

# CHEMICAL RESISTANCE GUIDE

| CHEMICALS                                                                                               | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                      | PLASTICS MAX TEMPERATURE (°F) |      |     |         |      | ALUMINUM | METALS |       |           |              |              |               |               |
|---------------------------------------------------------------------------------------------------------|---------------|-------------------------------|----------------------|-------------------------------|------|-----|---------|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                                                         |               | GFRPC POLYESTER               | GFRPC VINYL ESTER    | ABS                           | CPVC | PP  | PVC     | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| <b>A</b>                                                                                                |               |                               |                      |                               |      |     |         |      |          |        |       |           |              |              |               |               |
| Acetaldehyde CH <sub>3</sub> CHO                                                                        | Conc.         | NR                            | NR                   | X                             | NR   | 140 | NR      | B    | B        | NR     | NR    | B         | B            | A            | A             | A             |
| Acetamide CH <sub>3</sub> CONH <sub>2</sub>                                                             |               | X                             | X                    | X                             | X    | X   | X       | X    | X        | A      | X     | A         | A            | B            | B             | A             |
| Acetic Acid CH <sub>3</sub> COOH                                                                        | 25%           | 125                           | 180                  | NR                            | 180  | 180 | 140     | B    | X        | NR     | NR    | NR        | NR           | NR           | B             | A             |
| Acetic Acid CH <sub>3</sub> COOH                                                                        | 50%           | 60                            | 160                  | NR                            | X    | 120 | 73      | B    | X        | NR     | NR    | NR        | NR           | NR           | B             | A             |
| Acetic Acid CH <sub>3</sub> COOH                                                                        | 85%           | NR                            | NR                   | NR                            | NR   | 120 | 73      | B    | X        | NR     | NR    | NR        | NR           | NR           | B             | A             |
| Acetic Acid CH <sub>3</sub> COOH                                                                        | Glacial       | NR                            | NR                   | NR                            | NR   | 120 | 73      | B    | B        | NR     | NR    | NR        | NR           | NR           | B             | A             |
| Acetic Anhydride CH <sub>3</sub> CO <sub>2</sub> O                                                      |               | NR                            | NR                   | NR                            | NR   | 73  | NR      | A    | B        | NR     | NR    | NR        | NR           | NR           | A             | B             |
| Acetone CH <sub>3</sub> COCH <sub>3</sub>                                                               |               | NR                            | 180 TO 10% 60 TO 80% | NR                            | NR   | B   | NR      | B    | A        | A      | A     | A         | A            | A            | A             | A             |
| Acetophenone C <sub>6</sub> H <sub>5</sub> COCH <sub>3</sub>                                            |               | X                             | NR                   | X                             | X    | X   | X       | X    | X        | NR     | NR    | NR        | NR           | NR           | X             | NR            |
| Acetyl Chloride CH <sub>3</sub> COCl                                                                    |               | NR                            | NR                   | NR                            | NR   | X   | NR      | X    | X        | A      | A     | NR        | NR           | A            | B             | A             |
| Acetylene                                                                                               | Gas 100%      | X                             | X                    | 73                            | NR   | 73  | NR      | X    | A        | NR     | NR    | A         | A            | A            | A             | A             |
| Acrylic Acid                                                                                            | <25%          | NR                            | 100                  | X                             | X    | X   | X       | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Acrylic Latex                                                                                           |               | X                             | 120                  | X                             | X    | X   | X       | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Acrylonitrile H <sub>2</sub> C=CHCN                                                                     |               | NR                            | NR                   | X                             | NR   | X   | C       | X    | B        | A      | A     | A         | A            | A            | A             | A             |
| Adipic Acid COOH(CH <sub>2</sub> ) <sub>4</sub> COOH                                                    | Sat'd         | 85                            | 160                  | X                             | 180  | 140 | 140     | X    | X        | X      | X     | NR        | NR           | B            | X             | B to 200      |
| Alkyl Benzend Sulfonic Acid                                                                             | 92%           | NR                            | 120                  | X                             | X    | X   | X       | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Alkyl Benzene                                                                                           | 100%          | 80                            | 150                  | X                             | X    | X   | X       | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Allyl Alcohol CH <sub>2</sub> =CHCH <sub>2</sub> OH                                                     | 96%           | NR                            | NR                   | X                             | NR   | 140 | B to 73 | X    | X        | A      | A     | A         | A            | A            | X             | A             |
| Allyl Chloride CH <sub>2</sub> =CHCH <sub>2</sub> Cl                                                    |               | NR                            | 60                   | X                             | NR   | X   | NR      | X    | X        | X      | X     | X         | X            | NR           | X             | X             |
| Alpha Methyl Styrene                                                                                    |               | NR                            | 70                   | X                             | X    | X   | X       | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Alpha Olefin Sulfates                                                                                   | 100%          | X                             | 120                  | X                             | X    | X   | X       | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Alum                                                                                                    | all           | 150                           | 210                  | X                             | X    | X   | X       | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Aluminum Acetate AL(C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> ) <sub>3</sub>                         | Sat'd         | X                             | NR                   | X                             | X    | X   | X       | X    | X        | NR     | X     | X         | NR           | X            | X             | A             |
| Aluminum Ammonium Sulfate (Alum)<br>AlNH <sub>4</sub> (SO <sub>4</sub> ) <sub>12</sub> H <sub>2</sub> O | Sat'd         | X                             | NR                   | X                             | 180  | 140 | 140     | X    | X        | B      | B     | X         | X            | NR           | X             | A             |
| Aluminum Chloride (Aqueous) ALCl <sub>3</sub>                                                           | Sat'd         | 120                           | 210                  | 160                           | 180  | 180 | 140     | B    | NR       | NR     | NR    | NR        | NR           | NR           | NR            | A             |
| Aluminum Chlorohydrate                                                                                  | all           | X                             | 210                  | X                             | X    | X   | X       | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Aluminum Chlorohydroxide                                                                                | 50%           | X                             | 210                  | X                             | X    | X   | X       | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Aluminum Citrate                                                                                        | all           | X                             | 210                  | X                             | X    | X   | X       | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Aluminum Fluoride ALF <sub>3</sub>                                                                      | Sat'd         | NR                            | 80                   | 160                           | 180  | 180 | 73      | B    | X        | NR     | NR    | NR        | NR           | NR           | NR            | B             |
| Aluminum Hydroxide AL(OH) <sub>3</sub>                                                                  | Sat'd         | NR                            | 180                  | 160                           | 180  | 180 | 140     | X    | A        | NR     | NR    | B         | B            | NR           | A             | A             |

**KEY:**

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

## CHEMICAL RESISTANCE GUIDE

| CHEMICALS                                                       | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                        | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|-----------------------------------------------------------------|---------------|-------------------------------|------------------------|-------------------------------|------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                 |               | GFRPC POLYESTER               | GFRPC VINYL ESTER      | ABS                           | CPVC | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| Aluminum Nitrate $Al(NO_3)_3 \cdot H_2O$                        | Sat'd         | 100                           | 180                    | X                             | 180  | 180 | 140 | X    | X        | NR     | NR    | NR        | NR           | NR           | X             | A             |
| Aluminum Potassium Sulfate (Alum)<br>$AlK(SO_4)_2 \cdot 12H_2O$ | Sat'd         | 150                           | 210                    | 160                           | 180  | 140 | 140 | B    | B        | B      | B     | X         | X            | NR           | A TO 10%      | A             |
| Aluminum Sulfate (Alum) $Al_2(SO_4)_3$                          | Sat'd         | 100                           | 210                    | 160                           | 180  | 140 | 140 | B    | A        | NR     | NR    | NR        | NR           | NR           | B             | X             |
| Amino Acids                                                     | all           | X                             | 100                    |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Ammonia Gas $NH_3$                                              | 100%          | NR                            | 100                    | NR                            | NR   | 140 | 140 | B    | X        | B      | NR    | A         | X            | A            | X             | A             |
| Ammonia Liquid $NH_4$                                           | 100%          | NR                            | 100 @ 10%<br>NR @ 100% | 160                           | NR   | 140 | NR  | NR   | NR       | NR     | NR    | X         | X            | A            | A             | A             |
| Ammonium Acetate $CH_3COONH_4$                                  | Sat'd         | NR                            | 100                    | 120                           | 180  | 73  | 140 | X    | X        | NR     | NR    | X         | X            | X            | X             | B             |
| Ammonium Benzoate                                               | all           | X                             | 180                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Ammonium Bicarbonate                                            | 100%          | 60                            | 160                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Ammonium Bisulfate                                              |               | X                             | 120                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Ammonium Bisulfite (Black Liquor)                               | Sat'd         | X                             | 180                    | X                             | 180  | 140 | 140 | X    | X        | NR     | NR    | B         | B            | B            | X             | A             |
| Ammonium Bromate                                                | 40%           | 100                           | 160                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Ammonium Bromide                                                | 40%           | 100                           | 160                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Ammonium Bifluoride $NH_4HF_2$                                  | Sat'd         | X                             | X                      | X                             | 180  | 180 | 140 | X    | NR       | NR     | NR    | NR        | NR           | NR           | B             | B             |
| Ammonium Carbonate $(NH_4)_2CO_3$                               | Sat'd         | NR                            | 150                    | X                             | 180  | 212 | 140 | X    | B        | NR     | NR    | X         | X            | A to 140     | B             | B             |
| Ammonium Chloride $NH_4Cl$                                      | Sat'd         | 100                           | 210                    | 120                           | 180  | 212 | 140 | B    | B        | NR     | NR    | NR        | NR           | NR           | A             | B             |
| Ammonium Citrate                                                | all           | NR                            | 160                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Ammonium Fluoride $NH_4F$                                       | 10%           | NR                            | 150                    | 120                           | 180  | 212 | 140 | X    | X        | NR     | NR    | X         | X            | NR           | X             | NR            |
| Ammonium Fluoride $NH_4F$                                       | 25%           | NR                            | 150                    | 120                           | 180  | 212 | NR  | X    | X        | NR     | NR    | X         | X            | NR           | X             | NR            |
| Ammonium Hydroxide $NH_4OH$                                     | 10%           | 60 @ 5%<br>NR @ >5%           | 150                    | 120                           | NR   | 212 | 140 | B    | B        | NR     | NR    | X         | X            | NR           | A             | A             |
| Ammonium Hydroxide $NH_4OH$                                     | Sat'd         | NR                            | 100                    | X                             | X    | X   | X   | B    | B        | NR     | NR    | X         | X            | NR           | A             | A to 140      |
| Ammonium Lauryl Sulfate                                         | 30%           | 75                            | 120                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Ammonium Nitrate $NH_4NO_3$                                     | Sat'd         | 150                           | 200                    | 120                           | 180  | 212 | 140 | B    | B        | NR     | NR    | X         | X            | X            | A             | X             |
| Ammonium Persulphate $(NH_4)_2S_2O_8$                           |               | NR                            | 180                    | X                             | 180  | 140 | 140 | X    | B        | NR     | NR    | NR        | NR           | NR           | A             | A             |
| Ammonium Phosphate (Monobasic) $NH_4H_2PO_4$                    | All           | NR                            | 210                    | 120                           | 180  | 212 | 140 | B    | B        | NR     | NR    | B         | B            | NR           | A             | A             |
| Ammonium Sulfate $(NH_4)_2SO_4$                                 |               | 150                           | 210                    | 120                           | 180  | 212 | 140 | B    | NR       | NR     | NR    | B         | B            | NR           | B             | B             |
| Ammonium Sulfide $(NH_4)_2S$                                    | Dilute        | NR                            | 120                    | 120                           | 180  | 212 | 140 | X    | X        | NR     | NR    | NR        | NR           | NR           | X             | B             |
| Ammonium Sulfite                                                | all           | NR                            | 150                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Ammonium Thiocyanate $NH_4SCN$                                  | 60%           | X                             | 100                    | 120                           | 180  | 212 | 140 | X    | X        | NR     | NR    | NR        | NR           | NR           | X             | A             |

KEY:

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

## CHEMICAL RESISTANCE GUIDE

|                                                                                                              | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                   | PLASTICS MAX TEMPERATURE (°F) |         |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|--------------------------------------------------------------------------------------------------------------|---------------|-------------------------------|-------------------|-------------------------------|---------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                                                              |               | GFRPC POLYESTER               | GFRPC VINYL ESTER | ABS                           | CPVC    | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| CHEMICALS                                                                                                    |               |                               |                   |                               |         |     |     |      |          |        |       |           |              |              |               |               |
| Ammonium Thiosulfate                                                                                         | 50%           | 75                            | 100               | X                             | X       | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Amyl Acetate CH <sub>3</sub> COOC <sub>5</sub> H <sub>11</sub>                                               | all           | 75                            | NR                | NR                            | NR      | NR  | NR  | NR   | B        | B      | B     | B         | B            | B            | A             | A             |
| Amyl Alcohol C <sub>5</sub> H <sub>11</sub> OH                                                               | 100%          | NR                            | 120               | X                             | NR      | X   | NR  | B    | B        | A      | A     | B         | B            | B            | A             | A             |
| n-Amyl Chloride CH <sub>3</sub> (CH <sub>2</sub> ) <sub>3</sub> CH <sub>2</sub> Cl                           |               | NR                            | 120               | NR                            | NR      | NR  | NR  | NR   | NR       | A      | A     | A         | A            | A            | B             | A             |
| Anise Oil                                                                                                    |               | X                             | X                 | X                             | X       | X   | X   | X    | X        | X      | X     | X         | X            | X            | A             | A             |
| Aniline C <sub>6</sub> H <sub>5</sub> NH <sub>2</sub>                                                        |               | NR                            | 120               | NR                            | NR      | X   | NR  | B    | B        | NR     | NR    | B         | B            | NR           | A             | A             |
| Aniline Oil                                                                                                  |               | X                             | X                 | X                             | X       | A   | NR  | X    | B        | A      | X     | A         | A            | X            | A             | A             |
| Antifreeze                                                                                                   |               | X                             | X                 | X                             | X       | A   | A   | B    | A        | B      | B     | B         | X            | B            | A             | A             |
| Aniline Hydrochloride C <sub>6</sub> H <sub>5</sub> NH <sub>2</sub> *HCl                                     | Sat'd         | NR                            | 180               | X                             | NR      | X   | NR  | X    | X        | NR     | NR    | NR        | NR           | NR           | X             | NR            |
| Aniline Sulfate                                                                                              | Sat'd         | NR                            | 210               | X                             | X       | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Anthraquinone C <sub>14</sub> H <sub>8</sub> O <sub>2</sub>                                                  |               | X                             | X                 | X                             | 180     | X   | 140 | X    | X        | X      | X     | NR        | NR           | NR           | X             | X             |
| Anthraquinone Sulfonic Acid C <sub>14</sub> H <sub>7</sub> O <sub>2</sub> *SO <sub>3</sub> *H <sub>2</sub> O |               | X                             | X                 | X                             | 180     | 73  | 140 | X    | X        | NR     | NR    | NR        | NR           | NR           | X             | NR            |
| Antimony Chloride                                                                                            |               | X                             | 160               | X                             | X       | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Antimony Pentachloride                                                                                       | all           | NR                            | 100               | X                             | X       | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Antimony Trichloride SbCl <sub>3</sub>                                                                       | Sat'd         | 100                           | 180               | X                             | 180     | 140 | 140 | A    | NR       | NR     | NR    | NR        | NR           | NR           | NR            | NR            |
| Aqua Regia (Nitrohydrochloric Acid)<br>HCl:HNO3=3:1                                                          | all           | NR                            | NR                | NR                            | B to 73 | NR  | NR  | NR   | NR       | NR     | NR    | NR        | NR           | NR           | NR            | B             |
| Arochlor 1248                                                                                                |               | X                             | X                 | X                             | X       | X   | X   | X    | X        | X      | X     | X         | X            | A            | X             | X             |
| Aromatic Hydrocarbons                                                                                        |               | X                             | X                 | X                             | X       | X   | NR  | B    | A        | A      | X     | A         | X            | A            | X             | A             |
| Argon Ar                                                                                                     | Dry           | X                             | X                 | X                             | X       | X   | X   | X    | X        | A      | X     | A         | X            | A            | X             | A             |
| Arsenic Acid H <sub>3</sub> AsO <sub>4</sub>                                                                 | 80%           | X                             | 160               | X                             | 180     | 140 | 140 | B    | NR       | NR     | NR    | NR        | NR           | NR           | A             | A             |
| Arsenious Acid                                                                                               | 20%           | X                             | 180               | X                             | X       | X   | X   | X    | X        | X      | X     | X         | X            | A            | X             | X             |
| Asphalt                                                                                                      |               | X                             | X                 | X                             | NR      | 73  | NR  | X    | B        | A      | A     | A         | A            | A            | B             | A             |
| B                                                                                                            |               |                               |                   |                               |         |     |     |      |          |        |       |           |              |              |               |               |
| Barium Acetate                                                                                               | all           | 100                           | 180               | X                             | X       | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Barium Bromide                                                                                               | all           | 100                           | 210               | X                             | X       | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Barium Carbonate BaCO <sub>3</sub>                                                                           | Sat'd         | 60                            | 210               | 120                           | 180     | 140 | 140 | B    | B        | A      | A     | B         | B            | B            | A             | A             |
| Barium Chloride BaCl <sub>2</sub> * <sub>2</sub> H <sub>2</sub> O                                            | Sat'd         | 200                           | 210               | 120                           | 180     | 140 | 140 | B    | NR       | A      | A     | B         | B            | NR           | NR            | A             |
| Barium Cyanide                                                                                               |               | NR                            | 150               | X                             | X       | X   | X   | B    | X        | B      | X     | X         | X            | A            | X             | A             |
| Barium Hydroxide Ba(OH) <sub>2</sub>                                                                         | Sat'd         | NR                            | 150               | 73                            | 180     | 140 | 140 | B    | NR       | NR     | NR    | B         | B            | NR           | B             | A             |
| Barium Nitrate Ba(NO <sub>3</sub> ) <sub>2</sub>                                                             | Sat'd         | 100                           | X                 | 73                            | 180     | 140 | 73  | X    | X        | NR     | NR    | A         | A            | A            | A             | A             |
| Barium Sulfate BaSO <sub>4</sub>                                                                             | Sat'd         | 100                           | 210               | 73                            | 180     | 140 | 140 | B    | NR       | B      | B     | B         | B            | A            | A             | A             |
| Barium Sulfide BaS                                                                                           | Sat'd         | NR                            | 180               | 73                            | 180     | 140 | 140 | X    | X        | NR     | NR    | B         | B            | NR           | X             | A             |

KEY:

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

## CHEMICAL RESISTANCE GUIDE

| CHEMICALS                                                                                        | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                          | PLASTICS MAX TEMPERATURE (°F) |         |     |         |      | ALUMINUM | METALS |       |           |              |              |               |               |
|--------------------------------------------------------------------------------------------------|---------------|-------------------------------|--------------------------|-------------------------------|---------|-----|---------|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                                                  |               | GFRPC POLYESTER               | GFRPC VINYL ESTER        | ABS                           | CPVC    | PP  | PVC     | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| Bay Oil                                                                                          |               | X                             | X                        | X                             | X       | X   | X       | X    | X        | A      | X     | X         | X            | X            | A             | A             |
| Beer                                                                                             |               | 60                            | 160                      | 120                           | 180     | 180 | 140     | X    | X        | A      | A     | NR        | NR           | NR           | X             | A             |
| Beet Sugar Liquors                                                                               |               | X                             | 180                      | X                             | 180     | 180 | 140     | X    | A        | X      | X     | B         | B            | B            | A             | A             |
| Benzaldehyde C <sub>6</sub> H <sub>5</sub> CHO                                                   | 10%           | NR                            | NR                       | NR                            | B to 73 | 73  | B to 73 | NR   | B        | A      | A     | NR        | NR           | B            | A             | A             |
| Benzene C <sub>6</sub> H <sub>6</sub>                                                            |               | NR                            | 60                       | NR                            | NR      | NR  | NR      | NR   | B        | A      | A     | A         | A            | A            | A             | A             |
| Benzene Sulfonic Acid C <sub>6</sub> H <sub>5</sub> SO <sub>3</sub> H                            | 10%           | NR                            | 210                      | X                             | 180     | 180 | 140     | X    | X        | B      | B     | NR        | NR           | NR           | X             | B             |
| Benzoic Acid C <sub>6</sub> H <sub>5</sub> COOH                                                  |               | 80                            | 210                      | 160                           | 180     | 73  | 140     | B    | B        | NR     | NR    | NR        | NR           | X            | A             | A             |
| Benzoquinones                                                                                    | all           | X                             | 150                      | X                             | X       | X   | X       | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Benzyl Alcohol C <sub>6</sub> H <sub>5</sub> CH <sub>2</sub> OH                                  |               | NR                            | 60                       | X                             | NR      | 120 | NR      | X    | X        | A      | A     | B         | B            | B            | X             | A             |
| Benzyl Chloride                                                                                  |               | NR                            | NR                       | X                             | X       | X   | X       | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Bismuth Carbonate (BiO) <sub>2</sub> CO <sub>3</sub>                                             |               | X                             | X                        | X                             | 180     | 180 | 140     | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Black Liquor                                                                                     | Sat'd         | NR                            | 180                      | X                             | 180     | 140 | 140     | X    | X        | NR     | NR    | B         | B            | B            | X             | A             |
| Bleach (Sodium Hypochlorite)                                                                     | 12% Cl        | NR                            | 125                      | 73                            | 185     | 120 | 140     | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Blood                                                                                            |               | X                             | X                        | X                             | X       | X   | X       | X    | X        | B      | X     | NR        | NR           | X            | X             | A             |
| Bone Oil                                                                                         |               | X                             | X                        | X                             | X       | X   | X       | X    | X        | A      | X     | X         | X            | X            | A             | A             |
| Borax NaB <sub>4</sub> O <sub>7</sub> * <sub>10</sub> H <sub>2</sub> O                           | Sat'd         | 100                           | 210                      | 160                           | 180     | 212 | 140     | B    | B        | A      | A     | A         | A            | B            | A             | A             |
| Boric Acid H <sub>3</sub> BO <sub>3</sub>                                                        | Sat'd         | 85                            | 210                      | 160                           | 180     | 212 | 140     | B    | B        | B      | B     | NR        | NR           | B            | A             | A             |
| Brewery Slop                                                                                     |               | X                             | X                        | X                             | X       | X   | X       | X    | X        | A      | X     | A         | X            | X            | X             | A             |
| Brine                                                                                            | Sat'd         | 100                           | 210                      | X                             | 180     | 140 | 140     | X    | X        | A      | X     | NR        | NR           | NR           | X             | A             |
| Bromic Acid HBrO <sub>3</sub>                                                                    |               | X                             | X                        | X                             | 180     | NR  | 140     | X    | X        | NR     | NR    | X         | X            | X            | X             | X             |
| Bromine Br <sub>2</sub>                                                                          | Liquid        | NR                            | NR                       | 73                            | NR      | NR  | NR      | X    | X        | NR     | NR    | NR        | NR           | NR           | X             | NR            |
| Bromine Br <sub>3</sub>                                                                          | Gas 25%       | NR                            | NR                       | X                             | 180     | NR  | 140     | X    | X        | NR     | NR    | NR        | NR           | NR           | X             | NR            |
| Bromine Water                                                                                    | Sat'd         | NR                            | 180                      | X                             | 180     | NR  | 140     | X    | X        | NR     | NR    | NR        | NR           | NR           | X             | X             |
| Butadiene H <sub>2</sub> C=CHC=CH <sub>2</sub>                                                   | 50%           | X                             | 60                       | X                             | 180     | NR  | 140     | X    | A        | A      | A     | A         | A            | A            | A             | A             |
| Butane C <sub>4</sub> H <sub>10</sub>                                                            | 50%           | X                             | 60                       | X                             | 180     | 140 | 140     | B    | A        | A      | A     | A         | A            | A            | A             | A             |
| Butanol                                                                                          | all           | X                             | 120                      |                               |         |     |         |      |          |        |       |           |              |              |               |               |
| Buter                                                                                            |               | X                             | X                        | X                             | X       | X   | X       | X    | A        | NR     | X     | NR        | NR           | X            | B             | A             |
| Buttermilk                                                                                       |               | X                             | X                        | X                             | X       | X   | X       | X    | A        | NR     | X     | NR        | X            | X            | A             | A             |
| Butyl Acetate CH <sub>3</sub> COOCH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub> |               | X                             | NR                       | NR                            | NR      | NR  | NR      | B    | A        | B      | B     | B         | B            | B            | X             | A             |
| Butyl Acrylate                                                                                   |               | NR                            | NR                       | X                             | X       | X   | X       | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Butyl Amine                                                                                      |               | NR                            | NR                       | X                             | X       | X   | X       | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Butyl Alcohol CH <sub>3</sub> (CH <sub>2</sub> ) <sub>2</sub> CH <sub>2</sub> OH                 |               | 5% to 85<br>100% NR           | 5% to 120<br>100% to 175 | X                             | NR      | 180 | 140     | X    | A        | B      | X     | X         | B            | X            | A             | A             |
| Butyl Benzyl Phthalate                                                                           | 100%          | 75                            | 180                      | X                             | X       | X   | X       | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Butyl Carbitol                                                                                   | 80%           | NR                            | 100                      | X                             | X       | X   | X       | X    | X        | X      | X     | X         | X            | X            | X             | X             |

KEY:

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

## CHEMICAL RESISTANCE GUIDE

|                                                                                     | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                       | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |  |
|-------------------------------------------------------------------------------------|---------------|-------------------------------|-----------------------|-------------------------------|------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|--|
|                                                                                     |               | GFRPC POLYESTER               | GFRPC VINYL ESTER     | ABS                           | CPVC | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |  |
| CHEMICALS                                                                           |               |                               |                       |                               |      |     |     |      |          |        |       |           |              |              |               |               |  |
| Butyl Cellosolve                                                                    |               | NR                            | 100                   | X                             | NR   | X   | 73  | X    | X        | A      | A     | A         | A            | X            | X             | A             |  |
| n-Butyl Chloride C <sub>4</sub> H <sub>9</sub> Cl                                   |               | X                             | X                     | NR                            | NR   | X   | X   | X    | X        | B      | B     | B         | B            | B            | X             | B             |  |
| Butylene© CH <sub>3</sub> CH=CHCH <sub>3</sub>                                      | Liquid        | 100                           | 175                   | X                             | X    | NR  | 140 | X    | A        | A      | A     | X         | X            | A            | B             | A             |  |
| Butylene Glycol                                                                     | 100%          | 150                           | 160                   | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |  |
| Butylene Oxide                                                                      | 100%          | NR                            | NR                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |  |
| Butyl Phthalate C <sub>16</sub> H <sub>22</sub> O <sub>4</sub>                      |               | X                             |                       | X                             | NR   | 180 | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |  |
| Butyraldehyde                                                                       | 100%          | X                             | NR                    |                               |      |     |     |      |          |        |       |           |              |              |               |               |  |
| Butyl Stearate                                                                      |               | X                             |                       | X                             | X    | X   | 73  | X    | X        | A      | A     | B         | B            | X            | X             | A             |  |
| Butyric Acid CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> COOH                   |               | 60 @ 50%                      | 210 @ 50%<br>80 @ 85% | NR                            | NR   | 180 | 73  | X    | B        | A      | A     | NR        | NR           | NR           | B             | A             |  |
| C                                                                                   |               |                               |                       |                               |      |     |     |      |          |        |       |           |              |              |               |               |  |
| Cadmium Chloride                                                                    |               | 60                            | 180                   | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |  |
| Calcium Bisulfate                                                                   |               | 150                           | 160                   | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |  |
| Calcium Bisulfide Ca(HS) <sub>2</sub> * <sub>6</sub> H <sub>2</sub> O               |               | X                             | X                     | X                             | 73   | X   | NR  | X    | NR       | X      | X     | X         | X            | X            | NR            | A             |  |
| Calcium Bisulfite Ca(HSO <sub>3</sub> ) <sub>2</sub>                                |               | X                             | 180                   | X                             | 180  | 180 | 140 | X    | B        | NR     | NR    | NR        | NR           | NR           | A             | A             |  |
| Calcium Bromide                                                                     |               | 100                           | 200                   | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |  |
| Calcium Carbonate CaCO <sub>3</sub>                                                 |               | 60                            | 180                   | X                             | 180  | 180 | 140 | A    | B        | NR     | NR    | B         | B            | B            | A             | A             |  |
| Calcium Chlorate Ca(ClO <sub>3</sub> ) <sub>2</sub> * <sub>2</sub> H <sub>2</sub> O |               | 150                           | 210                   | X                             | 180  | 180 | 140 | A    | X        | B      | B     | B         | B            | B            | A             | A             |  |
| Calcium Chloride CaCl <sub>2</sub>                                                  |               | 150                           | 210                   | 120                           | 180  | 180 | 140 | A    | B        | B      | B     | A         | A            | NR           | A             | A             |  |
| Calcium Hydroxide Ca(OH) <sub>2</sub>                                               |               | 60                            | 180                   | 160                           | 180  | 180 | 140 | B    | B        | NR     | NR    | NR        | NR           | NR           | A             | A             |  |
| Calcium Hypochlorite Ca(OCl) <sub>2</sub>                                           | 30%           | 60                            | 180                   | 160                           | 180  | 140 | 140 | B    | B        | NR     | NR    | NR        | NR           | NR           | NR            | B             |  |
| Calcium Nitrate Ca(NO <sub>3</sub> ) <sub>2</sub>                                   |               | 150                           | 210                   | X                             | 180  | 180 | 140 | X    | X        | B      | B     | B         | B            | X            | X             | A             |  |
| Calcium Oxide CaO                                                                   |               |                               | X                     | X                             | 180  | X   | 140 | X    | X        | X      | X     | A         | A            | B            | X             | A             |  |
| Calcium Sulfate CaSO <sub>4</sub>                                                   |               | 150                           | 210                   | 100                           | 180  | 180 | 140 | B    | B        | A      | B     | A         | A            | B            | A             | A             |  |
| Calcium Sulfite                                                                     |               | 150                           | 180                   | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |  |
| Calgon                                                                              |               | X                             | X                     | X                             | X    | A   | X   | X    | X        | B      | X     | NR        | NR           | X            | A             | A             |  |
| Camphor C <sub>10</sub> H <sub>16</sub> O                                           |               | X                             | X                     | NR                            | X    | 73  | 73  | X    | X        | B      | B     | B         | B            | B            | X             | A             |  |
| Cane Sugar C <sub>12</sub> H <sub>22</sub> O <sub>11</sub>                          |               | X                             | 180                   | X                             | 180  | 180 | 140 | X    | B        | A      | A     | A         | A            | A            | A             | A             |  |
| Capric Acid                                                                         |               | 100                           | 180                   | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |  |
| Caprylic Acid CH <sub>3</sub> (CH <sub>2</sub> )COOH                                |               | 60                            | 180                   | X                             | X    | X   | X   | X    | X        | X      | X     | A         | A            | B            | X             | A             |  |
| Carbitol                                                                            |               | X                             | X                     | X                             | NR   | X   | 73  | X    | X        | B      | B     | B         | B            | B            | X             | B             |  |
| Carbon Bisulfide CS <sub>2</sub>                                                    |               | X                             | X                     | X                             | X    | NR  | NR  | X    | A        | B      | X     | B         | X            | X            | A             | A             |  |
| Carbon Dioxide CO <sub>2</sub>                                                      | Dry 100%      | 150                           | 210                   | 160                           | 180  | 140 | 140 | X    | X        | A      | A     | A         | A            | A            | X             | A             |  |

KEY:

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

# CHEMICAL RESISTANCE GUIDE

|                                                                                                      | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                   | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|------------------------------------------------------------------------------------------------------|---------------|-------------------------------|-------------------|-------------------------------|------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                                                      |               | GFRPC POLYESTER               | GFRPC VINYL ESTER | ABS                           | CPVC | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| CHEMICALS                                                                                            |               |                               |                   |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Carbon Dioxide CO <sub>3</sub>                                                                       | Wet           | 150                           | 160               | 160                           | 180  | 140 | 140 | X    | B        | A      | A     | B         | B            | B            | A             | A             |
| Carbon Disulfide CS <sub>2</sub>                                                                     |               | NR                            | NR                | NR                            | NR   | NR  | NR  | NR   | B        | B      | B     | A         | A            | A            | A             | A             |
| Carbon Methyl Cellulose                                                                              |               | X                             | 120               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Carbon Monoxide CO                                                                                   | Gas           | 150                           | 210               | X                             | 180  | 180 | 140 | A    | A        | A      | A     | A         | A            | B            | A             | A             |
| Carbon Tetrachloride CCl <sub>4</sub>                                                                |               | 75                            | 100               | NR                            | NR   | NR  | 73  | NR   | B        | A      | A     | NR        | NR           | A            | A             | A             |
| Carbonic Acid H <sub>2</sub> CO <sub>3</sub>                                                         | Sat'd         | 150                           | 160               | 185                           | 180  | 140 | 140 | B    | A        | NR     | NR    | B         | B            | B            | A             | A             |
| Carbowax 7                                                                                           |               | 100                           | 180               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Carbowax 7 Polyethylene Glycols                                                                      |               | 100                           | 150               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Carboxy Methyl Cellulose                                                                             |               | X                             | 150               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Carboxy Ethyl Cellulose                                                                              |               | X                             | 150               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Cashew nut oil                                                                                       | 100%          | 120                           | 180               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Castor Oil                                                                                           |               | 140                           | 160               | X                             | NR   | 140 | 140 | X    | X        | A      | A     | A         | A            | A            | A             | A             |
| Catsup                                                                                               |               | X                             | X                 | X                             | X    | A   | A   | X    | NR       | B      | X     | NR        | NR           | X            | A             | A             |
| Caustic Potash (Potassium Hydroxide) KOH                                                             | 50%           | X                             | X                 | 160                           | 180  | 180 | 140 | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Caustic Soda (see Sodium Hydroxide) NaOH                                                             |               |                               |                   |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Cellosolve                                                                                           |               | X                             | X                 | X                             | NR   | 73  | 73  | X    | X        | A      | A     | A         | A            | A            | X             | A             |
| Cellosolve Acetate CH <sub>3</sub> COOCH <sub>2</sub> CH <sub>2</sub> OC <sub>2</sub> H <sub>5</sub> |               | X                             | X                 | X                             | NR   | 73  | 73  | X    | X        | B      | X     | X         | B            | X            | X             | B             |
| Chloral Hydrate CCl <sub>3</sub> CH(OH) <sub>2</sub>                                                 |               | X                             | X                 | X                             | 180  | NR  | 140 | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Chloramine NH <sub>2</sub> Cl                                                                        | Dilute        | X                             | X                 | X                             | NR   | 73  | 73  | X    | X        | B      | B     | NR        | NR           | NR           | X             | B             |
| Chloracetic Acid C <sub>2</sub> H <sub>3</sub> ClO <sub>2</sub>                                      |               | X                             | X                 | X                             | X    | NR  | A   | NR   | B        | NR     | X     | NR        | NR           | X            | NR            | NR            |
| Chloric Acid HClO <sub>3</sub> * <sub>7</sub> H <sub>2</sub> O                                       | 10%           | X                             | 80                | X                             | 180  | 73  | 140 | X    | X        | NR     | NR    | NR        | NR           | NR           | NR            | B             |
| Chloric Acid HClO <sub>3</sub> * <sub>7</sub> H <sub>2</sub> O                                       | 20%           | X                             | 80                | X                             | 180  | 73  | 140 | X    | X        | NR     | NR    | NR        | NR           | NR           | NR            | NR            |
| Chlorine (Anhydrous Liquid)                                                                          |               | NR                            | X                 | X                             | X    | NR  | NR  | NR   | NR       | NR     | X     | B         | B            | X            | A             | A             |
| Chlorine Dioxide (Air)                                                                               |               | 60                            | 160               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Chlorine Dioxide (Wet gas)                                                                           |               | NR                            | 160               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Chlorine Gas (Moisture Content <15O ppm)                                                             |               | 60                            | 210               | X                             | X    | X   | X   | X    | X        | NR     | NR    | B         | A            | A            | X             | A             |
| Chlorine Gas (Moisture Content >15O ppm)                                                             |               | NR                            | 210               | NR                            | NR   | NR  | NR  | X    | X        | NR     | NR    | NR        | NR           | NR           |               | NR            |
| Chlorine                                                                                             | Liquid        | NR                            | NR                | NR                            | NR   | NR  | NR  | X    | NR       | B      | B     | NR        | NR           | NR           | X             | NR            |
| Chlorinated Water (<3500ppm)                                                                         |               | NR                            | 180               | X                             | X    | X   | X   | X    | NR       | B      | NR    | X         | X            | NR           | X             | A             |
| Chlorinated Water (>3500ppm)                                                                         |               | X                             | 180               | X                             | X    | X   | X   | X    | NR       | NR     | NR    | X         | X            | NR           | X             | A             |
| Chlorinated Wax                                                                                      |               | 100                           | 160               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |

KEY:

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

## CHEMICAL RESISTANCE GUIDE

|                                                                                                 | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                   | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|-------------------------------------------------------------------------------------------------|---------------|-------------------------------|-------------------|-------------------------------|------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                                                 |               | GFRPC POLYESTER               | GFRPC VINYL ESTER | ABS                           | CPVC | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| CHEMICALS                                                                                       |               |                               |                   |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Chloroacetic Acid CH <sub>2</sub> ClCOOH                                                        | 25%           | NR                            | 180               | NR                            | 180  | NR  | 140 | X    | X        | NR     | NR    | NR        | NR           | NR           | X             | NR            |
| Chloroacetic Acid CH <sub>2</sub> ClCOOH                                                        | 50%           | NR                            | 100               | NR                            | 180  | NR  | 140 | X    | X        | NR     | NR    | NR        | NR           | NR           | X             | NR            |
| Chlorobenzene C <sub>6</sub> H <sub>5</sub> Cl                                                  | Dry           | NR                            | NR                | NR                            | NR   | 73  | NR  | NR   | B        | A      | A     | NR        | NR           | B            | A             | A             |
| Chloroform CHCl <sub>3</sub>                                                                    | Dry           | NR                            | NR                | NR                            | NR   | NR  | NR  | NR   | NR       | A      | A     | NR        | NR           | NR           | A             | A             |
| Chloropyridine                                                                                  |               | NR                            | NR                | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Chlorosulfonic Acid ClSO <sub>2</sub> OH                                                        |               | NR                            | NR                | X                             | 73   | NR  | 73  | NR   | NR       | NR     | NR    | B         | B            | NR           | NR            | NR            |
| Chloroethylene (1,1,1-trichloroethylene)                                                        |               | NR                            | NR                | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Chlorotoluene                                                                                   | 100%          | NR                            | NR                | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Chromic Acid H <sub>2</sub> CrO <sub>4</sub>                                                    | 10%           | NR                            | 100               | 73                            | 180  | 140 | 140 | X    | X        | NR     | NR    | NR        | NR           | NR           | B             | A to 70       |
| Chromic Acid H <sub>2</sub> CrO <sub>5</sub>                                                    | 30%           | NR                            | NR                | NR                            | 180  | 73  | 140 | X    | X        | NR     | NR    | NR        | NR           | NR           | B             | B to 70       |
| Chromic Acid H <sub>2</sub> CrO <sub>6</sub>                                                    | 50%           | NR                            | NR                | NR                            | NR   | 73  | NR  | NR   | B        | NR     | NR    | NR        | NR           | NR           | B             | B to 71       |
| Chromic Fluoride                                                                                |               | X                             | 60                | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Chromium Sulfate                                                                                |               | 100                           | 150               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Chromous Sulfate                                                                                |               | 150                           | 180               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Cider                                                                                           |               | X                             | X                 | X                             | X    | X   | A   | B    | B        | A      | X     | NR        | NR           | X            | A             | A             |
| Cinnamon Oil                                                                                    |               | X                             | X                 | X                             | X    | A   | X   | X    | X        | X      | X     | X         | X            | X            | A             | A             |
| Citric Acid C <sub>6</sub> H <sub>8</sub> O <sub>7</sub>                                        | Sat'd         | 100                           | 210               | 160                           | 180  | 140 | 140 | B    | B        | NR     | NR    | NR        | NR           | NR           | A             | A             |
| Citric Oils                                                                                     |               | X                             | X                 | X                             | X    | A   | X   | X    | B        | B      | X     | X         | X            | X            | A             | A             |
| Clove Oil                                                                                       |               | X                             | X                 | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | A             | A             |
| Cobalt Chloride                                                                                 |               | 100                           | 180               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Cobalt Citrate                                                                                  |               | 100                           | 180               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Cobalt Naphthenate                                                                              |               | X                             | 150               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Cobalt Nitrate                                                                                  |               | 100                           | 120               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Cobalt Octoate                                                                                  |               | X                             | 150               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Coconut Oil                                                                                     |               | 60                            | 180               | X                             | NR   | 73  | 140 | X    | B        | B      | B     | NR        | NR           | B            | A             | A             |
| Cod Liver Oil                                                                                   |               | 140                           | 195               | X                             | X    | A   | X   | X    | B        | X      | X     | X         | X            | X            | A             | A             |
| Coffee                                                                                          |               | X                             | X                 | X                             | 180  | 140 | 140 | X    | A        | A      | A     | NR        | NR           | NR           | A             | A             |
| Coke Oven Gas                                                                                   |               | X                             | X                 | X                             | X    | 73  | 140 | X    | X        | B      | B     | A         | A            | A            | X             | A             |
| Copper Acetate Cu(C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> ) <sub>2</sub> *H <sub>2</sub> O | Sat'd         | 100                           | 210               | X                             | 73   | 73  | 73  | X    | X        | NR     | NR    | NR        | NR           | NR           | X             | A             |
| Copper Ammonium Chloride                                                                        | all           | 100                           | 180               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Copper Carbonate CuCO <sub>3</sub>                                                              | Sat'd         | X                             | X                 | X                             | 180  | X   | 140 | X    | X        | X      | X     | X         | X            | X            | X             | A             |
| Copper Chloride CuCl <sub>2</sub>                                                               | Sat'd         | 150                           | 210               | 73                            | 180  | 140 | 140 | B    | NR       | NR     | NR    | NR        | NR           | NR           | NR            | X             |
| Copper Cyanide                                                                                  |               | NR                            | 210               | X                             | 180  | X   | 140 | B    | NR       | NR     | NR    | NR        | NR           | NR           | A             | A             |
| Copper Fluoborate (or tetrafluoborate) Cu(BF <sub>4</sub> ) <sub>2</sub>                        |               | X                             | X                 | X                             | X    | X   | A   | A    | NR       | NR     | X     | NR        | NR           | X            | NR            | NR            |
| Copper Fluoride CuF <sub>2</sub> * <sub>2</sub> H <sub>2</sub> O                                | 2%            | NR                            | 210               | X                             | 180  | 73  | 140 | X    | X        | X      | X     | X         | X            | X            | X             | X             |

KEY:

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

## CHEMICAL RESISTANCE GUIDE

|                                                                                                  | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                   | PLASTICS MAX TEMPERATURE (°F) |      |         |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|--------------------------------------------------------------------------------------------------|---------------|-------------------------------|-------------------|-------------------------------|------|---------|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                                                  |               | GFRPC POLYESTER               | GFRPC VINYL ESTER | ABS                           | CPVC | PP      | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| CHEMICALS                                                                                        |               |                               |                   |                               |      |         |     |      |          |        |       |           |              |              |               |               |
| Copper Nitrate Cu(NO <sub>3</sub> ) <sub>2</sub> * <sub>3</sub> H <sub>2</sub> O                 | 30%           | 150                           | 210               | X                             | 180  | 140     | 140 | B    | NR       | NR     | NR    | NR        | NR           | NR           | A             | A             |
| Copper Sulfate CuSO <sub>4</sub> * <sub>5</sub> H <sub>2</sub> O                                 | Sat'd         | 150                           | 210               | 120                           | 180  | 120     | 140 | X    | X        | NR     | NR    | NR        | NR           | NR           | B             | A             |
| Corn Oil                                                                                         |               | 140                           | 200               | X                             | NR   | 73      | 140 | X    | B        | B      | B     | B         | B            | B            | A             | A             |
| Corn Starch                                                                                      |               | 100                           | 210               |                               |      |         |     |      |          |        |       |           |              |              |               |               |
| Corn Syrup                                                                                       |               | 100                           | 210               | X                             | 185  | 140     | 140 | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Cottonseed Oil                                                                                   |               | 140                           | 210               | 120                           | NR   | 140     | 140 | X    | B        | B      | B     | B         | B            | B            | A             | A             |
| Cream                                                                                            |               | X                             | X                 | X                             | X    | A       | X   | X    | A        | B      | X     | NR        | NR           | X            | A             | A             |
| Creosote                                                                                         |               | X                             | X                 | X                             | NR   | 73      | C   | NR   | X        | B      | B     | A         | A            | A            | A             | A             |
| Cresol CH <sub>3</sub> C <sub>6</sub> H <sub>4</sub> OH                                          | 90%           | NR                            | NR                | NR                            | NR   | B to 73 | C   | NR   | B        | X      | X     | X         | X            | X            | A             | A             |
| Cresylic Acid                                                                                    | 50%           | NR                            | NR                | X                             | 180  | X       | 140 | B    | B        | A      | A     | A         | A            | B            | A             | A             |
| Crude Oil                                                                                        |               | 100                           | 210               | X                             | NR   | 140     | 140 | X    | A        | NR     | NR    | NR        | NR           | B            | A             | A             |
| Cuprlc Sulfate CuSO <sub>4</sub> * <sub>5</sub> H <sub>2</sub> O                                 | Sat'd         | X                             | X                 | 100                           | 180  | 73      | 140 | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Cuprous Chloride CuCl                                                                            | Sat'd         | X                             | X                 | 70                            | 180  | X       | 140 | X    | X        | NR     | NR    | X         | X            | X            | X             | X             |
| Cyanic Acid CHNO                                                                                 |               | X                             | X                 | X                             | X    | X       | X   | X    | X        | X      | X     | X         | X            | X            | A             | A             |
| Cyclohexane C <sub>6</sub> H <sub>12</sub>                                                       |               | 60                            | 120               | 73                            | NR   | NR      | NR  | X    | A        | A      | A     | B         | B            | A            | A             | A             |
| Cyclohexanol C <sub>6</sub> H <sub>11</sub> OH                                                   |               | NR                            | X                 | NR                            | NR   | 140     | NR  | X    | X        | X      | X     | A         | A            | X            | X             | A             |
| Cyclohexanone C <sub>6</sub> H <sub>10</sub> O                                                   | Liquid        | NR                            | NR                | NR                            | NR   | 73      | NR  | X    | X        | B      | B     | B         | B            | B            | X             | A             |
| D                                                                                                |               |                               |                   |                               |      |         |     |      |          |        |       |           |              |              |               |               |
| Decalin                                                                                          | all           | NR                            | 140               | X                             | X    | X       | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Decanes                                                                                          | 100%          | 85                            | 195               | X                             | X    | X       | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Decanol (Decyl Alcohol)                                                                          |               | 85                            | 120               | X                             | X    | X       | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Decenes                                                                                          | 100%          | 85                            | 195               | X                             | X    | X       | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Detergents (Heavy Duty)                                                                          |               | NR                            | 160               | X                             | NR   | 180     | 140 | B    | A        | A      | A     | A         | A            | A            | A             | A             |
| Dextrin (Starch Gum)                                                                             | Sat'd         | X                             | X                 | X                             | 180  | 140     | 140 | X    | X        | A      | A     | B         | B            | B            | X             | A             |
| Dextrose C <sub>6</sub> H <sub>12</sub> O <sub>6</sub>                                           |               | X                             | X                 | X                             | 180  | 140     | 140 | X    | X        | A      | X     | A         | X            | X            | X             | A             |
| Diacetone Alcohol CH <sub>3</sub> COCH <sub>2</sub> C(CH <sub>3</sub> ) <sub>2</sub> OH          |               | X                             | X                 | X                             | NR   | 120     | NR  | X    | X        | A      | A     | A         | A            | A            | X             | A             |
| Diallylphthalate                                                                                 |               | 75                            | 180               | X                             | X    | X       | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Diammonium Phosphate                                                                             | 65%           | NR                            | 210               | X                             | X    | X       | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Dibasic Acids                                                                                    | 30%           | X                             | 180               | X                             | X    | X       | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Dibromephenol                                                                                    |               | NR                            | NR                | X                             | X    | X       | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Dibromopropanol                                                                                  |               | NR                            | NR                | X                             | X    | X       | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Dibutoxyethyl Phthalate C <sub>20</sub> H <sub>30</sub> O <sub>6</sub>                           |               | X                             | X                 | X                             | NR   | X       | NR  | X    | X        | A      | A     | A         | A            | A            | X             | A             |
| Dibutyl Ether                                                                                    |               | NR                            | 120               | X                             | X    | X       | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Dibutyl Phthalate C <sub>6</sub> H <sub>4</sub> (COOC <sub>4</sub> H <sub>9</sub> ) <sub>2</sub> |               | 75                            | 180               | NR                            | NR   | 73      | NR  | X    | X        | A      | A     | A         | A            | A            | X             | A             |

KEY:

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available



## CHEMICAL RESISTANCE GUIDE

| CHEMICALS                                     | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                   | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|-----------------------------------------------|---------------|-------------------------------|-------------------|-------------------------------|------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                               |               | GFRPC POLYESTER               | GFRPC VINYL ESTER | ABS                           | CPVC | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| Dibutyl Sebacate $C_4H_9OCO(CH_2)_8OCOC_4H_9$ |               | 75                            | 200               | X                             | X    | 73  | 73  | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Dichlorobenzene $C_6H_4Cl_2$                  |               | NR                            | NR                | NR                            | NR   | NR  | NR  | X    | X        | X      | X     | A         | A            | X            | X             | A             |
| Dichlorethane $C_2H_4Cl_2$                    |               | NR                            | NR                | X                             | X    | X   | NR  | NR   | X        | X      | X     | X         | X            | X            | A             | A             |
| Dichloroethylene $C_2H_4Cl_2$                 |               | NR                            | NR                | X                             | NR   | NR  | NR  | X    | X        | X      | X     | X         | B            | X            | X             | B             |
| Dichloromethane (Methylene Chloride)          |               | NR                            | NR                | X                             | NR   | NR  | NR  | X    | X        | B      | X     | B         | B            | B            | X             | A             |
| Dichloropropane                               |               | NR                            | NR                | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Dichloropropene                               |               | NR                            | NR                | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Dichloropropionic Acid                        |               | NR                            | NR                | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Diesel Fuels                                  |               | 60                            | 180               | X                             | NR   | 140 | 140 | X    | A        | A      | A     | A         | A            | A            | A             | A             |
| Diethanol Amine                               |               | NR                            | 80                |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Diethyl Amine $C_4H_{10}NH$                   |               | NR                            | NR                | NR                            | NR   | X   | NR  | X    | A        | NR     | NR    | A         | A            | NR           | A             | A             |
| Diethyl Cellosolve $C_6H_{14}O_2$             |               | X                             | X                 | X                             | X    | X   | X   | X    | X        | X      | X     | A         | A            | X            | X             | A             |
| Diethyl Ether $C_4H_{10}O$                    |               | NR                            | NR                | NR                            | NR   | 73  | 73  | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Diethyl Ketone                                |               | NR                            | NR                | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Diethyl Formamide                             |               | NR                            | NR                | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Diethyl Maleate                               |               | NR                            | NR                | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Diethylenetriamine (DETA)                     |               | NR                            | NR                | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Diethylene glycol dimethyl ether              | 100%          | NR                            | NR                | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Diethylene glycol monobutyl ether             | 100%          | NR                            | 90                | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Diethylene Glycol $C_4H_{10}O_3$              |               | 85                            | 200               | X                             | X    | X   | X   | B    | X        | A      | X     | X         | X            | X            | A             | X             |
| Diglycolic Acid $O(CH_2COOH)_2$               | Sat'd         | X                             | X                 | X                             | 180  | 140 | 140 | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Diisobutyl Ketone                             |               | NR                            | NR                | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Diisobutyl Phthalate                          |               | 75                            | 120               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Diisobutylene                                 |               | NR                            | NR                | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Diisopropanol Amine                           |               | NR                            | 110               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Dimethylamine $(CH_3)_2NH$                    |               | NR                            | X                 | X                             | X    | 73  | 140 | X    | X        | X      | X     | NR        | X            | X            | X             | A             |
| Dimethyl Formamide $HCON(CH_3)_2$             |               | NR                            | NR                | NR                            | NR   | 180 | NR  | X    | X        | B      | B     | B         | B            | B            | X             | A             |
| Dimethyl Phthalate                            |               | NR                            | 150               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Dimethyl Sulphide                             | 100%          | NR                            | NR                | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Dimethyl Sulphoxide                           | 20%           | NR                            | NR                | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Dinonyl Phthalate                             | 100%          | 100                           | 140               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Diocetyl Phthalate $C_6H_4(COOC_8H_{17})_2$   |               | 75                            | 180               | NR                            | NR   | NR  | NR  | X    | X        | A      | A     | NR        | NR           | NR           | X             | X             |
| Dioxane $C_4H_8O_2$                           |               | NR                            | NR                | X                             | NR   | NR  | NR  | X    | X        | A      | A     | A         | A            | A            | X             | X             |
| Diphenyl Ether                                |               | NR                            | 80                | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |

KEY:

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

## CHEMICAL RESISTANCE GUIDE

|                                                                                | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                                     | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|--------------------------------------------------------------------------------|---------------|-------------------------------|-------------------------------------|-------------------------------|------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                                |               | GFRPC POLYESTER               | GFRPC VINYL ESTER                   | ABS                           | CPVC | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| CHEMICALS                                                                      |               |                               |                                     |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Diphenyl Oxide (C <sub>6</sub> H <sub>5</sub> ) <sub>2</sub> O                 | Sat'd         | X                             | NR                                  | X                             | X    | X   | X   | X    | X        | A      | A     | A         | X            | X            | A             | X             |
| Dipiperazine Sulphate Solution                                                 | all           | X                             | 100                                 | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Dipotassium hydrogenphosphate                                                  | 5%            | 85                            | 195                                 | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Dipotassium hydrogenphosphate                                                  | 10%           | NR                            | 195                                 | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Dipropylamine (-n)                                                             | 50%           | NR                            | 75                                  | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Dipropylene Glycol                                                             | all           | 85                            | 200                                 | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Disodium Phosphate Na <sub>2</sub> HPO <sub>4</sub>                            |               | 5% to 85                      | 10% to 195                          | X                             | 180  | 140 | 140 | X    | X        | B      | B     | B         | B            | X            | X             | A             |
| Dipropylamine (n-)                                                             | 50%           | NR                            | 75                                  | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Dipropylene glycol                                                             | all           | 85                            | 195                                 | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Divinyl Benzene                                                                | 100%          | NR                            | 75                                  | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Dodecyl Alcohol                                                                | 100%          | 85                            | 160                                 | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Dodecyl Benzene Sulphonic Acid                                                 | all           | 75                            | 195                                 | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Dodecyl Guanidine Hydrochloride                                                | all           | 100                           | 180                                 | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Dodecene                                                                       | 100%          | 85                            | 180                                 | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Dowanol DB Glycoether                                                          | all           | NR                            | 100                                 | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Dow Therm A C <sub>12</sub> H <sub>10</sub> *C <sub>12</sub> H <sub>10</sub> O |               | X                             | X                                   | X                             | X    | X   | NR  | X    | X        | A      | A     | B         | A            | A            | X             | A             |
| Dyes                                                                           |               | X                             | X                                   | X                             | X    | X   | X   | X    | B        | B      | X     | X         | X            | X            | A             | A             |
| E                                                                              |               |                               |                                     |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Embalming Fluid                                                                |               | X                             | 110                                 | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Epichlorohydrin                                                                | 100%          | NR                            | NR                                  | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Epoxidized Soy Bean Oil                                                        |               | 120                           | 195                                 | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Epoxy Resins                                                                   | 100%          | X                             | 110                                 | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Esters of Fatty Acids                                                          | 100%          | 100                           | 195                                 | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Ethane C <sub>2</sub> H <sub>6</sub>                                           |               | X                             | X                                   | X                             | X    | X   | X   | X    | A        | A      | X     | X         | X            | X            | A             | X             |
| Ethanol amine                                                                  |               | NR                            | NR                                  | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | B            | A             | A             |
| Ether ROR                                                                      |               | X                             | X                                   | NR                            | NR   | NR  | NR  | X    | A        | A      | A     | B         | B            | B            | A             | A             |
| Ethyl Acetate CH <sub>3</sub> COOCH <sub>2</sub> CH <sub>3</sub>               |               | NR                            | NR                                  | NR                            | NR   | NR  | NR  | B    | B        | B      | X     | A         | A            | A            | A             | A             |
| Ethyl Acrylate CH <sub>2</sub> =CHCOOC <sub>2</sub> H <sub>5</sub>             |               | NR                            | NR                                  | X                             | NR   | X   | NR  | X    | X        | A      | X     | A         | A            | A            | X             | A             |
| Ethyl Alcohol (Ethanol) C <sub>2</sub> H <sub>5</sub> OH                       |               | 85 @ 20%<br>NR @ 50%          | 150 @ 10%<br>100 @ 50% 80<br>@ 100% | X                             | NR   | 140 | 140 | X    | X        | A      | A     | A         | A            | A            | X             | A             |
| Ethyl Benzene C <sub>6</sub> H <sub>5</sub> C <sub>2</sub> H <sub>5</sub>      |               | NR                            | NR                                  | X                             | X    | NR  | NR  | X    | X        | B      | X     | B         | B            | B            | X             | A             |
| Ethyl Bromide                                                                  |               | NR                            | NR                                  |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Ethyl Chloride C <sub>2</sub> H <sub>5</sub> Cl                                | Dry           | NR                            | NR                                  | X                             | NR   | NR  | NR  | NR   | B        | A      | X     | A         | A            | A            | A             | A             |
| Ethyl Ether (Diethyl Ether) C <sub>4</sub> H <sub>10</sub> O                   |               | NR                            | NR                                  | NR                            | NR   | 73  | 73  | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Ethyl Sulfate C <sub>2</sub> H <sub>6</sub> O <sub>4</sub> S                   |               | NR                            | NR                                  | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | NR            | X             |

**KEY:**

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

## CHEMICAL RESISTANCE GUIDE

|                                                                                  | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                          | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|----------------------------------------------------------------------------------|---------------|-------------------------------|--------------------------|-------------------------------|------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                                  |               | GFRPC POLYESTER               | GFRPC VINYL ESTER        | ABS                           | CPVC | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
|                                                                                  |               |                               |                          |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| CHEMICALS                                                                        |               |                               |                          |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Ethylene Bromide BrCH <sub>2</sub> CH <sub>2</sub> Br                            | Dry           | X                             | X                        | X                             | NR   | X   | NR  | X    | X        | A      | X     | X         | A            | A            | X             | A             |
| Ethylene Chloride (Vinyl Chloride) CH <sub>2</sub> CHCl                          | Dry           | NR                            | NR                       | NR                            | NR   | NR  | NR  | X    | B        | X      | X     | X         | X            | X            | A             | A             |
| Ethylene Chloroformate                                                           |               | NR                            | NR                       | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Ethylene Chlorohydrin ClCH <sub>2</sub> CH <sub>2</sub> OH                       |               | NR                            | 100                      | X                             | NR   | 73  | NR  | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Ethylene Diamine NH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> NH <sub>2</sub> |               | NR                            | NR                       | NR                            | X    | 73  | NR  | X    | X        | A      | A     | A         | B            | X            | X             | X             |
| Ethylene Diamine Tetra Acetic Acid                                               |               | NR                            | 100                      | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Ethylene Dibromide                                                               | 100%          | NR                            | NR                       | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Ethylene Dichloride C <sub>2</sub> H <sub>4</sub> Cl <sub>2</sub>                | Dry           | NR                            | NR                       | NR                            | NR   | NR  | NR  | NR   | NR       | A      | X     | A         | A            | A            | A             | A             |
| Ethylene Glycol OHCH <sub>2</sub> CH <sub>2</sub> OH                             | all           | 150                           | 200                      | 73                            | NR   | 212 | 140 | B    | A        | A      | A     | A         | A            | A            | A             | A             |
| Ethylene Glycol Monobutyl                                                        | 100%          | NR                            | 100                      | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Ethylene Oxide CH <sub>2</sub> CH <sub>2</sub> O                                 |               | NR                            | NR                       | X                             | NR   | NR  | NR  | X    | A        | A      | X     | B         | A            | A            | X             | A             |
| Ethyl Formate                                                                    |               | X                             | X                        | X                             | X    | X   | X   | X    | X        | A      | X     | A         | A            | X            | X             | A             |
| Ethyl Hexanol (2-)                                                               | all           | NR                            | 180                      | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Ethylhexylacrylat (-2)                                                           | 100%          | NR                            | 75                       | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Eucalyptus Oil                                                                   |               | 100                           | 140                      | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| F                                                                                |               |                               |                          |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Fatty Acids R-COOH                                                               |               | 150                           | 210                      | 160                           | 73   | 120 | 140 | B    | B        | NR     | NR    | NR        | NR           | NR           | A             | A             |
| Ferric Acid                                                                      |               | X                             | X                        | X                             | X    | A   | A   | X    | NR       | NR     | NR    | NR        | NR           | X            | NR            | NR            |
| Ferric Acetate                                                                   | all           | 100                           | 180                      | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Ferric Chloride (Aqueous) FeCl <sub>3</sub>                                      | Sat'd         | 150                           | 210                      | 120                           | 180  | 140 | 140 | X    | X        | NR     | NR    | NR        | NR           | NR           | X             | NR            |
| Ferric Hydroxide Fe(OH) <sub>3</sub>                                             | Sat'd         | X                             | X                        | 160                           | 180  | 140 | 140 | X    | X        | X      | X     | NR        | NR           | X            | X             | A             |
| Ferric Nitrate Fe(NO <sub>3</sub> ) <sub>3</sub> * 9H <sub>2</sub> O             | Sat'd         | 150                           | 210                      | 160                           | 180  | 140 | 140 | B    | NR       | NR     | NR    | NR        | NR           | NR           | A             | A             |
| Feric Sulfate Fe <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub>                    |               | 150                           | 210                      | 160                           | 180  | 140 | 140 | X    | NR       | NR     | NR    | NR        | NR           | NR           | A             | A             |
| Ferrous Chloride FeCl <sub>2</sub>                                               | Sat'd         | 150                           | 210                      | 160                           | 180  | 140 | 140 | B    | NR       | NR     | NR    | NR        | NR           | NR           | NR            | NR            |
| Ferrous Hydroxide Fe(OH) <sub>2</sub>                                            | Sat'd         | X                             | X                        | 160                           | 180  | 140 | 140 | X    | X        | X      | X     | NR        | X            | X            | X             | A             |
| Ferrous Nitrate Fe(NO <sub>3</sub> ) <sub>2</sub>                                |               | 150                           | 210                      | 160                           | 180  | 140 | 140 | X    | X        | X      | X     | X         | X            | X            | X             | A             |
| Ferrous Sulfate FeSO <sub>4</sub>                                                |               | 150                           | 210                      | 160                           | 180  | 140 | 140 | B    | NR       | NR     | X     | NR        | NR           | NR           | A             | A             |
| Fertilizer 8-8-8                                                                 |               | NR                            | 160                      | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Fertilizer (URAN - Urea Ammonium Nitrate)                                        |               | 75                            | 120                      | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Fish Oil                                                                         |               | X                             | X                        | X                             | 180  | 180 | 140 | X    | X        | A      | X     | B         | A            | A            | X             | A             |
| Flue Gas                                                                         |               | X                             | 160                      | X                             | X    | X   | X   | X    | X        | A      | X     | A         | A            | A            | X             | A             |
| Fluoroboric Acid HBF <sub>4</sub>                                                |               | NR                            | 210 @ 10%<br>120 @ sat'd | 73                            | 73   | 140 | 140 | B    | X        | B      | X     | NR        | NR           | X            | NR            | A             |

**KEY:**

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

## CHEMICAL RESISTANCE GUIDE

| CHEMICALS                                                                                     | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                                                | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|-----------------------------------------------------------------------------------------------|---------------|-------------------------------|------------------------------------------------|-------------------------------|------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                                               |               | GFRPC POLYESTER               | GFRPC VINYL ESTER                              | ABS                           | CPVC | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| Fluorine Gas F <sub>2</sub>                                                                   | Dry 100%      | NR                            | 60                                             | X                             | 73   | NR  | 73  | NR   | NR       | B      | X     | NR        | NR           | A            | NR            | A             |
| Fluorine Gas F <sub>3</sub>                                                                   | Wet           | NR                            | 60                                             | NR                            | 73   | NR  | 73  | NR   | NR       | NR     | X     | NR        | NR           | NR           | NR            | A             |
| Fluorocarbon 11                                                                               | 100%          | NR                            | 110                                            | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Fluorosilicic Acid (Hydrofluosilicic Acid) H <sub>2</sub> SiF <sub>6</sub>                    | 50%           | NR                            | 150 @ 20%<br>100 @ 35%<br>180 @ fumes          | X                             | 73   | 73  | 140 | B    | NR       | X      | X     | X         | NR           | NR           | X             | B             |
| Formaldehyde HCHO                                                                             | Dilute        | 60                            | 150                                            | 160                           | 73   | 140 | 140 | B    | A        | A      | X     | NR        | NR           | B            | A             | A             |
| Formaldehyde HCHO                                                                             | 35%           | 60                            | 150                                            | 160                           | NR   | 140 | 140 | B    | A        | A      | X     | NR        | X            | B            | A             | A             |
| Formaldehyde HCHO                                                                             | 50%           | 60                            | 150                                            | X                             | NR   | X   | 140 | B    | A        | B      | X     | NR        | X            | B            | A             | A             |
| Formic Acid HCOOH                                                                             |               | 60 @ 10%                      | 180 @ 10%<br>100 @ 50%<br>75 @ 85% NR<br>@ 98% | NR                            | NR   | 140 | 73  | B    | NR       | NR     | X     | NR        | NR           | NR           | A             | A             |
| Freon <sub>11</sub> CCl <sub>3</sub> F                                                        | 100%          | NR                            | 75                                             | NR                            | 73   | NR  | 140 | B    | B        | A      | A     | B         | B            | B            | X             | A             |
| Freon <sub>12</sub> CCl <sub>3</sub> F <sub>2</sub>                                           | 100%          | X                             | X                                              | X                             | 73   | 73  | 140 | B    | B        | A      | A     | B         | B            | B            | X             | A             |
| Freon <sub>21</sub> CHCl <sub>2</sub> F                                                       | 100%          | X                             | X                                              | X                             | X    | NR  | NR  | X    | X        | A      | A     | B         | B            | B            | X             | A             |
| Freon <sub>22</sub> CHClF <sub>3</sub>                                                        | 100%          | X                             | X                                              | X                             | 73   | 73  | NR  | X    | B        | A      | A     | B         | B            | B            | X             | A             |
| Freon <sub>113</sub> C <sub>2</sub> Cl <sub>2</sub> F <sub>3</sub>                            | 100%          | X                             | X                                              | X                             | X    | NR  | 140 | X    | B        | A      | A     | B         | B            | B            | X             | A             |
| Freon <sub>114</sub> C <sub>2</sub> Cl <sub>2</sub> F <sub>4</sub>                            | 100%          | X                             | X                                              | X                             | X    | NR  | 140 | X    | X        | A      | A     | B         | B            | B            | X             | A             |
| Fructose C <sub>6</sub> H <sub>12</sub> O <sub>6</sub>                                        | Sat'd         | X                             | X                                              | 73                            | 180  | 180 | 140 | X    | X        | X      | X     | A         | A            | X            | X             | A             |
| Fruit juice                                                                                   |               | X                             | X                                              | X                             | X    | A   | A   | B    | B        | B      | X     | NR        | NR           | NR           | A             | A             |
| Fuel Oil                                                                                      |               | 60                            | 210                                            |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Furan Resin                                                                                   |               | X                             | X                                              | X                             | X    | X   | X   | X    | A        | A      | X     | A         | A            | A            | A             | A             |
| Furfural C <sub>4</sub> H <sub>3</sub> OCHO                                                   |               | NR                            | 160 @ 5% 100<br>@ 20% NR @<br>>50%             | NR                            | NR   | NR  | NR  | NR   | A        | A      | A     | A         | A            | A            | A             | A             |
| Furfuryl Alcohol                                                                              | 100%          | NR                            | 75                                             | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| <b>G</b>                                                                                      |               |                               |                                                |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Galic Acid C <sub>6</sub> H <sub>2</sub> (OH) <sub>3</sub> CO <sub>2</sub> H*H <sub>2</sub> O | all           | 75                            | 140                                            | X                             | 73   | X   | 140 | X    | A        | B      | X     | NR        | NR           | NR           | A             | A             |
| Gasoline (Leaded)                                                                             |               | 60                            | 180                                            | NR                            | NR   | NR  | B   | NR   | A        | A      | A     | A         | A            | A            | A             | A             |
| Gasoline (Unleaded)                                                                           |               | 60                            | 120                                            | NR                            | NR   | NR  | B   | NR   | A        | A      | A     | A         | A            | A            | A             | A             |
| Gasohol                                                                                       |               | 60                            | 110                                            | NR                            | NR   | NR  | B   | X    | X        | A      | A     | A         | A            | A            | X             | A             |
| Gasoline (Sour)                                                                               |               | 60                            | 160                                            | NR                            | NR   | NR  | B   | X    | X        | B      | X     | A         | A            | A            | X             | A             |
| Gelatin                                                                                       |               | X                             | X                                              | X                             | 180  | 180 | 140 | X    | A        | NR     | X     | NR        | NR           | NR           | A             | NR            |
| Ginger Oil                                                                                    |               | X                             | X                                              | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | A             | A             |
| Glauber's Salt                                                                                |               | X                             | X                                              | X                             | X    | X   | X   | X    | X        | A      | A     | A         | A            | X            | X             | A             |

**KEY:**

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

## CHEMICAL RESISTANCE GUIDE

|                                                                            | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                       | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|----------------------------------------------------------------------------|---------------|-------------------------------|-----------------------|-------------------------------|------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                            |               | GFRPC POLYESTER               | GFRPC VINYL ESTER     | ABS                           | CPVC | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| CHEMICALS                                                                  |               |                               |                       |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Gluconic Acid                                                              | 50%           | X                             | 160                   | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Glucose C <sub>6</sub> H <sub>12</sub> O <sub>6</sub> *H <sub>2</sub> O    | all           | 85                            | 210                   | 120                           | 180  | 212 | 140 | B    | A        | A      | A     | A         | A            | A            | X             | A             |
| Glue                                                                       |               | X                             | X                     | X                             | X    | 140 | 140 | X    | B        | A      | A     | A         | A            | A            | B             | A             |
| Glutaric Acid                                                              | all           | 100                           | 140                   | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Glycerin C <sub>3</sub> H <sub>5</sub> (OH) <sub>3</sub>                   | 100%          | 85                            | 210                   | 140                           | 180  | 212 | 140 | X    | A        | A      | A     | A         | A            | A            | A             | A             |
| Glycerine Triacetate                                                       | all           | X                             | 75                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Glycol Amine                                                               |               | X                             | X                     | X                             | X    | X   | X   | X    | X        | NR     | X     | A         | A            | A            | X             | A             |
| Glycolic Acid (Hydroxyacetic Acid) OHCH <sub>2</sub> COOH                  | Sat'd         | 60                            | 180 @ 10%<br>80 @ 70% | X                             | 180  | 73  | 140 | B    | X        | B      | X     | NR        | NR           | NR           | X             | A             |
| Glyoxal OCHCHO                                                             |               | NR                            | 100 @ 40%             | X                             | X    | X   | X   | X    | X        | B      | X     | NR        | NR           | NR           | X             | A             |
| Gold Monocyanide                                                           |               | X                             | X                     | X                             | X    | X   | X   | X    | X        | A      | X     | NR        | NR           | X            | X             | A             |
| Grape Juice                                                                |               | X                             | X                     | X                             | X    | X   | A   | B    | B        | B      | X     | NR        | NR           | X            | A             | A             |
| Grease                                                                     |               | X                             | X                     | X                             | X    | X   | X   | X    | A        | NR     | NR    | A         | A            | A            | A             | A             |
| Green Liquor (pulp mill)                                                   |               | NR                            | 180                   | 160                           | 180  | X   | 140 | X    | X        | NR     | X     | A         | A            | X            | X             | A             |
| Gypsum (Phosphoric acid : Fluorine water)                                  | Slurry        | X                             | 110                   | X                             | X    | X   | X   | X    | X        | A      | B     | A         | A            | B            | X             | A             |
| H                                                                          |               |                               |                       |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Heavy Aromatic Naphta (HAN)                                                | 100%          | X                             | 110                   | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Heptane C <sub>7</sub> H <sub>16</sub>                                     | 100%          | 60                            | 200                   | 73                            | 180  | NR  | 140 | NR   | A        | A      | X     | A         | A            | A            | X             | A             |
| n-Hexane C <sub>6</sub> H <sub>14</sub>                                    |               | 60                            | 150                   | NR                            | 73   | 73  | 73  | X    | A        | A      | X     | A         | A            | A            | A             | A             |
| Hexachlorocyclopentadiene                                                  | 100%          | NR                            | 110                   | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Hexachloroethane                                                           | 100%          | NR                            | 100                   | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Hexalene Glycol                                                            |               | 150                           | 160                   | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Hexamethylenetertramine                                                    | 60%           | NR                            | 110                   | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Hexanol CH <sub>3</sub> (CH <sub>2</sub> ) <sub>4</sub> CH <sub>2</sub> OH |               | X                             | X                     | X                             | 180  | X   | 140 | X    | X        | A      | X     | A         | A            | A            | X             | A             |
| Hexene                                                                     | 100%          | 85                            | 160                   | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Hexene (2-)                                                                | 100%          | 85                            | 160                   | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Hexene (2-trans-)                                                          | 100%          | 85                            | 160                   | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Hexene (3-trans-)                                                          | 100%          | 85                            | 160                   | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Honey                                                                      |               | X                             | X                     | X                             | X    | A   | A   | X    | A        | A      | X     | A         | A            | X            | A             | A             |
| Hydraulic Oil (Petroleum)                                                  |               | 60                            | 195                   | X                             | X    | X   | 73  | X    | A        | A      | X     | A         | A            | A            | A             | A             |
| Hydrazine H <sub>2</sub> NNH <sub>2</sub>                                  |               | NR                            | NR                    | X                             | NR   | 73  | NR  | X    | X        | NR     | NR    | NR        | NR           | NR           | A             | A             |
| Hydrobromic Acid HBr                                                       | 20%           | 60                            | 180                   | 73                            | 73   | 140 | 140 | X    | X        | NR     | NR    | NR        | NR           | NR           | NR            | NR            |
| Hydrobromic Acid HBr                                                       | 50%           | NR                            | 150                   | NR                            | X    | 120 | X   | B    | NR       | NR     | NR    | NR        | NR           | NR           | NR            | NR            |
| Hydrochloric Acid HCl                                                      | 10%           | 60                            | 210                   | NR                            | 180  | 140 | 140 | A    | NR       | NR     | NR    | NR        | NR           | NR           | NR            | B             |
| Hydrochloric Acid HCl                                                      | 30%           | 60                            | 160                   | NR                            | 180  | 140 | 140 | A    | NR       | NR     | NR    | NR        | NR           | NR           | NR            | B             |
| Hydrochloric Acid HCl                                                      | fumes         | X                             | 195                   | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |

**KEY:**

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

## CHEMICAL RESISTANCE GUIDE

| CHEMICALS                                                                                    | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                        | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|----------------------------------------------------------------------------------------------|---------------|-------------------------------|------------------------|-------------------------------|------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                                              |               | GFRPC POLYESTER               | GFRPC VINYL ESTER      | ABS                           | CPVC | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| Hydrocyanic Acid HCN                                                                         | 10%           | 60                            | 180 @ 10%              | 160                           | 180  | 73  | 140 | B    | A        | NR     | NR    | NR        | NR           | NR           | A             | A             |
| Hydrofluoric Acid HF                                                                         | Dilute        | NR                            | 125                    | 73                            | 73   | 180 | 73  | B    | NR       | NR     | NR    | NR        | NR           | NR           | NR            | NR            |
| Hydrofluoric Acid HF                                                                         | 30%           | NR                            | 80                     | NR                            | 73   | 140 | 73  | B    | NR       | NR     | NR    | NR        | NR           | NR           | NR            | NR            |
| Hydrofluoric Acid HF                                                                         | 50%           | NR                            | X                      | NR                            | NR   | 73  | 73  | B    | NR       | NR     | NR    | NR        | NR           | NR           | NR            | NR            |
| Hydrofluosilicic Acid                                                                        | 50%           | NR                            | 150 @ 10%<br>100 @ 35% | X                             | X    | X   | X   | X    | NR       | B      | X     | NR        | NR           | NR           | NR            | B             |
| Hydrogen H <sub>2</sub>                                                                      | Gas           | X                             | X                      | X                             | 73   | 140 | 140 | X    | A        | A      | A     | A         | A            | A            | A             | A             |
| Hydrogen Bromine                                                                             | vapor         | X                             | 180                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Hydrogen Chloride                                                                            | wet gas       | NR                            | 160                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Hydrogen Chlorine,                                                                           | dry gas       | X                             | 210                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Hydrogen Fluoride                                                                            | vapor         | 95                            | 150                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Hydrogen Peroxide H <sub>2</sub> O <sub>2</sub>                                              | 50%           | 120 @ 35%                     | 150 @ 5%<br>120 @ 35%  | X                             | 180  | 73  | 140 | B    | X        | NR     | NR    | NR        | NR           | B            | A             | A             |
| Hydrogen Peroxide H <sub>2</sub> O <sub>3</sub>                                              | 90%           | X                             | 100 @ 30%              | X                             | 180  | NR  | 140 | B    | A        | NR     | NR    | NR        | NR           | B            | A             | A             |
| Hydrogen Sulfide H <sub>2</sub> S                                                            | Dry           | 250                           | 250                    | X                             | 180  | 150 | 140 | B    | B        | B      | X     | B         | X            | B            | NR            | A             |
| Hydrogen Sulfide H <sub>2</sub> S                                                            | Wet           | X                             | 160                    | X                             | 180  | X   | 140 | X    | NR       | NR     | NR    | NR        | NR           | NR           | B             | A             |
| Hydrogen Sulfite H <sub>2</sub> SO <sub>3</sub>                                              |               | X                             | X                      | X                             | X    | X   | X   | X    | X        | NR     | NR    | NR        | NR           | NR           | X             | A             |
| Hydrosulfite Bleach                                                                          |               | X                             | 120                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Hydroiodic Acid                                                                              | 10%           | NR                            | 150                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Hypochlorous Acid HOCl                                                                       | 10%           | 104                           | 160                    | 73                            | 180  | 73  | 140 | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Hypophosphorus Acid                                                                          | 50%           | NR                            | 120                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Hydroxyacetic Acid (Glycolic Acid)C <sub>2</sub> H <sub>4</sub> O <sub>3</sub>               | 70%           | X                             | 180 @ 10%<br>80 @ 70%  | X                             | X    | X   | A   | X    | NR       | X      | X     | X         | X            | X            | X             | X             |
| <b>I</b>                                                                                     |               |                               |                        |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Inks                                                                                         |               | X                             | X                      | X                             | X    | 140 | X   | B    | B        | A      | X     | NR        | NR           | NR           | A             | A             |
| Iodine I <sub>2</sub>                                                                        | 10%           | NR                            | 150                    | NR                            | 73   | 73  | NR  | NR   | NR       | NR     | NR    | NR        | NR           | NR           | NR            | NR            |
| Iodoform CHI <sub>3</sub>                                                                    |               | X                             | X                      | X                             | X    | X   | X   | X    | A        | B      | X     | B         | B            | B            | B             | A             |
| Iron Phosphate                                                                               |               | X                             | X                      | X                             | X    | X   | X   | X    | X        | NR     | NR    | X         | X            | X            | X             | A             |
| Isoamyl Alcohol                                                                              |               | NR                            | 120                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Isobutane                                                                                    |               | X                             | X                      | X                             | X    | X   | X   | X    | X        | A      | A     | A         | A            | A            | X             | A             |
| Isobutyl Alcohol (CH <sub>3</sub> ) <sub>2</sub> CHCH <sub>2</sub> OH                        |               | 100 @ 5% NR<br>@ 100%         | 180 @ 5% 120<br>@ 100% | NR                            | NR   | 73  | X   | X    | X        | X      | X     | X         | X            | X            | X             | A             |
| Isodecanol                                                                                   | 100%          | 85                            | 120                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Isononyl alcohol                                                                             | 100%          | 85                            | 180                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Isooctyl Alcohol                                                                             | 100%          | NR                            | 180                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Isooctane (CH <sub>3</sub> ) <sub>3</sub> CCH <sub>2</sub> CH(CH <sub>3</sub> ) <sub>2</sub> |               | X                             | X                      | X                             | X    | NR  | X   | X    | X        | A      | A     | A         | A            | A            | X             | A             |

**KEY:**

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

## CHEMICAL RESISTANCE GUIDE

|                                                                                      | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                        | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |  |
|--------------------------------------------------------------------------------------|---------------|-------------------------------|------------------------|-------------------------------|------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|--|
|                                                                                      |               | GFRPC POLYESTER               | GFRPC VINYL ESTER      | ABS                           | CPVC | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |  |
| CHEMICALS                                                                            |               |                               |                        |                               |      |     |     |      |          |        |       |           |              |              |               |               |  |
| Isopropyl Acetate CH <sub>3</sub> COOCH(CH <sub>3</sub> ) <sub>2</sub>               |               | X                             | X                      | NR                            | NR   | X   | X   | X    | B        | A      | X     | A         | A            | A            | X             | A             |  |
| Isopropyl Alcoholol (CH <sub>3</sub> ) <sub>2</sub> CHOH                             |               | 150 @ 10%<br>NR @ 100%        | 150 @ 10%<br>60 @ 100% | X                             | NR   | 212 | 140 | X    | X        | A      | A     | A         | A            | A            | X             | A             |  |
| Isopropyl Amine                                                                      |               | NR                            | 100                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |  |
| Isopropyl Ether (CH <sub>3</sub> ) <sub>2</sub> CHOCH(CH <sub>3</sub> ) <sub>2</sub> |               | X                             | X                      | X                             | NR   | NR  | NR  | X    | A        | A      | A     | A         | A            | A            | X             | A             |  |
| Isopropyl Myristate                                                                  |               | 75                            | 200                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |  |
| Isopropyl Palmitate                                                                  | all           | 100                           | 200                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |  |
| Isopropyl Sulphate                                                                   | all           | 75                            | 75                     | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |  |
| Isothane                                                                             |               | X                             | X                      | X                             | X    | NR  | X   | X    | A        | X      | X     | X         | X            | X            | X             | X             |  |
| Itaconic Acid                                                                        |               | NR                            | 120                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |  |
| J                                                                                    |               |                               |                        |                               |      |     |     |      |          |        |       |           |              |              |               |               |  |
| JP-3 Fuel                                                                            |               | 60                            | 180                    | X                             | X    | X   | X   | X    | A        | A      | A     | A         | A            | A            | A             | A             |  |
| JP-4 Fuel                                                                            |               | 60                            | 180                    | X                             | NR   | NR  | B   | X    | A        | A      | A     | A         | A            | A            | A             | A             |  |
| JP-5 Fuel                                                                            |               | 60                            | 180                    | X                             | NR   | NR  | B   | X    | A        | A      | A     | A         | A            | A            | A             | A             |  |
| JP-6 Fuel                                                                            |               | 60                            | 180                    | X                             | X    | X   | X   | X    | A        | A      | A     | A         | A            | A            | A             | A             |  |
| Jojoba Oil                                                                           |               | X                             | 180                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |  |
| K                                                                                    |               |                               |                        |                               |      |     |     |      |          |        |       |           |              |              |               |               |  |
| Kelp Slurry                                                                          |               | X                             | X                      | X                             | X    | X   | X   | X    | X        | A      | A     | A         | A            | A            | X             | A             |  |
| Kerosene                                                                             |               | 120                           | 180                    | 73                            | B    | NR  | B   | NR   | A        | A      | A     | A         | A            | A            | A             | A             |  |
| Ketchup                                                                              |               | X                             | X                      | X                             | X    | X   | 73  | X    | NR       | NR     | X     | NR        | NR           | NR           | A             | A             |  |
| Ketones                                                                              |               | X                             | X                      | NR                            | NR   | NR  | NR  | NR   | B        | A      | X     | A         | A            | A            | A             | A             |  |
| Kraft Liquors                                                                        |               | X                             | X                      | 73                            | 180  | X   | 140 | X    | X        | NR     | NR    | NR        | NR           | NR           | X             | A             |  |
| L                                                                                    |               |                               |                        |                               |      |     |     |      |          |        |       |           |              |              |               |               |  |
| Lactic Acid CH <sub>3</sub> CHOHCOOH                                                 | 25%           | 200                           | 210                    | 73                            | 180  | 212 | 140 | B    | B        | NR     | NR    | NR        | B            | NR           | A             | A             |  |
| Lactic Acid CH <sub>3</sub> CHOHCOOH                                                 | 80%           | X                             | 210                    | NR                            | NR   | 140 | 73  | B    | B        | NR     | NR    | NR        | B            | NR           | A             | A             |  |
| Lacquers                                                                             |               | X                             | X                      | X                             | X    | A   | X   | X    | A        | A      | B     | B         | B            | B            | A             | A             |  |
| Lacquer Thinners                                                                     |               | X                             | X                      | X                             | X    | B   | B   | X    | X        | X      | B     | X         | X            | X            | X             | A             |  |
| Lard Oil                                                                             |               | X                             | X                      | X                             | NR   | X   | 140 | X    | A        | NR     | NR    | B         | B            | B            | A             | A             |  |
| Latex                                                                                |               | X                             | 120                    | X                             | X    | 140 | X   | B    | A        | A      | X     | A         | A            | X            | A             | A             |  |
| Lauric Acid CH <sub>3</sub> (CH <sub>2</sub> ) <sub>10</sub> COOH                    | 100%          | 100                           | 210                    | X                             | 180  | 140 | 140 | X    | X        | X      | X     | NR        | NR           | X            | X             | A             |  |
| Lauryl Alcohol                                                                       | all           | 120                           | 195                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |  |
| Lauryl Chloride CH <sub>3</sub> (CH <sub>2</sub> ) <sub>10</sub> CH <sub>2</sub> Cl  | all           | 120                           | 120                    | X                             | 73   | X   | 140 | X    | X        | X      | X     | NR        | NR           | X            | X             | A             |  |
| Lead Acetate Pb(CH <sub>3</sub> COO) <sub>2</sub> * <sub>3</sub> H <sub>2</sub> O    | Sat'd         | 160                           | 210                    | X                             | 180  | 180 | 140 | B    | NR       | NR     | X     | NR        | NR           | NR           | A             | A             |  |
| Lead Chloride PbCl <sub>2</sub>                                                      | all           | 75                            | 200                    | X                             | 180  | 140 | 140 | X    | X        | X      | X     | X         | X            | X            | X             | X             |  |
| Lead Nitrate Pb(NO <sub>3</sub> ) <sub>2</sub>                                       | Sat'd         | 75                            | 210                    | X                             | 180  | 140 | 140 | X    | X        | X      | X     | X         | X            | A            | X             | A             |  |

KEY:

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

## CHEMICAL RESISTANCE GUIDE

|                                                                                                   | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                   | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|---------------------------------------------------------------------------------------------------|---------------|-------------------------------|-------------------|-------------------------------|------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                                                   |               | GFRPC POLYESTER               | GFRPC VINYL ESTER | ABS                           | CPVC | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| CHEMICALS                                                                                         |               |                               |                   |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Lead Sulfate PbSO <sub>4</sub>                                                                    |               | X                             | X                 | X                             | 180  | 140 | 140 | X    | X        | B      | X     | NR        | NR           | NR           | X             | B             |
| Lemon Oil                                                                                         |               | X                             | X                 | X                             | NR   | NR  | X   | X    | X        | X      | X     | NR        | NR           | X            | A             | A             |
| Lenoleic Acid                                                                                     |               | X                             | X                 | X                             | 180  | 180 | 140 | X    | X        | NR     | NR    | NR        | NR           | NR           | X             | B             |
| Levulinic Acid                                                                                    | all           | 120                           | 210               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Ligroin                                                                                           |               | X                             | X                 | X                             | X    | NR  | X   | X    | X        | A      | X     | X         | X            | X            | X             | A             |
| Lignin Sulphate, PH 3-7                                                                           | all           | NR                            | 180               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Ligninsulfonate Sodium Salt                                                                       | all           | NR                            | 180               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Lime (Calcium Hydroxide)                                                                          |               | NR                            | 180               | X                             | X    | X   | A   | X    | B        | A      | X     | A         | A            | X            | A             | A             |
| Lime Sulfur                                                                                       |               | X                             | X                 | X                             | 73   | 73  | 73  | X    | X        | NR     | NR    | A         | A            | A            | X             | A             |
| Linseed Oil                                                                                       | 100%          | 140                           | 210               | 73                            | NR   | 140 | 140 | X    | A        | A      | A     | A         | A            | A            | A             | A             |
| Lithium Bromide LiBr                                                                              | all           | 100                           | 210               | X                             | X    | 140 | 140 | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Lithium Carbonate                                                                                 | Sat'd         | NR                            | 180               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Lithium Chloride LiCl                                                                             | all           | 100                           | 210               | X                             | X    | 140 | 140 | X    | X        | B      | X     | B         | B            | NR           | X             | A             |
| Lithium Hydroxide LiOH                                                                            | Sat'd         | NR                            | 150               | X                             | X    | 140 | X   | X    | X        | NR     | NR    | A         | A            | X            | X             | A             |
| Lithium Hypochlorite, PH>11, active Cl>18%                                                        |               | NR                            | 150               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Lithium Sulfate                                                                                   | all           | 100                           | 210               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Lubricating Oil (ASTM #1)                                                                         |               | X                             | X                 | X                             | 180  | NR  | 140 | X    | A        | A      | A     | A         | A            | A            | A             | A             |
| Lubricating Oil (ASTM #2)                                                                         |               | X                             | X                 | X                             | 180  | NR  | 140 | X    | A        | A      | A     | A         | A            | A            | A             | A             |
| Lubricating Oil (ASTM #3)                                                                         |               | X                             | X                 | X                             | 180  | NR  | 140 | X    | A        | A      | A     | A         | A            | A            | A             | A             |
| Ludox                                                                                             |               | X                             | X                 | X                             | X    | X   | X   | X    | X        | NR     | NR    | A         | A            | A            | X             | A             |
| M                                                                                                 |               |                               |                   |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Magnesium Bicarbonate                                                                             | all           | 85                            | 180               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Magnesium Bisulfite                                                                               | all           | 75                            | 180               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Magnesium Carbonate MgCO <sub>3</sub>                                                             | Sat'd         | 160                           | 180               | 120                           | 180  | 212 | 140 | B    | X        | B      | X     | B         | B            | B            | A             | A             |
| Magnesium Chloride MgCl2                                                                          | Sat'd         | 220                           | 220               | 120                           | 180  | 140 | 140 | B    | NR       | A      | B     | NR        | NR           | NR           | B             | NR            |
| Magnesium Citrate MgHC <sub>6</sub> H <sub>5</sub> O <sub>7</sub> * <sub>5</sub> H <sub>2</sub> O |               | X                             | X                 | X                             | 180  | X   | 140 | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Magnesium Fluosilicate                                                                            | 37.50%        | NR                            | 100               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Magnesium Hydroxide Mg(OH) <sub>2</sub>                                                           | Sat'd         | NR                            | 210               | X                             | X    | A   | A   | B    | NR       | B      | B     | B         | B            | B            | A             | A             |
| Magnesium Nitrate Mg(NO <sub>3</sub> ) <sub>2</sub>                                               | all           | 160                           | 210               | X                             | X    | A   | A   | B    | X        | X      | X     | X         | X            | X            | A             | A             |
| Magnesium Oxide MgO                                                                               |               | X                             | X                 | 160                           | X    | X   | X   | X    | X        | A      | X     | X         | A            | X            | A             | A             |
| Magnesium Silicofluoride                                                                          | 37.50%        | NR                            | 100               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Magnesium Sulfate (epsom salts) MgSO <sub>4</sub> * <sub>7</sub> H <sub>2</sub> O                 | all           | 200                           | 210               | 160                           | 180  | 212 | 140 | X    | A        | A      | A     | A         | A            | A            | A             | A             |
| Maleic Acid HOOCCH=CHCOOH                                                                         | Sat'd         | 75                            | 200               | 160                           | 180  | 140 | 140 | X    | B        | NR     | NR    | NR        | NR           | NR           | A             | A             |
| Maleic Anhydride C <sub>4</sub> H <sub>2</sub> O <sub>3</sub>                                     | 100%          | NR                            | 200               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |

**KEY:**

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available



# CHEMICAL RESISTANCE GUIDE

|                                                                           | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                        | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|---------------------------------------------------------------------------|---------------|-------------------------------|------------------------|-------------------------------|------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                           |               | GFRPC POLYESTER               | GFRPC VINYL ESTER      | ABS                           | CPVC | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| CHEMICALS                                                                 |               |                               |                        |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Manganese Chloride                                                        | all           | 100                           | 210                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Manganese Nitrate                                                         | all           | 100                           | 210                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Manganese Sulfate MnSO <sub>4</sub> * <sub>4</sub> H <sub>2</sub> O       | all           | 100                           | 210                    | X                             | 180  | 180 | 140 | X    | X        | A      | X     | NR        | NR           | B            | X             | A             |
| Maple Syrup                                                               | all           | 75                            | 180                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Mash                                                                      |               | X                             | X                      | X                             | X    | X   | X   | X    | X        | A      | X     | X         | X            | X            | A             | A             |
| Mayonnaise                                                                |               | X                             | X                      | X                             | X    | A   | X   | X    | NR       | NR     | X     | NR        | NR           | NR           | A             | A             |
| Melamine                                                                  |               | NR                            | 75                     | X                             | X    | X   | X   | X    | X        | NR     | X     | X         | X            | X            | NR            | NR            |
| Mercaptoacetic Acid                                                       | all           | NR                            | NR                     | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Mercaptopropionic (-2)                                                    | 10%           | X                             | 180                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Mercuric Chloride HgCl <sub>2</sub>                                       | all           | 212                           | 210                    | X                             | 180  | 180 | 140 | B    | NR       | NR     | NR    | NR        | NR           | NR           | NR            | NR            |
| Mercuric Cyanide Hg(CN) <sub>2</sub>                                      | Sat'd         | X                             | X                      | X                             | 180  | 140 | 140 | B    | NR       | NR     | NR    | NR        | NR           | NR           | A             | A             |
| Mercuric Sulfate HgSO <sub>4</sub>                                        | Sat'd         | X                             | X                      | X                             | 180  | 140 | 140 | X    | X        | NR     | NR    | X         | X            | X            | X             | X             |
| Mercurous Nitrate HgNO <sub>3</sub> * <sub>2</sub> H <sub>2</sub> O       | Sat'd         | X                             | X                      | X                             | 180  | 140 | 140 | X    | X        | NR     | NR    | NR        | NR           | NR           | X             | A             |
| Mercury Hg                                                                | 100%          | 100                           | 210                    | X                             | 180  | 140 | 140 | B    | B        | NR     | NR    | A         | A            | A            | A             | A             |
| Methacrylic Acid                                                          | 40%           | X                             | 75                     | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Methanesulphonic Acid                                                     | all           | X                             | 100                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Methane CH <sub>4</sub>                                                   |               | X                             | 140                    | NR                            | 73   | 73  | 140 | X    | X        | A      | A     | A         | A            | A            | X             | A             |
| Methanol (Methyl Alcohol) CH <sub>3</sub> OH                              |               | NR                            | 160                    | X                             | NR   | 180 | 140 | B    | B        | A      | A     | A         | A            | A            | A             | A             |
| Methoxyethylacetate                                                       | 100%          | NR                            | NR                     | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Methyl Acetate CH <sub>3</sub> CO <sub>2</sub> CH <sub>3</sub>            |               | X                             | X                      | NR                            | NR   | 140 | NR  | X    | A        | B      | X     | B         | B            | B            | X             | A             |
| Methyl Acetone C <sub>7</sub> H <sub>16</sub> O <sub>4</sub>              |               | X                             | X                      | X                             | X    | X   | X   | X    | A        | A      | A     | A         | A            | A            | X             | A             |
| Methyl Alcohol CH <sub>3</sub> OH                                         | 10%           | X                             | 150 @ 10%<br>80 @ 100% | X                             | X    | X   | A   | X    | B        | B      | X     | X         | X            | B            | X             | A             |
| Methyl Amine CH <sub>3</sub> NH <sub>2</sub>                              |               | NR                            | NR                     | X                             | NR   | NR  | NR  | X    | X        | NR     | X     | A         | A            | B            | X             | A             |
| Methyl Aniline                                                            | 100%          | NR                            | 100                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Methyl Bromide CH <sub>3</sub> Br                                         |               | NR                            | NR                     | X                             | NR   | NR  | NR  | NR   | X        | NR     | X     | NR        | NR           | B            | X             | B             |
| Methyl Bromine                                                            | gas           | NR                            | NR                     | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Methyl Cellosolve HOCH <sub>2</sub> CH <sub>2</sub> OCH <sub>3</sub>      |               | NR                            | NR                     | X                             | NR   | 73  | NR  | X    | A        | A      | X     | B         | B            | B            | X             | A             |
| Methyl Chloride CH <sub>3</sub> Cl                                        | Dry           | NR                            | 75                     | NR                            | NR   | NR  | NR  | NR   | NR       | A      | NR    | A         | A            | A            | A             | A             |
| Methyl Chloroform CH <sub>3</sub> CCl <sub>3</sub>                        |               | X                             | X                      | NR                            | NR   | NR  | NR  | X    | X        | X      | X     | A         | A            | X            | X             | A             |
| Methyl Ethyl Ketone (MEK) CH <sub>3</sub> COC <sub>2</sub> H <sub>5</sub> | 100%          | NR                            | NR                     | NR                            | NR   | 73  | NR  | NR   | A        | A      | A     | A         | A            | A            | A             | A             |
| Methyl Formate                                                            |               | X                             | X                      | X                             | X    | X   | X   |      |          | A      | X     | A         | A            | NR           |               | A             |
| Methyl Isobutyl Alcohol                                                   |               | X                             | 150                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |

KEY:

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

## CHEMICAL RESISTANCE GUIDE

| CHEMICALS                                                                                  | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                   | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|--------------------------------------------------------------------------------------------|---------------|-------------------------------|-------------------|-------------------------------|------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                                            |               | GFRPC POLYESTER               | GFRPC VINYL ESTER | ABS                           | CPVC | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| Methyl Isobutyl Ketone (CH <sub>3</sub> ) <sub>2</sub> CHCH <sub>2</sub> COCH <sub>3</sub> | 100%          | NR                            | 75                | NR                            | NR   | 73  | NR  | X    | X        | X      | X     | A         | X            | X            | X             | A             |
| Methyl Isopropyl Ketone CH <sub>3</sub> COCH(CH <sub>3</sub> ) <sub>2</sub>                |               | X                             | X                 | X                             | NR   | X   | NR  | X    | X        | X      | X     | X         | X            | X            | X             | A             |
| Methyl Methacrylate CH <sub>2</sub> =C(CH <sub>3</sub> )COOCH <sub>3</sub>                 | all           | NR                            | NR                | X                             | NR   | X   | 73  | X    | X        | X      | X     | X         | X            | NR           | X             | X             |
| Methyl -2 - Pentanediol -2,4                                                               | 100%          | NR                            | 180               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Methyl Styrene                                                                             | 100%          | NR                            | 100               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Methyl Tertiarybutyl Ether (MTBE)                                                          |               | X                             | 180               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Methylene Bromide CH <sub>2</sub> Br <sub>2</sub>                                          |               | NR                            | NR                | X                             | NR   | NR  | NR  | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Methylene Chloride CH <sub>2</sub> Cl <sub>2</sub>                                         |               | NR                            | NR                | X                             | NR   | NR  | NR  | X    | X        | B      | X     | B         | B            | B            | X             | A             |
| Methylene Chlorobromide CH <sub>2</sub> ClBr                                               |               | X                             | X                 | X                             | NR   | X   | NR  | X    | X        | X      | X     | A         | A            | X            | X             | A             |
| Methylene Iodine CH <sub>2</sub> I <sub>2</sub>                                            |               | X                             | X                 | X                             | NR   | NR  | NR  | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Methylstyrene                                                                              | 100           | NR                            | 75                | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Methylsulfuric Acid CH <sub>3</sub> HSO <sub>4</sub>                                       |               | X                             | X                 | X                             | 180  | 140 | 140 | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Milk                                                                                       |               | 75                            | 150               | 160                           | 180  | 212 | 140 | B    | A        | B      | B     | NR        | NR           | NR           | A             | A             |
| Mineral Oil                                                                                |               | 180                           | 210               | 73                            | 180  | NR  | 140 | X    | A        | A      | A     | A         | A            | A            | A             | A             |
| Molasses                                                                                   |               | 100                           | 180               | X                             | 180  | 140 | 140 | B    | A        | A      | A     | A         | A            | A            | A             | A             |
| Molybdenum Disulfide                                                                       |               | X                             | 200               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Monochloroacetic Acid CH <sub>2</sub> ClCOOH                                               | 50%           | NR                            | 120               | X                             | X    | 140 | 140 | X    | X        | NR     | NR    | NR        | NR           | NR           | X             | NR            |
| Monochlorobenzene C <sub>6</sub> H <sub>5</sub> Cl                                         |               | NR                            | NR                | X                             | NR   | 73  | NR  | X    | X        | A      | X     | A         | A            | A            | X             | A             |
| Monoethanolamine HOCH <sub>2</sub> CH <sub>2</sub> NH <sub>2</sub>                         | 100%          | NR                            | 120               | X                             | X    | X   | NR  | X    | X        | X      | X     | B         | B            | B            | X             | A             |
| Monomethylhydrazine                                                                        |               | NR                            | NR                | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Morpholine C <sub>4</sub> H <sub>8</sub> ONH                                               |               | NR                            | NR                | X                             | X    | 140 | X   | X    | X        | B      | X     | B         | B            | B            | X             | B             |
| Motor Oil                                                                                  | 100%          | 100                           | 210               | X                             | 180  | NR  | 140 | X    | X        | A      | A     | A         | A            | A            | X             | A             |
| Muratic Acid (see HCl - Hydrochloric Acid)                                                 |               |                               |                   |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Mustard                                                                                    | all           | X                             | 195               | X                             | X    | A   | A   | X    | B        | B      | X     | B         | B            | B            | A             | A             |
| Myristic Acid                                                                              | 100%          | 75                            | 210               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| <b>N</b>                                                                                   |               |                               |                   |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Naphtha                                                                                    |               | 150                           | 180               | X                             | 73   | 73  | 140 | NR   | A        | A      | X     | A         | A            | A            | A             | A             |
| Naphthalene C <sub>10</sub> H <sub>8</sub>                                                 |               | 60                            | 180               | X                             | NR   | 73  | NR  | NR   | B        | A      | X     | A         | A            | A            | A             | A             |
| Natural Gas                                                                                |               | 60                            | 160               | 73                            | X    | 73  | 140 | X    | X        | A      | A     | A         | A            | A            | X             | A             |
| Nickel Ammonium Sulfate                                                                    |               | X                             | X                 | X                             | X    | X   | X   | X    | X        | NR     | NR    | NR        | NR           | NR           | X             | A             |

**KEY:**

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

# CHEMICAL RESISTANCE GUIDE

|                                                                                                 | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                   | PLASTICS MAX TEMPERATURE (°F) |          |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|-------------------------------------------------------------------------------------------------|---------------|-------------------------------|-------------------|-------------------------------|----------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                                                 |               | GFRPC POLYESTER               | GFRPC VINYL ESTER | ABS                           | CPVC     | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| CHEMICALS                                                                                       |               |                               |                   |                               |          |     |     |      |          |        |       |           |              |              |               |               |
| Nickel Chloride NiCl <sub>2</sub>                                                               | Sat'd         | 60                            | 210               | 160                           | 180      | 180 | 140 | B    | NR       | NR     | X     | NR        | NR           | NR           | A             | A             |
| Nickel Nitrate Ni(NO <sub>3</sub> ) <sub>2</sub> *6H <sub>2</sub> O                             | Sat'd         | 150                           | 210               | 160                           | 180      | 180 | 140 | X    | X        | NR     | X     | NR        | NR           | NR           | X             | A             |
| Nickel Sulfate NiSO <sub>4</sub>                                                                | Sat'd         | 150                           | 210               | 160                           | 180      | 180 | 140 | B    | NR       | NR     | X     | NR        | NR           | NR           | A             | X             |
| Nicotine C <sub>10</sub> H <sub>14</sub> N <sub>2</sub>                                         |               | X                             | X                 | X                             | 180      | X   | 140 | X    | X        | X      | X     | X         | X            | X            | X             | A             |
| Nicotinic Acid C <sub>5</sub> H <sub>4</sub> NCOOH                                              |               | X                             | 110               | X                             | 180      | X   | 140 | X    | X        | B      | X     | NR        | NR           | NR           | X             | B             |
| Nitric Acid HNO <sub>3</sub>                                                                    | <10%          | 150                           | 160               | NR                            | 180      | 180 | 140 | B    | NR       | NR     | NR    | NR        | NR           | NR           | A             | A             |
| Nitric Acid HNO <sub>3</sub>                                                                    | 30%           | NR                            | 100               | NR                            | B to 130 | 140 | 140 | B    | NR       | NR     | NR    | NR        | NR           | NR           | A             | A             |
| Nitric Acid HNO <sub>3</sub>                                                                    | 40%           | NR                            | 85                | NR                            | B to 120 | 73  | 140 | B    | NR       | NR     | NR    | NR        | NR           | NR           | A             | A             |
| Nitric Acid HNO <sub>3</sub>                                                                    | 50%           | NR                            | 75                | NR                            | 110      | NR  | 100 | B    | NR       | NR     | NR    | NR        | NR           | NR           | A             | A             |
| Nitric Acid HNO <sub>3</sub>                                                                    | 70%           | NR                            | X                 | NR                            | 100      | NR  | 73  | NR   | NR       | NR     | NR    | NR        | NR           | NR           | B             | A             |
| Nitric Acid HNO <sub>3</sub>                                                                    | Fuming        | NR                            | 180               | X                             | X        | X   | X   | X    | X        | NR     | NR    | NR        | NR           | NR           | X             | A             |
| Nitrobenzene C <sub>6</sub> H <sub>5</sub> NO <sub>2</sub>                                      |               | NR                            | NR                | NR                            | NR       | NR  | NR  | NR   | B        | B      | X     | A         | A            | A            | A             | A             |
| Nitrogen N <sub>2</sub>                                                                         | Gas           | 140                           | 210               | X                             | X        | X   | X   | X    | X        | A      | A     | A         | A            | A            | X             | A             |
| Nitrogen Tetroxide                                                                              |               | NR                            | NR                | X                             | X        | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Nitroglycerin CH <sub>2</sub> NO <sub>3</sub> CHNO <sub>3</sub> CH <sub>2</sub> NO <sub>3</sub> |               | X                             | X                 | X                             | X        | X   | NR  | X    | X        | B      | X     | X         | B            | B            | X             | A             |
| Nitrous Acid HNO <sub>2</sub>                                                                   | 10%           | X                             | 75                | X                             | 180      | NR  | 140 | X    | X        | NR     | NR    | NR        | NR           | NR           | X             | B             |
| Nitrous Oxide N <sub>2</sub> O                                                                  |               | X                             | X                 | X                             | 73       | 73  | 73  | X    | X        | B      | X     | NR        | B            | B            | X             | A             |
| N-methyl-2-pyrrolidone (NMP)                                                                    | 3%            | X                             | 100               | X                             | X        | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| N-methyl-2-pyrrolidone (NMP)                                                                    | 100%          | NR                            | NR                | X                             | X        | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Nonanes                                                                                         | 100%          | 100                           | 210               | X                             | X        | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Nonenes                                                                                         | 100%          | 100                           | 210               | X                             | X        | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| O                                                                                               |               |                               |                   |                               |          |     |     |      |          |        |       |           |              |              |               |               |
| Octane C <sub>8</sub> H <sub>18</sub> (n-)                                                      | 100%          | 100                           | 210               | X                             | NR       | X   | X   | X    | X        | A      | A     | A         | A            | A            | X             | A             |
| Octanoic Acid                                                                                   | all           | 100                           | 210               | X                             | X        | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Oil, Sweet or Sour Crude                                                                        | 100%          | 150                           | 210               | X                             | X        | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Oleic Acid                                                                                      | 100%          | 150                           | 210               | X                             | X        | B   | A   | NR   | B        | B      | B     | B         | B            | B            | A             | A             |
| Oleum (Sulfuric Acid) xH <sub>2</sub> SO <sub>4</sub> *ySO <sub>3</sub>                         | Fuming        | NR                            | NR                | NR                            | NR       | NR  | NR  | X    | B        | B      | B     | X         | X            | B            | X             | A             |
| Olive Oil                                                                                       | 100%          | 150                           | 210               | 160                           | NR       | 73  | 140 | X    | A        | A      | A     | A         | A            | A            | A             | A             |
| Orange Oil                                                                                      | 100%          | X                             | 210               | X                             | X        | A   | X   | X    | X        | X      | X     | X         | X            | X            | A             | A             |
| Oxalic Acid HOOC-COOH* <sub>2</sub> H <sub>2</sub> O                                            | 50%           | 150                           | 210               | 160                           | 180      | 140 | 140 | A    | B        | B      | B     | NR        | NR           | NR           | A             | A             |
| Oxygen O <sub>2</sub>                                                                           | Gas           | X                             | X                 | 160                           | 180      | NR  | 140 | X    | X        | A      | A     | A         | A            | A            | X             | A             |
| Ozone O <sub>3</sub>                                                                            | all           | NR                            | 80                | X                             | 180      | NR  | 140 | X    | X        | A      | A     | A         | A            | A            | X             | A             |

KEY:

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

# CHEMICAL RESISTANCE GUIDE

| CHEMICALS                                                                     | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                   | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|-------------------------------------------------------------------------------|---------------|-------------------------------|-------------------|-------------------------------|------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                               |               | GFRPC POLYESTER               | GFRPC VINYL ESTER | ABS                           | CPVC | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| <b>P</b>                                                                      |               |                               |                   |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Palm Oil                                                                      | 100%          | X                             | 210               | X                             | X    | 73  | A   | X    | A        | NR     | X     | NR        | NR           | NR           | A             | A             |
| Palmitic Acid $\text{CH}_3(\text{CH}_2)_{14}\text{COOH}$                      | 10%           | X                             | 210               | 73                            | 73   | 180 | 140 | X    | X        | B      | A     | B         | B            | B            | X             | A             |
| Palmitic Acid $\text{CH}_3(\text{CH}_2)_{14}\text{COOH}$                      | 70%           | X                             | 210               | X                             | 73   | 180 | 73  | X    | X        | B      | A     | B         | B            | B            | X             | A             |
| Palmitic Acid $\text{CH}_3(\text{CH}_2)_{14}\text{COOH}$                      | 100%          | 75                            | 210               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | A             |
| Palmitoyl Chloride                                                            | all           | 100                           | 120               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Parafin $\text{C}_{36}\text{H}_{74}$                                          | 100%          | 100                           | 195               | 73                            | 180  | 140 | 140 | X    | A        | A      | X     | B         | A            | A            | A             | A             |
| Peanut Oil                                                                    | 100%          | 100                           | 195               | X                             | NR   | 140 | A   | X    | A        | A      | X     | A         | A            | X            | A             | A             |
| n-Pentane $\text{CH}_3(\text{CH}_2)_3\text{CH}_3$                             | 100%          | 95                            | 95                | NR                            | NR   | NR  | NR  | X    | A        | A      | A     | A         | A            | A            | B             | A             |
| Pentanedioic Acid                                                             | all           | 100                           | 180               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Pentasodium Triphosphate ( $\text{Na}_5\text{O}_{10}\text{P}_3$ )             | all           | 100                           | 210               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Pentene                                                                       | 100%          | 85                            | 85                | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Peppermint Oil                                                                |               | X                             | X                 | X                             | X    | NR  | X   | X    | X        | A      | X     | X         | X            | X            | A             | A             |
| Peracetic Acid $\text{CH}_3\text{COOOH}$                                      | 40%           | NR                            | 75                | NR                            | X    | 73  | 73  | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Perchloric Acid $\text{HClO}_4$                                               | 10%           | NR                            | 150               | X                             | X    | X   | X   | X    | X        | X      | X     | NR        | X            | X            | X             | A             |
| Perchloric Acid $\text{HClO}_4$                                               | 30%           | NR                            | 100               | X                             | X    | X   | X   | X    | X        | X      | X     | NR        | X            | X            | X             | A             |
| Perchloric Acid $\text{HClO}_4$                                               | 70%           | NR                            | 75                | 73                            | 180  | NR  | 73  | X    | X        | X      | X     | NR        | X            | X            | X             | B             |
| Perchloroethylene (Tetrachloroethylene)<br>$\text{Cl}_2\text{C}=\text{CCl}_2$ | 100%          | 70                            | 100               | NR                            | NR   | NR  | NR  | X    | A        | B      | X     | B         | B            | B            | A             | A             |
| Perphosphate                                                                  |               | X                             | X                 | X                             | 73   | 140 | 73  | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Petrolatum                                                                    |               | X                             | X                 | X                             | X    | X   | X   | X    | B        | B      | X     | B         | B            | B            | X             | A             |
| Phenol $\text{C}_6\text{H}_5\text{OH}$ (Carbolic acid)                        |               | NR                            | NR                | NR                            | 73   | 73  | 73  | X    | X        | A      | X     | NR        | NR           | NR           | A             | A             |
| Phenol Formaldehyde Resin                                                     | all           | X                             | 100               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Phenylhydrazine $\text{C}_6\text{H}_5\text{NHNH}_2$                           |               | X                             | X                 | X                             | NR   | NR  | NR  | NR   | B        | X      | X     | X         | X            | X            | X             | X             |
| Phenolsulphonic Acid                                                          | all           | NR                            | 75                | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Phosphate Esters                                                              |               | X                             | X                 | X                             | X    | X   | X   | X    | X        | NR     | X     | NR        | NR           | X            | X             | A             |
| Phosphoric Acid $\text{H}_3\text{PO}_4$                                       | 10%           | 150                           | 210               | X                             | 180  | 212 | 140 | B    | NR       | NR     | NR    | NR        | NR           | NR           | B             | A             |
| Phosphoric Acid $\text{H}_3\text{PO}_4$                                       | 50%           | 150                           | 210               | 73                            | 180  | 212 | 140 | B    | NR       | NR     | NR    | NR        | NR           | NR           | B             | A             |
| Phosphoric Acid $\text{H}_3\text{PO}_4$                                       | 85%           | 150                           | 210               | X                             | 180  | 212 | 140 | B    | NR       | NR     | NR    | NR        | NR           | NR           | B             | A             |
| Phosphoric Anhydride $\text{P}_2\text{O}_5$                                   |               | X                             | X                 | X                             | 73   | 73  | 73  | X    | X        | X      | NR    | X         | X            | NR           | A             | A             |
| Phosphorus Pentoxide $\text{P}_2\text{O}_5$                                   |               | 150                           | 160               | X                             | 73   | 73  | 73  | X    | X        | X      | X     | X         | X            | B            | X             | A             |
| Phosphorus Trichloride $\text{PCl}_3$                                         | 100%          | NR                            | NR                | X                             | NR   | 73  | NR  | X    | X        | X      | X     | X         | X            | X            | X             | A             |

**KEY:**

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

# CHEMICAL RESISTANCE GUIDE

|                                                                              | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                        | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|------------------------------------------------------------------------------|---------------|-------------------------------|------------------------|-------------------------------|------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                              |               | GFRPC POLYESTER               | GFRPC VINYL ESTER      | ABS                           | CPVC | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| CHEMICALS                                                                    |               |                               |                        |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Photographic Solutions                                                       |               | X                             | X                      | X                             | 180  | 140 | 140 | B    | B        | X      | X     | X         | NR           | X            | B             | A             |
| Phthalic Acid C <sub>6</sub> H <sub>4</sub> (COOH) <sub>2</sub>              | 100%          | 150                           | 210                    | X                             | X    | 140 | NR  | X    | X        | A      | X     | B         | B            | NR           | X             | A             |
| Phthalic Anhydride C <sub>6</sub> H <sub>4</sub> (CO) <sub>2</sub> O         |               | X                             | 210                    | X                             | X    | X   | X   | X    | B        | B      | X     | B         | B            | X            | A             | B             |
| Pickling Acids                                                               |               | 150                           | 160                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Picric Acid C <sub>6</sub> H <sub>2</sub> (NO <sub>2</sub> ) <sub>3</sub> OH | 10%           | 150                           | 100                    | NR                            | NR   | 73  | NR  | A    | B        | NR     | NR    | NR        | NR           | NR           | A             | A             |
| Pine Oil                                                                     | 100%          | 120                           | 195                    | X                             | NR   | 140 | A   | X    | A        | NR     | X     | B         | B            | B            | A             | A             |
| Piperazine Dihydrochloride                                                   | all           | X                             | 110                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Plating Solutions (Antimony)                                                 |               | X                             | X                      | X                             | X    | A   | A   | X    | X        | X      | X     | X         | X            | X            | X             | A             |
| Plating Solutions (Arsenic)                                                  |               | X                             | X                      | X                             | X    | A   | A   | X    | X        | X      | X     | X         | X            | X            | X             | A             |
| Plating Solutions (Brass)                                                    |               | X                             | X                      | X                             | 180  | 140 | 140 | X    | X        | X      | X     | X         | X            | X            | X             | A             |
| Plating Solutions (Cadmium)                                                  |               | NR                            | 180                    | X                             | 180  | 140 | 140 | X    | X        | X      | X     | X         | X            | X            | X             | A             |
| Plating Solutions (Chrome)                                                   |               | NR                            | 120                    | X                             | 180  | 140 | 140 | X    | X        | X      | X     | X         | X            | X            | X             | A             |
| Plating Solutions (Copper)                                                   |               | X                             | 160                    | X                             | 180  | 140 | 140 | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Plating Solutions (Gold)                                                     |               | X                             | 100                    | X                             | 180  | 140 | 140 | X    | X        | X      | X     | X         | X            | X            | X             | A             |
| Plating Solutions (Lead)                                                     |               | X                             | 180                    | X                             | 180  | 140 | 140 | X    | X        | X      | X     | X         | X            | X            | X             | B             |
| Plating Solutions (Nickel)                                                   |               | X                             | 180                    | X                             | 180  | 140 | 140 | X    | X        | X      | NR    | X         | X            | X            | X             | A             |
| Plating Solutions (Platinum)                                                 |               | X                             | 180                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Plating Solutions (Rhodium)                                                  |               | X                             | X                      | X                             | 180  | 140 | 140 | X    | X        | X      | X     | X         | X            | X            | X             | NR            |
| Plating Solutions (Silver)                                                   |               | X                             | 180                    | X                             | 180  | 140 | 140 | X    | X        | X      | X     | X         | X            | X            | X             | A             |
| Plating Solutions (Tin)                                                      |               | X                             | 200                    | X                             | 180  | 140 | 140 | X    | X        | X      | X     | X         | X            | X            | X             | B             |
| Plating Solutions (Zinc)                                                     |               | X                             | 180                    | X                             | 180  | 140 | 140 | X    | X        | X      | X     | X         | X            | B            | X             | B             |
| Pluronic Surfactant 25R-2                                                    | all           | 140                           | 140                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Polyacrylamide                                                               | all           | NR                            | 75                     | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Polyester resins (styrenated)                                                | 100%          | NR                            | 75                     | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Polyethylene Glycol                                                          | all           | 85                            | 210                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Polyols                                                                      | all           | 100                           | 180                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Polyphosphoric Acid (115%)                                                   |               | NR                            | 210                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Polysulfide Liquor                                                           |               | X                             | X                      | X                             | X    | X   | X   | X    | X        | NR     | NR    | B         | B            | X            | X             | B             |
| Polyvinyl Acetate                                                            |               | 60                            | 160                    | X                             | X    | X   | X   | X    | X        | B      | X     | A         | A            | NR           | X             | B             |
| Polyvinyl Alcohol                                                            | all           | 60                            | 120                    |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Potash                                                                       |               | X                             | X                      | X                             | X    | A   | A   | B    | B        | B      | X     | B         | X            | X            | A             | X             |
| Potassium Alum                                                               |               | X                             | X                      | X                             | 180  | X   | 140 | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Potassium Aluminum Sulphate                                                  |               | 170                           | 210                    | X                             | 180  | X   | 140 | X    | X        | X      | NR    | X         | X            | NR           | X             | A             |
| Potassium Bicarbonate KHCO <sub>3</sub>                                      | Sat'd         | 60                            | 150 @ 10%<br>140 @ 50% | X                             | 180  | 140 | 140 | B    | B        | X      | X     | X         | X            | A            | A             | A             |
| Potassium Bichromate K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>           | Sat'd         | X                             | X                      | X                             | 180  | 140 | 140 | X    | X        | X      | B     | X         | X            | B            | X             | A             |
| Potassium Bisulfate KHSO <sub>4</sub>                                        |               | X                             | X                      | X                             | 180  | 212 | 140 | X    | X        | B      | X     | NR        | NR           | NR           | X             | A             |

KEY:

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

# CHEMICAL RESISTANCE GUIDE

|                                                                                                   | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                        | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      |    | METALS   |        |       |           |              |              |               |               |
|---------------------------------------------------------------------------------------------------|---------------|-------------------------------|------------------------|-------------------------------|------|-----|-----|------|----|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                                                   |               | GFRPC POLYESTER               | GFRPC VINYL ESTER      | ABS                           | CPVC | PP  | PVC | HDPE |    | ALUMINUM | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| CHEMICALS                                                                                         |               |                               |                        |                               |      |     |     |      |    |          |        |       |           |              |              |               |               |
| Potassium Bromate KBrO <sub>3</sub>                                                               | all           | 100                           | 210                    | X                             | 180  | 212 | 140 | X    | X  | X        | X      | NR    | A         | A            | X            | A             |               |
| Potassium Bromide KBr                                                                             | all           | 100                           | 210                    | X                             | 180  | 212 | 140 | B    | B  | B        | X      | NR    | NR        | NR           | A            | A             |               |
| Potassium Carbonate (Potash) K <sub>2</sub> CO <sub>3</sub>                                       |               | 60                            | 150 @ 10%<br>140 @ 50% | 73                            | 180  | 180 | 140 | B    | B  | B        | B      | A     | A         | A            | A            | A             |               |
| Potassium Chlorate (Aqueous) KClO <sub>3</sub>                                                    |               | 100                           | 195                    | 160                           | 180  | 212 | 140 | B    | B  | B        | X      | A     | A         | A            | A            | A             |               |
| Potassium Chloride KCl                                                                            |               | 150                           | 210                    | 160                           | 180  | 212 | 140 | B    | B  | B        | A      | B     | B         | B            | A            | B             |               |
| Potassium Chromate K <sub>2</sub> CrO <sub>4</sub>                                                |               | 100                           | 210                    | X                             | 180  | 212 | 140 | B    | A  | A        | X      | B     | B         | B            | X            | A             |               |
| Potassium Cyanide KCN                                                                             |               | NR                            | 150                    | X                             | 180  | 180 | 140 | B    | NR | NR       | NR     | B     | B         | B            | A            | A             |               |
| Potassium Dichromate K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>                                | Sat'd         | 100                           | 210                    | X                             | 180  | 180 | 140 | B    | A  | B        | X      | B     | B         | NR           | A            | A             |               |
| Potassium Ferricyanide K <sub>3</sub> Fe(CN) <sub>6</sub>                                         |               | 150                           | 210                    | X                             | 180  | 180 | 140 | X    | X  | NR       | X      | B     | B         | NR           | X            | A             |               |
| Potassium Ferrocyanide K <sub>4</sub> Fe(CN) <sub>6</sub> * <sub>3</sub> H <sub>2</sub> O         |               | 100                           | 210                    | X                             | 180  | 180 | 140 | A    | B  | B        | NR     | NR    | NR        | NR           | A            | A             |               |
| Potassium Fluoride KF                                                                             |               | 100                           | X                      | X                             | 180  | 180 | 140 | X    | X  | X        | X      | X     | X         | X            | X            | A             |               |
| Potassium Hydroxide KOH                                                                           | 25%           | NR                            | 150 @ 10%<br>110 @ 25% | 160                           | 180  | 212 | 140 | X    | X  | NR       | X      | B     | B         | B            | X            | A             |               |
| Potassium Hydroxide KOH                                                                           | 50%           | NR                            | X                      | X                             | X    | A   | A   | B    | NR | NR       | NR     | B     | B         | A            | B            | B             |               |
| Potassium Hypochlorite KClO                                                                       |               | X                             | X                      | 160                           | 180  | X   | 140 | X    | X  | NR       | X      | X     | X         | NR           | X            | A             |               |
| Potassium Iodide KI                                                                               |               | 100                           | 140                    | X                             | 180  | 73  | 73  | X    | X  | B        | X      | X     | X         | B            | X            | A             |               |
| Potassium Nitrate KNO <sub>3</sub>                                                                |               | 150                           | 210                    | 160                           | 180  | 140 | 140 | B    | B  | A        | B      | B     | B         | B            | A            | A             |               |
| Potassium Orthophosphate, tribasic K <sub>3</sub> O <sub>4</sub> P <sub>12</sub> H <sub>2</sub> O |               | NR                            | 150                    | X                             | X    | X   | X   | X    | X  | X        | X      | X     | X         | X            | X            | X             |               |
| Potassium Oxalate                                                                                 | all           | NR                            | 150                    | X                             | X    | X   | X   | X    | X  | X        | X      | X     | X         | X            | X            | X             |               |
| Potassium Perborate KBO <sub>3</sub>                                                              |               | X                             | X                      | X                             | 180  | 140 | 140 | X    | X  | X        | X      | X     | X         | X            | X            | X             |               |
| Potassium Perchlorate KClO <sub>4</sub>                                                           |               | X                             | X                      | X                             | 180  | 140 | 140 | X    | X  | X        | X      | X     | X         | X            | X            | X             |               |
| Potassium Permanganate KMnO <sub>4</sub>                                                          | 10%           | 60                            | 210                    | X                             | 180  | 73  | 140 | B    | B  | B        | X      | A     | A         | A            | A            | A             |               |
| Potassium Permanganate KMnO <sub>4</sub>                                                          | 25%           | NR                            | 210                    | X                             | 180  | 73  | 73  | B    | B  | B        | X      | A     | A         | A            | A            | A             |               |
| Potassium Persulfate K <sub>2</sub> S <sub>2</sub> O <sub>8</sub>                                 |               | 60                            | 210                    | X                             | 180  | 140 | 140 | X    | X  | X        | X      | X     | X         | X            | X            | X             |               |
| Potassium Sulfate K <sub>2</sub> SO <sub>4</sub>                                                  |               | 150                           | 210                    | 160                           | 180  | 180 | 140 | B    | A  | A        | B      | A     | A         | A            | A            | A             |               |
| Potassium Sulfide K <sub>2</sub> S                                                                |               | X                             | X                      | X                             | 180  | 140 | A   | X    | B  | NR       | NR     | NR    | NR        | NR           | A            | B             |               |
| Potassium Sulfite K <sub>2</sub> SO <sub>3</sub> * <sub>2</sub> H <sub>2</sub> O                  |               | X                             | X                      | X                             | 180  | 140 | X   | X    | X  | B        | X      | NR    | NR        | NR           | X            | A             |               |
| Potassium Tetraborate                                                                             |               | X                             | X                      | X                             | X    | X   | X   | X    | X  | X        | X      | X     | A         | A            | X            | A             |               |
| Potassium Tripolyphosphate                                                                        |               | X                             | X                      | X                             | X    | X   | X   | X    | X  | X        | X      | A     | X         | A            | X            | A             |               |
| Propane C <sub>3</sub> H <sub>8</sub>                                                             |               | X                             | 160                    | X                             | 73   | 73  | 140 | X    | B  | A        | A      | A     | A         | A            | A            | A             |               |
| Propargyl Alcohol                                                                                 |               | X                             | X                      | X                             | NR   | 140 | 140 | X    | X  | X        | X      | X     | X         | X            | X            | X             |               |

KEY:

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

## CHEMICAL RESISTANCE GUIDE

| CHEMICALS                                                     | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                                     | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|---------------------------------------------------------------|---------------|-------------------------------|-------------------------------------|-------------------------------|------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                               |               | GFRPC POLYESTER               | GFRPC VINYL ESTER                   | ABS                           | CPVC | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| Propionic Acid $\text{CH}_3\text{CH}_2\text{CO}_2\text{H}$    |               | 75@20%<br>NR@100%             | 200 @ 20%<br>180 @ 50%<br>NR @ 100% | NR                            | NR   | 140 | X   | X    | X        | X      | X     | X         | X            | X            | X             | A             |
| Propyl Acetate                                                |               | X                             | X                                   | X                             | X    | X   | X   | X    | X        | X      | A     | X         | X            | A            | X             | A             |
| Propyl Alcohol $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$   |               | NR                            | 120                                 | 73                            | NR   | 140 | 140 | X    | X        | A      | A     | A         | A            | A            | X             | A             |
| Propylamine (n-)                                              |               | NR                            | 75@40%<br>NR@100%                   | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| n-Propyl Bromide                                              |               | X                             | X                                   | X                             | X    | X   | X   | X    | X        | B      | X     | B         | B            | B            | X             | A             |
| Propylene Glycol                                              | <25%          | 85                            | 210                                 | X                             | X    | X   | X   | B    | A        | A      | A     | A         | A            | A            | B             | A             |
| Propylene Glycol                                              | >25%          | 85                            | 210                                 | X                             | X    | X   | X   | B    | A        | A      | A     | A         | A            | A            | B             | A             |
| Propylene Oxide $\text{CH}_3\text{CHCH}_2\text{O}$            |               | X                             | X                                   | X                             | NR   | 73  | NR  | X    | X        | X      | X     | X         | X            | A            | X             | A             |
| n-Propyl Nitrate                                              |               | X                             | X                                   | X                             | X    | X   | X   | X    | X        | X      | X     | A         | A            | X            | X             | A             |
| Pulp Paper Mill Effluent                                      |               | 60                            | 160                                 |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Pyridine $\text{N}(\text{CH}_3)\text{CH}$                     |               | NR                            | NR                                  | X                             | NR   | NR  | NR  | B    | B        | B      | X     | B         | B            | B            | B             | B             |
| Pyrogalllic Acid $\text{C}_6\text{H}_3(\text{OH})_3$          |               | X                             | X                                   | X                             | X    | X   | 73  | X    | B        | A      | X     | A         | A            | A            | A             | A             |
| Pyrrole                                                       |               | X                             | X                                   | X                             | X    | X   | X   | X    | X        | B      | X     | B         | B            | B            | X             | B             |
| <b>Q</b>                                                      |               |                               |                                     |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Quarternary Ammonium Salts                                    | 25%           | 100                           | 180                                 | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Quinone $\text{C}_6\text{H}_4\text{O}_2$                      |               | X                             | X                                   | X                             | X    | 140 | X   | X    | X        | X      | X     | A         | A            | X            | X             | A             |
| <b>R</b>                                                      |               |                               |                                     |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Rape Seed Oil                                                 |               | X                             | X                                   | X                             | X    | X   | A   | X    | X        | A      | X     | X         | X            | X            | A             | A             |
| Rayon Spin Bath                                               |               | NR                            | 140                                 | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Ref. Fuel C (Isooctane/Toluene)                               | 100%          | NR                            | 140                                 | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Renex Detergents                                              | all           | X                             | 150                                 | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Rosin                                                         |               | 100                           | 195                                 | X                             | X    | A   | X   | X    | A        | NR     | X     | NR        | NR           | NR           | A             | A             |
| Rum                                                           |               | X                             | X                                   | X                             | X    | A   | A   | X    | X        | X      | X     | X         | X            | X            | A             | X             |
| Rust Inhibitors                                               |               | X                             | X                                   | X                             | X    | A   | X   | X    | X        | A      | X     | A         | X            | X            | A             | X             |
| <b>S</b>                                                      |               |                               |                                     |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Salicylaldehyde                                               | 100%          | NR                            | 75                                  | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Salicylic Acid $\text{C}_6\text{H}_4(\text{OH})(\text{COOH})$ | all           | 75                            | 140                                 | X                             | X    | 140 | 140 | X    | X        | B      | X     | NR        | NR           | NR           | X             | A             |
| Sebacic Acid                                                  |               | X                             | 210                                 | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Secondary Butyl Alcohol                                       |               | NR                            | 150                                 | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Selenic Acid $\text{H}_2\text{SeO}_4$                         | all           | 75                            | 210                                 | X                             | 180  | X   | 140 | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sesame Seed Oil                                               |               | X                             | X                                   | X                             | X    | X   | A   | X    | A        | A      | X     | A         | A            | X            | A             | A             |
| Shellac (Bleached)                                            |               | X                             | X                                   | X                             | X    | A   | X   | X    | A        | A      | B     | B         | B            | A            | A             | X             |

**KEY:**

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

## CHEMICAL RESISTANCE GUIDE

| CHEMICALS                                                                          | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                        | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|------------------------------------------------------------------------------------|---------------|-------------------------------|------------------------|-------------------------------|------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                                    |               | GFRPC POLYESTER               | GFRPC VINYL ESTER      | ABS                           | CPVC | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| Shellac (Orange)                                                                   |               | X                             | X                      | X                             | X    | A   | X   | X    | A        | A      | B     | B         | B            | A            | A             | X             |
| Silicic Acid $\text{SiO}_2 \cdot n\text{H}_2\text{O}$                              |               | X                             | 250                    | X                             | 180  | 140 | 140 | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Silicone                                                                           |               | X                             | X                      | X                             | X    | A   | X   | X    | B        | A      | X     | X         | X            | X            | B             | X             |
| Silicone Oil / Grease                                                              | 100%          | 100                           | 195                    | X                             | 180  | 212 | 73  | X    | X        | A      | A     | A         | A            | A            | A             | A             |
| Silver Bromide                                                                     |               | X                             | X                      | X                             | X    | X   | X   | X    | NR       | X      | X     | X         | X            | X            | B             | B             |
| Silver Chloride AgCl                                                               |               | X                             | X                      | 160                           | 180  | 140 | 140 | X    | X        | NR     | NR    | NR        | NR           | NR           | X             | NR            |
| Silver Cyanide AgCN                                                                |               | X                             | 200                    | X                             | 180  | 180 | 140 | X    | X        | NR     | NR    | NR        | NR           | NR           | X             | A             |
| Silver Nitrate $\text{AgNO}_3$                                                     |               | 150                           | 210                    | 160                           | 180  | 180 | 140 | B    | NR       | NR     | NR    | NR        | NR           | NR           | A             | A             |
| Silver Sulfate $\text{Ag}_2\text{SO}_4$                                            |               | X                             | X                      | 160                           | 180  | 140 | 140 | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Soaps                                                                              |               | 60                            | 160                    | 73                            | 180  | 140 | 140 | B    | B        | B      | X     | B         | B            | B            | A             | A             |
| Sodium Acetate $\text{CH}_3\text{COONa}$                                           | Sat'd         | 60                            | 210                    | X                             | 180  | 212 | 140 | B    | B        | A      | X     | B         | B            | NR           | A             | A             |
| Sodium Alkyl Aryl Sulfonates                                                       |               | X                             | 180                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sodium Aluminate $\text{Na}_2\text{Al}_2\text{O}_4$                                | Sat'd         | NR                            | 120                    | X                             | X    | X   | 140 | X    | B        | NR     | X     | B         | B            | A            | X             | A             |
| Sodium Benzoate $\text{C}_6\text{H}_5\text{COONa}$                                 |               | 60                            | 180                    | X                             | 180  | 140 | 140 | X    | X        | X      | X     | X         | X            | X            |               | X             |
| Sodium Bicarbonate $\text{NaHCO}_3$                                                |               | 85                            | 180                    | 73                            | 180  | 212 | 140 | B    | A        | A      | B     | A         | A            | C            | A             | A             |
| Sodium Bichromate                                                                  | Sat'd         |                               | X                      | X                             | X    | X   | X   |      |          | NR     | X     | X         | X            | X            |               | A             |
| Sodium Bifluoride                                                                  |               | 60                            | 120                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sodium Bisulfate $\text{NaHSO}_4$                                                  |               | 150                           | 210                    | 73                            | 180  | 140 | 140 | B    | NR       | NR     | NR    | NR        | NR           | NR           | A             | A             |
| Sodium Bisulfite $\text{NaHSO}_3$                                                  |               | 150                           | 210                    | X                             | 180  | 140 | 140 | X    | X        | B      | X     | NR        | NR           | NR           | X             | A             |
| Sodium Borate (Borax) $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$ | Sat'd         | X                             | 210                    | 160                           | 180  | 180 | 140 | A    | B        | A      | X     | B         | B            | X            | A             | A             |
| Sodium Bromate                                                                     | all           | 100                           | 210                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sodium Bromide NaBr                                                                | Sat'd         | 150                           | 210                    | 120                           | 180  | 140 | 140 |      |          | B      | X     | NR        | NR           | NR           |               | A             |
| Sodium Butyl Xanthane                                                              | 5%            | X                             | 150                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sodium Carbonate $\text{Na}_2\text{CO}_3$                                          |               | 60 @ 25%                      | 180 @ 10%<br>160 @ 35% | 73                            | 180  | 212 | 140 | B    | B        | A      | B     | A         | A            | A            | A             | A             |
| Sodium Chlorate $\text{NaClO}_3$                                                   | Sat'd         | 60                            | 210                    | X                             | 180  | 140 | 73  | B    | B        | A      | X     | B         | B            | B            | A             | A             |
| Sodium Chloride NaCl                                                               |               | 60                            | 210                    | 120                           | 180  | 212 | 140 | B    | B        | B      | A     | B         | B            | B            | A             | B             |
| Sodium Chlorite $\text{NaClO}_2$                                                   | 25%           | 60                            | 160 @ 10%<br>100 @ 50% | X                             | 180  | 73  | NR  | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sodium Chromate $\text{Na}_2\text{Cr}_2\text{O}_7 \cdot 4\text{H}_2\text{O}$       |               | 75 @ 50%                      | 210 @ 50%              | 120                           | 180  | 140 | X   | X    | NR       | A      | X     | B         | B            | B            | A             | A             |
| Sodium Crude Oil                                                                   |               | 150                           | 160                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sodium Cyanide NaCN                                                                |               | NR                            | 210 @ 5%<br>150 @ 15%  | X                             | 180  | 180 | 140 | B    | NR       | 275    | NR    | NR        | A            | A            | A             | A             |
| Sodium Dichromate $\text{Na}_2\text{Cr}_2\text{O}_7 \cdot 2\text{H}_2\text{O}$     | 20%           | 150                           | 210                    | X                             | 180  | 180 | 140 | X    | X        | NR     | X     | B         | B            | B            | X             | A             |
| Sodium Dihydrogen Phosphate                                                        | all           | 100                           | 195                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sodium Diphosphate                                                                 |               | 150                           | 210                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |

**KEY:**

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available



# CHEMICAL RESISTANCE GUIDE

| CHEMICALS                                                                                       | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                   | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|-------------------------------------------------------------------------------------------------|---------------|-------------------------------|-------------------|-------------------------------|------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                                                 |               | GFRPC POLYESTER               | GFRPC VINYL ESTER | ABS                           | CPVC | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| Sodium Dodecylbenzene Sulphonate                                                                | all           | X                             | 180               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sodium Ethyl Xanthate                                                                           | 5%            | X                             | 150               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sodium Ferricyanide Na <sub>3</sub> Fe(CN) <sub>6</sub> * <sub>2</sub> H <sub>2</sub> O         | Sat'd         | 150                           | 210               | X                             | 180  | 140 | 140 | X    | X        | NR     | X     | NR        | NR           | X            | X             | A             |
| Sodium Ferrocyanide Na <sub>3</sub> Fe(CN) <sub>6</sub> * <sub>10</sub> H <sub>2</sub> O        | Sat'd         | 100                           | 210               | X                             | 180  | 140 | 140 | X    | X        | X      | X     | X         | X            | X            | X             | A             |
| Sodium Fluoride NaF                                                                             | all           | 85                            | 180               | 120                           | 180  | 180 | 140 | B    | B        | A      | X     | NR        | NR           | NR           | B             | A             |
| Sodium Fluorosilicate                                                                           | all           | 75                            | 120               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sodium Hexametaphosphate                                                                        | all           | 100                           | 180               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sodium Hydrosulfide                                                                             | all           | NR                            | 180               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sodium Hydrosulfite Na <sub>2</sub> S <sub>2</sub> O <sub>4</sub>                               | all           | NR                            | 100               | X                             | X    | X   | B   | X    | A        | B      | X     | X         | X            | X            | X             | X             |
| Sodium Hydroxide NaOH                                                                           | <10%          | 150                           | 150               | X                             | X    | X   | X   | B    | NR       | A      | X     | X         | A            | A            | A             | A             |
| Sodium Hydroxide NaOH                                                                           | 30%           | NR                            | 150               | 120                           | 180  | 212 | 140 | B    | NR       | A      | X     | X         | B            | B            | A             | A             |
| Sodium Hydroxide NaOH                                                                           | 50%           | NR                            | 150               | 120                           | 180  | 212 | 140 | B    | NR       | B      | NR    | B         | B            | B            | A             | A             |
| Sodium Hydroxide NaOH                                                                           | 70%           | NR                            | X                 | 120                           | 180  | 212 | 140 | B    | NR       | NR     | NR    | B         | B            | B            | A             | A             |
| Sodium Hypochlorite (Bleach) NaOCl* <sub>5</sub> H <sub>2</sub> O                               |               | 60                            | 140               | 120                           | 180  | 73  | 73  | B    | B        | NR     | NR    | NR        | NR           | NR           | NR            | NR            |
| Sodium Hyposulfate Na <sub>2</sub> S <sub>2</sub> O <sub>6</sub>                                |               | X                             | X                 | X                             | X    | X   | X   | X    | NR       | NR     | X     | X         | X            | X            | A             | A             |
| Sodium Lauryl Sulfate                                                                           |               | 150                           | 180               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sodium Metaphosphate (NaPO <sub>3</sub> ) <sub>n</sub>                                          |               | X                             | X                 | X                             | 180  | 120 | 140 | X    | A        | NR     | X     | NR        | NR           | NR           | X             | A             |
| Sodium Metasilicate                                                                             |               | X                             | X                 | X                             | X    | X   | X   | X    | B        | B      | X     | B         | B            | B            | X             | A             |
| Sodium Monophosphate                                                                            |               | 150                           | 210               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sodium Nitrate NaNO <sub>3</sub>                                                                | Sat'd         | 150                           | 210               | 160                           | 180  | 180 | 140 | B    | A        | A      | B     | A         | A            | A            | A             | A             |
| Sodium Nitrite NaNO <sub>2</sub>                                                                |               | X                             | 210               | 160                           | 180  | 73  | 140 | X    | X        | A      | X     | B         | B            | B            | X             | A             |
| Sodium Orthophosphate, Tribasic Na <sub>3</sub> O <sub>4</sub> P <sub>12</sub> H <sub>2</sub> O | all           | NR                            | 150               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sodium Oxalate                                                                                  |               | 100                           | 180               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sodium Perborate NaBO <sub>3</sub> * <sub>4</sub> H <sub>2</sub> O                              |               | X                             | X                 | 120                           | 180  | 73  | 140 | X    | B        | NR     | X     | B         | B            | B            | X             | A             |
| Sodium Perchlorate NaClO <sub>4</sub>                                                           |               | X                             | X                 | X                             | 180  | 212 | 140 | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sodium Persulphate                                                                              |               | 100                           | 210               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sodium Peroxide Na <sub>2</sub> O <sub>2</sub>                                                  | 10%           | X                             | 60                | X                             | 180  | X   | 140 | X    | B        | NR     | NR    | NR        | NR           | NR           | A             | A             |
| Sodium Phosphate NaH <sub>2</sub> PO <sub>4</sub>                                               | Acid          | X                             | 160               | 120                           | 180  | 212 | 140 | X    | NR       | B      | B     | B         | B            | B            | A             | A             |
| Sodium Phosphate NaH <sub>2</sub> PO <sub>5</sub>                                               | Alkaline      | X                             | 150               | X                             | 120  | 180 | 212 | X    | NR       | B      | B     | B         | B            | B            | A             | A             |
| Sodium Phosphate NaH <sub>2</sub> PO <sub>6</sub>                                               | Neutral       | X                             | 150               | X                             | 120  | 180 | 212 | X    | NR       | B      | B     | B         | B            | B            | A             | A             |
| Sodium Polyacrylate                                                                             |               | X                             | 150               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sodium Silicate                                                                                 |               | 60                            | 210               | X                             | 180  | 140 | 140 | X    | B        | NR     | X     | A         | A            | A            | A             | A             |

## KEY:

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

## CHEMICAL RESISTANCE GUIDE

|                                                                                                  | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                        | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|--------------------------------------------------------------------------------------------------|---------------|-------------------------------|------------------------|-------------------------------|------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                                                  |               | GFRPC POLYESTER               | GFRPC VINYL ESTER      | ABS                           | CPVC | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
|                                                                                                  |               |                               |                        |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| CHEMICALS                                                                                        |               |                               |                        |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Sodium Sulfate Na <sub>2</sub> SO <sub>4</sub>                                                   | Sat'd         | 150                           | 210                    | 160                           | 180  | 212 | 140 | B    | B        | A      | B     | A         | A            | A            | A             | A             |
| Sodium Sulfide NaSO <sub>3</sub>                                                                 | Sat'd         | 60                            | 210                    | 160                           | 180  | 212 | 140 | B    | NR       | NR     | NR    | B         | B            | NR           | A             | A             |
| Sodium Sulfite Na <sub>2</sub> SO <sub>3</sub>                                                   | Sat'd         | 60                            | 210                    | 160                           | 180  | 212 | 140 | X    | X        | A      | X     | B         | B            | B            |               | A             |
| Sodium Tartrate                                                                                  | all           | 100                           | 210                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sodium Tetraborate                                                                               |               | 150                           | 200                    | X                             | X    | X   | A   | X    | X        | X      | X     | X         | X            | X            | X             | A             |
| Sodium Thiocyanate                                                                               |               | 100                           | 180 @ 57%              | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sodium Thiosulfate Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> * <sub>5</sub> H <sub>2</sub> O |               | 60                            | 180                    | X                             | 180  | 180 | 140 | X    | B        | B      | X     | NR        | NR           | NR           | A             | A             |
| Sodium Triphosphate                                                                              |               | 60                            | 210                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sodium Xylene Sulfonate                                                                          |               | 60                            | 160                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sorbitol                                                                                         |               | 100                           | 180                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sorghum                                                                                          |               | X                             | X                      | X                             | X    | X   | X   | X    | X        | X      | X     | A         | A            | X            | A             | A             |
| Sour Crude Oil                                                                                   |               | X                             | X                      | X                             | X    | 140 | 140 |      |          | NR     | X     | A         | A            | A            |               | A             |
| Soya Oil                                                                                         |               | 150                           | 160                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Soybean Oil                                                                                      |               | 100                           | 210                    | X                             | X    | 73  | A   | X    | A        | A      | X     | A         | A            | B            | A             | A             |
| Soy Sauce                                                                                        |               | X                             | 110                    | X                             | X    | X   | X   | X    | A        | A      | X     | NR        | NR           | X            | A             | A             |
| Span Surfactant                                                                                  | all           | X                             | 150                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sperm Oil                                                                                        |               | X                             | X                      | X                             | X    | X   | A   | X    | X        | A      | X     | X         | X            | X            | A             | A             |
| Spermint Oil                                                                                     | 100%          | 100                           | 195                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Stannic Chloride SnCl <sub>4</sub>                                                               | Sat'd         | 150                           | 210                    | X                             | 180  | 140 | 140 | B    | NR       | NR     | NR    | NR        | NR           | NR           | NR            | NR            |
| Stannic Fluoborate                                                                               |               | X                             | X                      | X                             | X    | X   | X   | X    | X        | X      | X     | NR        | NR           | X            | X             | A             |
| Stannous Chloride SnCl <sub>2</sub>                                                              | 15%           | 150                           | 210                    | 120                           | 180  | 140 | 140 | A    | NR       | NR     | NR    | NR        | NR           | NR           | NR            | A             |
| Stannous Sulphate                                                                                | all           | 100                           | 195                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Starch                                                                                           |               | 100                           | 210                    | X                             | 180  | 140 | 140 | B    | A        | B      | B     | B         | B            | B            | A             | A             |
| Steam (low pressure)                                                                             |               | X                             | X                      | X                             | X    | X   | X   | X    | X        | A      | A     | A         | A            | A            | X             | A             |
| Steam (medium pressure)                                                                          |               | X                             | X                      | X                             | X    | X   | X   | X    | X        | A      | A     | A         | A            | A            | X             | A             |
| Steam (high pressure)                                                                            |               | X                             | X                      | X                             | X    | X   | X   | X    | X        | NR     | NR    | NR        | B            | A            | X             | A             |
| Stearic Acid CH <sub>3</sub> (CH <sub>2</sub> ) <sub>16</sub> COOH                               |               | 150                           | 210                    | X                             | 180  | 73  | 140 | B    | B        | A      | B     | NR        | NR           | NR           | A             | A             |
| Stoddard's Solvent                                                                               |               | X                             | X                      | X                             | NR   | NR  | NR  | D    | A        | A      | A     | A         | A            | A            | A             | A             |
| Styrene C <sub>6</sub> H <sub>5</sub> CH=CH <sub>2</sub>                                         |               | NR                            | 100                    | X                             | X    | 73  | X   | X    | A        | B      | X     | B         | B            | B            | A             | A             |
| Styrene Acrylic Emulsion                                                                         |               | X                             | 120                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Styrene Butadiene Latex                                                                          |               | X                             | 120                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Succinic Acid COOH(CH <sub>2</sub> ) <sub>2</sub> COOH                                           |               | 85                            | 180                    | X                             | 180  | 140 | 140 | X    | X        | A      | X     | A         | A            | A            | X             | A             |
| Succinonitrile (aqueous)                                                                         |               | 75                            | 100                    | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sugar C <sub>6</sub> H <sub>12</sub> O <sub>6</sub>                                              |               | 150                           | 210                    | X                             | 180  | X   | 140 | X    | A        | NR     | X     | B         | B            | NR           | A             | A             |
| Sulfamic Acid HSO <sub>3</sub> NH <sub>2</sub>                                                   | 20%           | 60                            | 210 @ 10%<br>150 @ 25% | X                             | NR   | 180 | NR  | X    | X        | B      | X     | NR        | NR           | NR           | X             | A             |

KEY:

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

## CHEMICAL RESISTANCE GUIDE

|                                                                          | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                   | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|--------------------------------------------------------------------------|---------------|-------------------------------|-------------------|-------------------------------|------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                          |               | GFRPC POLYESTER               | GFRPC VINYL ESTER | ABS                           | CPVC | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| CHEMICALS                                                                |               |                               |                   |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Sulfanilic Acid                                                          |               | NR                            | 210               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sulfate Liquors (Oil)                                                    | 6%            | X                             | 200               | X                             | 180  | 140 | 140 | X    | B        | NR     | NR    | B         | A            | X            | B             | A             |
| Sulfated Detergents                                                      |               | 60                            | 160               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sulfite Liquors                                                          | 6%            | NR                            | 200               | 73                            | 180  | X   | 140 | X    | X        | X      | X     | X         | X            | NR           | X             | A             |
| Sulfonyl Chloride (aromatic)                                             |               | NR                            | NR                | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sulfur S                                                                 |               | X                             | 210               | X                             | 180  | 212 | 140 | X    | X        | NR     | NR    | B         | B            | NR           | X             | A             |
| Sulfur Chloride S <sub>2</sub> Cl <sub>2</sub>                           |               | NR                            | NR                | X                             | X    | NR  | A   | A    | NR       | NR     | NR    | NR        | NR           | NR           | NR            | NR            |
| Sulfur Dichloride                                                        |               | NR                            | NR                | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sulfur Dioxide SO <sub>2</sub>                                           | Gas (Dry)     | NR                            | 210 @ 5%          | NR                            | 73   | 140 | 140 | NR   | A        | A      | A     | A         | A            | A            | A             | A             |
| Sulfur Dioxide SO <sub>3</sub>                                           | Gas (Wet)     | NR                            | 211 @ 5%          | NR                            | NR   | 140 | 73  | B    | A        | NR     | NR    | X         | X            | X            | A             | A             |
| Sulfur Trioxide SO <sub>3</sub>                                          | Gas           | NR                            | 210               | X                             | NR   | X   | 73  | X    | A        | NR     | NR    | X         | X            | X            | B             | B             |
| Sulfuric Acid H <sub>2</sub> SO <sub>4</sub>                             | <30%          | 150                           | 210               | 120                           | 180  | 180 | 140 | B    | B        | NR     | NR    | NR        | NR           | NR           | NR            | A             |
| Sulfuric Acid H <sub>2</sub> SO <sub>4</sub>                             | 50%           | 85                            | 180               | 73                            | 180  | 140 | 140 | B    | NR       | NR     | NR    | NR        | NR           | NR           | NR            | A             |
| Sulfuric Acid H <sub>2</sub> SO <sub>4</sub>                             | 70%           | NR                            | 180               | NR                            | 180  | 73  | 140 | X    | NR       | NR     | NR    | NR        | NR           | NR           | NR            | B             |
| Sulfuric Acid H <sub>2</sub> SO <sub>4</sub>                             | 90%           | NR                            | NR                | NR                            | 150  | 73  | 73  | X    | NR       | NR     | NR    | NR        | NR           | NR           | NR            | NR            |
| Sulfuric Acid H <sub>2</sub> SO <sub>4</sub>                             | 100%          | NR                            | NR                | NR                            | NR   | NR  | NR  | X    | NR       | NR     | NR    | NR        | NR           | NR           | NR            | NR            |
| Sulfurous Acid H <sub>2</sub> SO <sub>3</sub>                            | Sat'd         | NR                            | 100 @ 10%         | X                             | 180  | 140 | 140 | B    | B        | NR     | NR    | NR        | NR           | NR           | B             | A             |
| Sulfuric Acid & Ferrous Sulfate                                          | 10/sat'd      | X                             | 200               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sulfuric & Phosphoric Acids                                              |               | X                             | 180               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Sulfuryl Chloride                                                        |               | NR                            | NR                | X                             | X    | X   | A   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Superphosphoric Acid                                                     |               | 60                            | 160               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| T                                                                        |               |                               |                   |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Tall Oil                                                                 |               | 60                            | 150               | X                             | NR   | 180 | 140 | X    | X        | NR     | X     | B         | B            | B            | A             | A             |
| Tallow                                                                   |               | X                             | X                 | X                             | X    | X   | X   | B    | A        | X      | X     | X         | X            | X            | A             | A             |
| Tannic Acid C <sub>76</sub> H <sub>52</sub> O <sub>46</sub>              | all           | 75                            | 210               | NR                            | 180  | 73  | 140 | B    | B        | A      | X     | B         | B            | NR           | A             | A             |
| Tanning Liquors                                                          |               | X                             | X                 | 160                           | 180  | 73  | 140 | X    | B        | A      | X     | B         | X            | X            | A             | A             |
| Tar                                                                      |               | X                             | X                 | X                             | NR   | X   | NR  | X    | X        | A      | A     | A         | A            | A            | X             | A             |
| Taric Acid HOOC(CHOH) <sub>2</sub> COOH                                  | all           | 150                           | 210               | 160                           | 180  | 140 | 140 | B    | B        | A      | NR    | NR        | NR           | NR           | A             | A             |
| Tert-Amylmethyl Ether (TAME)                                             |               | X                             | 180               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Tetrachloroethane CHCl <sub>2</sub> CHCl <sub>2</sub>                    |               | NR                            | NR                | X                             | X    | B   | NR  | X    | X        | X      | X     | X         | X            | X            | X             | A             |
| Tetrachloroethylene Cl <sub>2</sub> C=CCl <sub>2</sub> (Perchloroethene) | 100%          | 60                            | 120               | NR                            | NR   | NR  | NR  | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Tetrachloromethane                                                       | 100%          | NR                            | 150               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Tetrachloropyridine                                                      | 100%          | NR                            | 110               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Tetraethyl Lead Pb(C <sub>2</sub> H <sub>5</sub> ) <sub>4</sub>          |               | X                             | X                 | X                             | 73   | 73  | 73  | X    | X        | A      | X     | X         | B            | B            | X             | X             |

**KEY:**

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

## CHEMICAL RESISTANCE GUIDE

| CHEMICALS                                                                        | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                              | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|----------------------------------------------------------------------------------|---------------|-------------------------------|------------------------------|-------------------------------|------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                                  |               | GFRPC POLYESTER               | GFRPC VINYL ESTER            | ABS                           | CPVC | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| Tetrapotassium Pyrophosphate                                                     |               | 100 @ 5%                      | 210 @ 5% 150 @ 60%           | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Tetrahydrofuran C <sub>4</sub> H <sub>8</sub> O                                  |               | X                             | X                            | NR                            | NR   | NR  | NR  | NR   | NR       | NR     | X     | NR        | NR           | A            | A             | A             |
| Tetrasodium Ethylenediamine (Tetracetic Acid Salts)                              | all           | NR                            | 140                          | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Tetrasodium Pyrophosphate                                                        |               | 100 @ 5%                      | 210 @ 5% 150 @ 60%           | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| THF (Tetrahydrofuran)                                                            |               | NR                            | 100 @ 5% NR @ 60%            | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Textone 7                                                                        |               | X                             | 200                          | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Thioglycolic Acid                                                                |               | NR                            | 100 @ 10% 85 @ 80% NR @ 100% | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Thionyl Chloride SOCl <sub>2</sub>                                               |               | NR                            | NR                           | X                             | NR   | NR  | NR  | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Thread Cutting Oils                                                              |               | X                             | X                            | X                             | 73   | 73  | 73  | X    | X        | A      | X     | A         | A            | A            | X             | A             |
| Titanium Tetrachloride TiCl <sub>4</sub>                                         |               | X                             | X                            | X                             | X    | 140 | NR  | X    | X        | NR     | X     | X         | X            | NR           | X             | B             |
| Tobias Acid (2-Naphthylamine Sulfonic Acid)                                      |               | X                             | 210                          | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Toluene (Toluol) CH <sub>3</sub> C <sub>6</sub> H <sub>5</sub>                   |               | NR                            | 60                           | NR                            | NR   | NR  | NR  | NR   | A        | A      | A     | A         | A            | A            | A             | A             |
| Toluene Di-isocyanate (TDI)                                                      |               | NR                            | 75                           | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Toluene Diisocyanate                                                             | Fumes         | X                             | 80                           | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Toluene Sulfonic Acid                                                            |               | NR                            | 210                          | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Toluidine                                                                        |               | NR                            | 100                          | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Tomato Juice                                                                     |               | X                             | X                            | X                             | 180  | 212 | 140 | X    | A        | B      | X     | NR        | NR           | B            | A             | A             |
| Transformer Oil                                                                  |               | NR                            | 210                          | X                             | 180  | 73  | 140 | X    | X        | A      | X     | X         | A            | A            | X             | A             |
| Tributyl Phosphate (C <sub>4</sub> H <sub>9</sub> ) <sub>3</sub> PO <sub>4</sub> |               | NR                            | 75                           | X                             | NR   | NR  | NR  | X    | X        | B      | X     | A         | A            | A            | X             | A             |
| Trichloroacetaldehyde                                                            |               | NR                            | NR                           | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Trichloroacetic Acid CCl <sub>3</sub> COOH                                       | 50%           | 60                            | 210                          | X                             | X    | 140 | 140 | X    | X        | B      | X     | NR        | NR           | NR           | X             | B             |
| Trichlorethane C <sub>2</sub> H <sub>3</sub> Cl <sub>3</sub>                     |               | NR                            | 100                          | X                             | X    | X   | X   | X    | B        | B      | X     | B         | B            | X            | B             | A             |
| Trichloroethylene CHCl=CCl <sub>2</sub>                                          |               | NR                            | NR                           | NR                            | NR   | NR  | NR  | N    | B        | A      | A     | B         | B            | B            | A             | A             |
| Trichlorophenol                                                                  |               | NR                            | NR                           | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Trichloropropane C <sub>3</sub> H <sub>5</sub> Cl <sub>3</sub>                   |               | X                             | X                            | X                             | X    | X   | X   | X    | X        | A      | X     | X         | X            | X            | X             | A             |
| Tricresylphosphate C <sub>21</sub> H <sub>21</sub> O <sub>4</sub> P              |               | NR                            | 120                          | X                             | X    | X   | NR  | X    | X        | A      | X     | X         | X            | X            | X             | A             |
| Tridecylbenzene Sulfonate                                                        |               | 60                            | 210                          | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Triethanolamine (HOCH <sub>2</sub> CH <sub>2</sub> ) <sub>3</sub> N              |               | NR                            | 120                          | NR                            | 73   | 140 | 73  | X    | X        | NR     | X     | NR        | NR           | NR           | X             | A             |
| Triethylamine (C <sub>2</sub> H <sub>5</sub> ) <sub>3</sub> N                    |               | NR                            | 75                           | X                             | X    | NR  | 140 | X    | X        | A      | X     | X         | X            | X            | X             | X             |

KEY:

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

## CHEMICAL RESISTANCE GUIDE

|                                                                                      | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                           | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|--------------------------------------------------------------------------------------|---------------|-------------------------------|---------------------------|-------------------------------|------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                                      |               | GFRPC POLYESTER               | GFRPC VINYL ESTER         | ABS                           | CPVC | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| CHEMICALS                                                                            |               |                               |                           |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Triethylamine Chlorobromide                                                          |               | NR                            | NR                        | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Triethylamine Hydrochloride                                                          |               | NR                            | 130                       | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Triphenyl Phosphate                                                                  | 100%          | NR                            | 140                       | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Triphenyl Phosphite                                                                  | 100%          | NR                            | 140                       | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Tripotassium Phosphate K <sub>5</sub> O <sub>10</sub> P <sub>3</sub>                 |               | NR                            | 180 @ 0.03%<br>140 @ 100% | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Trimethylpropane (CH <sub>2</sub> OH) <sub>3</sub> C <sub>3</sub> H <sub>5</sub>     |               | X                             | X                         | X                             | X    | 140 | 73  | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Trypropyl Amine -N                                                                   | all           | NR                            | 120                       | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Tripropylene Glycol                                                                  | all           | 85                            | 210                       | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Trisodium Phosphate Na <sub>3</sub> PO <sub>4</sub> *1 <sub>2</sub> H <sub>2</sub> O |               | 60                            | 175                       | 73                            | 180  | 140 | 140 | X    | X        | NR     | X     | B         | B            | X            | X             | A             |
| Tung Oil                                                                             | 100%          | 100                           | 210                       | X                             | X    | X   | X   | X    | X        | B      | X     | B         | B            | B            | X             | A             |
| Turbine Oil                                                                          |               | X                             | 100                       | X                             | X    | X   | A   | X    | A        | A      | X     | A         | A            | X            | A             | A             |
| Turpentine                                                                           | all           | 75                            | 210                       | NR                            | NR   | NR  | 140 | NR   | B        | A      | A     | A         | A            | A            | A             | A             |
| Tween Surfactant                                                                     | all           | X                             | 150                       | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| U                                                                                    |               |                               |                           |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Uranium extraction                                                                   |               | X                             | 180                       | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Urea CO(NH <sub>2</sub> ) <sub>2</sub>                                               | all           | 85                            | 150                       | X                             | 180  | 180 | 140 | X    | X        | X      | X     | X         | NR           | NR           | X             | X             |
| Urea Formaldehyde Resins PH>7                                                        | all           | 75                            | 75                        | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Urine                                                                                |               | X                             | X                         | 160                           | 180  | 180 | 140 | B    | B        | X      | X     | NR        | NR           | NR           | A             | A             |
| V                                                                                    |               |                               |                           |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Varsol Solvent                                                                       | 100%          | X                             | 100                       | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Varnish                                                                              |               | X                             | X                         | X                             | X    | A   | X   | X    | A        | A      | B     | NR        | NR           | NR           | A             | A             |
| Varsene (NaEDTA)                                                                     | all           | NR                            | 140                       | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Vaseline (Petroleum Jelly)                                                           |               | X                             | X                         | X                             | NR   | 140 | NR  | X    | X        | X      | X     | A         | A            | A            | X             | A             |
| Vegetable Juice                                                                      |               | X                             | X                         | X                             | X    | X   | X   | X    | A        | B      | X     | NR        | NR           | X            | A             | A             |
| Vegetable Oil                                                                        |               | 150                           | 210                       | X                             | NR   | 140 | NR  | X    | X        | A      | X     | X         | A            | A            | X             | A             |
| Vinegar                                                                              |               | 150                           | 210                       | 73                            | 150  | 140 | 140 | B    | NR       | NR     | NR    | NR        | NR           | NR           | A             | A             |
| Vinyl Acetate CH <sub>3</sub> COOCH=CH <sub>2</sub>                                  |               | NR                            | NR                        | X                             | NR   | 73  | NR  | X    | X        | B      | B     | B         | B            | X            | X             | X             |
| Vinyl Chloride                                                                       | 100%          | NR                            | NR                        | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Vinyl Toluene                                                                        | 100%          | NR                            | 100                       | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Vinylidene Chloride (-1,1-dichloroethylene)                                          | 100%          | NR                            | NR                        | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| W                                                                                    |               |                               |                           |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Water (Acid Mine) H <sub>2</sub> O                                                   |               | X                             | X                         | 160                           | 180  | 140 | 140 | X    | B        | NR     | NR    | NR        | NR           | NR           | A             | A             |
| Water (Deionized) H <sub>2</sub> O                                                   |               | 150                           | 180                       | 160                           | 180  | 140 | 140 | X    | X        | B      | NR    | NR        | NR           | NR           | X             | A             |

**KEY:**

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available

## CHEMICAL RESISTANCE GUIDE

|                                                                                   | CONCENTRATION | POLYMERS MAX TEMPERATURE (°F) |                   | PLASTICS MAX TEMPERATURE (°F) |      |     |     |      | ALUMINUM | METALS |       |           |              |              |               |               |
|-----------------------------------------------------------------------------------|---------------|-------------------------------|-------------------|-------------------------------|------|-----|-----|------|----------|--------|-------|-----------|--------------|--------------|---------------|---------------|
|                                                                                   |               | GFRPC POLYESTER               | GFRPC VINYL ESTER | ABS                           | CPVC | PP  | PVC | HDPE |          | BRONZE | BRASS | GRAY IRON | DUCTILE IRON | CARBON STEEL | 304 STAINLESS | 316 STAINLESS |
| CHEMICALS                                                                         |               |                               |                   |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Water (Distilled) H <sub>2</sub> O                                                |               | 150                           | 180               | 160                           | 180  | 212 | 140 | X    | B        | A      | B     | NR        | NR           | NR           | A             | A             |
| Water (Potable) H <sub>2</sub> O                                                  |               | 150                           | 160               | 160                           | 180  | 212 | 140 | NR   | A        | A      | A     | B         | B            | B            | A             | A             |
| Water (Salt) H <sub>2</sub> O                                                     |               | 150                           | 160               | 160                           | 180  | 212 | 140 | X    | B        | B      | NR    | NR        | NR           | NR           | A             | A             |
| Water (Sea) H <sub>2</sub> O                                                      |               | 150                           | 210               | 160                           | 180  | 212 | 140 | B    | B        | B      | NR    | NR        | NR           | NR           | A             | A             |
| Water (Soft) H <sub>2</sub> O                                                     |               | 150                           | 160               | 160                           | 180  | 212 | 140 | X    | X        | A      | B     | NR        | NR           | B            | X             | A             |
| Water (Waste) H <sub>2</sub> O                                                    |               | X                             | X                 | 73                            | 180  | 212 | 140 | X    | X        | B      | B     | B         | B            | B            | X             | A             |
| Weed Killers                                                                      |               | X                             | X                 | X                             | X    | X   | X   | X    | B        | B      | X     | X         | X            | X            | A             | A             |
| Whey                                                                              |               | X                             | X                 | X                             | X    | X   | X   | X    | B        | X      | X     | X         | X            | X            | A             | A             |
| Whiskey                                                                           |               | X                             | 110               | X                             | 180  | 140 | 140 | B    | NR       | NR     | B     | NR        | NR           | NR           | A             | A             |
| White Liquor                                                                      |               | 60                            | 180               | 73                            | 180  | X   | 140 | X    | X        | NR     | X     | NR        | NR           | NR           | A             | A             |
| Wine                                                                              |               | X                             | 110               | 73                            | 180  | 140 | 140 | B    | NR       | NR     | X     | NR        | NR           | NR           | A             | A             |
| X                                                                                 |               |                               |                   |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Xylene (Xylol) C <sub>6</sub> H <sub>4</sub> (CH <sub>3</sub> ) <sub>2</sub>      |               | NR                            | 75                | NR                            | NR   | NR  | NR  | NR   | A        | A      | A     | A         | A            | A            | A             | A             |
| Xylidine (-dimethyl aniline)                                                      | 100%          | NR                            | 100               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Z                                                                                 |               |                               |                   |                               |      |     |     |      |          |        |       |           |              |              |               |               |
| Zeolite                                                                           | all           | X                             | 200               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Zinc Acetate Zn(CH <sub>3</sub> COO) <sub>2</sub> * <sub>2</sub> H <sub>2</sub> O |               | X                             | X                 | X                             | 180  | X   | X   | X    | X        | NR     | NR    | NR        | NR           | NR           | X             | A             |
| Zinc Carbonate ZnCO <sub>3</sub>                                                  |               | X                             | X                 | X                             | 180  | 140 | X   | X    | X        | B      | X     | X         | X            | X            | X             | B             |
| Zinc Chlorate                                                                     |               | 150                           | 210               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |
| Zinc Chloride ZnCl <sub>2</sub>                                                   |               | 100                           | 210               | 120                           | 180  | 180 | 140 | B    | NR       | NR     | NR    | NR        | NR           | NR           | NR            | B             |
| Zinc Hydrosulphite                                                                |               | X                             | X                 | X                             | X    | X   | X   | X    | NR       | NR     | X     | NR        | NR           | X            | X             | A             |
| Zinc Nitrate Zn(NO <sub>3</sub> ) <sub>2</sub> * <sub>6</sub> H <sub>2</sub> O    |               | 150                           | 210               | 160                           | 180  | 180 | 140 | X    | X        | X      | X     | X         | X            | X            | X             | A             |
| Zinc Sulfate ZnSO <sub>4</sub> * <sub>7</sub> H <sub>2</sub> O                    |               | 150                           | 210               | 160                           | 180  | 212 | 140 | B    | NR       | B      | B     | NR        | NR           | NR           | A             | A             |
| Zinc Sulfite                                                                      |               | 100                           | 210               | X                             | X    | X   | X   | X    | X        | X      | X     | X         | X            | X            | X             | X             |

**KEY:**

A - resistant under normal conditions

B - conditional resistance, consult factory

# - number represents maximum service temperature recommended

NR - Not recommended

X - No data available