

# **FLEX-PRO**<sup>®</sup>

## **Peristaltic Metering Pumps**

### **Tubing Selection Guide**

Selecting the most suitable tubing material is important to the success of the Flex-Pro peristaltic pump in a specific application.

The system pressure, output volume, chemical being pumped and other variables will affect the performance of the tubing.

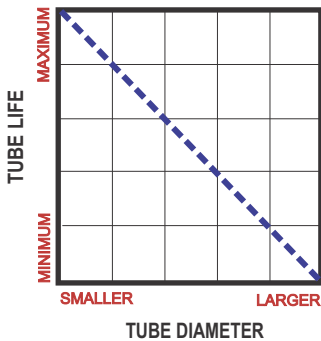
The follow data will assist you in determining the most suitable pump tube assembly for your specific application.

**TUBING CHARACTERISTICS**

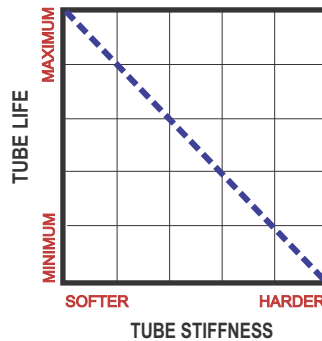
Shown below are the three primary application variables that will affect the life of the tube and the tubing characteristics that are affected by these variables. Chemical resistance is not depicted graphically.

| APPLICATION VARIABLES | TUBING CHARACTERISTICS |                      |                    |
|-----------------------|------------------------|----------------------|--------------------|
|                       | Tube Diameter          | Material Formulation | Material Stiffness |
| Discharge Pressure    | X                      |                      | X                  |
| Output Volume         | X                      |                      |                    |
| Chemical              |                        | X                    |                    |

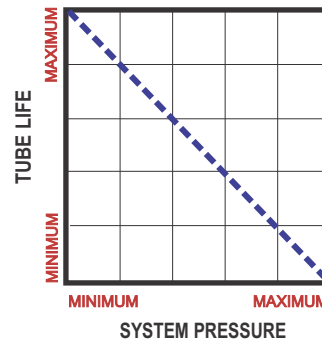
Tube Life vs Tube Diameter



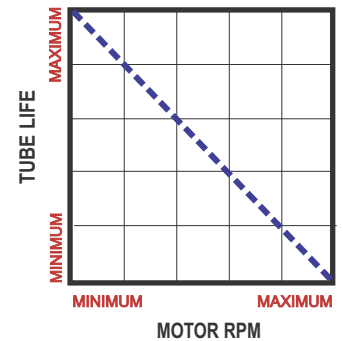
Tube Life vs Tube Stiffness



Tube Life vs Pressure



Tube Life vs Output Volume



**MATERIALS AND DIAMETERS**

- The first letter in the tubing designation always indicates the tube’s material.
- The second letter indicates the tube size. Two of the same letters indicate a dual tube assembly.
- The letter “L” at the end of the code indicates a “low pressure” or “softer” version of the tube.

**N = Norprene/Flex-A-Prene** - An excellent material for most water treatment applications. Chemically resistant to 25% Sodium Hypochlorite, 50% Sulfuric Acid, 30% Fluosilicic Acid, Ferric Chloride, Alum and many others. Available in a wide stiffness range for both low and high pressure applications.

**T = Norprene Chemical** - This tubing material consists of an outer Norprene jacket with an inner liner that is virtually unaffected by acids, bases, salts, ketones and alcohols. Available in a medium stiffness for applications up to 50 psi.

**G = Tygothane** - This polyurethane material can be used with a variety of chemicals including Oil and Water based Polymers, Sodium Hypochlorite, Alum, Ferric Chloride, fuels and lubricants and many others. Available in a medium stiffness for applications up to 65 psi.

| Flex-Pro Peristaltic Pump Tubing Options |                   |                |                     |                     |                             |           |           |                |
|--|-------------------|----------------|---------------------|---------------------|-----------------------------|-----------|-----------|----------------|
| Material Designation                     | Tube Material     | Tube Size Code | Tube Size ID Inches | Tube Stiffness Code | Maximum Pressure Capability |           |           | Max Temp F (C) |
|  |                   |                |                     |                     | A2                          | A3        | A4        |                |
| Code                                     | Material          | Code           | ID Inches           | Code                | PSI (bar)                   | PSI (bar) | PSI (bar) | F (C)          |
| ND                                       | Norprene          | D              | 0.075               | Medium              | 125 (8.6)                   | 125 (8.6) | NA        | 185 (85)       |
| NEE                                      | Norprene          | EE             | 0.093               | Medium              | 110 (7.6)                   | 110 (7.6) | NA        | 185 (85)       |
| NGG                                      | Norprene          | GG             | 0.187               | Medium              | 110 (7.6)                   | 110 (7.6) | NA        | 185 (85)       |
| NHL                                      | Norprene          | HL             | 0.250               | Medium              | 65 (4.5)                    | 65 (4.5)  | 65 (4.5)  | 185 (85)       |
| NJ                                       | Norprene          | J              | 0.312               | Hard                | NA                          | 125 (8.6) | 100 (6.9) | 185 (85)       |
| NK                                       | Norprene          | K              | 0.375               | Hard                | NA                          | 125 (8.6) | 80 (5.5)  | 185 (85)       |
| NKL                                      | Norprene          | KL             | 0.375               | Soft                | NA                          | 30 (2.1)  | 30 (2.1)  | 185 (85)       |
| NL                                       | Norprene          | L              | 0.500               | Medium              | NA                          | NA        | 50 (3.4)  | 185 (85)       |
| NP                                       | Norprene          | P              | 0.750               | Medium              | NA                          | NA        | 30 (2.1)  | 185 (85)       |
| TH                                       | Norprene Chemical | H              | 0.250               | Medium              | 50 (3.4)                    | 50 (3.4)  | 30 (2.1)  | 130 (54)       |
| TK                                       | Norprene Chemical | K              | 0.375               | Medium              | NA                          | 50 (3.4)  | 30 (2.1)  | 130 (54)       |
| GE                                       | Tygothane         | E              | 0.125               | Medium              | 65 (4.5)                    | 65 (4.5)  | NA        | 130 (54)       |
| GG                                       | Tygothane         | G              | 0.187               | Medium              | 65 (4.5)                    | 65 (4.5)  | NA        | 130 (54)       |
| GH                                       | Tygothane         | H              | 0.250               | Medium              | NA                          | 65 (4.5)  | 65 (4.5)  | 130 (54)       |
| GK                                       | Tygothane         | K              | 0.375               | Medium              | NA                          | 65 (4.5)  | 65 (4.5)  | 130 (54)       |

**VISCOSITY EFFECTS**

The viscosity of your chemical will have an affect on the pump output volume.

- As the viscosity increases, pump output is reduced.
- Long suction lines will reduce the pump output. Use a flooded suction where possible.
- A small inside diameter suction line will reduce output. Use a large ID pipe or tube where possible.
- Pump tube assemblies with 1/2" pipe thread or 1/2" ID barb connections have the largest through holes. Use these options when pumping viscous fluids.

**SUCTION LIFT EFFECTS**

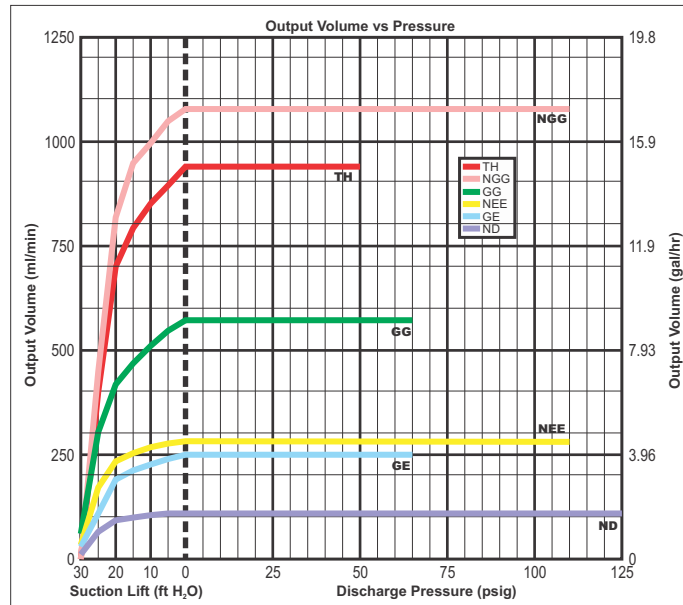
Note that the pump's output specification is based on laboratory tests with water at 72 degrees Fahrenheit (Sp.gr. = 1.0) and 3 feet of suction lift. When lifting fluids with a Specific Gravity other than water, your output rate will vary. Use the following equation and the graphs below to calculate your pump output.

**Fluid Sp.Gr. x Suction Lift Height = the equivalent height in water**

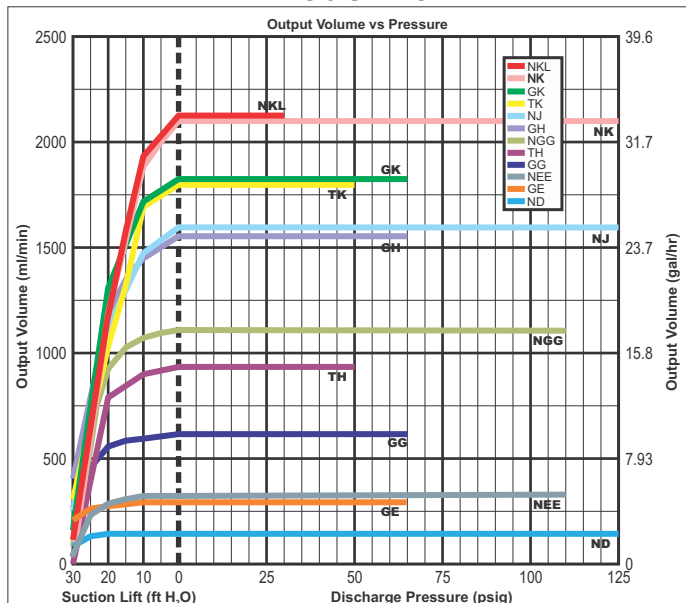
Example: The Sp.Gr. of 12.5% Sodium Hypochlorite at 60 degrees F is 1.20. If the required suction lift is 8 feet, the equivalent suction lift using water is 1.20 x 8 = 9.6 feet.

**Model A2**

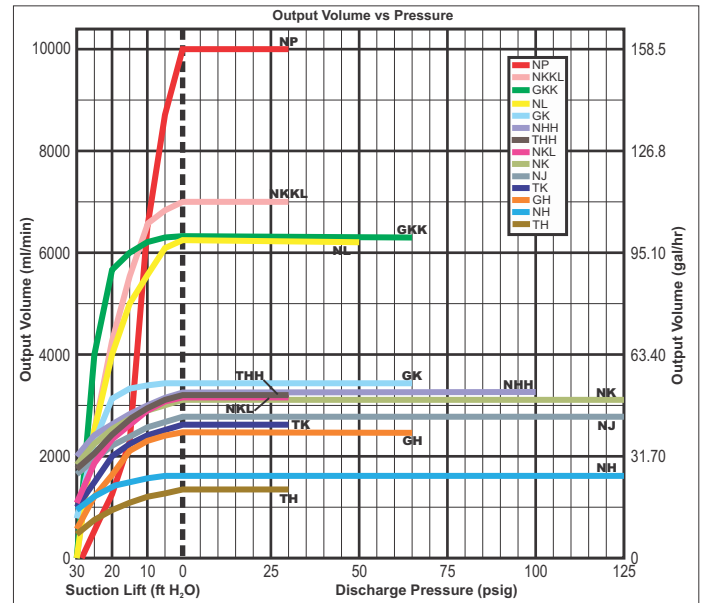
**Note:** All tests performed after approximately 30 minutes tube break-in period. Tested using 72°F water at atmospheric conditions at sea level. Output volume shown with the pump operating at 125 rpm motor speed.

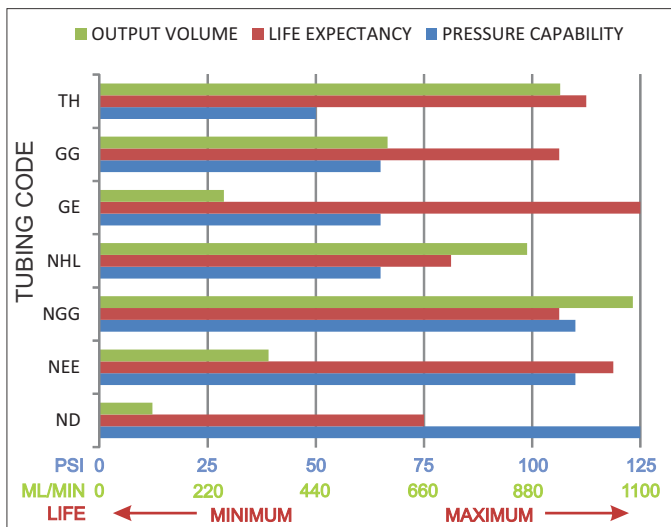


**Model A3**



**Model A4**





How to use this data:

First, select the tube materials that are resistant to the chemical. See the following pages for chemical resistance data.

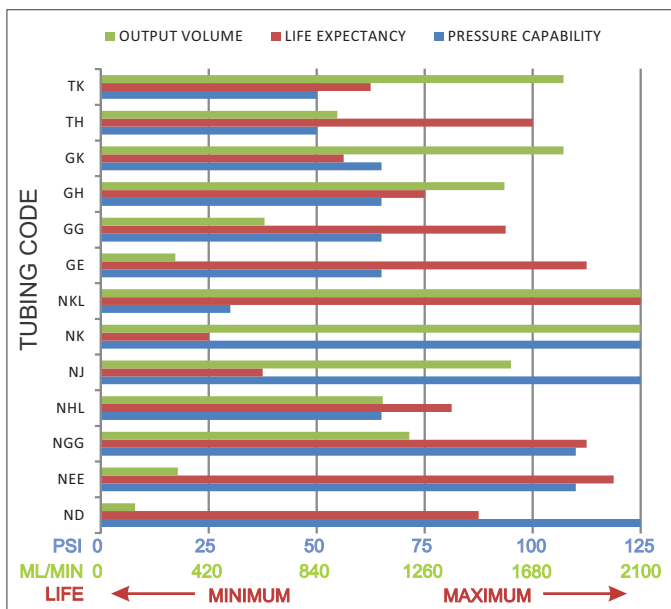
Then, select the tube sizes that meet the system pressure requirement.

Finally, select the tube with the highest output volume and life expectancy.

**Model A2 Pump Tubes and Output Ranges**

| Tube Material     | Tube Size | Max Pressure | Max Temp | Output Range | Roller Size |
|-------------------|-----------|--------------|----------|--------------|-------------|
| Material          | Code      | PSI (bar)    | F (C)    | ML/Min       | Code        |
| Norprene          | ND        | 125 (8.6)    | 185 (85) | 1 - 108      | A2-SND-R    |
| Flex-A-Prene      | NEE       | 110 (7.6)    | 185 (85) | 3 - 280      | A2-SNGG-R   |
| Flex-A-Prene      | NGG       | 110 (7.6)    | 185 (85) | 11 - 1085    | A2-SNGG-R   |
| Norprene          | NHL       | 65 (4.5)     | 185 (85) | 9 - 870      | A2-SNH-R    |
| Norprene Chemical | TH        | 50 (3.4)     | 130 (54) | 9 - 937      | A2-STH-R    |
| Tygothane         | GE        | 65 (4.5)     | 130 (54) | 3 - 253      | A2-SGE-R    |
| Tygothane         | GG        | 65 (4.5)     | 130 (54) | 6 - 586      | A2-SGE-R    |

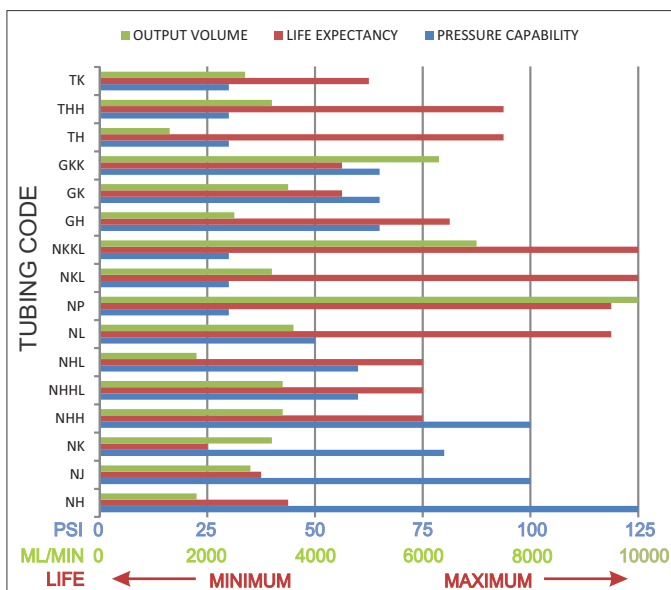
Note: The NGG tube's maximum output is 1,043 ml/min when using the "S" flexible tubing connections and 989 ml/min when using the "Q" quick-dissconnect connections.



**Model A3 Pump Tubes and Output Ranges**

| Tube Material     | Tube Size | Max Pressure | Max Temp | Output Range | Roller Size |
|-------------------|-----------|--------------|----------|--------------|-------------|
| Material          | Code      | PSI (bar)    | F (C)    | ML/Min       | Code        |
| Norprene          | ND        | 125 (8.6)    | 185 (85) | .05 - 133    | A3-SND-R    |
| Flex-A-Prene      | NEE       | 110 (7.6)    | 185 (85) | .1 - 300     | A3-SNGG-R   |
| Flex-A-Prene      | NGG       | 110 (7.6)    | 185 (85) | .5 - 1200    | A3-SNGG-R   |
| Norprene          | NHL       | 65 (4.5)     | 185 (85) | .4 - 1097    | A3-SNH-R    |
| Norprene          | NJ        | 125 (8.6)    | 185 (85) | .6 - 1596    | A3-SNH-R    |
| Norprene          | NK        | 125 (8.6)    | 185 (85) | .8 - 2100    | A3-SNH-R    |
| Norprene          | NKL       | 30 (2.1)     | 185 (85) | .8 - 2100    | A3-SNH-R    |
| Norprene Chemical | TH        | 50 (3.4)     | 130 (54) | .4 - 920     | A3-STH-R    |
| Norprene Chemical | TK        | 50 (3.4)     | 130 (54) | .7 - 1800    | A3-STH-R    |
| Tygothane         | GE        | 65 (4.5)     | 130 (54) | .1 - 290     | A3-SGE-R    |
| Tygothane         | GG        | 65 (4.5)     | 130 (54) | .3 - 637     | A3-SGE-R    |
| Tygothane         | GH        | 65 (4.5)     | 130 (54) | .6 - 1570    | A3-SGE-R    |
| Tygothane         | GK        | 65 (4.5)     | 130 (54) | .7 - 1800    | A3-SGE-R    |

Note: The NGG tube's maximum output is 1,150 ml/min when using the "S" flexible tubing connections and 1,041 ml/min when using the "Q" quick-dissconnect connections.



**Model A4 Pump Tubes and Output Ranges**

| Tube Material     | Tube Size | Max Pressure | Max Temp | Output Range | Roller Size |
|-------------------|-----------|--------------|----------|--------------|-------------|
| Material          | Code      | PSI (bar)    | F (C)    | ML/Min       | Code        |
| Norprene          | NH        | 125 (8.6)    | 185 (85) | .7 - 1800    | A4-MNH-R    |
| Norprene          | NHL       | 65 (4.5)     | 185 (85) | .7 - 1800    | A4-MNH-R    |
| Norprene          | NJ        | 100 (6.9)    | 185 (85) | 1.1 - 2800   | A4-MNH-R    |
| Norprene          | NK        | 80 (5.5)     | 185 (85) | 1.3 - 3200   | A4-MNH-R    |
| Norprene          | NHH       | 100 (6.9)    | 185 (85) | 1.4 - 3400   | A4-MNH-R    |
| Norprene          | NHHL      | 65 (4.5)     | 185 (85) | 1.4 - 3400   | A4-MNH-R    |
| Norprene          | NL        | 50 (3.4)     | 185 (85) | 2.5 - 6300   | A4-MNL-R    |
| Norprene          | NP        | 30 (2.1)     | 185 (85) | 4.0 - 10000  | A4-MNL-R    |
| Norprene          | NKL       | 30 (2.1)     | 185 (85) | 1.3 - 3200   | A4-MNH-R    |
| Norprene          | NKKL      | 30 (2.1)     | 185 (85) | 2.8 - 7000   | A4-MNH-R    |
| Norprene Chemical | TH        | 30 (2.1)     | 130 (54) | .5 - 1300    | A4-MTH-R    |
| Norprene Chemical | TK        | 30 (2.1)     | 130 (54) | 1.1 - 2700   | A4-MTH-R    |
| Norprene Chemical | THH       | 30 (2.1)     | 130 (54) | 1.3 - 3200   | A4-MTH-R    |
| Tygothane         | GH        | 65 (4.5)     | 130 (54) | 1.0 - 2500   | A4-MGH-R    |
| Tygothane         | GK        | 65 (4.5)     | 130 (54) | 1.4 - 3500   | A4-MGH-R    |
| Tygothane         | GKK       | 65 (4.5)     | 130 (54) | 2.5 - 6300   | A4-MGH-R    |

28 Day Immersions at 73° F

E = Excellent  
G = Good  
F = Fair  
U = Not Recommended

| Chemical, Conc. % (1)               | Norprene/Flex-A-Prene |              |           | Chemical, Conc. % (1)               | Norprene/Flex-A-Prene |              |           | Chemical, Conc. % (1)                 | Norprene/Flex-A-Prene |              |           |
|-------------------------------------|-----------------------|--------------|-----------|-------------------------------------|-----------------------|--------------|-----------|---------------------------------------|-----------------------|--------------|-----------|
|                                     | Norprene              | Flex-A-Prene | Tygothane |                                     | Norprene              | Flex-A-Prene | Tygothane |                                       | Norprene              | Flex-A-Prene | Tygothane |
| Acetate Solvents                    | F                     | U            | U         | Bromine, Anhydrous Liquid           | U                     | U            | U         | Ethylene Chlorohydrin                 | E                     | E            | U         |
| Acetic Acid, 10% in w               | F                     | F            | G         | Butadiene                           | F                     | G            | F         | Ethylene Diamine                      | F                     | U            | U         |
| Acetic Acid, 50-60% in w            | G                     | F            | U         | Butane                              | F                     | G            | F         | Ethylene Dichloride                   | F                     | U            | U         |
| Acetic Acid, Glacial, 100%          | G                     | F            | U         | Butyl Acetate                       | G                     | U            | U         | Ethylene Glycol                       | F                     | F            | F         |
| Acetic Anhydride                    | F                     | F            | U         | Butyl Alcohol                       | G                     | F            | U         | Ethylene Oxide                        | F                     | F            | F         |
| Acetone                             | U                     | G            | U         | Butyric Acid                        | G                     | U            | U         | Fatty Acids                           | F                     | F            | G         |
| Acrylonitrile                       | G                     | G            | U         | Calcium Bisulfite, 1% in w          | F                     | F            | F         | Ferric Chloride, 43% in w             | F                     | F            | F         |
| Adipic Acid, 100% in alc            | G                     | U            | U         | Calcium Bromide 52%                 | F                     | F            | F         | Ferric Hydroxide                      | F                     | F            | U         |
| Air                                 | F                     | F            | F         | Calcium Carbonate, 25% acids        | F                     | F            | F         | Ferric Nitrate, 60% in w              | F                     | F            | F         |
| Alcohols General                    | F                     | F            | U         | Calcium Chlorate, 30% in w          | F                     | F            | F         | Ferric Salts                          | F                     | F            | F         |
| Aliphatic Hydrocarbons              | U                     | U            | G         | Calcium Chloride, 30% in w          | F                     | F            | F         | Ferric Sulfate, 5% in w               | F                     | F            | F         |
| Allyl Alcohol                       | F                     | F            | U         | Calcium Hydroxide, 10% in glycerol  | F                     | F            | U         | Ferrous Chloride, 40% in w            | F                     | F            | F         |
| Alum, 5% in w                       | F                     | F            | F         | Calcium Hydroxide, 20% in water     | F                     | F            | U         | Ferrous Salts                         | F                     | F            | F         |
| Aluminum Chloride, 53% in w         | F                     | F            | F         | Calcium Hypochlorite, 20% in w      | F                     | F            | G         | Ferrous Sulfate, 5% in w              | F                     | F            | F         |
| Aluminum Chlorohydrate 50%          | F                     | F            | F         | Calcium Nitrate, 55% in w           | F                     | F            | F         | Fluoborate Salts                      | F                     | F            | F         |
| Aluminum Fluoride, 0.1% in w        | F                     | F            | F         | Calcium Oxide, 3% in w              | F                     | F            | F         | Fluoboric Acid, 48% in w              | U                     | F            | U         |
| Aluminum Hydroxide, 2% in w         | F                     | F            | F         | Calcium Salts                       | F                     | F            | F         | Fluorine Gas                          | U                     | U            | U         |
| Aluminum Nitrate, 39% in w          | F                     | F            | F         | Calcium Sulfate, 1% in w            | F                     | F            | F         | Fluosilicic Acid, 30% in w (Fluoride) | F                     | F            | F         |
| Aluminum Potassium Sulfate          | F                     | F            | F         | Carbon Dioxide, Wet/Dry             | F                     | F            | F         | Formaldehyde, 37% in w                | F                     | F            | U         |
| Aluminum Sulfate                    | F                     | F            | F         | Carbon Disulfide                    | U                     | U            | U         | Formic Acid, 25% in w                 | F                     | F            | F         |
| Aluminum Sulfate, 50% in w          | F                     | F            | F         | Carbon Monoxide                     | F                     | F            | F         | Formic Acid, 40-50% in w              | G                     | F            | U         |
| Aluminum Salts                      | F                     | F            | F         | Carbon Tetrachloride                | U                     | U            | U         | Formic Acid, 98% in w                 | G                     | F            | U         |
| Amines                              | F                     | U            | U         | Carbonic Acid                       | F                     | F            | F         | Fruit Juice                           | F                     | F            | F         |
| Ammonia, Anhydrous Liquid           | G                     | G            | F         | Castor Oil                          | F                     | G            | F         | Fuel Oil                              | U                     | U            | G         |
| Ammonium Acetate, 45% in w          | F                     | F            | G         | Cellosolve                          | F                     | U            | U         | Furfural                              | U                     | U            | U         |
| Ammonium Bifluoride, 50% in w       | F                     | F            | F         | Cellosolve Acetate                  | F                     | U            | U         | Gallic Acid, 17% in acetone           | G                     | U            | U         |
| Ammonium Bisulfite, 50%             | F                     | F            | F         | Chloroacetic Acid, 20% in w         | G                     | F            | U         | Gasoline, Automotive                  | U                     | U            | G         |
| Ammonium Carbonate, 50% in w        | F                     | F            | F         | Chlorobenzene, Mono, Di, Tri        | U                     | U            | U         | Gelatin                               | F                     | F            | F         |
| Ammonium Chloride, 23% in w         | F                     | F            | F         | Chloroform                          | U                     | U            | U         | Glucose, 50% in w                     | F                     | F            | F         |
| Ammonium Hydroxide, 5-10% in w      | F                     | F            | F         | Chlorosulfonic Acid                 | U                     | U            | U         | Glycerol, (Glycerin)                  | F                     | F            | F         |
| Ammonium Hydroxide, 30% in w        | F                     | F            | F         | Chromic Acid, 10-20% in w           | F                     | F            | U         | Glycolic Acid, 70% in w               | G                     | F            | U         |
| Ammonium Nitrate, 54% in w          | F                     | F            | F         | Chromic Acid, 50% in w              | F                     | G            | U         | Heptane                               | U                     | U            | G         |
| Ammonium Persulfate, 30% in w       | F                     | F            | F         | Chromium Salts                      | F                     | F            | F         | Hexane                                | U                     | U            | G         |
| Ammonium Phosphate, 21% in w        | F                     | F            | F         | Citric Acid, 50% in w               | F                     | F            | G         | Hydrazine                             | F                     | U            | U         |
| Ammonium Salts                      | F                     | F            | F         | Coconut Oil                         | F                     | G            | F         | Hydrobromic Acid, 20-50% in w         | U                     | F            | U         |
| Ammonium Sulfate, 30% in w          | F                     | F            | F         | Copper Salts                        | F                     | F            | F         | Hydrobromic Acid, 100% in w           | U                     | F            | U         |
| Amyl Acetate                        | G                     | U            | U         | Corn Syrup                          | F                     | F            | F         | Hydrochloric Acid, 10% in w           | F                     | F            | F         |
| Amyl Alcohol                        | U                     | F            | F         | Cottonseed Oil                      | F                     | G            | F         | Hydrochloric Acid, 37% in w           | G                     | F            | U         |
| Amyl Chloride                       | F                     | U            | U         | Cresol (m, o, or p)                 | U                     | F            | U         | Hydrocyanic Acid                      | F                     | F            | G         |
| Aniline                             | F                     | U            | U         | Cresylic Acid                       | G                     | U            | U         | Hydrofluoric Acid, 10% in w           | U                     | F            | U         |
| Aniline Hydrochloride               | F                     | U            | U         | Cupric Chloride, 40% in w           | F                     | F            | F         | Hydrofluoric Acid, 25% in w           | U                     | F            | U         |
| Antimony Salts                      | F                     | F            | F         | Cupric Cyanide, 10% in dilute bases | F                     | F            | F         | Hydrofluoric Acid, 40-48% in w        | U                     | F            | U         |
| Antimony Trichloride                | F                     | F            | F         | Cupric Nitrate, 70% in w            | F                     | F            | F         | Hydriodic Acid, 55-58% in w           | G                     | F            | U         |
| Aqua Regia                          | U                     | F            | U         | Cupric Sulfate, 13% in w            | F                     | F            | F         | Hydrogen Peroxide, 3% in w            | F                     | F            | F         |
| Aqueous Ammonia                     | F                     | F            | F         | Cyclohexane                         | U                     | U            | G         | Hydrogen Peroxide, 10% in w           | F                     | F            | F         |
| Aromatic Hydrocarbons               | U                     | U            | U         | Cyclohexanone                       | U                     | F            | U         | Hydrogen Peroxide, 30% in w           | F                     | F            | F         |
| Arsenic Acid, 20% in w              | F                     | F            | F         | Detergent Solutions                 | G                     | F            | F         | Hydrogen Peroxide, 90% in w           | G                     | G            | U         |
| Arsenic Salts                       | F                     | F            | F         | Diacetone Alcohol                   | U                     | F            | F         | Hydrogen Sulfide                      | F                     | F            | F         |
| ASTM Reference No. 1 Oil            | F                     | U            | F         | Dibutyl Phthalate                   | F                     | F            | U         | Hydroquinone, 7% in w                 | G                     | F            | F         |
| ASTM Reference No. 2 Oil            | U                     | U            | F         | Dichlorobenzene                     | U                     | U            | U         | Hypochlorous Acid, 25% in w           | F                     | F            | F         |
| ASTM Reference No. 3 Oil            | U                     | U            | F         | Diesel Fuel                         | U                     | U            | G         | Iodine, 50 ppm in w                   | F                     | F            | F         |
| Barium Carbonate, 1% in w           | F                     | F            | F         | Diethylamine, 2.5% in w             | F                     | F            | F         | Isobutyl Alcohol                      | F                     | F            | U         |
| Barium Chloride, 27% in w           | F                     | F            | F         | Diethylene Glycol                   | F                     | F            | F         | Isooctane                             | U                     | U            | G         |
| Barium Hydroxide, 5% in w           | F                     | F            | F         | Diethyl Ether                       | F                     | U            | U         | Isopropyl Acetate                     | G                     | U            | U         |
| Barium Salts                        | F                     | F            | F         | Dimethylformamide                   | G                     | F            | U         | Isopropyl Alcohol                     | F                     | F            | U         |
| Barium Sulfate, <1% in dilute acids | F                     | F            | F         | Dimethylsulfoxide                   | F                     | G            | U         | Isopropyl Ether                       | F                     | U            | U         |
| Barium Sulfide                      | F                     | F            | F         | Diocetyl Phthalate                  | F                     | F            | U         | Jet Fuel, Jp8                         | U                     | U            | G         |
| Beer                                | F                     | F            | F         | Dioxane                             | U                     | U            | U         | Kerosene                              | U                     | U            | G         |
| Benzaldehyde                        | U                     | F            | U         | Ether                               | F                     | U            | U         | Ketones                               | U                     | F            | U         |
| Benzene                             | U                     | U            | U         | Ethyl Acetate                       | F                     | G            | U         | Lacquer Solvents                      | G                     | U            | U         |
| Benzenesulfonic Acid                | U                     | U            | U         | Ethyl Alcohol (Ethanol)             | F                     | F            | U         | Lactic Acid, 3-10% in w               | F                     | F            | G         |
| Benzoic Acid                        | F                     | F            | U         | Ethyl Benzoate                      | U                     | U            | U         | Lactic Acid, 85% in w                 | G                     | F            | U         |
| Benzyl Alcohol                      | F                     | F            | U         | Ethyl Chloride                      | F                     | U            | U         | Lard, Animal Fat                      | F                     | G            | F         |
| Bleach Liquor, 22% in w             | F                     | F            | G         | Ethyl Ether                         | F                     | U            | U         | Lead Acetate, 35% in w                | F                     | F            | F         |
| Borax, 6% in w                      | F                     | F            | F         | Ethylamine, 70% in w                | U                     | G            | U         | Lead Nitrate, 27% in w                | F                     | F            | F         |
| Boric Acid, 4% in w                 | F                     | F            | F         | Ethylene Bromide                    | U                     | F            | U         | Lead Salts                            | F                     | F            | F         |

28 Day Immersions at 73° F

E = Excellent  
G = Good  
F = Fair  
U = Not Recommended

| Chemical, Conc. % (1)                  | Norprene/Flex-A-Prene |              |           | Chemical, Conc. % (1)                | Norprene/Flex-A-Prene |              |           | Chemical, Conc. % (1)                             | Norprene/Flex-A-Prene |              |           |
|--|-----------------------|--------------|-----------|--------------------------------------|-----------------------|--------------|-----------|---|-----------------------|--------------|-----------|
|  | Norprene              | Flex-A-Prene | Tygothane |                                      | Norprene              | Flex-A-Prene | Tygothane |   | Norprene              | Flex-A-Prene | Tygothane |
| Lemon Oil                              | U                     | U            | G         | Paraffins                            | U                     | U            | G         | Sodium Peroxide, 20% in w                         | E                     | E            | E         |
| Lime Slurry (Calcium Hydroxide)        | E                     | E            | U         | Peracetic acid                       | G                     | E            | -         | Sodium Phosphate, 30% in w                        | E                     | E            | E         |
| Limonene-D                             | U                     | U            | G         | Perchloric Acid, 67% in w            | E                     | E            | U         | Sodium Salts                                      | E                     | E            | E         |
| Linoleic Acid                          | F                     | F            | G         | Perchloroethylene                    | F                     | U            | U         | Sodium Sulfate, 38% in w                          | E                     | E            | E         |
| Linseed Oil                            | F                     | G            | E         | Phenol, 5-10% in w                   | E                     | E            | U         | Sodium Sulfide, 45% in w                          | E                     | E            | E         |
| Lubricating Oils, Petroleum            | U                     | U            | E         | Phenol, 91% in w                     | E                     | E            | U         | Sodium Sulfite, 10% in w                          | E                     | E            | E         |
| Magnesium Carbonate, 1% in w           | E                     | E            | E         | Phosphoric Acid, <10% in w           | E                     | E            | E         | Stannic Chloride, 50% in w                        | E                     | E            | F         |
| Magnesium Chloride, 35% in w           | E                     | E            | E         | Phosphoric Acid, 25% in w            | E                     | E            | E         | Stannous Chloride, 45% in w                       | E                     | E            | E         |
| Magnesium Hydroxide                    | E                     | E            | E         | Phosphoric Acid, 85% in w            | E                     | E            | U         | Stearic Acid, 5% in alc                           | F                     | F            | G         |
| Magnesium Hydroxide, 10% in acids      | E                     | E            | E         | Phosphorous Trichloride Acid         | G                     | E            | U         | Styrene Monomer                                   | U                     | U            | U         |
| Magnesium Nitrate, 50% in w            | E                     | E            | E         | Photographic Solutions               | G                     | E            | E         | Sulfur Chloride                                   | U                     | E            | U         |
| Magnesium Sulfate, 25% in w            | E                     | E            | E         | Phthalic Acid, 9% in alc             | E                     | E            | U         | Sulfur Dioxide, Gas Dry                           | E                     | E            | F         |
| Maleic Acid, 30% in w                  | F                     | F            | G         | Phthalic Anhydride, 9% in alc        | E                     | E            | U         | Sulfur Dioxide, Gas Wet                           | E                     | E            | F         |
| Malic Acid, 36% in w                   | E                     | E            | G         | Picric Acid, 1% in w                 | U                     | E            | U         | Sulfur Trioxide, Wet                              | G                     | G            | U         |
| Manganese Salts                        | E                     | E            | E         | Plating Solutions                    | E                     | E            | U         | Sulfuric Acid, 10% in w                           | E                     | E            | E         |
| Manganese Sulfate, 34% in w            | E                     | E            | E         | Polyaluminum Chloride (PAC) in w     | E                     | E            | -         | Sulfuric Acid, 30% in w                           | E                     | E            | U         |
| Mercuric Chloride, 6% in w             | E                     | E            | E         | Potassium Amyl Xanthate (PAX)        | -                     | G            | -         | Sulfuric Acid, 95-98% in w                        | U                     | E            | U         |
| Mercuric Cyanide, 8% in w              | E                     | E            | E         | Potassium Carbonate, 55% in w        | E                     | E            | E         | Sulfurous Acid                                    | E                     | E            | E         |
| Mercurous Nitrate, 10% in dilute acids | E                     | E            | E         | Potassium Chloride, 20% in w         | E                     | E            | E         | Tannic Acid, 75% in w                             | G                     | E            | U         |
| Mercury                                | E                     | E            | E         | Potassium Chloride, 33% in w         | E                     | E            | E         | Tanning Solutions                                 | E                     | E            | F         |
| Mercury Salts                          | E                     | E            | E         | Potassium Dichromate, 5% in w        | E                     | E            | E         | Tartaric Acid, 56% in w                           | E                     | E            | E         |
| Methane Gas                            | E                     | E            | E         | Potassium Hydroxide, 43% in w        | E                     | E            | U         | Tetrahydrofuran                                   | U                     | U            | U         |
| Methyl Acetate                         | G                     | U            | U         | Potassium Hypochlorite, 70% in w     | E                     | E            | E         | Thionyl Chloride                                  | E                     | E            | F         |
| Methyl Alcohol (Methanol)              | E                     | E            | U         | Potassium Iodide, 56% in w           | E                     | E            | E         | Tin Salts   | E                     | E            | E         |
| Methyl Bromide                         | F                     | U            | U         | Potassium Nitrate, 10% in w          | E                     | E            | E         | Titanium Salts                                    | E                     | E            | E         |
| Methyl Chloride                        | F                     | U            | U         | Potassium Oxide, 50% in w            | E                     | E            | E         | Toluene   | U                     | U            | U         |
| Methyl Ethyl Ketone                    | U                     | F            | U         | Potassium Permanganate, 6% in w      | E                     | E            | E         | Trichloroacetic Acid, 90% in w                    | G                     | E            | U         |
| Methyl Isobutyl Ketone                 | U                     | F            | U         | Potassium Salts                      | E                     | E            | E         | Trichloroethane                                   | F                     | U            | U         |
| Methylene Chloride                     | F                     | U            | U         | Potassium Sulfate, 10% in w          | E                     | E            | E         | Triethanolamine                                   | F                     | U            | U         |
| Methyl Methacrylate                    | U                     | U            | U         | Potassium Sulfide, 20% in w          | E                     | E            | E         | Trichloroethylene                                 | U                     | U            | U         |
| Milk                                   | E                     | E            | E         | Propyl Alcohol (Propanol)            | F                     | E            | U         | Trichloropropane                                  | F                     | U            | U         |
| Mineral Oil                            | U                     | U            | E         | Propylene Glycol                     | E                     | E            | E         | Tricresyl Phosphate                               | E                     | E            | U         |
| Mineral Spirits                        | U                     | U            | G         | Propylene Oxide                      | E                     | E            | E         | Trisodium Phosphate                               | E                     | E            | E         |
| Molasses                               | E                     | E            | E         | Pyridine                             | F                     | F            | U         | Turpentine  | U                     | U            | G         |
| Monoethanolamine                       | F                     | U            | U         | Salicylic Acid, 1% in w              | E                     | E            | G         | Urea, 20% in w                                    | E                     | E            | E         |
| Motor Oil                              | U                     | U            | E         | Silicone Oils                        | F                     | E            | E         | Uric Acid   | E                     | E            | F         |
| Naphtha                                | U                     | U            | G         | Silver Nitrate, 55% in w             | E                     | E            | E         | Vinegar   | E                     | E            | G         |
| Naphthalene                            | U                     | U            | G         | Skydrol 500A                         | U                     | U            | G         | Vinyl Acetate                                     | G                     | U            | U         |
| Nickel Chloride, 40% in w              | E                     | E            | E         | Soap Solutions                       | G                     | E            | E         | Water, Brine                                      | E                     | E            | E         |
| Nickel Nitrate, 75% in w               | E                     | E            | E         | Sodium Acetate, 55% in w             | E                     | G            | U         | Water, Deionized                                  | E                     | E            | E         |
| Nickel Salts                           | E                     | E            | E         | Sodium Aluminate                     | E                     | E            | U         | Water, Distilled                                  | E                     | E            | E         |
| Nickel Sulfate, 25% in w               | E                     | E            | E         | Sodium Benzoate, 22% in w            | E                     | E            | E         | Xylene  | U                     | U            | U         |
| Nitric Acid, 10% in w                  | E                     | E            | U         | Sodium Bicarbonate, 7% in w          | E                     | E            | E         | Zinc Chloride, 80% in w                           | E                     | E            | E         |
| Nitric Acid, 35% in w                  | E                     | E            | U         | Sodium Bisulfate, 50% in w           | E                     | E            | E         | Zinc Salts  | E                     | E            | E         |
| Nitric Acid, 68-71% in w               | U                     | E            | U         | Sodium Bisulfite                     | E                     | E            | E         | Zinc Sulfate, 30% in w                            | E                     | E            | E         |
| Nitrobenzene                           | U                     | U            | U         | Sodium Carbonate, 7% in w (soda ash) | E                     | E            | E         |   |                       |              |           |
| Nitromethane                           | U                     | U            | U         | Sodium Chlorate, 45% in w            | E                     | E            | E         |   |                       |              |           |
| Nitrous Acid, 10% in w                 | E                     | E            | F         | Sodium Chloride, 20% in w            | E                     | E            | E         |   |                       |              |           |
| Oils, Animal                           | F                     | G            | E         | Sodium Chlorite, 12% in              | E                     | -            | -         |   |                       |              |           |
| Oils, Essential                        | U                     | U            | F         | Sodium Cyanide, 30% in w             | E                     | E            | U         | (1) - If a concentration is not indicated, assume |                       |              |           |
| Oils, Hydraulic (Phosphate Ester)      | U                     | U            | G         | Sodium Dichromate, 70% in w          | E                     | E            | E         | 100% concentration or the maximum percent         |                       |              |           |
| Oils, Hydrocarbon                      | U                     | U            | E         | Sodium Fluoride, 3% in w             | E                     | E            | E         | solubility in water.                              |                       |              |           |
| Oils, Vegetable                        | F                     | G            | E         | Sodium Hydroxide, 10-15% in w        | E                     | E            | U         |   |                       |              |           |
| Oleic Acid                             | F                     | F            | G         | Sodium Hydroxide, 30-50% in w        | E                     | E            | U         | NOTE - Concentrations of room temperature         |                       |              |           |
| Oleum, 25% in w                        | E                     | E            | U         | Sodium Hypochlorite, 25% in w        | E                     | E            | G         | liquids are given in % volume. Concentrations of  |                       |              |           |
| Ortho Dichlorobenzene                  | U                     | U            | U         | Sodium Nitrate, 3.5% in w            | E                     | E            | E         | room temperature solids are given in % weight.    |                       |              |           |
| Oxalic Acid, 12% in w                  | G                     | E            | U         | Sodium Perborate, 25% in w           | E                     | E            | E         | w = Water   |                       |              |           |
| Ozone, 300pphm                         | E                     | E            | E         | Sodium Permanganate, 40% in w        | E                     | -            | -         | alc = Alcohol                                     |                       |              |           |
| Palmitic Acid, 100% in ether           | F                     | F            | G         | Sodium Persulfate                    | E                     | E            | E         | - = no data                                       |                       |              |           |

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