resistance and physical properties. This article is intended to help the user make preliminary choices of suitable materials. Final selection should be based on actual service conditions expected and consultation with membrane manufacturer.

The following chart rates the chemical resistance of different single-ply membranes according to the following code.

A – Good chemical resistance. Long service may be expected with no effect on membrane.

C – Conditional (consult mfg.). Suitable for applications where chemical exposure is limited. X- Do not use. Not recommended. Damage to membrane expected.

-- - No information.

EPDM –	Ethylene propylene diene monomer
Neoprene -	Chloroprene rubber
CSPE -	Chlorosulphonated polyethylene (hypolon)
PVC -	Polyvinyl chloride
TPO -	Thermoplastic polyelofin
EP -	Ethylene propylene

Chemicals and Typical Uses

	EPDM	Neoprene	CSPE	PVC	TPO	EP
Acetic acid – 97% (from fatty acid group, a weak acid used in many industries: e.g. in vinegar, textile dye)	C	X	X	X	A	A
Acetic acid – 50%	A	X	C	C	A	A
Acetic acid – 10%	A	C	A	A	A	A
Acetone (solvents in paints, lacquers, waxes, nail polish remover)	A	C	C	X	A	A
Acetophenone (solvent for plastics, textile, paint industries)	A	X	X	--	C	--
Aluminum chloride (catalyst for organic compounds)	A	A	A	A	A	A
Aluminum fluoride (used in ceramics & industrial processes)	A	A	A	A	A	A
Aluminum sulfate (in sewage treatment plants, paper products)	A	A	A	--	A	C
Alums (all types) (medical-styptic pencil)	A	A	A	A	A	A
Ammonia gas – dry (refrigerant in food (fish) preservation)	A	A	A	A	A	A
Ammonia – aqueous 10% (cleaning agent)	A	A	A	A	A	A
Ammonium acetate – aqueous	A	A	A	A	--	--
Ammonium carbonate	A	A	A	A	A	A
Ammonium chloride (used in batteries)	A	A	A	A	A	A
Ammonium fluoride – 20%	--	A	--	--	A	--
Ammonium hydroxide (less than 30% ammonia + water)	A	A	A	--	A	A
Ammonium metaphosphate	A	A	A	--	A	--
Ammonium nitrate (used in fertilizer)	A	A	A	A	A	A
Ammonium persulfate	A	A	A	A	A	A
Ammonium sulfate (used in herbicides)	A	A	A	A	A	A
Amyl acetate (food additive, textile operations)	A	X	C	--	C	--
Amyl alcohol (pentane, fuel oil)	A	A	A	C	A	A
Amyl chloride	X	X	X	--	X	--
Aniline (photography chemical, in dyes, rubber industry)	A	X	X	X	A	--
Animal Fats	A	A	A	--	A	A
Aqua regia (in metallurgical industry, can dissolve gold)	C	X	X	X	C	--
Asphalt	X	A	C	C	C	A
Aviation fuel (115/145 octane)	X	C	X	--	X	--
Aviation turbine fuel	X	C	X	--	X	--
Barium chloride (water softener)	A	A	A	--	A	A
Barium hydroxide	A	A	A	--	A	--
Barium sulfate (white paint pigment, in oil well drilling mud)	A	A	A	A	A	A
Beer	A	A	A	--	A	A
Benzene (base for many aromatic compounds)	X	X	X	X	C	X
Benzaldehyde	A	X	X	X	--	--

Chemicals and Typical Uses

	EPDM	Neoprene	CSPE	PVC	TPO	EP
Benzoic acid (mild antiseptic)	A	C	A	A	A	--
Benzyl alcohol (solvent, local anesthetic, used in cosmetics)	A	C	A	--	A	--
Borax (mild detergent, used in mfg. of ceramics)	A	A	A	A	A	A
Borax acid (weal acid, used in cosmetics & pharmaceutical)	A	A	A	A	A	C
Brine (water with high conc. of salts, used in pickling industry)	A	A	A	--	A	A
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Bromine liquid (used in bleaches for textile and paper industry)	X	X	X	X	X	--
Bromine water (used in water purification)	X	A	A	C	X	--
Butane liquid	X	A	A	X	--	--
Butyl alcohol (butanol, used as a solvent)	A	A	A	X	A	--
Calcium carbonate (limestone, calcium salt)	A	A	A	--	A	A
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Calcium chloride (road salt, pulp & paper treatment)	A	A	A	A	A	A
Calcium hydroxide (slaked lime, used in plaster & cements)	A	A	A	--	A	A
Calcium hypochlorite bleach (bleach)	A	X	A	--	A	A
Calcium nitrate (natural fertilizer)	A	A	A	A	A	A
Calcium phosphate (in backing power)	A	A	A	--	A	--
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Calcium sulfate (gypsum, plaster of paris)	A	A	A	--	A	A
Carbon dioxide – dry (dry ice)	A	A	A	--	A	--
Carbolic acid (PHENOL)	X	X	C	X	--	--
Carbon disulfide (used mfg. carbon tetrachloride)	X	X	X	--	C	--
Carbon monoxide	A	A	A	--	A	--
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Carbon tetrachloride (solvent for heavy oils, drycleaning agent)	X	X	X	--	X	
Carbonic acid (weak acid used in soft drinks)	A	A	A	--	A	A
Castor oil	A	A	A	--	A	A
Caustic soda – 50%		A	A	A	X	--
Caustic soda – 10%		A	A	A	A	--
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Chlorine - gas	A	C	C	X	X	X
Chlorine – liquid (used in products for: bleach, swimming pools)	C	X	C	X	X	X
Chlorobenzene (solvent in plastics, dyes and paint industries)	X	X	X	X	X	--
Chloroform (anesthetic)	X	X	X	X	X	A
Chlorosulfonic acid	X	X	X	X	X	--
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Chromic/sulfuric acid (metal cleaning & plating)	C	X	A	--	X	--
Chromic acid 80% (extremely strong oxidizing agent)	C	A	X	--	A	--
Chromic acid 50%	A	X	A	--	A	C
Chromic acid 10%	A	X	A	A	A	A

Chemicals and Typical Uses

	EPDM	Neoprene	CSPE	PVC	TPO	EP
Citric acid – 10% (used in food industry, acid in many fruits)	A	A	A	A	A	--
Copper chloride (used as dye fixer in textile)	A	A	A	A	A	--
Coppercyanide (used in electroplating operations)	A	A	A	--	A	--
Copper salts	A	A	A	A	A	--
Copper sulfate (blue vitriol used in fungicides and inks)	A	A	A	--	A	A
Creosote	X	C	C	X	--	--
Cuprous chloride	A	A	A	--	A	C
Cyclohexanol (solvent used in mfg. of nylon)	C	A	A	X	A	--
Cyclohexanone (solvent for mfg. of plastics)	A	X	X	X	C	--
Decalin	X	X	X	--	X	--
Developers (photographic)	A	A	A	--	A	A
Dibutyl phthalate (plasticizer for plastics, resins and coatings)	A	X	X	X	A	--
Dichloroethylene (solvent in plastics, dyes and perfume and paints)	X	X	X	X	A	--
Diesel Oil	X	X	X	X	--	--
Dimethyl formamide	A	X	X	X	--	A
Ethyl acetate (solvent, used in mfg. of powder)	A	X	X	--	C	--
Ethyl alcohol (ethanol, grain alcohol)	A	A	A	X	A	--
Ethylene glycol (permanent antifreeze)	A	A	A	A	A	A
Ethy ether (solvent for oils, rubber, perfumes)	X	X	X	--	C	--
Ethyl chloride (insecticide)	A	A	C	X	X	--
Ethylene dichloride (varnish remover, mfg. of vinyl chloride)	C	X	X	--	C	--
Ethylene oxide (source of antifreeze compounds)	C	X	X	--	C	A
Fatty Acids -C6 (mfg. soap by product of food industry)	X	A	X	C	A	--
Ferric chloride 40% iron	A	A	A	C	A	A
Freon 12	A	A	A	--	--	--
Formaldehyde (mfg. of permanent press & wash and wear fabrics)	A	A	A	C	A	A
Formic acid – 100% (produced by insects: bees, ants)	A	A	A	X	A	--
Formic acid – 10% (textile, dye, pesticide, electroplating industry)	A	A	A	A	A	--
Fuel oil	X	A	C	X	--	--
Furfural (derivative of agricultural waste products)	A	X	C	--	X	--
Gasoline	X	A	X	X	X	--
Gelatin (gel forming agent: ice cream & confectionery industry)	A	A	A	--	A	A
Glucose (sugar used in intravenous feeding, wine mfg., baby food)	A	A	A	--	A	A
Glycerin (sticky liquid used in mfg. alkyd resins)	A	A	A	C	A	A

Chemicals and Typical Uses

	EPDM	Neoprene	CSPE	PVC	TPO	EP
Glycol (alcohol added to cosmetics, foods, glues)	A	A	A	A	A	A
Heptane	X	A	A	X	--	--
Hexane (solvent)	X	A	A	X	A	--
Hydrochloric acid - 100% (common acid for lab,	X	X	C	X	X	X
Hydrochloric acid - 30% commercial, industrial	A	C	A	C	A	X
Hydrochloric acid – 20% and pharmaceutical uses,	A	A	A	C	A	X
Hydrochloric acid – 10% also called muriatic acid)	A	A	A	A	A	X
Hydrofluoric acid – 40%	A	A	A	X	A	A
Hydrogen peroxide – 30% (oxidizing agent: bleaching)	A	X	C	--	A	A
Hydrogen peroxide – 10%	A	C	A	--	A	A
Hydrogen peroxide – 3%	A	A	A	--	A	A
Hydrogen sulfide	A	A	A	A	A	A
Hydroquinone (reducing agent, used in photography developing)	X	X	C	--	A	A
Iron salts	A	A	A	A	--	--
Isopropyl alcohol (used in hydraulic systems)	A	A	A	A	A	A
Ketones (common solvent in plastic, textile, paint industries)	A	X	X	--	A	--
Lactic acid – 20% (in milk and other food industries)	A	A	A	A	A	--
Linseed Oil	A	A	A	C	A	A
Lubricating Oil	X	A	X	C	C	A
Magnesium carbonate (used in foods, cosmetics, paints, inks)	A	a	a	--	A	A
Magnesium chloride (textile industry, fire extinguishing agent)	A	A	A	A	A	A
Magnesium hydroxide (milk of magnesia)	A	A	A	A	A	A
Magnesium nitrate	A	A	A	A	A	A
Magnesium sulfate (Epsom salt)	A	A	A	A	A	A
Mercuric chloride (fungicide, insecticide)	A	A	A	A	A	A
Mercury (in thermometers, barometers, lamps)	A	A	A	A	A	--
Mercurous nitrate	A	A	A	A	A	--
Methyl ethyl ketone MEK (solvent and industrial process chemical)	A	X	X	X	A	--
Methyl alcohol – 100% (gasoline antifreeze)	A	A	A	X	A	A
Methyl alcohol – 50%	A	A	A	C	A	A
Methylene chloride (mfg. of butyl rubber and silicone polymers)	X	X	X	X	A	--
Milk and it products	A	A	A	--	A	--
Mineral oil	X	A	A	--	C	A
Molasses (beverage industries)	A	A	A	--	A	A
Naphthalene (antimoth agent, fumigant)	X	X	X	X	A	--
Nickel chloride (salts)	A	A	A	A	A	A

Chemicals and Typical Uses

	EDPM	Neoprene	CSPE	PVC	TPO	EP
Nickel nitrate	A	A	A	A	A	A
Nickel sulfate (nickel plating of iron and copper products)	A	A	A	--	A	A
Nitric acid (wide spread commercial applications)	X	X	C	X	X	A
Nitric acid – 70% (fertilizers and explosives)	X	X	C	X	X	A
Nitric acid – 60%	X	X	C	X	X	A
Nitric acid – 10%	A	A	A	C	A	A
Nitrobenzene	X	X	X	X	A	--
Oleic acid (fatty acid, used in soap mfg.)	C	A	A	X	A	A
Olive oil	A	A	A	--	A	A
Oxalic acid – aqueous (metal cleaner, bleaching agent)	--	--	--	A	A	A
Ozone	A	A	A	A	A	A
Paraffin (hydrocarbon from petroleum, e.g. methane, propane, butane)	X	--	X	C	A	--
Paraffin wax (end product of aliphatic petroleum)	X	--	X	C	A	--
Phenol (used in processing other chemicals)	X	X	C	--	A	A
Phosphoric acid (in fertilizer, in coke)	A	X	C	A	A	A
Potassium bicarbonate (potash, used in glass technology)	--	A	A	--	A	A
Potassium carbonate (pearl ash used in soap and glass products)	A	A	A	--	A	A
Potassium chlorate (explosives)	A	A	A	A	A	A
Potassium chloride (non sodium table salt, also in fertilizer)	A	A	A	A	A	--
Potassium cyanide (crab grass killers)	A	A	A	A	A	A
Potassium dichromate (used in photo process)	A	A	A	A	--	A
Potassium hydroxide 50% (caustic pot ash or lye)	A	A	A	A	A	A
Potassium hydroxide – 10% (drain cleaner)	A	A	A	A	A	A
Potassium nitrate (salt peter used in explosives)	A	A	A	A	A	A
Potassium permanganate (bleaching agent, deodorizer)	A	A	A	C	A	--
Potassium sulfate	A	A	A	A	A	A
Potassium sulfide	A	A	A	A	A	A
Potassium sulfite	A	A	A	A	A	A
Propyl alcohol (propanol)	A	A	A	--	A	A
Pyridine (barbiturate, medical industry)	A	X	X	X	A	--
Silicone oil (water repellency products)	A	A	A	--	A	A
Sodium acetate (weak acid)	A	A	A	--	A	A
Sodium bicarbonate (used in antacid, baking powder)	A	A	A	A	A	A
Sodium bisulfite (decontamination)	A	A	A	--	A	A
Sodium borate (borax)	A	A	A	--	A	A

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