



Permadri Chemical Resistance Chart

Chemical name	Formula	Concentration	Compatibility	72 hour
Acetic acid	CH ₃ COOH	>20% w/w	Unsuitable	Suitable
Acetic acid		2- 20% w/w	Limited	Suitable
Acetic acid		<2% w/w	Suitable	Suitable
Aluminum chloride	NH ₄ Cl	All concentrations	Suitable	Suitable
Aluminum sulfate	NH ₄ SO ₄	All concentrations	Suitable	Suitable
Ammonia (anhydrous)	NH ₃	>3% v/v	Limited (Note 8)	N/A
Ammonia (anhydrous)		<3% v/v	Suitable	N/A
Ammonium bisulfite	NH ₄ Cl	All concentrations	Suitable*	Suitable
Ammonium chloride	(NH ₄)HSO ₃	All concentrations	Suitable	Suitable
Ammonium hydroxide	NH ₄ OH	15-28% NH ₃ w/w	Unsuitable	Suitable
Ammonium hydroxide		3-15% NH ₃ w/w	Limited	Suitable
Ammonium hydroxide		<3% NH ₃ w/w	Suitable	Suitable
Ammonium nitrate	NH ₄ NO ₃	All concentrations	Suitable*	Suitable
Ammonium acid phosphate	(NH ₄)H ₂ PO ₄	All concentrations	Suitable	Suitable
Ammonium phosphate (di-)	(NH ₄) ₂ HPO ₄	All concentrations	Suitable	Suitable
Ammonium polysulfide	(NH ₄) _x S	5-30% w/w	Unsuitable	Suitable
Ammonium polysulfide	(NH ₄) _x S	<5-30% w/w	Suitable	Suitable
Ammonium sulfate	(NH ₄) ₂ SO ₄	All concentrations	Suitable	Suitable
Ammonium thiosulfate	(NH ₄)S ₂ O ₇	All concentrations	Suitable*	Suitable
Aqua regia (hydrochloric/nitric acid)	HCl-H NO ₃	>5% w/w	Unsuitable	Suitable
		<5-30% w/w	Limited	Suitable
Barium carbonate	BaCO ₃	All concentrations	Suitable	Suitable
Barium chloride	BaCl ₂	All concentrations	Suitable	Suitable
Barium hydroxide	Ba(OH) ₂	All concentrations	Suitable	Suitable
Barium sulfate	BaSO ₄	All concentrations	Suitable	Suitable
Benzene	C ₆ H ₆	-	Unsuitable	Suitable
Borax (sodium tetraborate)	Na ₂ B ₄ O ₇	All concentrations	Suitable	Suitable
Bromine (gas or liquid)	Br ₂	>3% v/v	Unsuitable (Note 8)	N/A
Bromine (gas or liquid)		<3% v/v	Limited	N/A
Calcium ammonium nitrate	Ca(NH ₄)NO ₃	All concentrations	Suitable*	Suitable
Calcium bisulfate	Ca (HSO ₄) ₂	All concentrations	Suitable*	Suitable
Calcium bisulfite	Ca (HSO ₃) ₂	All concentrations	Suitable*	Suitable
Calcium bicarbonate	Ca(HCO ₃) ₂	All concentrations	Suitable	Suitable
Calcium carbonate	CaCO ₃	All concentrations	Suitable	Suitable
Calcium chloride	CaCl ₂	All concentrations	Suitable	Suitable
Calcium cyanide	Ca(CN) ₂	>5% w/w	Unsuitable	Suitable
Calcium cyanide		2-5% w/w	Limited	Suitable
Calcium cyanide		<2% w/w	Suitable	Suitable
Calcium hydroxide (lime)	Ca(OH) ₂	All concentrations	Suitable	Suitable



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Calcium nitrate	Ca(NO ₃) ₂	All concentrations	Suitable*	Suitable
Calcium sulfate	CaSO ₄	All concentrations	Suitable	Suitable
Calcium sulfite	CaSO ₃	All concentrations	Suitable*	Suitable
Calcium bisulfite	Ca(HSO ₃) ₂	All concentrations	Suitable*	Suitable
Calcium sulfide	CaS	All concentrations	Suitable	Suitable
Calcium thiosulfate	CaS ₂ O ₃	All concentrations	Suitable	Suitable
Carbon dioxide	CO ₂	All concentrations	Suitable (Note 8)	N/A
Carbonic acid	H ₂ CO ₃	All concentrations	Suitable	Suitable
Chlorine (gas)	Cl ₂	>2% v/v	Unsuitable (Note 8)	N/A
Chlorine (gas)		0-2%	Limited	N/A
Chlorine water (hypochlorous acid)	HOCl	> 100 ppm	Unsuitable	Suitable
		< 100 ppm (0.01%)	Limited	Suitable
Chromic acid	H ₂ CrO ₇	All concentrations	Unsuitable	Suitable
Citric acid	C ₆ H ₈ O ₇	All concentrations	Suitable*	Suitable
Copper carbonate	CuCO ₃	All concentrations	Suitable	Suitable
Copper (cuprous) chloride	CuCl	All concentrations	Suitable	Suitable
Copper (cupric) chloride	CuCl ₂	All concentrations	Suitable	Suitable
Copper (cupric) hydroxide	Cu(OH) ₂	All concentrations	Suitable	Suitable
Copper (cupric) nitrate	Cu(NO ₃) ₂	All concentrations	Suitable	Suitable
Copper (cupric) sulfate	CuSO ₄	All concentrations	Suitable	Suitable
Corn Syrup	C ₆ H ₁₂ O ₆	All concentrations	Suitable	Suitable
Diesel fuel	-	-	Unsuitable	Unsuitable
Diethylene glycol	C ₄ H ₁₀ O ₃	50-100% w/w	Unsuitable	Suitable
		5-30% w/w	Limited	Suitable
		<5% w/w	Suitable	Suitable
Ethyl alcohol	C ₂ H ₅ OH	50-100% w/w	Unsuitable	Suitable
Ethyl alcohol		5-30% w/w	Limited	Suitable
Ethyl alcohol		<5% w/w	Suitable	Suitable
Ethylene glycol	C ₂ H ₆ O ₂	50-100% w/w	Unsuitable	Suitable
		5-30% w/w	Limited	Suitable
		<5% w/w	Suitable	Suitable
Fructose	C ₆ H ₁₂ O ₆	All concentrations	Suitable	Suitable
				Suitable
Gasoline	-	-	Unsuitable	Suitable
Glucose	C ₆ H ₁₂ O ₆	All concentrations	Suitable	Suitable
Glycol ether (Butyl Carbitol)	C ₆ H ₁₄ O ₂	10-100% w/w	Unsuitable	Suitable
		3-10% w/w	Limited	Suitable
		<3% w/w	Suitable	Suitable
Glycerol	C ₃ H ₈ O ₃	30-100% w/w	Unsuitable	Suitable
Glycerol		5-30% w/w	Limited	Suitable



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Glycerol		<5% w/w	Suitable	Suitable
Hydrochloric acid	HCl	30-35% w/w (conc.)	Unsuitable	Suitable
Hydrochloric acid		10-30% w/w	Limited	Suitable
Hydrochloric acid		<10% w/w	Suitable	Suitable
Hydrogen cyanide (gas)	HCN	All concentrations	Unknown (Note 8)	N/A
Hydrocyanic acid	HCN (aq.)	All concentrations	Limited	Suitable
Hydrogen (gas)	H ₂	All concentrations	Suitable (Note 8)	N/A
Hydrogen peroxide	H ₂ O ₂	>5%	Unsuitable	Suitable
Hydrogen peroxide		<5%	Limited	Suitable
Hydrogen sulfide (gas)	H ₂ S	All concentrations	Suitable (Note 8)	N/A
Iron (ferrous) ammonium sulfate	Fe(NH ₄)SO ₄	All concentrations	Suitable	Suitable
Iron (ferrous) carbonate	FeCO ₃	All concentrations	Suitable	Suitable
Iron (ferrous) chloride	FeCl ₂	All concentrations	Suitable	Suitable
Iron (ferrous) hydroxide	Fe(OH) ₂	All concentrations	Suitable	Suitable
Iron (ferrous) sulfate	FeSO ₄	All concentrations	Suitable	Suitable
Iron (ferric) carbonate	Fe ₂ (CO ₃) ₃	All concentrations	Suitable	Suitable
Iron (ferric) chloride	FeCl ₃	>5% w/w	Unsuitable	Suitable
Iron (ferric) chloride		1-5% w/w	Limited	Suitable
Iron (ferric) chloride		<1% w/w	Suitable	Suitable
Iron (ferric) hydroxide	Fe(OH) ₃	All concentrations	Suitable	Suitable
Iron (ferric) nitrate	Fe(NO ₃) ₃	>5% w/w	Unsuitable	Suitable
Iron (ferric) nitrate		1-5% w/w	Limited	Suitable
Iron (ferric) nitrate		<1% w/w	Suitable	Suitable
Iron (ferric) sulfate	Fe ₂ (SO ₄) ₃	> 1% w/w	Limited	Suitable
Iron (ferric) sulfate		<1% w/w	Suitable	Suitable
Isopropyl alcohol	C ₃ H ₈ O	>5% w/w	Limited	Suitable
Isopropyl alcohol		< 5% w/w	Suitable	Suitable
Magnesium bisulfite	Mg(HSO ₃) ₂	All concentrations	Suitable*	Suitable
Magnesium carbonate	MgCO ₃	All concentrations	Suitable	Suitable
Magnesium chloride	MgCl ₂	All concentrations	Suitable	Suitable
Magnesium hydroxide	Mg(OH) ₂	All concentrations	Suitable	Suitable
Magnesium sulfate	MgSO ₄	All concentrations	Suitable	Suitable
Methyl alcohol	CH ₃ OH	>35% w/w	Unsuitable	Suitable
Methyl alcohol		5-35% w/w	Limited	Suitable
Methyl alcohol		<5% w/w	Suitable	Suitable
Methyl bromide (gas)	CH ₃ Br	>2% v/v	Limited (Note 8)	N/A
Methyl bromide (gas)		<2% v/v	Suitable	N/A
Nickel carbonate	NiCO ₃	All concentrations	Suitable	Suitable
Nickel chloride	NiCl ₂	All concentrations	Suitable	Suitable



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Nickel hydroxide	Ni(OH) ₂	All concentrations	Suitable	Suitable
Nickel sulfate	NiSO ₄	All concentrations	Suitable	Suitable
Nitric acid	HNO ₃	>5% w/w	Suitable	Suitable
Nitric acid		1-5% w/w	Suitable	Suitable
Nitric acid		<1% w/w	Unsuitable	Suitable
Oils (salad, mineral, baby, motor)	-	-	Limited	Suitable
Ozone (gas)	O ₃	>1% v/v	Suitable	Suitable
		0-1% v/v	Unsuitable	Unsuitable
Phosphine	PH ₃	>1% v/v	Unsuitable (Note 8)	N/A
		<1% v/v	Limited	N/A
Phosphoric acid (ortho)	H ₃ PO ₄	>80% w/w	Unsuitable	N/A
Phosphoric acid (ortho)		70-80% w/w	Suitable	N/A
Phosphoric acid (ortho)		<70% w/w	Unsuitable	Suitable
Potassium carbonate	K ₂ CO ₃	>20% w/w	Limited	Suitable
Potassium carbonate		<20% w/w	Suitable	Suitable
Potassium chlorate	KClO ₃	All concentrations	Limited	Suitable
Potassium chloride	KCl	All concentrations	Suitable	Suitable
Potassium citrate	K ₃ C ₄ O ₇	All concentrations	Unsuitable	Suitable
Potassium cyanide	KCN	All concentrations	Suitable	Suitable
Potassium fluoride	KF	All concentrations	Suitable	Suitable
Potassium hydroxide	KOH	All concentrations	Suitable*	Suitable
Potassium metabisulfite	KHSO ₃	All concentrations	Suitable	Suitable
Potassium perchlorate	KClO ₄	All concentrations	Suitable	Suitable
Potassium permanganate	KMnO ₄	All concentrations	Suitable	Suitable
Potassium nitrate	KNO ₃	>10% w/w	Limited	Suitable
Potassium nitrate		<10% w/w	Suitable	Suitable
Potassium sulfate	K ₂ SO ₄	All concentrations	Suitable	Suitable
Potassium sulfite	K ₂ SO ₃	All concentrations	Suitable	Suitable
Potassium thiosulfate	Na ₂ S ₂ O ₃	All concentrations	Suitable	Suitable
Sodium acid phosphate	NaH ₂ PO ₄	>10% w/w	Limited	Suitable
Sodium acid phosphate		<10% w/w	Suitable	Suitable
Sodium bisulfite, meta	NaHSO ₃	All concentrations	Suitable	Suitable
Sodium borate, tetrahydrate (Borax)	Na ₂ B ₄ O ₇	All concentrations	Suitable	Suitable
Sodium bromide	NaBr	All concentrations	Suitable	Suitable
Sodium carbonate	Na ₂ CO ₃	All concentrations	Suitable	Suitable
Sodium chlorate	NaClO ₃	All concentrations	Unsuitable	Suitable
Sodium chloride	NaCl	All concentrations	Suitable	Suitable
Sodium cyanide	NaCN	All concentrations	Suitable*	Suitable
Sodium dichromate	Na ₂ CrO ₇	All concentrations	Unsuitable	Suitable



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Chemical name	Formula	Concentration	Compatibility	72 hour
Sodium fluoride	NaF	All concentrations	Suitable	Suitable
Sodium hydroxide	NaOH	All concentrations	Suitable	Suitable
Sodium hypochlorite	NaOCl	>2% Available chloride	Unsuitable	Suitable
Sodium hypochlorite		0-2% Available chloride	Limited	Suitable
Sodium iodide	NaI	All concentrations	Suitable	Suitable
Sodium nitrate	NaNO ₃	>10% w/w	Suitable	Suitable
Potassium nitrate		<10% w/w	Suitable	Suitable
Sodium nitrite	NaNO ₂	All concentrations	Suitable	Suitable
Sodium phosphate (ortho)	Na ₃ PO ₄	All concentrations	Suitable	Suitable
Sodium phosphate (acid)	NaH ₂ PO ₄	All concentrations	Suitable	Suitable
Sodium phosphate (poly)	(Na ₂ O)(PO ₃) _x	All concentrations	Suitable	Suitable
Sodium perborate	Na ₂ B ₄ O ₇ ·H ₂ O ₂	>2% w/w	Unsuitable	Suitable
Sodium perborate		0-2% w/w	Limited	Suitable
Sodium perchlorate	NaClO ₄	All concentrations	Unsuitable	Suitable
Sodium permanganate	NaMnO ₄	All concentrations	Unsuitable	Suitable
Sodium silicate (meta)	Na ₂ SiO ₃	All concentrations	Suitable	Suitable
Sodium silicate (poly)	(Na ₂ O)(SiO ₂) _x	All concentrations	Suitable	Suitable
Sodium sulfate	Na ₂ SO ₄	All concentrations	Suitable	Suitable
Sodium sulfite	Na ₂ SO ₃	All concentrations	Suitable	Suitable
Sodium thiosulfate	Na ₂ S ₂ O ₃	All concentrations	Suitable	Suitable
Sucrose	C ₆ H ₁₂ O ₆	All concentrations	Suitable	Suitable
Sulfuric acid	H ₂ SO ₄	>80% w/w	Unsuitable	Suitable
Sulfuric acid		50-80% w/w	Limited	Suitable
Sulfuric acid		<50% w/w	Suitable	Suitable
Tin chloride (stannous)	SnCl ₂	All concentrations	Suitable	Suitable
Tin sulfate (stannous)	Sn SO ₄	All concentrations	Suitable	Suitable
Toluene	C ₇ H ₈	-	Unsuitable	Unsuitable
Trichlorethylene	C ₂ HCl ₃	-	Unsuitable	Unsuitable
Urea	CO(NH ₂) ₂	All concentrations	Suitable	Suitable
Urea/Ammonium nitrate mixture	CO(NH ₂) ₂ /NH ₄ NO ₃	>15% w/w	Suitable (Note 9)*	Suitable
Urea/Ammonium nitrate		<15% w/w	Suitable	Suitable
Xylene	C ₈ H ₁₀	-	Unsuitable	Unsuitable
Zinc oxide	ZnO	All concentrations	Suitable	Suitable
Zinc chloride	ZnCl ₂	All concentrations	Suitable	Suitable
Zinc sulfate	ZnSO ₄	All concentrations	Suitable	Suitable



Permadri Chemical Resistance Chart

Notes:

1. This chart is applicable to the following Permadri products at time of writing: Rubber Coat, Rubber Spray, Mine coat, Mine Spray, Rubber Patch, Mine Patch
2. Performance was evaluated by determining the properties of samples before and after immersion in the aqueous solutions of the chemical for 180 days at room temperature ($22\pm 3^{\circ}\text{C}$, $72\pm 5^{\circ}\text{F}$). Evaluation involved visual and tensile strength measurements according to the method described in ASTM D-412.
3. Results indicated for those chemicals identified with an asterisk (*) were derived using accelerated testing, and are to be treated as preliminary.
4. "72 hours" indicates that this material is considered to be suitable for spill areas where the membrane will be exposed to the chemical at ambient temperatures ($<40^{\circ}\text{C}$, 100°F) for no more than a 3 day period before the area is cleaned up.
5. Most of the chemicals listed are solutions of inorganic compounds in water. With rare exceptions Permadri products are not recommended for applications in which it is to be in contact with organic compounds such as oils or solvents.
6. Note that in general Permadri products are not recommended for extended contact with strong oxidizing agents.
7. All testing was carried using pure chemicals. In some cases the presence of even small quantities of contaminants may significantly affect the results.
8. This product is a gas under normal conditions of temperature and pressure. 'Suitable' in this case indicates that the gas neither reacts with nor dissolves the Permadri membrane. Depending on the temperature, pressure, type of gas and thickness of the membrane, some penetration of the gas through the Permadri film may occur. Please consult your Technical Service Representative for more information on the permeability of any specific gas.
9. Results vary with ratio of urea to ammonium nitrate. Please consult your Technical Service department for more information.

Disclaimer

The information provided here was determined in the Liquid Rubber Industries Laboratories using PermaDri products sprayed and cured using the recommended procedures. These data are provided in good faith and are considered to be accurate to the best of our knowledge. Results may vary if the product is incorrectly applied or if unknown contaminants are present. This information provides no guarantee of performance. Note that the simulated conditions utilized in this evaluation will not apply to all real world situations. Neither Liquid Rubber Industries nor PermaDri, Inc. accepts responsibility for inadvertent errors in the chart, or for any consequences which might result from exposure of the membranes to any of the chemicals described.

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