

Chemical Resistance Guide

RED THREAD® II

GREEN THREAD®

CHEM THREAD®

Z-CORE®



CENTRICAST PLUS® RB-2530

CENTRICAST® RB-1520

CENTRICAST PLUS® CL-2030

CENTRICAST® CL-1520

F-CHEM®

F-CHEM-V®

SMITH
Fibercast™
| A Varco Company

Chemical Resistance Guide

Introduction

This guide is intended for use only as a reference in evaluating fiberglass pipe. It should be used for a general indication of chemical resistance. Smith Fibercast data indicates that the pipe and fittings listed are suitable for the services as recommended. However, due to varying conditions encountered in usage from plant to plant, the data should be considered as a recommendation and not as a guarantee. Smith Fibercast offers a limited warranty of its products, which is in the *Terms and Conditions of Sale*. This data does not take into account chemical mixtures, thermal-mechanical or associated loading or stress combinations. Accordingly, the end-user of the fiberglass products assumes the responsibility and risk for proper evaluation, selection, use, and performance of the products in its particular application.

Basis of Chemical Resistance Recommendations

The information contained in this literature is based on corrosion resistance testing, field experience, published information, and Smith Fibercast engineering judgment. Corrosion resistance testing includes the pipe, fittings and adhesive used in Smith Fibercast piping systems. There are many successful Smith Fibercast installations that form the basis of the field experience and engineering judgment recommendations. Smith Fibercast products must be installed and used in accordance with proven practice and common sense. Corrosion barrier and total wall thickness may affect service life in aggressive chemical or abrasive applications.

Unlisted Applications and Combinations of Chemicals

Smith Fibercast piping is being used in many applications containing other chemicals, solvents and combinations of chemicals not listed in this literature. These applications should be reviewed with the factory for evaluations of the chemicals, their concentrations, temperatures, frequency of use, and other factors that may determine our suitability to provide economic service life. Extra care should be taken whenever there are combinations of chemicals as some combinations may be more aggressive than their constituent parts. Trace amounts of some chemicals can affect the piping service life. Smith Fibercast is pleased to provide recommendations on request.

Custom Piping Systems

Smith Fibercast can provide 2" through 84" filament wound and contact molded piping systems manufactured with resins specified by our customers. The resin manufacturers chemical recommendations should be followed when specifying custom piping.

Product Changes and Description

It is the policy of Smith Fibercast to improve its products continually. The company, therefore, reserves the right, without notice, to change specifications and/or design at any time without incurring an obligation for product previously sold. Descriptions contained in this catalog are for the purpose of identification and neither limit nor extend the standard product limited warranty set forth in the *Terms and Conditions of Sale* and Trade Customs.



Chemical Resistance Guide

Chemical	RED THREAD II	GREEN THREAD	CHEM THREAD	Z-CORE	RB-2530 RB-1520	CL-2030 CL-1520	F-CHEM(20) F-CHEM-V
Acetaldehyde	---	---	NR	100	---	---	NR
Acetamide	NR	NR	NR	100	---	---	---
Acetyl Chloride	NR	NR	NR	100	---	---	NR
Acetonitrile ACN	NR	NR	NR	120	---	---	NR
Acetic Acid, 10%	150	200	215	200	150(1)	150	210
Acetic Acid, 25%	NR	120	200	120	100	100	210
Acetic Acid, 50%	NR	120	150	120	100	100	180
Acetic Acid, 75%	NR	75	150	75	75	100	140
Acetic Acid, Glacial	NR	NR	NR	NR	NR	NR	NR
Acetic Anhydride,100%	NR	NR	NR	100	NR	NR	NR
Acetone, 1%	150	150	150	200	150	150	150
Acetone, 10%	150	150	100	200	125	140	NR
Acetone,100%	NR	75	NR	125	NR	NR	NR
Acrylic Acid, 25%	NR	120	100	120	NR	100	100(1)
Acrylic Acid, 95%	NR	100	---	100	NR	75	NR
Acrylonitrile,100%	NR	NR	NR	100	NR	NR	NR
Adipic Acid, Hexanedioic Acid	---	---	---	250	250	75	180
Air (Wet Or Dry)(6)	210	225	225	300	300	200	200
Alcohol Allyl	NR	NR	NR	120	---	---	NR(3)
Alcohol Amyl	NR	NR	NR	175	150	120	120
Alcohol, Butyl (Sec.), 10%	175	175	150	200	---	---	100
Alcohol, Butyl, 100%	120	150	120	200	150	---	100
Alcohol, Ethyl, 10%	150	175	150	200	150	100	120
Alcohol, Ethyl, 95%	120	120	100	175	125	75	80
Alcohol, Ethyl, 100%	120	120	100	175	---	---	80
Alcohol, Isopropyl, 10%	150	150	150	175	150	120	100
Alcohol, Isopropyl, 100%	120	120	100	150	100	120	100
Alcohol, Methyl, 10%	120	150	150	175	150	100	NR
Alcohol, Methyl, 100%	75	120	NR	150	100	NR	NR
Allyl Chloride	100	120	NR	150	100	NR	NR
Alum, Sat'd	210	225	225	275	250	200	210
Aluminum Chloride, 1%(4)	210	225	225	275	250	200	210
Aluminum Chloride, SAT'D(4)	150	205	225	275	250	200	210
Aluminum Fluoride, SAT'D	NR	75	85	100	150	70	80(1)(5)
Aluminum Hydroxide, SAT'D	NR	190	190	200	200	150	180
Aluminum Nitrate, ALL	150	205	225	250	250	150	180
Aluminum Potassium Sulfate, Sat'd	210	225	225	275	250	150	210
Aluminum Sulfate, Sat'd	210	225	225	275	250	200	210
Ammonia, Gas, Dry, Anhydrous(2)(6)	150	225	100	275	150(1)	100	100(1)
Ammonia, Gas, Wet	---	---	---	---	150(1)	100	100
Ammonia, Liquid	NR	NR	NR	NR	NR	NR	NR
Ammonium Acetate, 65%	200	225	220	275	75	75	80
Ammonium Bicarbonate, Sat'd	150	180	150	225	225	125	150
Ammonium Bisulfite, Black Liquor	NR	---	---	---	NR	150	180
Ammonium Bisulfite, Cook Liquor	NR	NR	---	---	NR	150	150
Ammonium Bisulfite, Sat'd	150	225	220	275	75	150	150
Ammonium Bromate, 43%	NR	NR	---	---	75	150	160
Ammonium Bromide, 43%	NR	---	---	---	100	150	160
Ammonium Carbonate, Sat'd	150	205	150	225	200	125	150
Ammonium Chloride, 25%	150	205	225	225	200	200	210
Ammonium Chloride, Sat'd	150	205	210	225	200	200	210
Ammonium Citrate, Sat'd	200	225	150	275	175	125	150
Ammonium Fluoride, 25%	NR	---	150	---	150	125	150(5)
Ammonium Fluoride, Sat'd	NR	75	150	100	100	125	150(5)
Ammonium Hydroxide, 5%	120	150	180	200	150	150	180(5)(7)
Ammonium Hydroxide, 10%	120	150	165	200	150	150	150(5)(7)
Ammonium Hydroxide, 20%	100	125	150	200	150	150	150(5)(7)

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Ammonium Hydroxide, 28%	100	125	125	200	100	100	100(5)(7)
Ammonium Hydroxide, Saturated	---	---	---	175	---	---	---
Ammonium Lauryl Sulfate, 30%	---	---	---	---	150	120	120
Ammonium Molybdate	---	---	---	---	100	150	150
Ammonium Nitrate, 25%	210	225	200	275	250	200	200
Ammonium Nitrate, Sat'd	210	225	200	210	---	---	200
Ammonium Pentaborate, 12%	---	---	---	---	NR	120	120
Ammonium Persulfate, Sat'd	NR	---	180	100	250	180	180
Ammonium Phosphate, 25%	150	200	210	225	150	190	210
Ammonium Phosphate, 65%	150	200	210	225	150	190	210
Ammonium Sulfate, Sat'd	200	225	225	275	250	190	210
Ammonium Sulfide (Bisulfide), Sat'd	NR	NR	---	100	100	120	120
Ammonium Sulfite	NR	NR	NR	150	NR	NR	120
Ammonium Thiocyanate, 20%	---	---	---	---	150	190	210
Ammonium Thioglycolate, 8%	---	---	---	---	100	90	100
Ammonium Thiosulfate, 60%	---	---	---	---	100	90	100
Amyl Acetate, 100%	75	120	NR	150	NR	NR	NR
Amyl alcohol	NR	NR	NR	175	NR	NR	120
Amyl Chloride	NR	NR	NR	100	NR	100	120
Aniline	---	---	---	150	75	NR	NR
Aniline Hydrochloride, 100%	---	---	165	100	NR	180	150
Aniline Sulfate, Sat'd	NR	NR	215	100	NR	200	210
Antimony Trichloride	NR	NR	---	150	150	200	200
Arsenic Acid (orthoarsenic acid)	---	---	---	---	NR	100	100
Arsenious Acid	NR	NR	180	100	---	---	180
Barium Acetate, Sat'd	210	225	210	275	100	180	190
Barium Bromide	---	---	---	---	100	200	210
Barium Carbonate, Sat'd	210	225	215	275	250	200	210
Barium Chloride, Sat'd	210	225	210	275	250	200	210
Barium Cyanide	---	---	---	---	200	150	150
Barium Hydroxide, 0 - 10%	180	200	160	225	200	200	150
Barium Hydroxide, >10%	---	---	---	---	200	150	150
Barium Sulfate, Sat'd	210	225	215	275	250	200	210
Barium Sulfide, Sat'd	210	225	215	275	250	200	180
Beer	210	225	150	250	200	200	120
Benzaldehyde	NR	NR	NR	200	---	---	NR(3)
Benzene Sulfonic Acid, 50%	NR	NR	215	100	100	125	180
Benzene Sulfonic Acid, 75%	NR	NR	215	100	NR	100	180
Benzene Sulfonic Acid, 100%	NR	NR	215	75	NR	100	180
Benzene, 10%	120	150	NR	180	125	NR	NR(3)
Benzene, 100%	120(1)	150	NR	180	125	NR	NR(3)
Benzene in Kerosene; 5% Benzene	---	---	---	---	200	200	180
Benzoic Acid, Sat'd	100	150	210	200	200	200	210
Benzoyl (ortho) Benzoic Acid	---	---	195	100	200	200	180
Benzyl Alcohol, 100%	NR	NR	NR	150	NR	NR	NR
Benzyl Chloride, 100%	NR	NR	NR	150	NR	NR	NR(3)
o-Benzoyl Benzoic Acid	---	---	---	---	NR	200	180
Benzyltrimethylammonium Chloride, 60%	---	---	---	---	150	100	100
Black Liquor (Pulp Mill)	150	225	225	230	180	180	180(5)(13)
Borax	---	---	---	---	250	200	210
Boric Acid, Sat'd	200	225	200	250	200	200	210
Brass Plating Solution	---	---	---	---	NR	150	180
Brine	210	225	225	275	250	200	210
Brominated Phosphate Ester	---	---	---	---	NR	NR	---
Bromic Acid	---	---	---	---	150	NR	---
Bromine Dry Gas	---	---	---	---	NR	100	90
Bromine Water, 5%	NR	NR	190	75	100	100	180

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Bromine, 10%	NR	NR	NR	NR	NR	NR	NR
Bromine, Liquid, Wet Gas	NR	NR	NR	NR	NR	NR	NR
Brown Stock	---	---	---	---	NR	100	180(9)
Bromoform	NR	NR	NR	185	---	---	---
Butane,100%(6)	75(1)	75(1)	---	100(1)	180	100	NR
Butadiene, Gas	NR	NR	NR	200	100	100	(9)
Butanol (Alcohol, Normal Butyl)	120	150	120	200	120	100	120
2-Butoxyethoxyethanol	---	---	---	---	NR	NR	100
Butyl Acetate,100%	75	150	NR	175	100	NR	NR
Butyl Acrylate	---	---	---	---	NR	NR	NR(3)
Buthyl Alcohol,10%	120	150	120	200	120	120	100
Buthyl Alcohol,100%	120	150	120	200	---	---	100
Butyl Benzoate,70%	---	150	---	200	NR	NR	---
Butyl Benzyl Phthalate,100%(4)	---	---	150	120	125	100	150
Butyl Carbitol Diethylene Glycol	---	---	---	---	NR	80	NR
Butyl CELLOSOLVE	150	150	---	175	150	100	100
Butylene Glycol,100%	150	150	160	250	200	150	160
Butyl Phthalate	NR	NR	NR	125	NR	NR	(9)
Butyric Acid 0-25%	NR	---	210	100	150	175	210
Butyric Acid 25-50%	NR	---	210	100	150	150	210
Cadmium Chloride, Sat'd	---	---	---	---	220	180	180
Cadmium Cyanide Plating Solution	---	---	---	---	NR	150	180
Calcium Bisulfite, Sat'd	NR	NR	180	100	200	180	180
Calcium Bromide	---	---	---	---	210	200	200
Calcium Carbonate, Sat'd	150	205	200	275	250	150	180
Calcium Chlorate, Sat'd	180	180	215	200	200	200	210
Calcium Chloride, Sat'd	210	225	215	275	250	200	210
Calcium Hydroxide, 15%	150	200	180	225	200	150	180
Calcium Hydroxide, 15-50%	---	---	---	---	200	150	180(5)
Calcium Hydroxide, >50%	---	---	---	---	200	175	180(5)
Calcium Hypochlorite, 10%(21)	---	---	---	---	180	125	160(7)(9)(10)
Calcium Hypochlorite, Sat'd(21)	NR	NR	170	NR	NR	NR	160(7)(9)(10)
Calcium Nitrate, Sat'd	150	205	215	275	250	200	210
Calcium Sulfate, Sat'd	200	225	215	275	250	200	210
Calcium Sulfite, Sat'd	NR	NR	180	100	225	180	180
Cane Sugar Liquor, Sat'd	200	225	180	250	225	180	180
Capric Acid	---	---	---	---	NR	80	160
Caprylic Acid, Sat'd	NR	NR	190	100	NR	150	180
Carbon Dioxide Gas, Dry(6)	210	225	225	275	250	200	210
Carbon Dioxide, Wet Acidic(6)	210	225	225	250	---	---	210
Carbon Disulfide	120	120	NR	150	---	---	NR
Carbon Monoxide Gas	---	---	---	250	250	200	210(9)
Carbon Tetrachloride,100%	150	150	125	175	100	125	100
Carbonic Acid	150	150	200	150	150	150	150
Carbo Wax	---	---	---	---	NR	150	100
Carboxyethyl Cellulose, 10%	---	---	---	---	75	150	150
Carboxymethyl Cellulose, 10%	NR	NR	165	100	75	125	150
Cascade Detergent in Solution	---	---	---	---	100	180	180
Castor Oil	210	225	210	250	200	160	160
Caustic Soda (See Sodium Hydroxide)							
CELLOSOLVE	NR	NR	NR	150	NR	NR	(9)
Chlorinated Water, 0-100 ppm CL2	150	225	200	275	200	200	180
Chlorinated Water, 100-200 ppm CL2	NR	200	200	275	200	200	180
Chlorinated Water, Sat'd	NR	NR	150	NR	NR	150	180
Chlorinated Wax	NR	NR	190	150	75	125	180
Chlorine Liquid	NR	NR	NR	NR	NR	NR	NR
Chlorine Saturated Brine(11)	NR	NR	150	75	NR	---	(9)

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Chlorine Water, Sat'd	NR	NR	150	75	NR	200	180(9)
Chlorine, Dry Gas, 100%(2)(6)	NR	NR	225	NR	125	200	210(9)(12)
Chlorine, Wet Gas, 100%(2)(6)	NR	NR	210	NR	NR	200	210(9)(12)
Chlorine Dioxide, 15%	---	150	150	150	75	150	180(9)
Chlorine Dioxide, 100%	NR	NR	120	NR	NR	---	160(9)
Chloroacetic Acid, 10%	100	120	135	150	100	100	100(9)
Chloroacetic Acid, 25%	---	---	135	100	100	100	100(9)
Chloroacetic Acid, 50%	NR	NR	100	100	NR	75	100(9)
Chloroacetic Acid, Glacial	NR	NR	NR	100	NR	NR	NR(9)
Chlorobenzene, 100%	100(1)	150(1)	NR	200	---	NR	NR
Chloroform, 100%	NR	NR	NR	185	100(9)	NR	NR
Chloromethane (Methyl Chloride)	NR	NR	NR	75	NR	NR	NR
2-Chlorophenol	---	---	---	100	---	---	---
Chlorosulfonic Acid, 100%	NR	NR	NR	75	NR	NR	NR
Chromic Acid, 5%	NR	NR	110	75	120	100	100(13)
Chromic Acid, 10%	NR	NR	90	75	100	100	100(13)
Chromic Acid, 15%	NR	NR	80	75	75	100	100(13)
Chromic Acid, 15-20%	NR	NR	70	NR	75	100	100(13)
Chromic Acid, 30%	NR	NR	NR	NR	NR	NR	NR
Chromic Acid, 45%	NR	NR	NR	100	NR	NR	NR
Chromic Flouride	---	---	---	---	75	75	---
Chromium Plate	---	---	---	---	NR	100	120
Chromium Sulfate, Sat'd	---	---	180	100	125	180	150
Cinnamaldehyde, 50%	---	---	---	---	NR	NR	---
Cinnamic Acid, 50%	---	---	---	---	NR	100	---
Cinnamic Alcohol, 50%	---	---	---	---	NR	NR	---
Citric Acid, 15%	NR	NR	NR	225	---	---	210
Citric Acid, Sat'd	210	225	215	225	200	200	210
Cobalt Chloride	---	---	---	---	200	180	180
Coca-Cola (syrup)	100	150	NR	NR	---	NR	---
Coconut Oil	200	225	180	275	100	180	180
Copper Acetate	---	---	---	200	---	---	160
Copper Carbonate	---	---	---	200	---	---	---
Copper Brite Plating: Caustic-Cyanide	---	---	160	100	NR	NR	160
Copper Chloride, Sat'd	150	205	215	225	250	200	210
Copper Cyanide, Sat'd	150	205	215	225	140	200	210
Copper Fluoride, Sat'd	---	200	210	225	250	175	210
Copper Nitrate, Sat'd	150	200	215	210	200	200	210
Copper Matte Dipping Bath	---	---	180	200	NR	NR	180
Copper Plating Solution, Cyanide Based	---	---	180	---	NR	150	160(5)
Copper Plating Solution, Fluoroborate..	NR	NR	180	NR	NR	NR	180
Copper Pickling Bath: 10% Ferric Sulfate	NR	---	205	150	NR	200	200
Copper Sulfate, Sat'd	150	200	215	250	200	200	210
Corn Oil	200	225	205	275	200	200	180
Corn Starch, Slurry	200	225	215	275	---	---	210
Corn Sugar	200	225	215	275	---	---	210
Cottonseed Oil	200	225	205	275	200	210	210
Cresol, 5%	75	120	---	200	---	---	---
Cresol, 10%	NR	75	---	200	---	---	---
Cresol, 100%	---	---	---	200	---	---	---
Cresylic Acid, 100%	NR	NR	NR	100	NR	---	NR
Crude Oil Sour, 100%	210	225	210	275	250	200	210
Crude Oil, Sweet, 100%	210	225	210	275	250	200	210
Cupric Chloride 5%	---	---	---	200	---	---	---
Cupric Chloride 50%	---	---	---	200	---	---	---
Cyclohexane, 100%	150	150	135	175	NR	110	120
Cyclohexanol	---	---	---	200	---	---	---

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Cyclohexanone, 100%	100(1)	100(1)	100	125	---	---	NR
Decanoic Acid	---	---	---	---	NR	80	160
Detergents, Sulfonated	210	225	215	275	200	150	200
Di-Ammonium Phosphate, 65%	150	225	210	275	150	150	210
Diacetone Alcohol	---	---	---	---	150	NR	---
Diallylphthalate (DAP)	---	---	180	150	NR	150	180
Dibromophenol, 100%	NR	NR	NR	100	NR	NR	NR
Dibutyl Carbitol	---	---	---	---	NR	75	80
Dibutyl Ether, 100%	100(1)	100(1)	125	125	NR	75	100
Dibutyl Sebacate	---	---	---	---	NR	NR	120
Dichloroacetic Acid	NR	NR	NR	100	NR	NR	(9)
Dichlorobenzene (Ortho), 100%	150	150	NR	180	---	---	NR
Dichloroethane	---	---	---	185	NR	NR	NR(3)
Dichloroethylene, 100%	---	---	NR	185	75	NR	NR
Dichloromethane (Methylene Chloride)	---	---	---	100	---	---	NR
Dichloromonomethane, 100%	---	---	NR	125	---	---	NR
Dichloropropane, 100%	---	---	NR	185	---	---	NR
Dichloropropene, 100%	---	---	NR	185	---	---	NR(3)
Dichloropropionic Acid	---	---	---	---	NR	NR	NR
Diesel Fuel	210	225	190	275	250	180	180
Diethanolamine, 100%	120	120	100	150	NR	NR	80
Diethylamine, 100%	NR	NR	NR	100	NR	NR	NR
Diethyl Benzene, 100%	150	150	100	185	---	---	80
Diethyl Carbonate, 100%	NR	NR	NR	100	NR	NR	NR
Diethylene Glycol, 100%	210	225	180	275	NR	150	180
Diethylhexyl Phosphoric Acid, 20% Kerosene	---	---	135	---	NR	150	120
Diethyl Sulfate, 100%	---	---	---	100	NR	NR	NR
Diethylene Triamine, 10%	NR	NR	NR	120	---	---	---
Diisobutyl Phthalate, 100%	150	150	125	175	NR	100	120
Diisobutylene, 100%	150	200	100	225	NR	80	90
Diisopropanolamine, 100%	---	---	110	120	NR	110	100
Dimethyl Formamide, 100% (DMF)	NR	NR	NR	100	NR	NR	NR
Dimethyl Morpholine, 100%	NR	NR	NR	100	NR	NR	NR
Dimethyl Phthalate, 100%	150	150	150	175	NR	125	150
Diocetyl Phthalate, 100% (DOP)	150	150	150	175	NR	125	150
Dioxane	NR	75	NR	125	---	---	NR
Diphenyl Oxide	(9)	(9)	(9)	(9)	NR	NR	80
Dipotassium Phosphate, 50%	---	---	---	---	150	100	---
Dipropylene Glycol, 100%	210	225	180	275	200	150	180
Distillery Stillage	150	150	150	175	---	---	---
Distillery Syrup	150	150	150	175	---	---	---
Divinyl Benzene	100(1)	100(1)	100	175	---	---	NR
Dodecene	---	---	---	---	NR	100	150
Dodecyl Alcohol, 100%	150	200	165	225	NR	125	150
Dodecyl Benzene Sulfonic Acid	---	---	---	---	75	100	200
DOW Latex 2144	210(1)	225	215	275	---	---	---
DOW Latex 560	210(1)	225	215	275	---	---	---
DOW Latex 700	210(1)	225	215	275	---	---	---
DOWANOL EE	75	75	NR	100	---	---	---
DOWANOL EM	NR	NR	NR	100	---	---	---
DOWFAX 9N9-Surfactant	100(1)	100(1)	---	100	---	---	---
ELECTROSOL, 5%	150	200	150	225	100	75	150
Epichlorohydrin, 100%	NR	NR	NR	100	---	---	NR
Epoxidized Soybean Oil, 100%	200	225	150	275	NR	150	150
Esters, Fatty Acids, 100%	200	225	180	275	100	150	180
Ethanol (Ethyl Alcohol)	120	120	100	175	---	---	80
Ethyl Acetate, 100%	75	120	NR	150	---	---	NR(3)

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Ethyl Acrylate,100%	120	120	NR	150	---	---	NR
Ethyl Alcohol,10%	---	---	---	200	---	---	150
Ethyl Alcohol,100%	120(1)	120(1)	100	175	---	---	80
Ethyl Amines	NR	NR	NR	---	NR	NR	NR
Ethyl Benzene,100%	120	150	NR	185	---	---	NR
Ethyl Bromide,100%	---	---	NR	100	---	---	NR
Ethyl Cellosolve	---	---	---	---	100	NR	---
Ethyl Chloride,100%	---	---	NR	100	75	NR	NR
Ethyl Ether,100%	100(1)	100(1)	NR	120	---	---	NR
Ethyl Sulfate,100%	NR	NR	90	100	---	---	80
Ethylene Dichloride, EDC	---	---	---	185	NR	NR	NR(3)
Ethylene Glycol, 50% (in water)	210	225	225	275	200	200	210
Ethylene Glycol, 100%	210	225	210	275	200	200	210
Ethylenediaminetetraacetic Acid	---	---	---	---	75	100	80
Eucalyptus Oil	---	---	---	---	150	140	140
Fatty Acids, Sat'd	210	225	215	275	200	200	210
Ferric Acetate, Sat'd	---	---	---	---	150	160	180
Ferric Chloride, Sat'd	150	205	215	275	250	200	210
Ferric Nitrate, Sat'd	150	205	215	275	250	200	210
Ferric Sulfate, Sat'd	210	225	215	275	200	200	210
Ferrous Chloride, Sat'd	210	225	215	275	250	200	210
Ferrous Chloride 5% HCL	---	---	---	---	210	175	---
Ferrous Nitrate, Sat'd	210	225	215	275	200	200	210
Ferrous Sulfate, Sat'd	210	225	215	275	200	200	210
Fertilizer (8-8-8)	210	225	200	275	NR	120	120
Fertilizer-Urea Ammonium Nitrate	210	225	200	275	75	120	120
Flue Gas	210	225	225	275	---	---	180(9)
Fluoboric Acid, Sat'd	NR	NR	190	75	---	150	180(5)
Fluorine Gas, Dry	---	---	---	---	75	75	80(5)
Fluorine Gas, Wet	---	---	---	---	NR	150	80(5)
Fluorobenzene (phenyl fluoride)	---	---	---	180	---	---	---
Fluoroboric Acid	---	---	---	---	180	150	---
Fluosilicic Acid, 10%	NR	100(1)	150	125	---	80	180(5)
Fluosilicic Acid, 25%	NR	100(1)	120	125	NR	100	100(5)
Formaldehyde, 25%	75	120(1)	150	150	75	75	150(21)
Formaldehyde, 37%	75	120(1)	100	150	75	75	150(21)
Formaldehyde, 40%	75	120(1)	---	150	75	75	150(21)
Formaldehyde, Sat'd	75	120(1)	NR	150	NR	NR	150(21)
Formic Acid, 0-10%	NR	NR	180	120	140	100	180
Formic Acid, 10-25%	NR	NR	100	120	100	100	100
Formic Acid, 25-88%	NR	NR	100	120	---	---	100
Formic Acid, Sat'd	NR	NR	100	100	---	---	100
Freon 11	75	75	75	75	150	75	80
Freon 12 OR 22 (Gas or Liquid)	NR	75	---	75	150	75	80
Fuel Oil, 100%	210	225	175	275	175	200	180
Fumaric Acid, 25%	---	---	---	---	100	100	---
Furfural, 5%	100	135	135	150	---	---	100
Furfural, 10%	100	110	110	125	---	---	100
Furfural,100%	NR	NR	NR	100	---	---	NR
Gallic Acid, Sat'd	---	---	---	---	NR	125	100
Gas, Natural(6)	210	225	210	275	200	200	210
Gasoline	210	225	100(1)	250	150	NR	120(9)
Gasoline, 0-12% Methanol	210	225	100	250	125	NR	100(9)
Glyconic Acid, 50%	100	100	150	120	---	---	180
Glucose,100%	210	225	215	275	250	200	210
Gluteraldehyde, 50%	120	120	120	150	---	75	120
Glutaric Acid, 50%	120	120	120	150	75	100	120

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Chemical	RED THREAD II	GREEN THREAD	CHEM THREAD	Z-CORE	RB-2530 RB-1520	CL-2030 CL-1520	F-CHEM(20) F-CHEM-V
Glycerine,100%	210	225	210	275	250	200	210
Glycol Ethylene	210	225	210	275	200	200	200
Glycolic Acid, 10%	NR	NR	180	100	NR	75	180
Glycolic Acid, 70%	NR	NR	100	100	NR	75	80
Glyoxal, 40%	120(1)	120(1)	80	125	NR	100	80
Glyoxal, Sat'd	120(1)	120(1)	NR	120	NR	NR	---
Gold Plating Solution	---	---	180	---	---	---	180
Green Liquor (Pulp Mill)	100	205(1)	180	225	---	---	180(8)
Heptane	200	200	200	225	150	150	200
Hexamethylenetetramine, 40%	---	---	---	---	100	75	100
Hexane	150(1)	150(1)	150	175	125	150	150
Hexylene Glycol	210	225	150	250	150	150	150
Hot Stack Gases	210	225	225	275	(9)	(9)	(9)
Hydrated Lime (Calcium Hydroxide)	150	200	180	225	200	175	180
Hydraulic Fluid, 0-60%	200	225	195	250	200	100	180
Hydraulic Fluid,100%	200	225	195	250	---	---	180
Hydriodic Acid, 40%	(9)	(9)	(9)	(9)	NR	NR	150
Hydrobromic Acid, 0-18%	NR	150(15)	180	150	150	100	180
Hydrobromic Acid, 18-48%	NR	100(15)	100	100	100	100	150
Hydrobromic Acid, 48-62%	NR	100(15)	100	100	100	NR	100
Hydrochloric Acid, 0-1%(16)	75	150(15)	215	200	200	175	180(8)
Hydrochloric Acid, 1-5%(16)	NR	150(15)	215	200	200	175	180(8)
Hydrochloric Acid, 10%(16)	NR	150(15)	215	200	200	175	180(8)
Hydrochloric Acid, 20%(16)(23)	NR	100	200	200	200(9)	175	160(17)
Hydrochloric Acid 38%, (36.5% Muriatic)(16)(23)	NR	NR	140	150	200(9)	150	140(17)
Hydrocyanic Acid, 10%	NR	NR	165	100	120	150	180
Hydrocyanic Acid, Sat'd (Prussic)	NR	NR	165	100	---	---	180
Hydrofluoric Acid, 1%	NR	75	150	75	NR	150	150(5)
Hydrofluoric Acid, 5%	NR	75(15)	150	75	NR	150	150(5)
Hydrofluoric Acid, 10%	NR	75	150	75	NR	150	125(5)
Hydrofluoric Acid, 20%	NR	NR	100	NR	NR	NR	100(5)
Hydrofluoric Acid, >50%	NR	NR	NR	NR	NR	NR	NR
HF,2.5% and HCl, 1.5%	NR	NR	200	NR	NR	---	(9)
Hydrofluosilicic Acid 10%	NR	100	150	125	NR	80	150(5)
Hydrofluosilicic Acid 25%	NR	100	120	125	NR	NR	100(5)
Hydrofluosilicic Acid, 37%	NR	NR	100	150	NR	NR	100(5)
Hydrogen Bromide, Wet Gas,100%(6)	NR	NR	180	NR	---	---	180
Hydrogen Chloride, Dry Gas, 100%(2)(6)	150	150	215	150	---	---	210(9)
Hydrogen Chloride, Wet Gas 100%(6)	NR	NR	215	NR	NR	---	210(9)
Hydrogen Fluoride, Vapor	NR	NR	180	NR	NR	NR	180(5)
Hydrogen Peroxide, 0-10%	NR	NR	125	75	75	NR	125(9)(10)
Hydrogen Peroxide, 10-20%	---	---	125	75	NR	NR	125(9)(10)
Hydrogen Peroxide, 20-30%	NR	NR	125	75	NR	NR	125(9)(10)
Hydrogen Sulfide, Dry Gas(2)(6)	150	150(1)	215	150(1)	250	175	210
Hydrogen Sulfide, Wet Gas, Sat'd(6)	150	150	210	150	250	175	210
Hydrogen Fluoride, Vapor(6)	NR	NR	180	NR	NR	---	150
Hydrosulfite Bleach	NR	NR	180	NR	NR	150	180
Hydroxyacetic Acid (Glycolic Acid 70%)	NR	NR	100	100	NR	75	80
Hypochlorous Acid 10%	NR	NR	165	NR	NR	NR	150
Hypochlorous Acid, 20%	NR	NR	135	NR	NR	NR	120
Hypophosphorous Acid,50%	NR	NR	---	---	NR	120	90
Iodine, Sat'd Vapor at room temp	120	150	200	200	NR	100	150
Isobutyric Acid, 50%	---	---	---	---	75	100	---
Isobutyl Alcohol, 10%	---	---	---	---	100	100	120
Isocaproic Acid	---	---	---	---	100	75	---
Isononyl Alcohol	---	---	---	---	125	115	150

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Chemical	RED THREAD II	GREEN THREAD	CHEM THREAD	Z-CORE	RB-2530 RB-1520	CL-2030 CL-1520	F-CHEM(20) F-CHEM-V
Isooctyl Adipate	---	---	---	---	NR	NR	120
Isooctyl Alcohol	---	---	---	---	125	75	150
Isophthalic Acid (liquor)	100	150	200	200	---	180	(9)
Isopropyl Alcohol, 10%	---	---	---	175	150	---	120
Isopropyl Alcohol, 100%	120	120	100	150	120	---	100
Isopropyl Ether	125	150	122	150	---	---	---
Isopropyl Myristate	---	---	---	---	200	75	200
Isopropyl Palmitate, 100%	200	225	215	275	200	200	210
Itaconic Acid, 25%	---	---	---	---	200	120	120
Jet Fuel	150	225	180	275	250	175	180(9)
Kerosene	210	225	175	275	250	175	180
Keytones (General)	NR	NR	NR	150	---	---	---
Lactic Acid	200	225	215	275	200	150	210
Lasso Herbicide	---	---	---	---	NR	NR	NR
Latex	210	225	200	275	200	120	120
Lauric Acid, Sat'd	200	225	215	275	200	150	210
Lauroyl Chloride, 100%	---	---	---	---	NR	120	100
Lauryl Alcohol	---	---	---	---	100	200	120
Lauryl Chloride, 100%	---	---	210	200	100	200	200
Lead Acetate, Sat'd	150	200	215	275	250	200	210
Lead Nitrate, Sat'd	150	200	215	225	---	---	210
Lead Plating Solution	NR	---	180(9)	---	---	---	180(5)(9)
Levulinic Acid	200	225	215	250	200	200	210
Lime Slurry	200	225	200	275	---	---	170
Linseed Oil	200	225	215	275	225	200	210
Lithium Bromide, Sat'd	200	225	215	275	100	200	210
Lithium Carbonate, Sat'd	---	---	---	---	140	100	150(5)
Lithium Chloride, Sat'd	210	225	215	275	210	200	210
Lithium Hydroxide, Sat'd	150	205(1)	150	225	---	---	150
Lithium Sulfate, Sat'd	210	225	215	275	100	200	210(5)
Magnesium Bisulfate, Sat'd	---	---	---	---	200	150	---
Magnesium Bisulfite, Sat'd	200	200	210	225	100	150	180
Magnesium Carbonate, Sat'd	150	200	200	275	250	175	180
Magnesium Chloride, Sat'd	210	225	225	275	250	200	210
Manganese Chloride, 30%	---	---	---	250	225	180	210
Manganese Chloride, Sat'd	210	225	225	275	225	180	210
Magnesium Fluosilicate	---	---	---	---	225	100	180(5)
Magnesium Hydroxide, Sat'd	120	205	215	275	250	150	210
Magnesium Nitrate, Sat'd	210	225	225	275	250	200	210
Magnesium Phosphate	---	---	---	---	250	150	120
Magnesium Sulfate, Sat'd	210	225	225	275	250	200	210
Manganese Sulfate	---	---	---	---	225	200	210
Maleic Acid	150	150	200	175	150	200	200
Maleic Anhydride	150	150	150	175	---	---	150
Mercaptoacetic Acid	---	---	---	---	NR	NR	NR
Mercuric Chloride, Sat'd	210	225	215	275	150	200	210
Mercurous Chloride, Sat'd	210	225	215	275	150	200	210
Mercury	---	---	---	---	250	200	210
Methyl Ethyl Ketone, 5%	---	---	---	---	100	NR	NR
Methane	150	150	---	150	---	---	---
Methanol (Methyl Alcohol), 10%	120	150	150	175	---	---	NR
Methanol (Methyl Alcohol), 20 - 50%	120	150	120	175	---	---	NR
Methanol (Methyl Alcohol), 80%	120	150	120	175	---	---	NR
Methanol (Methyl Alcohol), 100%	100	120	NR	150	---	---	NR
Methyl Acetate	75	120	---	150	---	---	---
Methylacetic (See Propionic Acid)							

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Chemical	RED THREAD II	GREEN THREAD	CHEM THREAD	Z-CORE	RB-2530 RB-1520	CL-2030 CL-1520	F-CHEM(20) F-CHEM-V
Methylene Chloride, 100%	NR	NR	NR	100	NR	NR	NR
Methyl Chloride	NR	NR	NR	75	NR	NR	NR
Methyl Ethyl Ketone, 5% MEK	---	---	---	---	100	NR	NR(3)
Methyl Ethyl Ketone, 100% MEK	75	150	NR	175	---	---	NR(3)
Methyl Isobutyl Carbitol, 100%	---	---	NR	150	100	NR	NR
Methyl Isobutyl Ketone, 100%	100	150	NR	175	150	NR	NR
Methyl Styrene, 100%	75	75	NR	175	---	---	NR
Methyl Tert-Butyl Ether,100%	75	75	NR	100	---	---	---
Methylene Chloride,100%	NR	NR	NR	100	NR	NR	NR
Mineral Oils	210	225	210	275	250	200	200
Mineral Spirits,100%	210	225	190	275	---	---	220
Monochloro Acetic Acid,100%	NR	NR	NR	100	NR	NR	NR(9)
Monochlorobenzene	100(1)	150(1)	NR	200	---	---	NR
Monoethanolamine,100%	NR	NR	NR	100	NR	NR	NR
Motor Oil	210	225	215	275	250	200	210
Muriatic Acid (See Hydrochloric Acid)(16)							
Myristic Acid,100%	---	---	215	250	150	175	210
Naphtha,100%	210	225	190	275	200	175	180(3)
Naphthalene,100%	200	200	190	225	150	100	210
Natural Gas(6)	210	225	200	275	---	---	---
Nickel Chloride, Sat'd	210	225	215	275	250	200	210
Nickel Nitrate, Sat'd	210	225	215	275	200	200	210
Nickel Plating Solution	(9)	(9)	(9)	(9)	(9)	(9)	180
Nickel Sulfate, Sat'd	210	225	215	275	225	200	210
Nitric Acid, 1%(19)	75	120(15)	215	150	120	125	150(13)
Nitric Acid, 5%	75	100(15)	150	150	120	125	150(13)
Nitric Acid, 10%	75	100(15)	150	120	120	150	120(13)
Nitric Acid, 20%	NR	75(15)	120	75	NR	NR	120(13)
Nitric Acid, 25%	NR	75(15)	75	75	NR	NR	NR
Nitric Acid, 35-70%	NR	NR	NR	NR	NR	NR	NR
Nitrotriacetic Acid, NTA	---	---	110	---	---	---	---
Nitrobenzene,100%	---	---	NR	200	NR	NR	NR
Oakite Rust Stripper	---	---	---	---	150	100	180
Octanoic Acid, Sat'd "Caprylic Acid"	---	---	190	225	NR	150	180
Oil, Sour Crude, 100%	210	225	210	275	250	200	210
Oil Sweet Crude,100%	210	225	210	275	250	200	210
Oleic Acid,100%	200	225	210	275	200	100	210
Oleum "Fuming Sulfuric"	NR	NR	NR	100	NR	NR	NR
Olive Oil,100%	210	225	210	275	200	200	210
Oxalic Acid, Sat'd	150	200	215	225	200	200	210
Ozone, 5mg/L	---	---	---	---	150	100	80(9)
Ozone 0-15 ppm	150	150	150	(9)	(9)	(9)	(9)
Ozone 0-35 ppm	NR	150	150	(9)	(9)	(9)	(9)
Ozone 0-300 ppm	NR	NR	150	(9)	(9)	(9)	(9)
Palmitic Acid	---	---	---	---	150	100	210
Perchloric Acid, 10%(18)	---	---	150	---	75	150	150
Perchloric Acid, 30%(18)	---	---	80	---	75	75	100
Perchloroethylene,100%	100	100(1)	100	150	120	75	80
Phenol Sulfonic Acid,100%	NR	NR	NR	---	NR	NR	NR
Phenol, 1% "in water"	75	150(15)	150	175	150	NR	NR
Phenol, 5% "in water"	NR	150(15)	75	175	NR	NR	NR
Phenol, 10-88% "in water"	NR	NR	NR	100	NR	NR	NR
Phosphoric Acid, 2%(19)	100	225(15)	215	225	100	200	210
Phosphoric Acid, 25%	75	150(15)	215	150	100	200	210
Phosphoric Acid, 50%	75	150(15)	215	125	100	200	210
Phosphoric Acid, 85%	NR	75(15)	215	120	NR	200	210
Phosphorus Pentoxide, 0-54%	---	---	210	---	100	200	210

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Chemical	RED THREAD II	GREEN THREAD	CHEM THREAD	Z-CORE	RB-2530 RB-1520	CL-2030 CL-1520	F-CHEM(20) F-CHEM-V
Phosphorus Trichloride, 100%	NR	NR	NR	---	NR	NR	NR
Phthalic Acid, All	---	---	215	---	NR	200	210
Phthalic Anhydride, 25%	---	---	215	---	NR	150	210
Picric Acid "Alcoholic", 10%	NR	NR	205	---	---	NR	100
Picric Acid, Sat'd	NR	---	---	100	---	---	NR
Pine Oil	---	---	---	---	200	NR	---
Polyethyleneimine, 10%	---	---	---	---	NR	100	150
Polyvinyl Acetate Adhesives	---	---	---	---	150	120	120
Polyvinyl Acetate Latex "PVCA"	210	225	210	250	150	100	210
Polyvinyl Alcohol, 100% "PVA"	150	150	120	175	100	100	120
Polyvinyl Chloride Latex W/35 parts DOP	NR	NR	120	---	NR	120	120
Potassium Alum Sulfate, Sat'd	210	225	210	275	120	200	210
Potassium Bicarbonate, 0-50%	150	200	150	225	225	150	150(5)
Potassium Bicarbonate, >50%	---	---	---	---	225	100	150(5)
Potassium Bromide, Sat'd	210	225	215	275	200	100	160
Potassium Carbonate, <14%	200	205	180	275	250	150	150(5)
Potassium Carbonate, 14-50%	150	205	120	275	250	150	140(5)
Potassium Carbonate, 50%-Sat'd	150	205	120	275	250	150	90
Potassium Chloride, Sat'd	210	225	215	275	250	200	210
Potassium Cyanide, 5%	210	225	---	275	---	---	---
Potassium Dichromate, Sat'd	---	---	210	---	250	200	210
Potassium Ferricyanide, Sat'd	200	225	215	275	250	200	210
Potassium Ferrocyanide, Sat'd	200	225	215	275	225	200	210
Potassium Fluoride, 30%	150	150	200	150	---	---	150
Potassium Gold Cyanide, 12%	---	---	---	---	225	100	100
Potassium Hydroxide, 0-25%	100	150	150	240	200	125	150(5)(7)(13)
Potassium Hydroxide, 25-50%	100	150	150	240	200	125	150(5)(7)(13)
Potassium Hydroxide, Sat'd "Potash"	100	150	150	225	---	---	150(5)(7)(13)
Potassium Iodide	---	---	---	---	225	120	120
Potassium Nitrate, Sat'd	200	225	215	275	250	200	210
Potassium Permanganate, 5%	150	200	215	225	152	200	210
Potassium Permanganate, 10%	NR	150(15)	215	175	125	200	210
Potassium Permanganate, Sat'd	NR	NR	215	---	125	200	210
Potassium Persulfate, Sat'd	---	---	215	---	225	200	210
Potassium Pyrophosphate, 60%	---	---	---	---	225	135	100
Potassium Sulfate, Sat'd	210	225	215	275	225	200	210
Propane Gas(6)	75(1)	75(1)	---	100	100	200	120
Propionic Acid, 20%	NR	---	200	120	100	150	180
Propionic Acid, 50%	NR	---	180	120	100	NR	180
Propionic Acid, 100%	NR	---	NR	100	100	NR	NR
Propylene Glycol	210	225	215	275	200	200	210
Prussic Acid (see Hydrocyanic Acid)							
Pyridine, 100%	---	---	NR	125	---	---	NR
Rayon Spin Bath	---	---	150	---	NR	NR	150
Red Liquor	---	---	---	---	NR	100	150
Salicylic Acid, Sat'd	---	---	160	---	125	125	140
Sebacic Acid, Sat'd	---	---	210	---	---	---	210
Selenious Acid, Sat'd	---	---	210	---	NR	200	210
Silicic Acid	---	---	---	---	200	125	210
Silver Nitrate, Sat'd	150	225	210	275	250	200	210
Silver Plating Solution (See note)	---	---	200	---	---	---	180
Soaps	200	225	210	275	250	200	210
Soda Ash (See Sodium Sulfate)							
Sodium Acetate, Sat'd	150	205	215	225	250	200	210
Sodium Alkyl Aryl Sulfonates	150	205	180	225	125	150	150
Sodium Aluminate, Sat'd	150	205	140	225	200	120	120

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Chemical	RED THREAD II	GREEN THREAD	CHEM THREAD	Z-CORE	RB-2530 RB-1520	CL-2030 CL-1520	F-CHEM(20) F-CHEM-V
Sodium Benzoate, Sat'd	---	---	200	250	250	150	180
Sodium Bicarbonate, Sat'd	200	205	170	275	250	150	180(5)
Sodium Bifluoride, Sat'd	NR	---	120	---	---	---	120(5)
Sodium Bisulfate, Sat'd	150	205	215	225	250	200	210
Sodium Bisulfite, Sat'd	150	205	215	250	250	200	210
Sodium Borate, Sat'd	---	---	---	---	225	200	210
Sodium Bromate, 10%	NR	---	210	---	125	140	210
Sodium Bromide, Sat'd	210	225	215	275	200	200	210
Sodium Carbonate, 10%	200	205	180	225	250	150	180(5)
Sodium Carbonate, 25%	150	205	180	225	250	(9)	160(5)
Sodium Carbonate, 35%	150	205	180	225	250	(9)	160(5)
Sodium Carbonate, 50% (Sat'd)	150	205	180	225	250	---	160
Sodium Chlorate, Sat'd	---	180	215	200	225	200	210
Sodium Chloride, Sat'd	210	225	225	275	250	200	210
Sodium Chlorite, 25%	(9)	(9)	(9)	(9)	125	100	160
Sodium Chlorite, Sat'd	NR	NR	185	---	---	---	100
Sodium Chloroacetate	---	---	---	---	NR	100	---
Sodium Chromate, Sat'd	---	---	215	---	150	200	210
Sodium Cyanide, 6%	210	225	210	250	250	200	210
Sodium Cyanide, Sat'd	NR	NR	210	---	250	200	210
Sodium Dichromate, Sat'd	---	---	210	---	250	200	210
Sodium Dodecylbenzenesulfonate	---	---	---	---	175	160	160
Sodium Diphosphate	---	---	---	---	210	200	210
Sodium Ferricyanide, Sat'd	200	225	215	275	250	200	210
Sodium Ferrocyanide, Sat'd	200	225	215	275	250	200	210
Sodium Fluoride, Sat'd	150	150	180	200	200	150	180(5)
Sodium Fluorosilicate, Sat'd	---	---	150	---	150	120	120(5)
Sodium Hexametaphosphate, Sat'd	---	---	135	---	150	100	120
Sodium Hydrosulfide, Sat'd	NR	---	175	---	NR	100	180
Sodium Hydroxide, 1%(19)	100(15)	150(15)	150	200	200	100	180(5)(7)(13)
Sodium Hydroxide, 2%	100(15)	150(15)	150	200	200	100	160(5)(7)(13)
Sodium Hydroxide, 5%	100(15)	150(15)	150	200	200	100	160(5)(7)(13)
Sodium Hydroxide, 10%	---	150(15)	150	215(1)	200	100	160(5)(7)(13)
Sodium Hydroxide, 20%	NR	150(15)	150	200	200	100	150(5)(7)(13)
Sodium Hydroxide, 25%	NR	150(15)	150	200	200	100	150(5)(7)(13)
Sodium Hydroxide, 30%	NR	150(15)	150	200	200	150	150(5)(7)(13)
Sodium Hydroxide, 50%	NR	150(15)	180	240	200	150	200(5)(7)(13)
Sodium Hydroxide, Sat'd	---	---	---	240	---	---	---
Sodium Hypochlorite, 0-10%(14)(22)	NR	NR	120(9)	NR	75(9)	75(9)	150(7)(9)(10)
Sodium Hypochlorite, 10-15%(14)(22)	NR	NR	120(9)	NR	NR	NR	150(7)(9)(10)
Sodium Lauryl Sulfate, Sat'd	---	---	180	---	200	160	180
Sodium Metabisulfite	(9)	(9)	(9)	(9)	NR	200	210
Sodium Monophosphate, Sat'd	---	---	215	---	210	200	210
Sodium Nitrate, Sat'd	200	225	215	275	250	200	210
Sodium Nitrite, Sat'd	200	225	215	275	---	---	210
Sodium Oxalate, Sat'd	---	---	---	---	210	200	180
Sodium Persulfate, 20%	NR	75	125	---	---	---	130
Sodium Phosphate, 10%	---	---	---	---	200	200	210
Sodium Phosphate, Sat'd	---	---	---	---	200	200	210
Sodium Silicate, Sat'd	---	200	215	225	150	200	210(5)
Sodium Sulfate, Sat'd "Soda Ash"	200	225	215	275	250	200	210
Sodium Sulfide, 0-15%	210	225	215	250	150	200	210
Sodium Sulfide, Sat'd	---	---	215	---	200	200	210
Sodium Sulfite, Sat'd	---	---	215	---	200	200	210
Sodium Tartate	---	---	---	---	225	200	210
Sodium Tetraborate, Sat'd	---	---	200	---	200	150	200
Sodium Thiocyanate, 57%	---	200	165	225	175	150	180

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Chemical	RED THREAD II	GREEN THREAD	CHEM THREAD	Z-CORE	RB-2530 RB-1520	CL-2030 CL-1520	F-CHEM(20) F-CHEM-V
Sodium Thiosulfate, Sat'd	---	150	180	200	150	150	180
Sodium Tripolyphosphate, Sat'd	100	200	210	225	200	200	210
Sodium Xylene Sulfonate, Sat'd	---	---	215	---	125	175	210
Sorbitol Solutions	100	150	150	225	200	160	160
Sour Crude Oil, 100%	210	225	210	275	225	200	210
Soya Oil, 100%	210	225	200	275	225	200	210
Soybean Fatty Acid	210	225	200	275	---	---	---
Stannic Chloride, Sat'd	150	205	210	225	200	200	210
Stannous Chloride, Sat'd "Tin Chloride"	150	205	210	225	140	200	210
Steam Condensate	NR	250(24)	NR	250	212	175	210
Stearic Acid	200	225	215	275	150	200	210
Styrene, 100%	75	75	NR	185	---	---	NR
Succinonitrile	---	---	100	120	NR	70	100
Sugar, Beet or Cane Liquor, Sat'd	200	225	210	275	NR	100	180
Sugar, Sucrose, Sat'd	200	225	210	275	225	200	210
Sulfamic Acid, 0-10%	100	150	210	150	125	200	210
Sulfamic Acid, 10-25%	100	150	210	150	125	150	150
Sulfamic Acid, >25%	---	---	---	---	NR	150	210
Sulfanilic Acid, Sat'd	---	---	210	---	---	---	210
Sulfate Liquor	---	---	---	---	NR	200	200
Sulfite Liquor	---	---	---	---	---	200	200
Sulfated Detergents, Sat'd	100	215	215	225	200	200	210(9)
Sulfur Chloride, Fumes	---	---	---	---	NR	200	---
Sulfur Dioxide(2)(6)	(9)	(9)	(9)	(9)	250	200	210(5)
Sulfur Dioxide, Dry Gas(2)(6)	150	150	225	150	150	200	210
Sulfur Dioxide, Wet(2)(6)	---	---	225	---	150	200	210
Sulfur Trioxide/Air/Dry	---	---	---	---	NR	200	210
Sulfuric Acid, 1-2%	75	205(15)	215	200	200	150	210
Sulfuric Acid, 3%	NR	150(15)	215	200	200	150	210
Sulfuric Acid, 5%	NR	150(15)	215	200	200	150	210
Sulfuric Acid, 10%	NR	150(15)	215	200	200	150	210
Sulfuric Acid, 10-25%	NR	150(15)	215	175	150	150	210
Sulfuric Acid, 25-50%	NR	150(15)	215	175	100	150	200
Sulfuric Acid, 50-70%	NR	100(15)	180	175	NR	NR	180
Sulfuric Acid, 75%	NR	NR	120	120	NR	NR	100
Sulfuric Acid, 75-98%	NR	NR	NR	120	NR	NR	NR
Sulfuric Acid, 100%	NR	NR	NR	100	NR	NR	NR
Sulfuric Acid, Fuming, Oleum	NR	NR	NR	100	NR	NR	(9)
Sulfurous Acid, 6%	NR	75(15)	150	75	---	120	100
Sulfurous Acid, 10%	NR	NR	100	---	---	---	100
Superphosphoric Acid	NR	NR	215	---	---	---	210
Tall Oil	---	150	150	225	150	210	150
Tannic Acid, 15%	210	225	200	275	200	200	210
Tannic Acid, Sat'd	---	---	200	---	200	200	210
Tartaric Acid, 10%	210	225	210	275	250	200	210
Tartaric Acid, Sat'd	210	225	210	275	250	200	210
Terephthalic Acid, 25%	---	---	---	---	100	NR	---
Tetrachloroethane 1, 1, 2, 2	NR	NR	NR	150	---	---	NR
Tetrachloroethylene, 100%	150	150	90	175	---	---	80
Tetrahydrofuran - THF	NR	NR	NR	100	---	---	NR
Tetraethyllead	---	---	---	---	100	NR	---
Tetrapotassium Pyrophosphate, 60%	---	---	---	---	NR	150	120
Tetrasodium Ethylene-Diamine, Sat'd	NR	NR	120	---	---	---	120
Tetrasodium Ethylenediaminetetra- acetic A	(9)	(9)	(9)	(9)	150	150	150(5)
Thioglycolic Acid, 10%	NR	NR	100	---	NR	NR	100
Thionyl Chloride, 100%	NR	NR	NR	---	75	175	NR

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Chemical	RED THREAD II	GREEN THREAD	CHEM THREAD	Z-CORE	RB-2530 RB-1520	CL-2030 CL-1520	F-CHEM(20) F-CHEM-V
Thionyl Chloride, Vents	NR	NR	NR	120	---	---	NR
Titanium Chloride	---	---	---	---	75	175	---
Titanium Dioxide	---	---	---	---	200	175	---
Tin Chloride "see Stannous Chloride"							
Tin Plating, "see notes"	NR	---	200	---	NR	200	200(5)
Tobias Acid "see note"	---	---	---	---	NR	200	210
Toluene Sulfonic Acid	NR	NR	210	---	NR	80	210(9)
Toluene,100%	100	100	75	200	125	NR	NR
Tomato Catsup	---	205	---	250	---	---	---
Tomato Puree	---	205	---	250	---	---	---
Transformer Oil (chloro-phenyl types)	---	---	NR	100	---	---	---
Transformer Oil (mineral oil type)	210	225	210	275	225	200	210
Tributyl Phosphate	---	---	---	---	NR	150	120
Trichloroacetic Acid, 50%	---	---	210	---	---	---	210
Trichloroethane 1, 1, 1	150	150(1)	75	175	---	---	100
Trichloroethylene, 100%	NR	120	NR	150	150	NR	NR
Trichloromonofluoromethane,100%	75	75	75	120	---	---	80(5)
Trichlorophenol,100%	NR	NR	NR	100	NR	NR	NR
Tricresyl Phosphate	N	---	110	---	NR	150	100
Tridecylbenzene Sulfonate	---	---	210	---	---	---	210
Triethanolamine,100%	150	150(1)	120	150	100	100	120
Triethylene Glycol	---	---	---	---	NR	100	180
Trimethylene Chlorobromide,100%	---	---	NR	150	---	---	NR
Tripropylene Glycol	---	---	---	---	NR	150	150
Trisodium Phosphate, All	100	200	210	225	150	200	210
Tung Oil	---	---	---	---	200	100	---
Turpentine,100%	100	100	100	150	75	100	100
TWEEN Surfactant	---	---	---	---	NR	125	150
Urea, 50%	200	200	165	225	150	150	150
Urea, Sat'd	200	200	165	225	150	125	150
Urea Formaldehyde Resin	---	---	---	---	150	120	100
Vegetable Oils	200	225	200	275	225	210	210
Vinegar, 300 Grain,"Acetic Acid"	NR	120	150	120	100	100	180
Vinyl Acetate Monomer,100%	NR	NR	NR	120	75	NR	NR
Vinyl Ester Resin, 45% Styrene	75(1)	75(1)	---	150	---	---	---
Vinyltoluene,100%	80	80	80	200	---	---	80
Water, Brine	210	225	210	275	212	175	210
Water, Chlorinated,100 PPM	150	200	200	275	---	---	---
Water, Deionized	200	205	210	275	212	175	180
Water, Distilled	200	205	210	275	212	175	180
Water, Fresh	200	225	210	275	212	175	210(13)
Water, Hard	200	225	210	275	212	175	180
Water, pH 2-13	210	225	210	275	(9)	(9)	(9)
Water, Salt	210	225	210	275	250	175	210
Water, Sea	210	225	210	275	250	175	180
Water, Steam Condensate (GT CR)	(9)	250	(9)	(9)	212	175	180
White Liquor (Pulp Mill)	---	---	165	275	---	---	180(5)(13)
Xylene,100%	150	150	75	200	125	NR	NR
Zinc Bromide	---	---	---	---	250	200	---
Zinc Chlorate, Sat'd	---	---	210	---	---	---	210
Zinc Chloride, 50%	210	215	215	250	250	200	210
Zinc Electrolyte	---	---	150	---	NR	150	150
Zinc Nitrate, Sat'd	200	200	210	250	---	200	210
Zinc Plating Sol. (Contact Smith Fibercast)	---	---	160	---	---	---	160
Zinc Sulfate, Sat'd	200	215	215	275	250	200	210

Chemical Resistance Guide

General Notes

- NR** = Not Recommended except for very low concentrations, check with Smith Fibercast Applications Engineering.
--- = Data not available at time of printing, check with Smith Fibercast Applications Engineering for recommendations.

Spills or Upset Conditions

Flush the system immediately if spills or upsets exposes the piping to chemicals that have not been recommended.

Solvent Applications

Solvents may separate from the fluid stream in piping with static or low flow rates. The solvent will be concentrated and may damage piping not recommended for 100% concentrations. Flush the piping system immediately after shutdown to prevent solvent damage. Vent lines carrying solvent vapors can also have high concentrations of liquid solvent due to condensation. The condensation can affect the service life of systems not recommended for full concentrations.

Mixing Chemicals in the Piping System

Chemicals should not be mixed in Smith Fibercast piping if mixing will cause a chemical reaction. Reaction by-products and free radicals may aggressively attack piping systems.

Abrasive Fluid

Smith Fibercast piping is used successfully in many abrasive slurry applications. Products made especially for abrasive applications are available. Product selection is dependent on particle size, percent solids, particle hardness, flow rates and continuous or intermittent usage. Smith Fibercast is pleased to provide recommendations based on the above information.

Regulations & Standards

Local, state, or federal regulations, or industry standards may govern the use of Smith Fibercast products in particular applications and should be reviewed by the customer to assure compliance.

Specific Notes

Note

1. Maximum temperature for which information is available; could be serviceable at higher temperatures. Consult your local Smith Fibercast representative.
2. Avoid use of Smith Fibercast piping systems where contact with liquefied gases, such as chlorine or sulfur dioxide, is a possibility. Dry gases under pressure can condense to liquids in cool weather. This situation should be avoided. Liquid chlorine and liquid sulfur dioxide should not be confused with water solutions of these gases.
3. A novolac vinyl ester resin lined product can be recommended, check with Smith Fibercast Applications Engineering.
4. Smith Fibercast does not recommend pneumatic conveying of dry chemicals.
5. A double synthetic veil liner is recommended.
6. Consult your local Smith Fibercast representative concerning all pressurized gas applications if the pipeline is not buried at least 3 feet deep. Under no circumstances are Smith Fibercast piping systems recommended for above ground pressurized gas lines if the operating pressures exceed 25 psig for 1-6" pipe, 14 psig for 8" pipe, 9 psig for 10" pipe, 6 psig for 12" pipe, 5 psig for 14" pipe, 4 psig for 16" pipe and 1 psig for 18" and larger sizes.
7. A bisphenol vinyl ester or epoxy resin is preferred for this application.
8. A double c-veil liner is recommended.
9. Check with Smith Fibercast Applications Engineering for specific recommendations.
10. Benzoyl peroxide - DMA cured vinyl ester resin, double synthetic veil liner, and secondary post cure is recommended.
11. Saturated at atmospheric pressure. Higher concentrations or super saturation caused by higher pressure in the system may increase attack.
A double surfacing veil and 200-mil liner is recommended.
12. A secondary post cure is recommended.
13. Suggested up to maximum stable temperature for fluid. To avoid rapid attack, stabilize Sodium Hypochlorite to a pH of 11 or greater at a maximum temperature of 120°F.
14. Grooved adapters and 8" and larger reducer bushings are not recommended for this service. Exposed surfaces and/or threads of fittings must be covered with adhesive during installation. Use adhesive as thread locking compound in these services.
15. Heavy wall products such as CHEM THREAD, Z-CORE, CENTRICAST Plus CL-2030, CENTRICAST Plus RB-2530 or 100 mil lined F-CHEM should be used in this application for extended economic service life.
16. A double c-veil with ECR mat 200-mil liner is recommended.
17. Perchloric acid can be dangerous when exposed to organics. Fully evaluate use.
18. For very low acid or caustic concentrations see "Water, pH 2-13" for recommended service temperatures.
19. Based on standard bisphenol A vinyl ester resin. Consult with Smith Fibercast Applications Engineering to determine the recommended resin and liner thickness for your specific application.
20. Suggested up to maximum stable temperature for fluid.
21. Requires special adhesive.
22. Not recommended above boiling point.
23. Use GREEN THREAD CR product.
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