

FLANGE GUARD SAFETY SHIELDS



Chemical Resistance Guide

Environmental conditions in industrial plants may vary and thus, affect material performance. Since chemical attack and resistance are very complex phenomena, this Chemical Resistance Guide is intended only as a "guide" subject to adjustment by engineers and piping designers for local conditions and individual industrial plant experience.

Consequently, it is the end-user and not the manufacturer who assumes all responsibility and risk for proper evaluation, application and performance of safety shields for any and all specific uses. The data presented in the following table is available from www.flangeguards.com

| FLUID | PVC (Polyvinyl Chloride) <i>maximum temperature</i> | ECTFE (Clear Teflon) <i>maximum temperature</i> | PTFE (Woven Teflon) <i>maximum temperature</i> | 316 (Stainless Steel) <i>maximum temperature</i> |
|---|--|--|---|---|
| NR = Not Recommended X = No data available | | | | |
| Acetaldehyde | NR | X | 450°F/232°C | X |
| Acetic acid (10%) | 140°F/60°C | 212°F/100°C | 450°F/232°C | 932°F/500°C |
| Acetic acid (50%) | 140°F/60°C | 212°F/100°C | 450°F/232°C | 932°F/500°C |
| Acetic acid (80%) | 73°F/23°C | 298°F/148°C | 450°F/232°C | 932°F/500°C |
| Acetic acid (glacial) | NR | 212°F/100°C | 450°F/232°C | 932°F/500°C |
| Acetone (10-100%) | NR | 120°F/49°C | 450°F/232°C | 932°F/500°C |
| Acetophenone | NR | 120°F/49°C | 450°F/232°C | 932°F/500°C |
| Acetyl chloride | NR | 120°F/49°C | 450°F/232°C | 932°F/500°C |
| Acetylene tetrabromide | NR | X | 450°F/232°C | X |
| Acetylene tetrachloride | NR | X | 450°F/232°C | 932°F/500°C |
| Aluminum chloride | 140°F/60°C | 300°F/149°C | 450°F/232°C | X |
| Aluminum hydroxide | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Aluminum nitrate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Aluminum oxychloride | 140°F/60°C | 300°F/149°C | 450°F/232°C | X |
| Aluminum sulfate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Ammonia (liquid) | NR | X | 450°F/232°C | 932°F/500°C |
| Ammonium bromide (50%) | NR | X | 450°F/232°C | 932°F/500°C |
| Ammonium carbonate (saturated) | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |

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|---|--|--|---|---|
| Ammonium chloride | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Ammonium dichromate | NR | 250°F/121°C | 450°F/232°C | X |
| Ammonium fluoride (25%) | 140°F/60°C | 300°F/149°C | 450°F/232°C | X |
| Ammonium fluoride (saturated) | X | X | 450°F/232°C | X |
| Ammonium hydroxide (10%) | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Ammonium hydroxide (cone) | NR | X | 450°F/232°C | 932°F/500°C |
| Ammonium nitrate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Ammonium phosphate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Ammonium sulfate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Amyl alcohol | 104°F/40°C | 300°F/149°C | 450°F/232°C | X |
| Aniline | NR | 212°F/100°C | 450°F/232°C | X |
| Aqua regia | 73°F/23°C | 212°F/100°C | 450°F/232°C | X |
| Arsenic acid | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Barium carbonate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Barium chloride | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Barium hydroxide | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Barium sulfate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Barium sulphide | 73°F/23°C | 300°F/149°C | 450°F/232°C | X |
| Benzaldehyde | NR | 120°F/49°C | 450°F/232°C | 932°F/500°C |
| Benzenesulfonic acid | 140°F/60°C | 120°F/49°C | 450°F/232°C | 932°F/500°C |
| Benzoic acid | 140°F/60°C | 250°F/121°C | 450°F/232°C | 932°F/500°C |
| Benzylamine | X | X | 450°F/232°C | X |
| Benzyl chloride | X | X | 450°F/232°C | X |
| Bismuth carbonate | 140°F/60°C | 300°F/149°C | 450°F/232°C | X |
| Black liquor | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Boric acid | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Bromine (liquid) | NR | 120°F/49°C | 450°F/232°C | NR |

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|---|--|--|---|---|
| Bromine chloride | NR | X | 250°F/121°C | X |
| Butyl acetate | NR | 72°F/22°C | 450°F/232°C | 932°F/500°C |
| Butyl alcohol (butanol) | 140°F/60°C | 300°F/149°C | 450°F/232°C | X |
| Butyl bromide | NR | X | 450°F/232°C | X |
| Butyl chloride | NR | X | 450°F/232°C | X |
| Butyric acid | 73°F/23°C | 250°F/121°C | 450°F/232°C | 932°F/500°C |
| Calcium bisulfide | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Calcium bisulfite | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Calcium carbonate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Calcium chlorate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Calcium chloride (saturated) | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Calcium chlorite | 140°F/60°C | X | 450°F/232°C | 932°F/500°C |
| Calcium hydroxide (saturated) | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Calcium hypochlorite | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Calcium nitrate | 140°F/60°C | 300°F/149°C | 450°F/232°C | X |
| Calcium oxide | 140°F/60°C | 300°F/149°C | 450°F/232°C | X |
| Calcium sulfate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Carbon tetrachloride | NR | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Chlorine dioxide | NR | 212°F/100°C | 450°F/232°C | NR |
| Chromic acid (50%) | 73°F/23°C | 212°F/100°C | 450°F/232°C | 932°F/500°C |
| Chromic acid (100%) | NR | X | 450°F/232°C | 932°F/500°C |
| Chromium trioxide (30%) | 140°F/60°C | X | 450°F/232°C | 932°F/500°C |
| Copper carbonate (basic) | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Copper chloride (saturated) | 140°F/60°C | 300°F/149°C | 450°F/232°C | NR |
| Copper cyanide (10%) | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Copper fluoride | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Copper nitrate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |

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|---|--|--|---|---|
| Copper sulfate (saturated) | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Cresol | 73°F/23°C | 212°F/100°C | 450°F/232°C | 932°F/500°C |
| Cresylic acid (50%) | 140°F/60°C | 120°F/49°C | 450°F/232°C | 932°F/500°C |
| Cyclohexanone | NR | 120°F/49°C | 450°F/232°C | 932°F/500°C |
| Diethylamine | NR | X | 450°F/232°C | X |
| Diethyl ether | NR | 73°F/23°C | 450°F/232°C | X |
| Diisobutyl ketone | NR | 212°F/100°C | 450°F/232°C | 932°F/500°C |
| Disodium phosphate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Ethyl acetate | NR | 120°F/49°C | 450°F/232°C | 932°F/500°C |
| Ethyl alcohol (ethanol) | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Ethyl chloride | NR | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Ethylene dibromide | NR | X | 450°F/232°C | 932°F/500°C |
| Ethylene dichloride | NR | 73°F/23°C | 450°F/232°C | 932°F/500°C |
| Ethylene glycol | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Ferric chloride | 140°F/60°C | 300°F/149°C | 450°F/232°C | NR |
| Ferric nitrate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Ferric sulfate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Ferrous chloride | 140°F/60°C | 300°F/149°C | 450°F/232°C | NR |
| Ferrous nitrate | 140°F/60°C | 300°F/149°C | 450°F/232°C | X |
| Fluosilicic acid | 140°F/60°C | 300°F/149°C | 450°F/232°C | X |
| Formaldehyde (50%) | 140°F/60°C | X | 450°F/232°C | 932°F/500°C |
| Formic acid | 73°F/23°C | 250°F/121°C | 450°F/232°C | 932°F/500°C |
| Gasoline (petroleum) | X | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Glucose | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Hydrobromic acid (10%) | 140°F/60°C | 300°F/149°C | 450°F/232°C | X |
| Hydrobromic acid (50%) | 140°F/60°C | 300°F/149°C | 450°F/232°C | NR |
| Hydrochloric acid (10-20%) | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |

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|---|--|--|---|---|
| Hydrochloric acid (35%) | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Hydrofluoric acid (30%) | 68°F/20°C | NR | NR | 932°F/500°C |
| Hydrofluoric acid (50-60%) | 68°F/20°C | NR | NR | 932°F/500°C |
| Hydrofluoric acid (100%) | NR | NR | NR | 932°F/500°C |
| Hydrogen peroxide (8-90%) | 68°F/20°C | 120°F/49°C | 450°F/232°C | 932°F/500°C |
| Hydrogen sulfide (aqueous) | 140°F/60°C | 120°F/49°C | 450°F/232°C | 932°F/500°C |
| Lactic acid (80%) | 68°F/20°C | 120°F/49°C | 450°F/232°C | 932°F/500°C |
| Lauryl chloride | 73°F/23°C | 212°F/100°C | 450°F/232°C | X |
| Magnesium carbonate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Magnesium chloride | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Magnesium hydroxide | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Magnesium nitrate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Magnesium sulfate (10%) | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Magnesium sulfate (saturated) | X | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Manganese sulfate (10%-saturated) | 140°F/60°C | X | 450°F/232°C | 932°F/500°C |
| Mercuric chloride | 140°F/60°C | 250°F/121°C | 450°F/232°C | 932°F/500°C |
| Mercuric nitrate | 140°F/60°C | X | 450°F/232°C | 932°F/500°C |
| Mercury | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Methyl alcohol (methanol) | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Methyl bromide | NR | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Methyl chloride | NR | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Methyl ethyl ketone | NR | 120°F/49°C | 450°F/232°C | 932°F/500°C |
| Methyl salicylate | NR | X | 450°F/232°C | 932°F/500°C |
| Naphtha | 140°F/60°C | X | 450°F/232°C | 932°F/500°C |
| Nickel chloride | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Nitric acid (10%) | 140°F/60°C | 250°F/121°C | 450°F/232°C | 932°F/500°C |
| Nitric acid (50%) | 140°F/60°C | 212°F/100°C | 450°F/232°C | 932°F/500°C |

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|---|--|--|---|---|
| Nitric acid (70%) | 73°F/23°C | 212°F/100°C | 450°F/232°C | 932°F/500°C |
| Nitric acid (fuming) | NR | X | 450°F/232°C | 932°F/500°C |
| Oleum | NR | 73°F/23°C | 450°F/232°C | 932°F/500°C |
| Perchloric acid (10%) | 104°F/40°C | 212°F/100°C | 450°F/232°C | 932°F/500°C |
| Perchloric acid (70%) | NR | 120°F/49°C | 450°F/232°C | 932°F/500°C |
| Phenol (5%) | 73°F/23°C | 120°F/49°C | 450°F/232°C | 932°F/500°C |
| Phenol (100%) | X | 120°F/49°C | 450°F/232°C | 932°F/500°C |
| Phosgene (wet) | NR | X | 450°F/232°C | X |
| Phosphoric acid (10-50%) | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Phosphoric acid (50-85%) | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Phthalic acid | 68°F/20°C | X | 450°F/232°C | 932°F/500°C |
| Potassium aluminum chloride | 140°F/60°C | X | 450°F/232°C | X |
| Potassium aluminum sulfate (50%) | 140°F/60°C | 300°F/149°C | 450°F/232°C | X |
| Potassium bicarbonate | 140°F/60°C | X | 450°F/232°C | 932°F/500°C |
| Potassium borate | 140°F/60°C | 250°F/121°C | 450°F/232°C | X |
| Potassium bromate | 140°F/60°C | X | 450°F/232°C | X |
| Potassium bromide | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Potassium carbonate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Potassium chlorate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Potassium chloride | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Potassium chromate | 140°F/60°C | 300°F/149°C | 450°F/232°C | X |
| Potassium cyanide | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Potassium fluoride | 140°F/60°C | X | 450°F/232°C | X |
| Potassium hydroxide (10%) | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Potassium hydroxide (50%) | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Potassium hydroxide (60-90%) | X | X | 450°F/232°C | 932°F/500°C |
| Potassium hypochlorite | 140°F/60°C | X | 450°F/232°C | X |

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|-----------------------------|--|--|---|---|
| Potassium nitrate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Potassium sulfate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Potassium sulfide | 104°F/40°C | X | 450°F/232°C | 932°F/500°C |
| Propylene dibromide | X | X | 450°F/232°C | X |
| Propylene dichloride | NR | X | 450°F/232°C | 932°F/500°C |
| Sodium bromide | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Sodium chlorate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Sodium chloride | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Sodium chlorite | 140°F/60°C | 250°F/121°C | 450°F/232°C | 932°F/500°C |
| Sodium fluoride (saturated) | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Sodium hydroxide (<10%) | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Sodium hydroxide (10-50%) | 140°F/60°C | 250°F/121°C | 450°F/232°C | 932°F/500°C |
| Sodium hydroxide (>50%) | X | X | 450°F/232°C | X |
| Sodium hypochlorite | 140°F/60°C | 250°F/121°C | 450°F/232°C | 932°F/500°C |
| Sodium iodide | 104°F/40°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Sodium nitrite | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Sodium peroxide | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Sodium phosphate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Sodium silicate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Sodium sulfate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Sodium sulfide | 104°F/40°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Sodium sulfite | 104°F/40°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Stannic chloride | 140°F/60°C | 300°F/149°C | 450°F/232°C | NR |
| Sulfur chloride | 140°F/60°C | 73°F/23°C | 450°F/232°C | NR |
| Sulfuric acid (10%) | 140°F/60°C | 212°F/100°C | 450°F/232°C | 932°F/500°C |
| Sulfuric acid (16%) | 140°F/60°C | 212°F/100°C | 450°F/232°C | 932°F/500°C |
| Sulfuric acid (30%) | 140°F/60°C | 212°F/100°C | 450°F/232°C | 932°F/500°C |

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|---|--|--|---|---|
| Sulfuric acid (60%) | 140°F/60°C | 250°F/121°C | 450°F/232°C | 932°F/500°C |
| Sulfuric acid (85%) | NR | 250°F/121°C | 450°F/232°C | 932°F/500°C |
| Sulfuric acid (93-98%) | NR | 250°F/121°C | 450°F/232°C | 932°F/500°C |
| Sulfuric acid fuming (>98%) | NR | X | 450°F/232°C | 932°F/500°C |
| Tannic acid | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Titanium tetrachloride | NR | X | 450°F/232°C | 932°F/500°C |
| Toluene | NR | 73°F/23°C | 450°F/232°C | 932°F/500°C |
| Trichloroacetic (10%) | 73°F/23°C | 120°F/49°C | 450°F/232°C | X |
| Trichloroacetic (100%) | 68°F/20°C | 120°F/49°C | 450°F/232°C | NR |
| Urea | 140°F/60°C | 140°F/60°C | 450°F/232°C | 932°F/500°C |
| Zinc chloride | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Zinc nitrate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |
| Zinc sulfate | 140°F/60°C | 300°F/149°C | 450°F/232°C | 932°F/500°C |