Corrosive Service Guide to Materials for Sheaths and Thermowells
Refer to A.S.M.E. Boiler Code, Section VIII for allowable stress levels
(Fluoropolymer coated thermowells and/or Fluoropolymer sheaths may be substituted for all corrosive agents listed)

CORROSIVE AGENT	TEMP. ºC	TEMP. °F	CONC. %	RECOM. MATERIAL	CORROSIVE AGENT	TEMP. ºC	TEMP. °F	CONC. %	RECOM. MATERIAL
Acetic Acid (Glacial)	199	[390]	ALL	316 SS	Chlorine (Gas)	93	[200]	ALL	Monel®
Acetic Acid	143	[290]	80%	Hast. C		199	[390]	ALL	316 SS[1]
	199	[390]	50%	316 SS	Chlorine (Gas - Moist)	66	[150]	ALL	Hast C
	143	[290]	80%	Carp. 20[1]	Chloroacetic Acid	182	[360]	ALL	Hast. B
Acetic Anhydride	132	[270]	ALL	Hast. C	Chloroform	93	[200]	ALL	Nickel
	199	[390]	ALL	316 SS[1]		93	[200]	ALL	Carp. 20[1]
Acetone	199	[390]	ALL	316 SS	Chromic Acid	93	[200]	50%	Titanium
Acetylene	199	[390]	ALL	304 SS		93	[200]	50%	Hast. C[1]
Alcohol, Ethyl	93	[200]	ALL	Hast. C	Citric Acid	127	[260]	ALL	Hast. C
	199	[390]	ALL	316 SS[1]		93	[200]	ALL	Carp. 20[1]
Aluminum Chloride (Aqueous)	143	[290]	ALL	Hast. B	Copper Chloride	88	[190]	ALL	Titanium
	143	[290]	ALL	Nickel[1]		88	[190]	ALL	Hast. C[1]
Aluminum Nitrate (Saturated)	93	[200]	ALL	446 SS	Copper Nitrate	149	[300]	ALL	304 SS
	88	[190]	ALL	316 SS[1]	Copper Sulfate	93	[200]	ALL	Hast. C
Aluminum Sulfate (Saturated)	93	[200]	ALL	Titanium		199	[390]	ALL	316 SS[1]
	93	[200]	ALL	316 SS[1]	Corn Oil	238	[460]	ALL	TFE
Ammonia (Anhydrous)	293	[560]	ALL	316 SS		193	[380]	ALL	FEP
Ammonia (Gas)	93	[200]	ALL	304 SS		171	[340]	ALL	316 SS[1]
Ammonium Chloride	88	[190]	ALL	Titanium	Crude Oil	93	[200]	ALL	304 SS
	293	[560]	ALL	Nickel[1]	Cyanogen Gas	238	[460]	ALL	TFE
	71	[160]	50%	Nickel		193	[380]	ALL	FEP
Ammonium Hydroxide	27	[80]	ALL	Steel		171	[340]	ALL	316 SS[1]
	82	[180]	ALL	Steel[1]	Ether	88	[190]	ALL	304 SS
Ammonium Nitrate	93	[200]	ALL	Carp. 20	Ethyl Acetate	93	[200]	ALL	Titanium
Ammonium Sulfate	93	[200]	SAT.	Hast. B		199	[390]	ALL	316 SS[1]
	143	[290]	SAT.	304 SS[1]	Ethyl Chloride (Dry)	293	[560]	ALL	316 SS
	93	[200]	10 - 40%	Titanium	Ethylene Glycol	93	[200]	ALL	Carp. 20
	199	[390]	10 - 40%	316 SS[1]		93	[200]	ALL	304 SS[1]
Amyl Acetate	143	[290]	ALL	304 SS	Ethylene Oxide	21	[70]	ALL	Hast. C
Aniline	254	[490]	ALL	304 SS		199	[390]	ALL	316 SS[1]
Barium Chloride (Saturated)	93	[200]	ALL	Hast. C	Fatty Acids	199	[390]	ALL	316 SS
	293	[560]	ALL	Inconel®[1]	Ferric Chloride	143	[290]	ALL	Titanium
Barium Hydroxide (Saturated)	104	[220]	50%	Carp. 20		27	[80]	ALL	Hast. C[1]
	199	[390]	ALL	316 SS[1]	Ferric Sulfate	49	[120]	ALL	Carp. 20
Beer	88	[190]		304 SS		88	[190]	10%	316 SS
Benzene (Benzol)	104	[220]	ALL	Carp. 20	Ferrous Sulfate	27	[80]		Titanium
	104	[220]	ALL	304 SS[1]		93	[200]	ALL	304 SS[1]
Benzoic Acid	199	[390]	ALL	Titanium	Formaldehyde	49	[120]	ALL	304 SS
	199	[390]	ALL	304 SS[1]		49-293	[120-560]	50%	304 SS[1]
Black Liquor	238	[460]	ALL	TFE	Formic Acid (Anhydrous)	93	[200]	50%	Carp. 20
	193	[380]	ALL	FEP	Freon (F-11)	204	[400]	ALL	Monel®
	93	[200]	ALL	Carp. 20[1]		204	[400]	ALL	316 SS[1]
Bleach (Active Chlorine)	60	[140]	12.5%	Hast. C	Furfural	199	[390]	ALL	Nickel
Borax	199	[390]	ALL	316 SS		199	[390]	ALL	304 SS[1]
Boric Acid	293	[560]	ALL	Hast. C	Gallic Acid	238	[460]	ALL	TFE
	93	[200]	ALL	Nickel[1]		193	[380]	ALL	FEP
Brine Acid	60	[140]	ALL	Hast. C		199	[390]	ALL	316 SS[1]
	27	[80]	ALL	Brass[1]	Gasoline (Unleaded)	154	[310]	ALL	Hast. C
Bromine (Liquid)	293	[560]	ALL	Tantalum		16	[60]		446 SS
	93	[200]	ALL	Aluminum[1]		171	[340]		Steel[1]
Butane	171	[340]	ALL	Steel		238	[460]		TFE
Butyl Acetate	93	[200]	ALL	Titanium	Gasoline (Refined)	193	[380]		FEP
	188	[370]	ALL	316 SS[1]		88	[190]		Steel[1]
Butyl Alcohol	199	[390]	ALL	316 SS		27	[80]	ALL	Nickel
Butyric Acid	143	[290]	ALL	Carp. 20	Glucose	193	[380]	ALL	316 SS[1]
	199	[390]	ALL	316 SS[1]		27	[80]	ALL	Hast. B
Calcium Bisulfite	93	[200]	ALL	TFE	Glue	60	[140]	ALL	Steel[1]
	193	[380]	ALL	FEP		127	[260]	ALL	304 SS
	171	[340]	ALL	316 SS[1]	Glycerine	88	[190]	50%	Titanium
Calcium Chlorate	238	[460]	ALL	TFE	Hydrobromic Acid	121	[250]	50%	Hast. B[1]
	193	[380]	ALL	FEP		60	[140]	38%	Hast. B
	93	[200]	ALL	316 SS[1]	Hydrochloric Acid	238	[460]	ALL	TFE
Calcium Chloride (Saturated)	171	[340]	ALL	Hast. C	Hydrocyanic Acid	193	[380]	ALL	FEP
	93	[200]	ALL	Carp. 20[1]		171	[340]	ALL	316 SS[1]
Calcium Hydroxide	93	[200]	50%	Hast. C		238	[460]	ALL	TFE
	88	[190]	SAT.	304 SS[1]	Hydroflouric Acid	193	[380]	ALL	FEP
Carbonic Acid	293	[560]	ALL	Carp. 20		93	[200]	ALL	Hast. C[1]
	171	[340]	ALL	316 SS[1]		293	[560]	ALL	Carp. 20
Carbon Dioxide (Dry)	427	[800]	ALL	Brass	Hydrogen Chloride (Gas, Dry)	38	[100]	ALL	304 SS
Carbonated Beverages	100	[212]	ALL	304 SS	Hydrogen Flouride (Dry)	199	[390]	ALL	304 SS[1]
Carbon Disulfide	93	[200]	ALL	Titanium		88	[190]	90%	Hast. C
	199	[390]	ALL	316 SS[1]	Hydrogen Peroxide	71	[160]	ALL	316 SS
Carbon Tetrachloride	93	[200]	ALL	304 SS	Hydrogen Sulfide (Dry)	293	[560]	ALL	316 SS

All materials listed are rated < 2 Mils penetration/year except as noted: [1] = < 20 Mils penetration/year

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