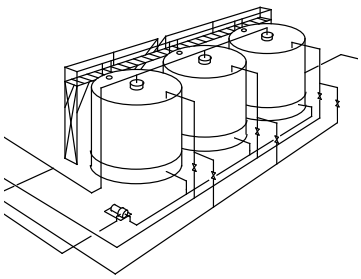
FIBERGLASS PIPE GROUP



Bondstrand Fiberglass Pipe and Fittings

for industrial, marine, offshore, and military applications

How to use this guide

Bondstrand pipe and fittings are suitable for the applications listed up to the maximum recommended temperature. However, due to variations in actual service conditions, this corrosion guide should be considered only a recommendation and not a guarantee. Note that combinations of chemical solutions are often far more aggressive than the individual components. For applications not listed, contact Ameron Applications Engineering.

For service designated CM, consult manufacturer (Ameron) for possible limitations. When no concentration is shown, recommendations apply to any concentration to 100% or to saturation.

Service considerations

The recommendations in this guide are based on continuous operating conditions. Temperature ratings are usually higher for cyclic or occasional exposure. Contact Ameron Applications Engineering for recommendations concerning systems with:

- Cyclic chemical exposure
- Temperature and concentration excursions exceeding those listed
- Waste streams or solutions containing mixtures of materials listed herein or containing traces of materials with CM rating
- Solutions containing materials not listed herein
- Secondary containment piping.

Ameron will also provide complimentary service analysis, piping recommendations and value engineering.

2000 Series piping systems

Series 2000 — A lined epoxy system using the Quick-Lock joint for continuous operating temperatures to 250°F (121°C) generally and to 300°F (149°C) for selected substances.

Series 2000M — A lined epoxy system for marine and offshore applications with chemical resistance properties similar to Series 2000, but with greater resistance to external collapse for in-tank operation under vacuum.

Series 2000M-FP — A lined epoxy system with the same service capabilities and chemical resistance as Series 2000M for marine and offshore fire protection systems; incorporates an external intumescent coating which greatly enhances the fire resistance properties of the system.

2000 Series piping systems (cont.)

Series 2000MP — A lined epoxy system rated to 250°F (121°C) and 125 psig (8.5 bar) meeting MIL-P-28584B requirements for steam condensate, hot water, district heating and similar piping applications with chemical resistance properties similar to Series 2000.

Fittings — Filament-wound epoxy.

Adhesives — Type 34 for most applications; Type 6 for foodstuffs.

Key-Lock® (K/L) joined piping systems

Series 2400 — A lined epoxy system for operating temperatures to 200°F (93°C) when employing the Key-Lock mechanical joint or 250°F (121°C) when using a taper/taper adhesive-bonded joint. See Series 2000 for corrosion resistance properties.

Series 3400 — An unlined epoxy system with joining identical to those of Series 2400. Also available in a lined variant upon request. Consult Ameron for specific corrosion resistance properties.

3000(A) Series piping systems

Series 3000A — A lined epoxy system for operating temperatures to 210°F (99°C). Designed for water/wastewater applications requiring less wall thickness or less temperature resistance than Series 2000.

Series 3200 — A lined epoxy system designed to meet Underwriters' Laboratories requirements for underground fire protection systems. All Series 3200 pipe and fittings are rated to 200 psig at 150°F (14 bar at 66°C). Contact Ameron for recommendations regarding corrosion resistance.

Series 3300 — A lined epoxy system rated to temperatures to 150°F (66°C) and pressures to 300 psig (21 bar) in 8 through 12-inch sizes. Corrosion resistance properties of Series 3300 are identical to those of Series 3200.

Fittings — Molded epoxy (2 to 6 inches); filament-wound epoxy (8 to 16 inches).

Adhesive — Type 34

4000 Series piping systems

Series 4000 — A lined epoxy system similar to Series 2000 in temperature capabilities, but with a thicker liner for even greater corrosion and erosion resistance.

Fittings — Filament-wound epoxy.

Adhesives — Type 34 for most applications; Type 6 for foodstuffs.

5000 Series piping systems

Series 5000 — A vinyl ester system for severely corrosive services at temperatures to 200°F (93°C).

Fittings — Filament-wound or molded vinyl ester.

Adhesives — Type 105

7000 Series piping systems

Series 7000 — An unlined epoxy system incorporating high-strength conductive carbon filaments in the wall of pipe and fittings that, when properly installed and grounded, prevent the accumulation of static electrical charges. Joined using either the Quick-Lock adhesive joint or flanges.

Series 7000M — A marine variant of Series 7000 with resistance to external collapse similar to that of Series 2000M. Series 7000M is widely used on vessels transporting refined petroleum products.

Fittings — Filament-wound epoxy with electrically conductive filament reinforcement.

Adhesive — Type 60

Corrosion resistance tables

Substance	Concentration	Temperature Limit (°F) for Piping Series 2000	3000A	4000	5000	7000	K/L	O-ring Mat'l
Acetaldehyde		100	80	100	CM	CM	CM	E
Acetic acid	≤ 10%	150	150	150	200	150	150	N
Acetic acid	10 ≤ 20%	CM	CM	CM	200	CM	CM	CM
Acetic acid	20 ≤ 50%	CM	CM	CM	100	CM	CM	CM
Acetic acid	50 ≤ 100%	CM	CM	CM	CM	CM	CM	CM
Acetic anhydride		100	100	120	CM	CM	CM	CM
Acetone		120	CM	120	CM	75	CM	E
Acetonitrile		120	100	120	CM	CM	CM	CM
Acetophenone		120	100	120	CM	100	CM	CM
Acrylic acid		CM	CM	CM	75	CM	CM	CM
Acrylonitrile		100	CM	100	CM	100	CM	CM
Air		300	250	300	200	250	200	N
Alcohol, amyl		200	175	200	100	150	150	N
Alcohol, butyl		200	175	200	100	150	150	N
Alcohol, ethyl (ethanol)		180	150	180	CM	150	150	N
Alcohol, isobutyl		180	150	180	100	150	150	N
Alcohol, isopropyl		180	150	180	100	150	150	N
Alcohol, methyl (methanol)		150	100	150	CM	100	100	N
Alcohol, polyvinyl		150	150	150	100	100	100	N
Allyl chloride		120	100	120	CM	CM	CM	CM
Aluminum acetate	10%	250	210	250	150	200	200	N
Aluminum chloride		270	210	270	200	200	200	N
Aluminum chlorohydroxide	≤ 50%	100	CM	100	CM	CM	CM	CM
Aluminum hydroxide		200	200	200	150	180	180	CM
Aluminum nitrate		250	210	250	180	200	200	N/E
Aluminum potassium sulfate (alum)		270	210	270	200	210	200	N/E
Aluminum sulfate		270	210	270	200	210	200	N/E
Ammonia gas (dry)		150	150	150	100	150	150	E
Ammonium bicarbonate	≤ 50%	220	200	220	150	180	150	-
Ammonium carbonate	≤ 15%	180	180	180	100	150	150	E
Ammonium carbonate	15 ≤ 50%	180	180	180	100	150	150	E
Ammonium chloride		270	210	270	200	120	120	N
Ammonium hydroxide	≤ 20%	180	180	180	150	100	100	E
Ammonium hydroxide	20 ≤ 29%	150	150	150	100	100	100	E
Ammonium nitrate	≤ 25%	225	200	225	200	210	200	N
Ammonium nitrate	>25%	225	200	225	200	210	200	N/E
Ammonium persulfate		100	80	100	180	CM	CM	E
Ammonium phosphate		200	200	200	150	150	150	N
Ammonium sulfate	≤ 40%	270	210	270	200	210	200	N
Ammonium sulfate	>40%	270	210	270	200	210	200	N/E
Ammonium thiocyanate		150	120	150	100	100	100	CM
Ammonium thiosulfate		150	120	150	100	100	100	CM
Amyl acetate		100	100	100	CM	CM	CM	E
Amyl chloride		100	100	100	CM	CM	CM	V
Aniline		100	100	100	CM	75	75	E
Antimony pentachloride		100	CM	100	100	75	75	CM
Antimony trichloride		220	180	220	150	150	150	CM
Aqua regia		CM	CM	CM	CM	CM	CM	CM
Arsenic acid		180	180	180	180	150	150	N
Barium acetate		180	180	180	150	150	150	CM
Barium carbonate		200	200	250	200	180	180	N/E
Barium chloride		250	210	250	200	200	200	N/E
Barium hydroxide	10%	220	200	220	150	200	200	CM
Barium nitrate		200	150	200	150	150	150	N
Barium sulfate		225	210	250	200	180	180	N/E
Barium sulfide	≤ 25%	225	210	225	180	180	180	N/E
Beer		200	200	200	150	180	180	N
Benzaldehyde		100	CM	100	CM	CM	CM	E

E = EPR N = Buna-N V = Viton A CM = Consult manufacturer
When a choice is shown (N/E), proper selection will depend on concentration, temperature and pressure.

Corrosion resistance tables

Substance	Concentration	Temperature Limit (°F) for Piping Series 2000	3000A	4000	5000	7000	K/L	O-ring Mat'l
Benzene		150	125	150	CM	120	120	V
Benzene sulfonic acid		220	200	220	200	180	180	V
Benzoic acid		220	200	220	200	200	180	V
Black liquor		150	125	200	150	150	150	V
Borax		250	210	250	200	200	200	N
Boric acid	≤ 4%	225	200	225	200	200	200	N/E
Boric acid	4 ≤ 20%	225	200	225	200	200	200	E
Boric acid	>20%	225	200	225	200	200	200	E
Brine (< 20% salts)		250	190	250	200	210	200	N/E
Bromine (dry)		CM	CM	CM	CM	CM	CM	CM
Bromine (liquid)		CM	CM	CM	CM	CM	CM	CM
Bromine water	≤ 4%	150	100	150	CM	150	150	E
Bromine (wet)		CM	CM	CM	CM	CM	CM	CM
Butadiene		150	150	150	100	120	120	V
Butane		150	150	150	100	120	120	N
Butyl acetate		150	150	150	CM	100	100	CM
Butyl cellosolve		150	150	150	CM	100	100	E
Butyraldehyde		150	120	150	CM	CM	CM	E
Butyric acid		200	150	200	180	150	150	V
Calcium bisulfate		270	210	270	200	200	200	N
Calcium bisulfite		270	210	270	200	200	200	N
Calcium carbonate		270	210	270	200	200	200	N
Calcium chlorate		150	125	150	200	100	100	CM
Calcium chloride		270	210	270	200	210	200	N
Calcium hydroxide		200	180	200	180	CM	150	N
Calcium hypochlorite	< 20%	150	120	150	200	150	150	E
Calcium hypochlorite	≥ 20%	150	120	150	100	150	150	E
Calcium nitrate		250	210	250	200	200	200	N/E
Calcium phosphate		250	210	250	200	200	200	N
Calcium sulfate		250	210	250	200	200	200	N
Caprylic acid		150	150	150	150	120	120	CM
Carbon dioxide (dry)		250	210	250	200	200	200	N/E
Carbon disulfide		75	CM	75	CM	75	75	N
Carbonic acid		180	175	180	180	150	150	N
Carbon monoxide		200	200	200	200	150	150	N
Carbon tetrachloride		150	125	150	CM	150	150	V
Castor oil		220	210	220	200	200	200	N
Chloride dioxide (wet)		CM	CM	CM	150	CM	CM	CM
Chlorine gas (dry)		CM	CM	CM	200	CM	CM	CM
Chlorine gas (wet)		CM	CM	CM	200	CM	CM	CM
Chloroacetic acid	≤ 10%	100	CM	100	200	75	75	V
Chloroacetic acid	10 ≤ 25%	100	CM	100	200	CM	CM	V
Chloroacetic acid	25 ≤ 50%	CM	CM	CM	150	CM	CM	V
Chlorobenzene		100	CM	100	CM	75	75	V
Chloroform		CM	CM	CM	CM	CM	CM	CM
Chlorosulfonic acid		CM	CM	CM	CM	CM	CM	CM
Chromic acid	≤ 5%	CM	CM	CM	200	CM	CM	CM
Chromic acid	5 ≤ 20%	CM	CM	CM	100	CM	CM	CM
Chromic acid	20 ≤ 30%	CM	CM	CM	CM	CM	CM	CM
Chrome alum		200	180	200	200	150	150	N
Citric acid		250	210	250	200	210	200	N
Copper acetate		180	150	180	180	150	150	E
Copper chloride		250	210	250	200	200	200	N
Copper cyanide		220	210	220	200	180	180	N
Copper nitrate		250	210	250	200	200	200	N
Copper sulfate		220	210	220	220	210	200	N
Corn syrup		220	210	220	180	200	200	N
Cresylic acid		CM	CM	CM	CM	CM	CM	CM

Temperature Conversions	°F	75	100	125	150	180	200	210	225	250	270	300
°C = ⅝(°F - 32)	°C	24	38	52	66	82	93	99	107	121	132	149

Corrosion resistance tables

Substance	Concentration	Temperature Limit (°F) for Piping Series 2000	3000A	4000	5000	7000	K/L	O-ring Mat'l
Crude oil (sweet or sour)		250	210	250	200	210	200	N/E
Cupric fluoride		200	200	250	200	150	200	N/V
Cupric nitrate		220	200	250	200	180	180	N
Cupric sulfate		220	200	250	200	180	180	N
Cyclohexane		150	150	150	120	120	120	N/V
Cyclohexanol		150	150	150	CM	100	100	N/V
Detergents		180	180	180	150	120	120	N/V
Diallyl phthalate		180	180	180	150	120	120	CM
Dibutyl phthalate		180	180	180	180	120	120	E
Diacetone alcohol		CM	CM	CM	CM	CM	CM	CM
Dicalcium phosphate		150	125	150	120	100	100	CM
Dichloroacetaldehyde		CM	CM	CM	CM	CM	CM	CM
Dichlorobenzene		150	150	150	CM	100	CM	V
Dichloroethylene		CM	CM	CM	CM	CM	CM	CM
Diesel fuel		250	210	250	150	200	200	N/V
Diethanolamine		CM	CM	CM	CM	CM	CM	CM
Diethyl ketone		CM	CM	CM	CM	CM	CM	CM
Diethyl ether		100	80	100	CM	CM	CM	CM
Diethylene glycol		200	150	200	180	180	180	N/V
Diethylene triamine		CM	CM	CM	CM	CM	CM	CM
Dimethylamine		CM	CM	CM	CM	CM	CM	CM
Dimethyl formamide		CM	CM	CM	CM	CM	CM	CM
Dimethyl phthalate		100	100	100	100	CM	CM	V
Diphenyl ether		120	100	120	CM	100	100	V
Dipropylene glycol		200	175	200	150	150	150	V
Disodium methyl arsenate		220	200	220	100	200	200	N
Ethyl acetate		150	125	150	CM	120	120	E
Ethyl acrylate		120	100	120	CM	120	120	E
Ethyl alcohol → alcohol, ethyl								
Ethyl benzene		150	125	150	CM	100	100	V
Ethyl cellosolve		150	100	150	CM	120	120	E
Ethyl chloride		CM	CM	CM	CM	CM	CM	CM
Ethyl ether		100	CM	100	CM	100	100	CM
Ethyl *tert*-butyl ether (ETBE)		120	CM	120	CM	100	200	CM
Ethylene chlorohydrin		150	125	150	100	100	100	V
Ethylene diamine		CM	CM	CM	CM	CM	CM	CM
Ethylene dichloride		CM	CM	CM	CM	CM	CM	V
Ethylene glycol (aq.)		270	210	270	200	210	200	N/E
Fatty acids		225	210	225	200	100	100	V
Ferric acetate		200	180	200	180	200	200	N
Ferric chloride	≤ 20%	220	210	220	200	170	170	N
Ferric chloride	20 ≤ 40%	205	210	205	200	150	150	N
Ferric chloride	40 ≤ 60%	205	210	205	200	150	150	N
Ferric nitrate		200	200	200	200	150	150	N
Ferric sulfate		225	210	225	200	210	160	N
Ferrous chloride		220	210	220	200	200	200	N
Ferrous nitrate		220	210	220	200	200	200	N
Ferrous sulfate		220	210	220	200	200	200	N
Fire Fighting Foam*	ATC 3 or 6%	150	CM	150	CM	CM	CM	N
Fire Fighting Foam*	AFFF 3 or 6%	150	CM	150	CM	CM	CM	N
Fluoboric acid		200	150	200	200	150	150	CM
Fluorine		CM	CM	CM	CM	CM	CM	CM
Fluosilicic acid	≤ 10%	CM	CM	150	200	CM	CM	CM
Fluosilicic acid	10 ≤ 25%	CM	CM	CM	100	CM	CM	CM
Formaldehyde	≤ 40%	150	100	150	150	75	75	N
Formic acid	≤ 10%	CM	CM	CM	150	CM	CM	CM

E = EPR N = Buna-N V = Viton A CM = Consult manufacturer
When a choice is shown (N/E), proper selection will depend on concentration, temperature and pressure.

* Fire Fighting Foam (FFF) & PSX Series Pipe

FFF Type	Conc.	Temp. (°F) Limit for Piping Series PSX L3	PSX Jetfire	O -ring Mat'l
ATC	3 or 6%	150	150	N
AFFF	3 or 6%	150	150	N

Corrosion resistance tables

Substance	Concentration	Temperature Limit (°F) for Piping Series 2000	3000A	4000	5000	7000	K/L	O-ring Mat'l
Formic acid	10 ≤25%	CM	CM	CM	100	CM	CM	CM
Freon		CM	CM	CM	CM	CM	CM	CM
Fuel oil		220	210	220	180	210	200	N
Furfural		CM	CM	CM	CM	CM	CM	CM
Gasoline		225	210	225	150	150	150	N
Gluconic acid	≤ 50%	180	150	180	100	150	120	CM
Glucose		220	210	250	200	200	200	N
Glycerine (aq.)		300	210	300	200	210	200	N/E
Glycerine	100%	300	210	300	200	210	200	N/E
Glyoxal	≤ 30%	120	120	120	CM	CM	CM	CM
Green liquor		180	150	200	CM	100	100	CM
Heptane		200	175	200	180	150	150	N
Hexane		150	150	150	120	100	100	N
Hydraulic oils		250	210	250	200	200	200	N
Hydrazine		CM	CM	CM	CM	CM	CM	CM
Hydrobromic acid	≤ 10%	100	CM	120	120	CM	CM	E
Hydrobromic acid	10 ≤48%	100	CM	120	120	CM	CM	E
Hydrochloric acid	≤ 1%	150	125	200	200	75	75	E
Hydrochloric acid	1 ≤ 10%	150	125	200	200	CM	CM	V
Hydrochloric acid	10 ≤ 20%	120	100	200	200	CM	CM	V
Hydrochloric acid	20 ≤ 37%	CM	CM	180	150	CM	CM	CM
Hydrofluoric acid	≤ 5%	CM	CM	CM	150	CM	CM	CM
Hydrogen chloride gas (dry)		150	150	150	150	150	150	V
Hydrogen peroxide	≤ 30%	CM	CM	CM	150	CM	CM	V
Hydrogen sulfide (dry)		250	200	250	180	150	150	E
Hydrogen sulfide (wet)		180	175	180	180	100	100	E
Hydrochlorous acid	10%	120	100	150	180	CM	CM	E
Iodine		120	80	120	100	120	120	V
n-Isopropyl acetate		150	125	150	CM	120	120	E
Jet fuel (JP-A, JP-8 …)		250	210	250	180	200	200	N/E
Juice, orange		250	210	250	180	200	200	N/E
Kerosene		250	210	250	200	210	200	N
Lactic acid		225	210	225	200	170	170	N/E
Latex		225	210	225	120	210	160	CM
Lauric acid		220	210	220	200	200	200	N/E
n-Lauryl alcohol		220	200	250	200	200	200	E/V
Lead acetate		250	210	250	200	200	200	E
Lead nitrate		220	210	220	200	170	170	N/E
Levulinic acid		220	210	220	200	200	200	N/E
Lime		200	200	220	180	180	180	N/V
Linseed oil		250	210	250	200	200	200	N/V
Lithium chloride		225	210	225	200	210	160	N
Lithium hydroxide		150	150	150	120	150	150	CM
Lube oil		250	210	250	200	200	200	N
Magnesium carbonate		220	210	220	200	170	170	N/E
Magnesium chloride		270	210	270	200	210	200	N/E
Magnesium hydroxide		270	210	270	150	210	200	E/V
Magnesium nitrate		250	210	250	200	200	200	N/E
Magnesium sulfate		270	210	270	200	210	120	N/E
Maleic acid	≤ 5%	220	200	220	200	170	120	V
Maleic acid	5 ≤ 35%	220	200	220	200	170	120	V

Temperature Conversions	°F	75	100	125	150	180	200	210	225	250	270	300
°C = ⅝(°F - 32)	°C	24	38	52	66	82	93	99	107	121	132	149

Corrosion resistance tables

Substance	Concentration	Temperature Limit (°F) for Piping Series 2000	3000A	4000	5000	7000	K/L	O-ring Mat'l
Maleic acid	> 35%	220	200	220	200	150	100	V
Maleic anhydride		150	150	150	120	150	150	V
Mercuric chloride		220	210	220	200	200	200	N
Mercurous chloride		220	210	220	200	200	200	N
Mercury		270	210	270	200	200	200	N
Methacrylic acid		CM	CM	CM	CM	CM	CM	CM
Methyl chloride		CM	CM	CM	CM	CM	CM	CM
Methyl ethyl ketone		100	80	100	CM	100	100	E
Methyl isobutyl alcohol		180	170	180	120	150	150	CM
Methyl isobutyl carbitol		120	100	120	CM	CM	CM	CM
Methyl isobutyl ketone		150	125	150	CM	100	100	CM
Methyl methacrylate		100	75	100	CM	CM	CM	CM
Methyl sulfonic acid		CM	CM	CM	NR	CM	CM	CM
Methyl *tert*-butyl ether (MTBE)		120	CM	120	CM	100	200	CM
Methylene chloride		CM	CM	CM	CM	CM	CM	CM
Mineral oil		270	210	270	200	210	200	N/E
Naphtha		225	210	225	180	210	200	V
Naphthalene		200	200	200	200	150	150	V
Natural gas		250	210	250	200	210	200	N/V
Nickel chloride		270	210	270	200	210	160	N/V
Nickel nitrate		220	210	220	200	180	180	N
Nickel sulfate		225	210	225	200	210	160	N
Nitric acid	≤ 1%	120	75	120	150	CM	75	E
Nitric acid	1 ≤ 5%	75	75	75	150	CM	CM	CM
Nitric acid	5 ≤10%	75	75	75	100	CM	CM	CM
Nitric acid	10 ≤ 20%	CM	CM	CM	100	CM	CM	CM
Nitrogen solutions		150	125	150	100	CM	CM	CM
Oil, sour crude		250	210	250	200	210	200	N
Oil, diesel		250	210	250	180	200	200	N
Oil, lubricating		220	210	220	180	200	200	N
Oleic acid		220	200	220	200	200	200	V
Oleum		CM	CM	CM	CM	CM	CM	V
Olive oil		220	200	250	200	200	200	N/V
Oxalic acid	≤ 10%	150	150	150	200	150	150	N/V
Oxalic acid	10 ≤ 20%	CM	CM	CM	200	CM	CM	N/V
Oxalic acid	20 ≤ 50%	CM	CM	CM	CM	CM	CM	N/V
Palmitic acid		220	210	220	200	200	200	N/V
Perchloric acid		CM	CM	CM	CM	CM	CM	V
Perchloroethylene		120	100	120	CM	100	100	V
Petroleum ether		100	100	100	CM	CM	CM	CM
Phenol	≤ 1%	100	CM	100	CM	75	75	V
Phenol	1 ≤ 5%	100	CM	100	CM	CM	CM	V
Phenol	5 ≤ 100%	CM	CM	CM	CM	CM	CM	CM
Phosphoric acid	≤ 2%	100	100	100	200	100	100	E
Phosphoric acid	2 ≤ 10%	100	100	100	200	75	75	E
Phosphoric acid	10 ≤ 50%	100	75	100	200	75	75	E
Phosphoric acid	50 ≤ 85%	100	CM	100	200	CM	CM	E
Phosphorous oxychloride		CM	CM	CM	CM	CM	CM	CM
Phthalic anhydride		220	200	220	200	200	200	CM
Pickling acid (5% H_2SO_4, 0.25% coal coal tar inhibitor, water)		100	80	180	200	CM	CM	V
Picric acid		100	100	100	100	CM	CM	N/V
Pine oil		150	125	150	150	150	150	V

E = EPR N = Buna-N V = Viton A CM = Consult manufacturer
When a choice is shown (N/E), proper selection will depend on concentration, temperature and pressure.

Corrosion resistance tables

Substance	Concentration	Temperature Limit (°F) for Piping Series 2000	3000A	4000	5000	7000	K/L	O-ring Mat'l
Plating solution (17% $NiSO_4$, 5% $NiCl_2$, 30% H_3BO_3, water)		220	210	220	180	120	120	E
Polyvinyl acetate emulsion		150	150	150	100	100	100	E
Polyethylene glycol (E-200)		150	120	180	150	150	150	N
Polyethylene glycol (P-400)		150	210	180	150	150	150	N
Potassium bicarbonate		220	200	270	150	100	100	N
Potassium bromide		220	200	220	200	200	200	N/E
Potassium carbonate	≤ 50%	100	100	100	150	CM	CM	N
Potassium chloride		270	210	270	200	210	200	N/E
Potassium cyanide		225	210	225	180	210	200	N/E
Potassium dichromate	≤ 10%	200	180	200	200	150	150	N/E
Potassium ferricyanide		220	200	220	200	200	200	N
Potassium ferrocyanide		220	200	220	200	200	200	N
Potassium fluoride	≤ 30%	200	200	220	150	150	150	N
Potassium hydroxide	≤ 25%	150	150	180	120	100	100	E
Potassium hydroxide	25 ≤ 50%	150	150	180	100	100	100	E
Potassium hydroxide	50 ≤ 75%	150	150	180	100	CM	CM	E
Potassium nitrate		270	210	270	200	210	200	N/E
Potassium permanganate	≤ 10%	CM	CM	CM	150	CM	CM	N
Potassium persulfate		CM	CM	CM	180	CM	CM	CM
Potassium phosphate		180	150	180	100	150	150	N/E
Potassium sulfate		250	210	270	180	210	200	N/E
Propane		150	125	150	100	100	100	N
Propylene glycol		270	210	270	200	210	200	N/E
Quatenary ammonium salts		120	120	120	100	100	100	CM
Silver nitrate		220	200	220	200	200	200	E/V
Sodium acetate		220	200	220	200	200	200	E
Sodium aluminum sulfate		220	200	250	200	200	200	N
Sodium benzoate		200	200	200	180	180	180	CM
Sodium bicarbonate	≤ 10%	250	210	250	180	180	180	N/V
Sodium bicarbonate	10 ≤ 20%	250	210	250	150	180	180	N/V
Sodium bisulfate		250	210	250	200	200	200	N/E
Sodium bisulfite		220	200	220	200	200	200	N/E
Sodium bromate		150	125	180	140	150	150	N
Sodium bromide		250	210	250	200	210	200	N
Sodium carbonate	< 10%	200	210	200	150	210	200	N
Sodium carbonate	10%	100	150	200	150	150	150	N
Sodium chlorate	≤ 50%	250	200	250	180	210	200	CM
Sodium chloride		270	210	270	200	210	200	N/E
Sodium cyanide	< 6%	225	210	225	200	210	200	N/E
Sodium cyanide	6%	225	210	225	200	200	200	N/E
Sodium dichromate	≤ 10%	200	180	200	200	180	180	E
Sodium ferricyanide		270	210	270	200	200	200	E
Sodium ferrocyanide		270	210	270	200	200	200	E
Sodium hydrosulfide		120	100	120	100	CM	CM	CM
Sodium hydroxide	≤ 10%	150	150	180	100	100	100	E
Sodium hydroxide	10 ≤ 40%	150	150	180	100	CM	CM	E
Sodium hydroxide	40 ≤ 50%	150	150	180	150	CM	CM	CM
Sodium hypochlorite	≤ 5¼%	CM	CM	CM	150	CM	CM	V
Sodium hypochlorite (stable)	≤ 10%	CM	CM	CM	CM	CM	CM	V
Sodium hypochlorite (stable)	11 ≤ 18%	CM	CM	CM	CM	CM	CM	V
Sodium nitrate		270	210	270	200	210	200	N/E
Sodium nitrite		250	210	250	200	200	200	E
Sodium silicate		220	210	220	200	200	200	N/E
Sodium sulfate		270	210	270	200	210	200	N/E
Sodium sulfide	≤ 10%	200	200	200	150	200	200	N
Sodium sulfite		200	200	200	200	200	200	N
Sodium thiocyanate		200	200	200	180	200	200	V

Temperature Conversions												
°C = ⅝(°F - 32)	°F	75	100	125	150	180	200	210	225	250	270	300
	°C	24	38	52	66	82	93	99	107	121	132	149

Corrosion resistance tables

Substance	Concentration	Temperature Limit (°F) for Piping Series 2000	3000A	4000	5000	7000	K/L	O-ring Mat'l
Sodium thiosulfate		150	125	150	200	120	120	V
Stannic chloride		250	210	270	200	200	200	N
Stannic sulfate		250	210	270	200	200	200	N
Stannous chloride		220	210	220	200	200	200	N/E
Stearic acid		220	210	220	200	200	200	N/V
Strontium chloride		200	200	200	200	200	200	N
Styrene		100	100	100	100	75	75	V
Sugar solutions		220	210	250	180	200	200	N/V
Sulfamic acid	< 25%	100	100	100	180	100	100	N
Sulfite liquors		150	125	150	200	100	100	V
Sulfur chloride		CM	CM	CM	CM	CM	CM	V
Sulfur dioxide gas (dry)		180	150	200	200	150	120	E
Sulfur trioxide		150	150	180	160	100	100	V
Sulfuric acid	≤ 2%	150	100	180	200	75	75	V
Sulfuric acid	2 ≤ 5%	125	80	180	200	CM	CM	V
Sulfuric acid	5 ≤ 10%	100	CM	180	200	CM	CM	V
Sulfuric acid	10 ≤ 20%	100	CM	180	200	CM	CM	V
Sulfuric acid	20 ≤ 25%	100	CM	150	180	CM	CM	V
Sulfuric acid	25 ≤ 50%	100	CM	150	180	CM	CM	V
Sulfuric acid	50 ≤ 70%	100	CM	100	120	CM	CM	V
Sulfuric acid	> 70%	CM	CM	CM	CM	CM	CM	CM
Sulfurous acid		200	180	200	200	120	120	V
Tall oil		200	200	200	200	200	200	N
Tannic acid		225	210	225	200	210	200	N/E
tert-Amyl methyl ether (TAME)		100	CM	100	CM	100	100	CM
Tetrachloroethylene		180	150	180	CM	CM	CM	V
Tetraethyl lead		120	120	120	100	100	100	V
Thionyl chloride		CM	CM	CM	CM	CM	CM	CM
Toluene		150	125	150	CM	100	100	V
Transformer oil		300	210	300	200	210	210	N/V
1,1,1 Trichloroethane		150	CM	150	CM	CM	150	V
Trichloroethylene		120	100	120	CM	CM	CM	V
Triethanolamine		150	150	150	CM	150	150	E
Triethylamine		100	100	100	CM	CM	CM	CM
Triphenyl phosphite		120	120	120	120	100	100	CM
Trisodium phosphate	25%	200	200	200	150	150	150	CM
Turpentine		150	125	150	CM	120	120	N/V
Urea		200	150	200	150	150	150	CM
Vinegar		200	150	200	200	150	150	E/V
Vinyl acetate		150	120	150	CM	100	100	CM
Water, chlorinated	≤ 50 ppm	150	150	150	180	120	120	N
Water, chlorinated	50 ≤ 500 ppm	125	125	125	150	110	110	N
Water, chlorinated	500 ≤ 2000 ppm	100	100	100	110	100	100	N
Water, chlorinated	2000 ≤ 3500 ppm	CM	CM	CM	110	CM	CM	N
Water, chlorinated brine		120	120	120	150	CM	CM	N
Water, deionized		250	210	250	180	210	200	N/E
Water, demineralized		250	210	250	200	210	200	N/E
Water, distilled		250	210	250	200	210	200	N/E
Water, fresh		250	210	250	200	210	200	N/E
Water, salt		270	210	270	200	210	200	N/E
Water, sea		270	210	270	200	210	200	N/E
Water, steam condensate		250	210	250	200	210	200	N/E
White liquor		150	150	200	150	CM	CM	N/E
Xylene		150	125	150	CM	150	150	V
Zinc acetate		180	150	180	180	150	150	E

E = EPR N = Buna-N V = Viton A CM = Consult manufacturer
When a choice is shown (N/E), proper selection will depend on concentration, temperature and pressure.

Corrosion resistance tables

Substance	Concentration	Temperature Limit (°F) for Piping Series 2000	3000A	4000	5000	7000	K/L	O-ring Mat'l
Zinc chloride		250	210	250	200	200	200	N/E
Zinc phosphate		180	150	180	200	150	150	CM
Zinc sulfate		200	210	250	200	200	200	N/E

Mechanical joining systems

Pronto-Lock and Pronto-Lock II — Available on all 3000A Series products. These joints utilize an O-ring seal with locking threads.

Key-Lock (K/L) — Available for Series 2400 and 3400 in diameters from 2 to 40 inches . The Key-Lock joint utilizes an O-ring seal with locking keys.

Fittings

Filament-wound fittings — Compatible with, and equivalent in corrosion resistance to the premium corrosion resistant epoxy or vinyl ester piping systems offered by Ameron (i.e. Series 4000 and Series 5000). These fittings also may be used with Series 2000 where higher strength, greater impact resistance, etc., are desired.

Molded fittings — Offer an economical alternative to filament-wound fittings with corrosion performance equivalent to Series 2000 or Series 3000A.

Key-Lock and Pronto-Lock O-ring Selection Guide

Code	Polymer	Temperature Range °F	°C
N	Buna-N (Nitrile)	-30 to +225	-5 to +105
E	Ethylene propylene rubber (EPR)	-65 to +250	-55 to +125
V	Fluorocarbon (Viton A)	-15 to +375	-25 to +190

Where a choice of materials is shown (i.e. N/E), the proper material selection will depend on the concentration, temperature and pressure of the system.

Bondstrand adhesives

Type	Joint Type	Primary Use	Areas of Use	Pipe Resin System	Temperature °F	°C
6	Q/L	Foodstuffs	All	Epoxy	300	149
34	Q/L or T/T	General Service	All	Epoxy	300	149
60	Q/L	Antistatic piping	All	Epoxy	250	121
105	Q/L	Resistance to acids	All	Vinyl ester	200	93

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