Section 4: Chemical Resistance Table

This chemical resistance table is to be used only as a guide to assist in the selection of the most satisfactory combination of natural and synthetic rubber linings for resistance to various chemical solutions. The table offers several rubber lining selections based on chemical concentration and temperature. The temperatures identified in the chart are considered to be normal operating temperatures in which the rubber lining will function properly. Temperature is a big factor in determining the service life realized from a rubber lining. Generally, the higher the temperature, the shorter the service life, while the lower the temperature, the longer the service life.

Polycorp Protective Linings offer a full line of natural and synthetic rubber linings to meet a growing list of service needs. The chemical resistance chart provides for common recommendations, however, we can meet the special needs for FDA, color, chemical cure linings, and special tie gum requirements.

The specific ratings found in this chart are based on past field experience, the advice of various polymer suppliers, and specific laboratory test results. **This information is offered only as a guide, and because of variables in actual service conditions, the accuracy of the ratings cannot be guaranteed**. Only the user evaluating the rubber lining in actual service conditions can determine actual service life.

We have included a ***"Material Recommendation Request"*** form in Appendix III. It is important to provide the technical group with as much detailed data concerning the service conditions in order to determine the appropriate rubber lining recommendation.

Chemical Resistance Table

Chemical	Concentration (%)	Temperature		Recommended Rubber Lining	Chemical Cure Repair Stock
		°F	°C		
Acetaldehyde	40	150	66	1053	-
Acetic Acid-Glacial	100	80	27	1006 1035	1038 1038
Acetic Acid	10	140	60	1006 1035	1038 1038
Acetic Anhydride	100	100	38	1006 1035	1038 1038
Acetone	100	100	38	1051	-
Activated Silica	100	100	38	1060	2019
Alkyl Sulfonate	Any	150	65	1006 1035	1038 1038
Alum	Sat.	175 180	79 82	1000 2010	1001 2013
Aluminum Acetate	Sat.	150	65	1006 1035	1038 1038
Aluminum Bromide	Sat.	150	65	1006 1035	1038 1038
Aluminum Chloride	Sat.	180	82	1055	2040
Aluminum Fluoride	Sat.	100	38	1055 1051	2040 -
Aluminum Hydroxide	Sat. Sat.	150 180	65 82	1008 1055 2010	1001 2040 2013
Aluminum Nitrate	Sat.	150 180	65 82	1006 1035 1055	1038 1038 2040
Aluminum Phosphate	Sat.	150 180	65 82	1006 1035 1055	1038 1038 2040
Aluminum Sulfate	5 Sat.	125 180	52 82	1099 1055	2042 2040
Ammonium Alum	Sat.	180	82	1008	1001

Chemical	Concentration (%)	Temperature		Recommended Rubber Lining	Chemical Cure Repair Stock
		°F	°C		
Ammonium Carbonate	Sat.	160	71	1006 1035	1038 1038
Aluminum Chloride	Sat.	180	82	1055	2040
Ammonium Hydroxide	Sat.	150	65	1055	2040
Ammonium Nitrate	Sat.	150	65	1055	2040
Ammonium Persulfate	Sat.	140	60	1055	2040
Ammonium Phosphate	Sat.	140	60	1055	2040
Ammonium Sulfate	Sat.	150 190	65 88	1055 1051	2040 -
Amyl Iodine	Any	Amb.		Testing Req.	
Amyl Alcohol	100	125	52	1055	2040
Arsenic Acid	Sat.	150	65	1000 1006	1001 1038
Barium Chloride	Sat.	180	82	1055	2040
Barium Sulfate	5 Sat.	125 175	52 80	1099 1055	2042 2040
Barium Sulfide	5 Sat.	125 175	52 80	1099 1055	2042 2040
Battery Acid (H_2SO_4)	50	150	65	1055	2040
Beer	100	125	52	1054	1058
Beet Sugar Liquid	Any	160	71	1055	2040
Beryllium Sulfate	Sat.	125 175	52 80	1000 1008	1001 1001
Bleach Liquor (NaOCl)	15	140	60	1051 1024	- -
Boric Acid	10 Sat.	125 175	52 80	1099 1008 1055	2042 1001 2040

Section 4: Chemical Resistance Table

Chemical	Concentration (%)	Temperature		Recommended Rubber Lining	Chemical Cure Repair Stock
		°F	°C		
Brine (Calcium or Sodium Chloride)	Sat.	160 180	71 82	1000 1008 1055 2010	1001 1001 2040 2013
Butyl Alcohol	-	Amb.		1006 2010 1055	1038 2013 2040
Cadmium Chloride	Sat.	170	77	1008 1035	1001 1038
Calcium Chloride	Sat.	140 170 180	60 77 82	1000 1055 2010	1001 2040 2013
Calcium Hydroxide	Sat.	140 170	60 77	2020 1000 1055	2019 1001 2040
Calcium Hypochlorite	10	125	52	1006 1035 1055	1038 1038 2040
Cane Sugar Liquor	-	150	65	1006 1035	1038 1038
Carbonic Acid	Sat.	125 170	52 77	2020 1008 1055	2019 1001 2040
Caustic Soda	50	140 175	60 80	1020 1055	2019 2040
Caustic Potash	Sat.	140 180	60 82	1020 1055	2019 2040
Chlorinated Salt Brine	Sat.	140	60	1006 1035 1048	1038 1038 1038
Chlorine	-	175	80	1053	-
Chlorine Water	-	175	80	1053	-

Section 4: Chemical Resistance Table

Chemical	Concentration (%)	Temperature		Recommended Rubber Lining	Chemical Cure Repair Stock
		°F	°C		
Chrome Alum	Sat.	140 160	60 71	1006 1035 1055	1038 1038 2040
Chrome Plating Solution				Rubber Lining Not Recommended	
Chrome Salts	Sat.	125	52	1000 1006 1035	1001 1038 1038
Chromic Acid				Rubber Lining Not Recommended	
Citric Acid	Sat.	140	60	1006 1035 1055	1038 1038 2040
Copper Chloride	Sat.	160 180	71 82	1006 1035 1055	1038 1038 2040
Copper Cyanide (in solution with alkali cyanides)	Sat.	140 160	60 71	1000 1099 1055	1001 2041 2040
Copper Plating (Acid)	-	150	65	1000	1001
Copper Plating (Bright-Wes-X)	-	150	65	1008	1001
Copper Electroplating	-	150	65	1008	1001
Copper Sulfate	Sat.	160 180	71 82	1000 1006 1035 1055	1001 1038 1038 2040
Cupric Chloride	Sat.	140 160 180	60 71 82	1008 1006 1035 1055	1001 1038 1038 2040

Section 4: Chemical Resistance Table

Chemical	Concentration (%)	Temperature		Recommended Rubber Lining	Chemical Cure Repair Stock
		°F	°C		
Deionized Water	-	175	80	1006 1035 1048 1042	1038 1038 1038 -
Denatured Alcohol	100	125	52	1006 1035	1038 1038
Dextrose	Sat.	140	60	1006 1035	1038 1038
Diammonium Phosphate	Sat.	Amb. 150	Amb. 65	1000 1006 1035	1001 1038 1038
Distilled Water	-	175	80	1035 1048 1055	1038 1038 2040
Epsom Salts	Any	175	80	1055	2040
Ethanol	100	125	52	1035 1055	1038 2040
Ethyl Alcohol	100	125	52	1035 1055	1038 2040
Ethylene Glycol	50	150 175	65 80	1006 1035 1055	1038 1038 2040
Fatty Acid				Testing Recommended	
Ferric Chloride	Sat.	175	80	1055	2040
Ferric Sulfate	Sat.	175 180	80 82	1008 1035 1055	1001 1038 2040
Ferrous Chloride	Sat.	180	82	1055	2040
Ferrous Sulfate	Sat.	180	82	1055	2040
Fluoroboric Acid	40	150	65	1008 1055	1001 2040

Chemical	Concentration (%)	Temperature		Recommended Rubber Lining	Chemical Cure Repair Stock
		°F	°C		
Fluorophosphoric Acid Mono	25	Amb.	Amb.	2010 1051	2013 -
Fluorosilicic Acid	20	160 180	71 82	1055 1051	2040 -
Fluorophosphoric Acid di	25	Amb.	Amb.	1051	-
Fluorophosphoric Acid Hexa	25	Amb.	Amb.	1051	-
Formaldehyde	40	100	38	1051	-
Formic Acid	Sat.	125	52	1051	-
Fumaric Acid	Any	Amb.	Amb.	1035	1038
Furfural (Furfuraldehyde)	100	70	21	1051	-
Gelatin	Sat.	140	60	1055	2040
Glauber's Salt	5 Sat.	150 125	65 52	1035 1006 2010	1038 1038 2013
Glycerine	100	125	52	1035	1038
Glycerol	100	125	52	1035 1055	1038 2040
Gold Chloride	Sat.	180	82	1055	2040
Grain Alcohol	100	125	52	1035 1055	1038 2040
Gypsum	Any	180	82	1055	2040
Hexahydrobenzene				Rubber Lining Not Recommended	
Hexyl Alcohol				Testing Suggested	
Hydrated Lime & H_2O	Sat.	175	80	1055	2040
Hydrobromic Acid	-	140	60	1055	2040

Chemical	Concentration (%)	Temperature		Recommended Rubber Lining	Chemical Cure Repair Stock
		°F	°C		
Hydrochloric Acid	3-4	160	71	1060 1035 1048	2019 1038 1038
	10-15	175	80	1008	1001
	Sat.	140	60	1099 2000	2042 2042
		160	71	1000	1001
Hydrocyanic Acid	25	150	65	1051	-
Hydrofluoric Acid	<50%	90	32	2000 1055	2042 2040
	70	90	32	1051 6511	- -
Hydrofluorosilic Acid	50	180	82	1055 1051	2040 -
Hydrogen Sulfate (Sulfuric Acid)	30	140	60	1000 1055	1001 2040
	50	100	52	1051	-
Hydrogen Sulfide (wet)	1	Amb.	Amb.	1051	-
Hydrosilicofluoric Acid	50	180	82	1055	2040
Hypochlorous Acid	10	150	65	1035	1038
Iron Chloride	Sat.	180	82	1055	2040
Iron Sulfate	Sat.	180	82	1008 1055	1001 2040
Isobutanol	100	125	52	1035 1051	1038 -
Isobutyl Alcohol	100	Amb.	Amb.	1006 1035	1038 1038
		125	52	1051	-
Isopropanol	100	Amb.	Amb.	1006 1035 1051	1038 1038 -

Chemical	Concentration (%)	Temperature		Recommended Rubber Lining	Chemical Cure Repair Stock
		°F	°C		
Isopropyl Alcohol	100	Amb.	Amb.	1006 1035 1051	1038 1038 -
Lead Acetate	Sat.	120	49	1000 1035	1001 1038
Lead Nitrate	Sat.	Amb. 150	Amb. 65	1000 1035	1001 1038
Lead Sulfate	Any	Amb. 175	Amb. 80	1099 1000 1055	2042 1001 2040
Lime Bleach	10	125	52	1035 1051	1038 -
Lime Hydrated	Sat.	140 180	60 82	2020 1055 1051	2019 2040 -
Lye Solution	Sat. 35 Sat.	Amb. 150 180	Amb. 65 82	1099 1000 1055	2042 1001 2040
Magnesium Chloride	Sat.	140 180	60 82	2020 1055	2019 2040
Magnesium Hydroxide	Sat.	140 180	60 82	2020 1055 1051	2019 2040 -
Magnesium Nitrate	Sat.	125 175	52 80	1099 2020 1055	2042 2019 2040
Magnesium Sulfate	Sat.	140 180	60 82	2020 1055	2019 2040
Maleic Acid	25	Amb.	Amb.	1000 1035	1001 1038
Malic Acid	Sat.	125	52	1000 1008	1001 1001
Manganese Chloride	Sat.	180	82	1055	2040

Chemical	Concentration (%)	Temperature		Recommended Rubber Lining	Chemical Cure Repair Stock
		°F	°C		
Manganese Sulfate	Sat.	180	82	1055	2040
Mercuric Chloride	Sat	140 185	60 85	1000 1055	1001 2040
Mercuric Cyanide	Sat.	140 160	60 71	1000 1055	1001 2040
Methanal (also formaldehyde)	40	100 125	38 52	1000 1055	1001 2040
Methanol	100	Amb. 125	Amb. 52	1035 1055	1038 2040
Methane Carboxylic Acid (also acetic acid)	10	140	60	1055	2040
Methyl Alcohol	100	Amb. 125	Amb. 52	1035 1055	1038 2040
Methyl Benzene				Rubber Lining Not Recommended	
Methyl Chloride				Rubber Lining Not Recommended	
Monochlorobenzene				Rubber Lining Not Recommended	
Monochloromethane				Rubber Lining Not Recommended	
Muriatic Acid (also hydrochloric acid)	3-4 10-15 Sat. 	160 175 140 160	71 80 60 71	1060 1048 1008 1099 2000 1000	2019 1038 1001 2042 2042 1001
Naptha				Rubber Lining Not Recommended	

Chemical	Concentration (%)	Temperature		Recommended Rubber Lining	Chemical Cure Repair Stock
		°F	°C		
Natural Gas				Rubber Lining Not Recommended	
Nickel Acetate	Sat.	180	82	1055	2040
Nickel Chloride	Sat.	180	82	1055	2040
Nickel Nitrate	Sat.	140 180	60 82	1099 1055	2042 2040
Nickel Sulfate	Sat.	140 180	60 82	1099 1055	2042 2040
Niter	Sat.	140 180	60 82	2020 1055	2019 2040
Niter Cake	Sat.	125 180	52 82	1099 1055	2042 2040
Nitric Acid				Rubber Lining Not Recommended	
Nitrogen	100	150	65	1055	2040
Oil of Vitriol (see Sulfuric Acid)					
Oleum				Rubber Lining Not Recommended	
Orthoboric Acid	10 Sat.	125 175	52 80	1099 1008 1055 1051	2042 1001 2040 -
Oxalic Acid	10	Amb.	Amb.	1055	2040
Phosphoric Acid	85	185	85	1054 1055 1051 1020	1058 2040 - -
Phospholeum	105	120	49	1055	2040
Pickling Acid (H_2SO_4)	25-30	180	82	1008	1001

Chemical	Concentration (%)	Temperature		Recommended Rubber Lining	Chemical Cure Repair Stock
		°F	°C		
Plating Solutions:					
Brass	-	150	65	1008 1035 1051	1001 1038 -
Cadmium	-			Rubber Lining Not Recommended	
Chrome	-			Rubber Lining Not Recommended	
Copper Cyanide	-	150	65	1000 1006 1035 1055	1001 1038 1038 2040
Copper Acid	-	150	65	1000	1001
Copper Bright	-	150	65	1008	1001
Copper Electroplating	-	150	65	1053	-
Gold	-	150	65	1053	-
Indium	-	150	65	1053	-
Iron	-	150	65	1053	-
Lead	-	150	65	1053 1051	- -
Nickel, Gray	-	150	65	1035	1038
Nickel Bright	-	150	65	1035	1038
Tin	-	150	65	1000 1035 1051	1001 1038 -
Zinc	-	150	65	1000 1035 1051	1001 1038 -

Chemical	Concentration (%)	Temperature		Recommended Rubber Lining	Chemical Cure Repair Stock
		°F	°C		
Potable Water	-	140	60	1048	1038
Potash	Sat.	125 175 180	52 80 82	1099 1035 1055	2042 1038 2040
Potassium Acid Sulfate	Sat.	125 150	52 65	1099 1000 1035	2042 1001 1038
Potassium Alum	Sat.	140 175 180	60 80 82	1000 1008 1055	1001 1001 2040
Potassium Carbonate	Sat.	125 140 180	52 60 82	1099 2020 1055	2042 2019 2040
Potassium Bicarbonate	Sat.	125 140 180	52 60 82	1099 2020 1055	2042 2019 2040
Potassium Carbonate	Sat.	125 140 180	52 60 82	1099 2020 1055	2042 2019 2040
Potassium Chloride	Sat.	125 140 180	52 60 82	1099 1035 1055	2042 1038 2040
Potassium Cuprocyanide	Any	125 150	52 65	1099 1000 1055	2042 2041 2040
Potassium Cyanide	Sat.	125 140 180	52 60 82	1099 1035 1055	2042 1038 2040
Potassium Hydroxide	Sat.	180	82	1055	2040
Potassium Hypochlorite	13	140	60	1051	-
Potassium Nitrate	Sat.	125 140 180	52 60 82	1099 1035 1055	2042 1038 2040

Chemical	Concentration (%)	Temperature		Recommended Rubber Lining	Chemical Cure Repair Stock
		°F	°C		
Potassium Sulfate	Sat.	175 180	80 82	1035 1055	1038 2040
Potassium Sulfite	Sat.	125 170	52 77	1099 1035	2042 1038
Propanol	100	120	49	1055	2040
Propyl Alcohol	100	125	52	1055	2040
Saline Water	2-3 5-10	160 175	71 80	1035 1008 1055 2010	1038 1001 2040 2013
Salt Brine	Sat.	160 180	71 82	1000 1035 1008 1055	1001 1038 1001 2040
Salt Peter (potassium chloride)	Sat.	125 140 180	52 60 82	1099 1035 1055	2042 1038 2040
Salt Water	-	125 160 175	52 71 80	2020 1035 1008 1055 2010	2019 1038 1001 2040 2013
Silver Nitrate	Sat.	125 175	52 80	1099 1055	2042 2040
Slaked Lime	Any	170 180	77 82	1008 1055	1001 2040
Soda Alum	5 Sat.	125 150 180	52 66 82	1099 1008 1055	2042 1001 2040
Soda Ash	Any	140 175	60 80	1000 1035 1008 1055	1001 1038 1001 2040

Chemical	Concentration (%)	Temperature		Recommended Rubber Lining	Chemical Cure Repair Stock
		°F	°C		
Sodium Acid Carbonate	Any	140 175	60 80	1000 1035 1008 1055	1001 1038 1001 2040
Sodium Acid Sulfite	Sat.	150	66	1035	1038
Sodium Aluminate	Sat.	140 170 185	60 77 85	2020 1008 1035 1055	2019 1001 1038 2040
Sodium Aluminum Sulfate	Sat.	125 150	52 66	1099 1000 1055	2042 1001 2040
Sodium Antimonate	Any	150	66	1000 1055	1001 2040
Sodium Bicarbonate	Sat.	125 140 175 200	52 60 80 93	1099 1008 1055 1051	2042 1001 2040 -
Sodium Bifluoride	Sat.	140	60	1008	1001
Sodium Bisulfite	Sat.	150	66	1035	1038
Sodium Borate	10 Sat.	125 180	52 82	1099 1008 1055	2042 1001 2040
Sodium Carbonate	Sat.	125 140 175	52 60 80	1099 1000 1035 1055	2042 1001 1038 2040
Sodium Chloride	Sat	125 140 175 200	52 60 80 93	1099 1008 1035 1055 1051	2042 1001 1038 2040 -

Chemical	Concentration (%)	Temperature		Recommended Rubber Lining	Chemical Cure Repair Stock
		°F	°C		
Sodium Chlorite	Sat.	125 175 180	52 80 82	1099 1035 1055	2042 1038 2040
Sodium Fluoride	Sat.	125	52	1000	1001
Sodium Flurosilicate	10 20 50	Amb. 160 180	Amb. 71 82	1099 1055 1051	2042 2040 -
Sodium Glycolate	Any	150	66	1000 1035	1001 1038
Sodium Hexaflurosilicate	10 20 50	Amb. 160 180	Amb. 71 82	1099 1055 1051	2042 2040 -
Sodium Hydroxide	50	140 180	60 82	2020 1055	2019 2040
Sodium Hypochlorite	15	140	60	1051 1024	- -
Sodium Hypophosphite	Any	Amb. 150	Amb. 66	1099 1000	2042 1001
Sodium Perborate	Sat.	125 150 180	52 66 82	1099 1000 1008 1055	2042 1001 1001 2040
Sodium Phosphate	Sat.	125 175 180	52 80 82	1099 1048 1008 1055	2042 1038 1001 2040
Sodium Pryoborate	10 Sat.	125 175 180	52 80 82	1099 2020 1008 1055	2042 2019 1001 2040
Sodium Sulfate	Sat.	140 175 180	60 80 82	2020 1048 1008 1055	2019 1038 1001 2040

Chemical	Concentration (%)	Temperature		Recommended Rubber Lining	Chemical Cure Repair Stock
		°F	°C		
Sodium Sulfite	Sat.	125 140	52 60	1099 2020 1000 1055	2042 2019 1001 2040
Sodium Thiosulfate	Sat.	150 180	66 82	1000 1048 1055	1001 1038 2040
Stannic Chloride	Sat.	150 180	66 82	1008 1048 1055	1001 1038 2040
Stannous Chloride		150 180	66 82	1008 1048 1055	1001 1038 2040
Sucrose Solution	Any	120	49	1055	2040
Sugar Solution	Any	120	49	1055	2040
Sulfur Dioxide	Any	150 185	66 85	1053 1051	- -
Sulfonic Acid	50 20	140 160	60 71	1048 1008	1038 1001
Sulfuric Acid	30 25 50	150 160 150	66 71 66	1008 1048 1055 1051	1001 1038 2040 -
Sulfurous Acid	10 75	150 100	66 38	1035 1051	1038 -
Tannic Acid	Sat.	13 150	54 66	1055 1051	2040 -
Tartaric Acid	Sat.	140	60	1035	1038
Thallium Hydroxide	Sat.	150	66	1000	1001
Tin Perchloride	Sat.	125 150 180	52 66 82	1099 1000 1035 1055	2042 1001 1038 2040

Section 4: Chemical Resistance Table

Chemical	Concentration (%)	Temperature		Recommended Rubber Lining	Chemical Cure Repair Stock
		°F	°C		
Tin Salt	Sat.	125 150 180	52 66 82	1099 1000 1035 1055	2042 1001 1038 2040
Toluene				Rubber Lining Not Recommended	
Trichloroethylene				Rubber Lining Not Recommended	
Trisodium Phosphate	Sat.	125 140 175	52 60 80	1099 2020 1000 1055 1035	2042 2019 1001 2040 1038
Vinegar	-	100	38	1055 1035	2040 1038
Water	-	175	80	1048 1035	1038 1038
Water Demineralized	-	175	80	1048 1035	1038 1038
Xylene				Rubber Lining Not Recommended	
Zinc Acetate	Sat.	Amb. 125	Amb. 52	1099 1008 1055	2042 1001 2040
Zinc Chloride	Sat.	150 180	66 82	1008 1035 1055	1001 1038 2040
Zinc Cyanide	Sat.	150 180	66 82	1008 1035 1055	1001 1038 2040
Zinc Sulfate	Sat.	150 180	66 82	1008 1035 1055	1001 1038 2040