

Thermowell Material Reference Guide

INFORMATION FROM ASME SECTION II-D (FOR APPLICATION SPECIFIC INFORMATION PLEASE CONTACT SALES).

Information is for reference only.

Ordering Code	Material	UNS Number	Welding P-Number	Recommended Maximum Operating Temperature	Tensile Strength (PSI)	Yield Strength (PSI) (0.2% Offset)	Allowable Stress Values (PSI)						
							0°F	300°F	500°F	700°F	900°F	1100°F	1300°F
304	304/304L SS	S30400 S30403	8	1500° F (816°C)	75,000	30,000	20,000	18,900	17,500	15,800	14,600	9,800	3,700
304H	304H SS	S30409	8	1500° F (816°C)	75,000	30,000	20,000	17,700	16,900	15,800	14,600	9,800	3,700
310	310SS	S31000	8	1500° F (816°C)	75,000	30,000	20,000	20,000	19,300	17,900	16,900	5,000	800
316	316/316L SS	S31600 S31603	8	1500° F (816°C)	75,000	30,000	20,000	20,000	18,000	16,300	15,600	12,400	4,100
316H	316H SS	S31609	8	1500° F (816°C)	75,000	30,000	20,000	20,000	18,000	16,300	15,600	12,400	4,100
321	321SS	S32100	8	1500° F (816°C)	75,000	30,000	20,000	19,100	18,700	17,500	16,500	6,900	1,700
347	347/347H SS	S34700 S34709	8	1500° F (816°C)	75,000	30,000	20,000	18,800	17,200	16,800	16,700	16,000	2,200
A105	A105 CS	K03504	1	1000° F (538°C)	70,000	36,000	20,000	20,000	19,600	17,200	6,700	-	-
F5	A182-F5 (5Cr-1/2Mo)	K41545	5B	1200° F (649°C)	70,000	40,000	20,000	19,400	19,200	18,200	10,900	2,900	-
F9	A182-F9 (9Cr-1Mo)	K90941	5B	1200° F (649°C)	85,000	55,000	24,300	23,500	23,300	22,100	16,400	3,300	-
F11	A182-F11 Cl 2 (1-1/4Cr-1/2Mo-Si)	K11572	4	1200° F (649°C)	70,000	40,000	20,000	20,000	20,000	20,000	13,700	2,800	-
F22	A182-F22 Cl 3 (2-1/4Cr-1Mo)	K21590	5A	1200° F (649°C)	75,000	45,000	21,400	20,900	20,500	20,000	15,800	3,200	-
F91	A182-F91 (9Cr-1Mo-V)	K90901	15E	1200° F (649°C)	85,000	60,000	24,300	24,300	24,100	22,900	19,100	10,300	-
A20	Alloy 20 (20Cb-3)	N08020	45	800° F (427°C)	80,000	35,000	22,900	22,600	22,100	21,900	-	-	-
I600	Inconel® 600	N06600	43	1200° F (649°C)	80,000	35,000	22,900	20,800	20,200	19,600	16,000	3,000	-
I625	Inconel® 625	N06625	43	1200° F (649°C)	120,000	60,000	34,300	34,300	32,900	31,800	30,600	29,000	-
I800	Incoloy® 800	N08800	45	1500° F (816°C)	75,000	30,000	20,000	20,000	20,000	20,000	20,000	13,000	2,000
I800H	Incoloy® 800H	N08810	45	1650° F (899°C)	65,000	25,000	16,700	14,400	12,900	11,600	10,700	10,000	4,700
I800HT	Incoloy® 800HT	N08811	45	1650° F (899°C)	65,000	25,000	16,700	16,700	16,700	15,700	14,500	12,900	5,400
I825	Incoloy® 825	N08825	45	1000° F (538°C)	85,000	35,000	23,300	23,300	23,300	23,300	22,800	-	-
C276	Hastelloy® C-276	N10276	43	1250° F (677°C)	100,000	41,000	27,300	27,300	26,900	24,000	22,600	15,000	-
HASTX	Hastelloy® X	N06002	43	1650° F (899°C)	95,000	35,000	23,300	23,300	22,300	20,300	19,600	17,500	7,700
M400	Monel® 400	N04400	42	900° F (482°C)	70,000	25,000	16,700	13,600	13,100	13,000	8,000	-	-

Thermowell Material Selection Guide

This recommended material list is to only be used as a guide, since variations in temperature, pressure, concentration, and impurities in the corrosive medium may affect actual performance. Contact Daily Thermetrics for recommendations for special applications.

CORROSION RESISTANCE MATERIAL GUIDE												
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Corrodent	Temp. °F	Conc. %	Recommended Material	Corrodent	Temp. °F	Conc. %	Recommended Material	Corrodent	Temp. °F	Conc. %	Recommended Material	
Acetic Acid	212	ALL	Monel	Copper Plating Solution (Cyanide)	180		304SS	Oxalic Acid	212	ALL	304SS	
Acetic Anhydrite	300		Nickel	Copper Plating Solution (Acid)	75		304SS	Photographic Bleaching	100	ALL	304SS	
Acetone	212	ALL	304SS	Corn Acid	200		304SS	Palmitic Acid	See Fatty Acids			
Acetylene	400		304SS	Creosote	200	ALL	304SS	Phosphoric Acid	212	ALL	316SS	
Alcohols	212	ALL	304SS	Crude Oil	300		Monel	Phenol	212	ALL	316SS	
Alum. (Potassium or Sodium)	300	ALL	Hast C	Ethel Acetate	See Laquer Thinner			Potassium Compounds	See Sodium Compound			
Aluminum Chloride	212	ALL	Hast C	Ethyl Chloride Dry	500		Steel	Propane	300		Steel	
Aluminum Sulfate	212	ALL	316SS	Ethanol	See Alcohols			Rosin	700	100	316SS	
Ammonia Dry	212	ALL	304/316SS	Ethylene Glycol (Uninhibited)	212	ALL	304SS	Sea Water	75		Monel	
Ammonia Hydroxide (Ammonia Aqua)	212	ALL	304/316SS	Ethylene Oxide	75		Steel	Soap & Detergents	212	ALL	304SS	
Ammonium Chloride	300	50	Monel	Fatty Acids	500	ALL	316SS	Sodium Bicarbonate	212	20	316SS	
Ammonium Nitrate	300	ALL	304SS	Ferric Chloride	75	ALL	Hast C	Sodium Bisulfite	212	20	304SS	
Ammonium Sulfate	212	ALL	316SS	Ferric Sulfate	300	ALL	304SS	Sodium Bisulfate	212	40	304SS	
Amyl Acetate	300	ALL	304SS	Formaldehyde	212	40	316SS	Sodium Carbonate	212	30	316SS	
Aniline	25		Monel	Formic Acid	300	ALL	316SS	Sodium Chloride	300	ALL	Monel	
Asphalt	250		304SS	Freon	300		Steel	Sodium Chromate	212	ALL	316SS	
Atmosphere (Industrial & Marine)			304SS	Fluorine, Anhydrous	100		304SS	Salt or Brine	See Sodium Chlorine			
Barium Compounds	See Calcium			Furfural	450		316SS	Sodium Cyanide	212	ALL	304SS	
Beer	70		304SS	Gasoline	300		Steel	Sodium Hydroxide	212	30	316SS	
Benzene (Benzol)	212		Steel	Glucose	300		304SS	Sodium Hypochlorite	75	10	Hast C	
Benzoic Acid	212	ALL	316SS	Glue ph 6-8	300	ALL	304SS	Sodium Nitrate	212	40	304SS	
Bleaching Powder	70	15	Monel	Glycerine	212	ALL	Brass	Sodium Nitrite	75	20	304SS	
Borax	212	ALL	Brass	Hydrobromic Acid	212	ALL	Hast C	Sodium Phosphate	212	10	Steel	
Bordeaux Mixture	200		304SS	Hydrochloric Acid (37-38%)	225	ALL	Hast C	Sodium Silicate	212	10	Steel	
Boric Acid	400	ALL	316SS	Hydrogen Chloride Dry	500		304SS	Sodium Sulfide	212	10	316SS	
Bromine	125	DRY	Monel	Hydrocyanic Acid	212	ALL	304SS	Sodium Sulfite	212	10	316SS	
Butane	400	ALL	Steel	Hydrofluoric Acid	212	60	Monel	Sodium Sulfate	212	30	316SS	
Butyl Alcohol	See Alcohols			Hydrogen Fluoride Dry	175		Steel	Sodium Thiosulfate	212	ALL	304SS	
Butyric Acid	212		Hast C	Hydrofluogilicic Acid	212	40	Monel	Steam			304SS	
Calcium Bisulfite	75	ALL	Hast C	Hydrogen Peroxide	125	10-100	304SS	Steamic Acid	See Fatty Acids			
Calcium Chloride	212	ALL	Hast C	Kerosene	300	ALL	Steel	Sugar Solution	See Glucose			
Calcium Hydroxide	300	20	Hast C	Laquers & Thinners	300	ALL	304SS	Sulfur	500		304SS	
Calcium Hypochlorite	See Bleaching Powder			Lactic Acid	300	ALL	316SS	Sulfur Chloride	75	DRY	316SS	
Carbolic Acid	See Phenol			Lime	212	ALL	316SS	Sulfur Dioxide	500	DRY	316SS	
Carbon Dioxide Dry	800	ALL	Brass	Linseed Oil	75		Steel	Sulfur Trioxide	500	DRY	316SS	
Carbonated Water	212	ALL	304SS	Magnesium Chloride	212	50	Nickel	Sulfuric Acid	212	0-10	Monel	
Carbonated Beverages	212		304SS	Magnesium Hydroxide (or Oxide)	75	ALL	304SS	Sulfuric Acid	212	0-100	Hast C	
Carbon Disulfide	200		304SS	Magnesium Sulfate	212	40	304SS	Sulfuric Acid	180-190	90-100	316SS	
Carbon Tetrachloride	125	ALL	Monel	Mercuric Chloride	75	10	Hast C	Sulfuric Acid, Fuming	175		Hast C	
Chlorine Dry	100		Monel	Mercury	700	100	Steel	Sulfurous Acid	75	20	316SS	
Chlorine Moist	100	ALL	Monel	Methylene Chloride	212	ALL	304SS	Titanium Tetrachloride	75	ALL	316SS	
Chloroacetic Acid	212	ALL	Monel	Methyl Chloride	Dry	75	Steel	Tannic Acid	75	40	Hast C	
Chloroform Dry	212		Monel	Milk, fresh or sour	180		304SS	Toluene	75		Steel	
Chromic Acid	300	ALL	Hast C	Molasses	See Glucose			Trichloroacetic Acid	75	ALL	Hast C	
Cider	300	ALL	304SS	Natural Gas	70		304SS	Trichlorethylene	300	DRY	Monel	
Citric Acid	212	ALL	Hast C	Nitric Acid	75	ALL	304SS	Turpentine	75		316SS	
Copper (10) Chloride	212	ALL	Hast C	Oxygen	75	ALL	Steel	Varnish	150		Steel	
Copper (10) Nitrate	300	ALL	316SS	Oleic Acid	See Fatty Acid			Zinc Chloride	212	ALL	Hast C	
Copper (10) Sulfate	300	ALL	316SS					Zinc Sulfate	212	ALL	316SS	