

Media	Utility Ferritics			Cr - Ni Austenitics			Cr - Ni - Mo Austenitics			Duplex		
	20°C	60°C	100°C	20°C	60°C	100°C	20°C	60°C	100°C	20°C	60°C	100°C
Aldyhydes	R <sub>1</sub>	R <sub>1</sub>	R <sub>1</sub>	R <sub>1</sub>	R <sub>1</sub>	R <sub>1</sub>	R <sub>1</sub>	R <sub>1</sub>	R <sub>1</sub>	R <sub>1</sub>	R <sub>1</sub>	R <sub>1</sub>
Acetic Acid (10%)	R	R	ND	R	R	R	R	R	R	R	R	R
Acetic Acid (glacial & anhydrous)	ND	ND	ND	R	R	ND	R	R	R	R	R	ND
Acetic Anhydride	R <sub>2</sub>	NR	ND	R <sub>2</sub>	NR	NR	R	R	NR	R	R	R
Acetylene	NR	NR	NR	R <sub>3</sub>	R <sub>3</sub>	R <sub>3</sub>	R <sub>3</sub>	R <sub>3</sub>	R <sub>3</sub>	R <sub>4</sub>	NR	NR
Alcohols	R	R	R	R	R	R	R	R	R	R	R	R
Aliphatic Esters	R	ND	ND	R	R	R	R	R	R	R	R	R
Alkyl Chlorides	R <sub>5</sub>	ND	ND	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R	R	R
Alum	ND	ND	ND	R	R <sub>6</sub>	NR	R	R <sub>1</sub>	NR	R	R	NR
Ammonia	R	R	R	R	R	R	R	R	R	R	R	R
Amyl Acetate	R	R	R	R	R	R	R	R	R	R	R	R
Aniline	R	R	R	R	R	R	R	R	R	R	R	R
Antimony Trichloride	NR	NR	NR	R <sub>5</sub>	NR	NR	R <sub>5</sub>	R <sub>5</sub>	NR	R	R	NR
Aromatic Solvents	R	R	R	R	R	R	R	R	R	R	R	R
Atmospheric: Industrial	R <sub>7</sub>	ND	ND	R <sub>7</sub>	ND	ND	R	ND	ND	R	ND	ND
Atmospheric: Marine	R <sub>7</sub>	ND	ND	R <sub>7</sub>	ND	ND	R	ND	ND	R	ND	ND
Atmospheric: Rural	R <sub>7</sub>	ND	ND	R	ND	ND	R	ND	ND	R	ND	ND
Ascorbic Acid	R <sub>1</sub>	ND	ND	R <sub>1</sub>	R <sub>1</sub>	R <sub>1</sub>	R	R	R	R	R	R
Benzoic Acid	R	R	R	R	R	R	R	R	R	R	R	R
Boric Acid	R	R	R	R	R	R	R	R	R	R	R	R
Brines, Saturated	NR	NR	NR	R <sub>8</sub>	NR	NR	R <sub>8</sub>	NR	NR	R	R	R
Bromide (gaseous)	NR	NR	NR	R <sub>9</sub>	NR	NR	R <sub>9</sub>	R <sub>9</sub>	R <sub>9</sub>	R	ND	ND
Bromide (aqueous)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Butyl Acetate	R	R	R	R	R	R	R	R	R	R	R	R
Calcium Chloride	NR	NR	NR	NR	NR	NR	R <sub>8</sub>	NR	NR	R <sub>10</sub>	R <sub>10</sub>	R <sub>10</sub>
Carbon Disulphide	R	R	R	R	R	ND	R	R	ND	R	R	R
Carbonic Acid	R	R <sub>9</sub>	NR	R	R	R	R	R	R	R	R	R
Carbon Tetrachloride	R	R	R	R	R	R	R	R	R	R	R	R
Caustic Soda & Potash	ND	R <sub>6</sub>	R <sub>6</sub>	R	R	R <sub>6</sub>	ND	R	R <sub>6</sub>	R <sub>6</sub>	R <sub>6</sub>	ND
Cellulose Paint	R	R	R	R	R	R	R	R	R	R	R	R
Chlorates of Na, K, Ba	ND	ND	ND	R <sub>1</sub>	R <sub>1</sub>	R <sub>1</sub>	R <sub>1</sub>	R <sub>1</sub>	R <sub>1</sub>	R	R	R
Chlorine, dry	ND	ND	ND	R	R	R	R	R	R	R	R	ND
Chlorine, wet	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chlorides of Na, K, Mg, Ca, Ni, NH <sub>4</sub> , Al, Sn, Zn	R <sub>5</sub>	NR	NR	R <sub>10</sub>	NR	NR	R <sub>9</sub>	R <sub>11</sub>	R <sub>11</sub>	R	R	ND
Chlorosulphonic Acid	ND	ND	ND	NR	NR	NR	R <sub>10</sub>	NR	NR	ND	ND	ND
Chromic Acid (80%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Citric Acid	NR	NR	NR	R <sub>6</sub>	R <sub>6</sub>	R <sub>6</sub>	R	R	R <sub>6</sub>	R	R	R
Cresylic Acids (50%)	R	R	R	R	R	R	R	R	R	R	R	R
Detergents, synthetic	R	R	R	R	R	R	R	R	R	R	R	R
Emulsifiers (all concentrations)	ND	ND	ND	R	R	R	R	R	R	R	R	R
Esters & Ethers	R	R	R	R	R	R	R	R	R	R	R	R
Fatty Acids (> C <sub>8</sub> )	R	R	R	R	R	R	R	R	R	R	R	R
Ferric Chloride	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Fluorinated Refrigerants, Aerosols, eg. Freon	R <sub>5</sub>	R	NR	R <sub>5</sub>	R	R	R <sub>5</sub>	R	R	R	R	R
Fluoride, dry	ND	ND	ND	R	ND	ND	R	ND	ND	R	R	ND
Formic Acid	NR	NR	NR	R	NR	NR	R	R	ND	R	R	RND
Fruit Juices	R <sub>12</sub>	NR	NR	R <sub>12</sub>	R	R	R	R	R	R	R	R
Gelatine	R <sub>1</sub>	R <sub>1</sub>	ND	R <sub>1</sub>	R	R	R <sub>1</sub>	R	R	R	R	R
Glycol	R	R	R	R	R	R	R	R	R	R	R	R
Hydrobromic Acid (50%)	NR	NR	NR	NR	NR	ND	NR	NR	ND	NR	NR	ND
Hydrochloric Acid (10%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND
Hydrochloric Acid (concentrated)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND
Hydrocyanic Acid	R	ND	ND	R	R	ND	R	R	ND	R	R	ND
Hydrofluoric Acid	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hydrogen Peroxide (30%)	R	R	ND	R	R	R	R	R	R	R	R	R
Hydrogen Sulphide	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>
Hydrochlorite (Na 12 - 14%)	R <sub>14</sub>	ND	ND	R <sub>14</sub>	NR	NR	R <sub>14</sub>	NR	ND	R <sub>14</sub>	ND	ND
Ketones	R	ND	ND	R	R	R	R	R	R	R	R	R
Lactic Acid (100%)	NR	NR	NR	R	NR	NR	R	R	NR	R	R	ND
Lead Acetate	R	R	R <sub>6</sub>	R	R	R	R	R	R	R	R	R
Lead Perchlorate	NR	NR	NR	R <sub>1</sub>	R <sub>1</sub>	R <sub>1</sub>	R	R <sub>1</sub>	ND	ND	ND	ND
Lime (CaO)	R	R	R	R	R	R	R	R	R	R	R	R
Manganate, Potassium (K)	R <sub>6</sub>	ND	ND	R	R	R	R	R	R	R	ND	ND
Meat Juices	R <sub>7</sub>	NR	NR	R	R	ND	R	R	ND	R	R	R
Mercuric Chloride	NR	NR	NR	NR	NR	NR	NR	NR	NR	R	R	R
Milk & Milk Products	R	NR	NR	R	R	R	R	R	R	R	R	R
Molasses	R	R	R	R	R	R	R	R	R	R	R	R
Monoethanalamine	R	R	R	R	R	R	R	R	R	R	R	R

\* Please refer to foot notes on page 14.

Media	Utility Ferritics			Cr - Ni Austenitics			Cr - Ni - Mo Austenitics			Duplex		
	20°C	60°C	100°C	20°C	60°C	100°C	20°C	60°C	100°C	20°C	60°C	100°C
Naphthalene	R	R	R	R	R	R	R	R	R	R	R	R
Nitrates of Na, K, NH <sub>3</sub> , Ag	R	R	R	R	R	R	R	R	R	R	R	R
Nitric Acid (< 25%)	R	R <sub>15</sub>	NR	R	R	R	R	R	R	R	R	R
Nitric Acid ( 50%)	R	R <sub>15</sub>	NR	R	R	R	R	R	R	R	R	R
Nitric Acid ( 90%)	R	NR	NR	R	NR	NR	R	NR	NR	R	NR	ND
Nitric Acid, fuming	ND	NR	ND	R	R <sub>2</sub>	NR	R	NR	NR	R	NR	ND
Oil, Diesel, Petroleum Spirits	R	R	R	R	R	R	R	R	R	R	R	ND
Oils, essential	R	R	R	R	R	R	R	R	R	R	R	R
Oils, lube with aromatic adds	R	R	R	R	R	R	R	R	R	R	R	R
Oils, vegetable & animal	R	R	R	R	R	R	R	R	R	R	R	R
Oxalic Acid	NR	NR	NR	R <sub>6</sub>	NR	NR	R <sub>6</sub>	R <sub>16</sub>	R <sub>16</sub>	NR	R	R
Perchloric Acid	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Phenol	R	R	R	R	R	R	R	R	R	R	R	R
Phosphoric Acid ( 20%)	NR	NR	NR	R	R	R	R	R	R	R	R	R
Phosphoric Acid ( 50%)	NR	NR	NR	R	R	NR	R	R	R	R	R	R
Phosphoric Acid ( 95%)	NR	NR	NR	R	R	NR	R	R	NR	R <sub>17</sub>	R <sub>17</sub>	R <sub>17</sub>
Phosphorous Pentoxide	ND	ND	ND	R	R	R <sub>5</sub>	R	R	R <sub>5</sub>	R	R	R
Pyridine	R	R	R	R	R	R	R	R	R	R	R	R
Sea Water	NR	NR	NR	R <sub>17</sub>	NR	NR	R <sub>9</sub>	NR	NR	R	R	R
Silicic Acid	R	R	R	R	R	R	R	R	R	R	R	R
Sodium Peroxide	NR	NR	NR	R <sub>16</sub>	NR	NR	R <sub>6</sub>	R <sub>16</sub>	R <sub>16</sub>	R	R	R
Sodium Silicate	R	R	R	R	R	R	R	R	R	R	R	R
Sodium Sulphate	R <sub>6</sub>	R <sub>6</sub>	NR	R	R	NR	R	R	NR	R	R	NR
Starch	R	R	R	R	R	R	R	R	R	R	R	R
Sugar, Syrup & Jam	R <sub>12</sub>	R <sub>12</sub>	R <sub>12</sub>	R <sub>12</sub>	R	R	R	R	R	R	R	R
Sulphamic Acid	NR	NR	NR	R <sub>18</sub>	NR	NR	R	R	R <sub>19</sub>	R	R	NR
Sulphates (Na, K, Mg, Ca, Al, Fe)	R	R	R	R	R	R	R	R	R	R	R	R
Sulphates	NR	NR	NR	R	R	R	R	R	R	R	R	R
Sulphur Dioxide, dry	R	R	R	R	R	R	R	R	R	R	R	R
Sulphur Dioxide, wet	NR	NR	NR	R	NR	NR	R	R	NR	R	R	NR
Sulphur Dioxide, ag, soln (96%)	NR	NR	NR	R	NR	NR	R	R	R	R	R	R
Sulphur Trioxide	NR	NR	NR	NR	NR	NR	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>
Sulphuric Acid (< 50%)	NR	NR	NR	NR	NR	NR	R <sub>16</sub>	NR	NR	R	R	R
Sulphuric Acid ( 70%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sulphuric Acid ( 95%)	R <sub>15</sub>	NR	NR	R	NR	NR	R	NR	NR	R	NR	NR
Sulphuric Acid, fuming	R <sub>2</sub>	R <sub>2</sub>	NR	R	R <sub>2</sub>	NR	R	NR	NR	R	R	R
Tannic Acid (10%)	R	R	NR	R	R	R	R	R	R	R	R	R
Tartaric Acid	NR	NR	NR	R	R	R	R	R	R	R	R	R
Trichloroethylene	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>	R <sub>5</sub>
Urea (30%)	R	R	R	R	R	R	R	R	R	R	R	R
Water, pure	R	R	R	R	R	R	R	R	R	R	R	R
Yeast	R	R	R	R	R	R	R	R	R	R	R	R

• NR = The material is not recommended • ND = No data is available  
 • R = Indicates that the material is resistant to the named chemical up to the temperature shown, subject to limitations indicated by the footnotes.

- 1 = Not if chlorides are present
- 2 = Limited data
- 3 = Depends on the acid
- 4 = Dry acid fumes, attack may occur if moisture builds up
- 5 = Anhydrous
- 6 = Depends on concentration
- 7 = May discolour with time
- 8 = In strong solutions only when inhibited
- 9 = Pitting possible in stagnant conditions
- 10 = Possibility of pitting
- 11 = May cause stress corrosion cracking
- 12 = When free of SO<sub>2</sub>
- 13 = May cause contamination of product
- 14 = Dilute hypochlorites can be used to sterilise some stainless steels
- 15 = General corrosion may become excessive
- 16 = 10%
- 17 = In the absence of impurities
- 18 = Dilute
- 19 = Some attack at high temperatures

### PITTING & CREVICE CORROSION RESISTANCE:

Exposure in chloride containing media can result in localised corrosion.  
 In order of increasing resistance to localised corrosion: 3CR12 < 430 < 304L < 316L < 2205

### CONDITIONS FOR AVOIDING PITTING & CREVICE CORROSION:

- Design vessels for complete drainage - avoid sharp corners and stagnant areas.
- Close crevices and lap joints by continuous welding.
- Remove solids in suspension. Prevent sedimentation. Ensure continuous agitation and adequate flow rates.
- Use compressive non-absorbent gaskets or inert sealing compounds.
- Ensure non-impairment of passive surface. Repair / restore any affected areas

\* Corrosion information courtesy of Columbus Stainless Steel (PTY) LTD. Values are typical guidelines and should not be used for design purposes.