



## CHEMICAL RESISTANCE OF HARVEL® PVC AND CPVC PIPING PRODUCTS

It is well known that both PVC and CPVC thermoplastic piping products are generally immune to most types of corrosion typically experienced with metallic underground piping systems. The effects of galvanic and electrochemical corrosion are nonexistent since both of these materials are non-conductors.

When compared to other piping materials, both PVC and CPVC piping products also exhibit exceptional chemical resistance to a wide variety of corrosive reagents and mixtures found in the chemical processing industries. This fact has been well demonstrated for over 30 years in numerous chemical-processing applications. In general, both PVC and CPVC are inert to most mineral acids, bases, salts, and paraffinic hydrocarbons.

The following information is provided as a general guide for the selection of piping systems subjected to various chemical substances. The recommendations stated are based on information provided by our raw material suppliers and is believed to be reliable. This information is based on one or more of the following: actual chemical immersion testing, chemical structure comparison to substances that have been tested, past field experience, and various other sources.

Factors such as percentage of chemical concentration, combinations of chemical substances, temperature, pressure, external system stress, and product quality can affect chemical resistance. Although extensive research has been conducted over the years to better define use parameters, the possible combinations of chemical mixtures and their resultant reaction when mixed is endless. Therefore the following chemical resistance data is by no means complete. The absence of a specific chemical or solution from the chemical resistance chart does not imply that Harvel products are not suitable for use with that substance. When test data on chemical resistance to particular chemicals under specific operating conditions is not available, Harvel Plastics, Inc. recommends that chemical immersion testing be performed, and if successful, a small test assembly be constructed to test the product under actual use conditions (appropriate care and safety precautions must be followed with all in service testing).

### ! CAUTION AREAS

! Chlorinated and aromatic hydrocarbons, esters, or ketones are not recommended for use with PVC or CPVC thermoplastic piping materials. Although the chemical resistance of PVC and CPVC compounds is similar, they are not always the same. Caution should be used when comparing the chemical resistance properties of PVC Type I, PVC Type 11, PVC Clear, and CPVC as differences in chemical resistance exist.

• When investigating the chemical compatibility of a piping system, it is important to note that the piping system components must also be investigated for compatibility. Gaskets, o-rings, valve seats, solvent cements, and other components should be evaluated for compatibility and approved by their respective manufacturers for use with the fluid

• Caution should be exercised when selecting thread paste compounds, lubricants, cleaning and wetting agents (surfactants), and other chemical substances that come into contact with the system for compatibility as well.

• The majority of the chemical resistance data provided in the following charts is based on chemical immersion testing run under non-pressurized conditions. Depending on the hazards of the chemical used, an additional pressure de-rating factor is typically applied to the standard working pressure rating of the product (shown for water). Standard temperature de-rating factors must also be applied to pressure applications at elevated temperatures.

• Applications involving certain oils, surfactants, and greases may result in environmental stress cracking. Environmental stress cracking occurs when the piping and components are weakened by contact with these chemicals, and failures are propagated by external stress (i.e. pressure, expansion/contraction, installation etc.) on the system.

• Certain substances called out on the following pages reference chemicals in a gaseous state. These substances are not recommended for pressure service. They are shown to provide the chemical resistance of PVC and CPVC when coming into contact with these substances. (i.e. exposure to or immersion in these substances). **Harvel Plastics does not recommend the use of its PVC and CPVC products for the testing, transporting or storing of compressed air or gases.**

• Harvel Clear® maintains its physical properties when exposed to many substances. However, exposure to certain chemicals can affect the clarity of the product over time. Certain nitrogen-containing organics, bleaches, oxidative agents and acids will result in discoloration. When investigating Harvel Clear® for potential use in chemical applications testing under actual use conditions is recommended.

Chemical attack to the plastic generally appears as a swelling whereby the incompatible substance is absorbed into the piping resulting in softening and eventual degradation of physical properties. The rate of decomposition is related to the concentration of the chemicals present and temperature/stress issues related to the operational parameters of the system.

Past experience has shown that in many cases both PVC and CPVC have been used successfully in contaminated water monitoring/recovery systems where very low levels (PPM/PPB range) of certain incompatible substances are present. In many instances the life expectancy of the system is adequate enough to provide a cost effective piping solution for contaminated ground water recovery projects. This is a complicated issue due to the variety of substances being extracted and their method of extraction. However, since most remediation projects involve low pressure/vacuum type applications for a limited recovery period, the use of PVC; CPVC can provide a viable piping solution for these types of applications.

### INTERPRETATION OF DATA:

R = RECOMMENDED

NR = NOT RECOMMENDED

C = CAUTION, SUSPECT AT CERTAIN STRESS LEVELS -

TESTING UNDER ACTUAL USE CONDITIONS REQUIRED

? = UNKNOWN; INSUFFICIENT DATA - TESTING UNDER

ACTUAL USE CONDITIONS REQUIRED

*NOTE: The data furnished herein is based on information provided by manufacturers of the raw material and is believed to be reliable. This information may be considered as a basis for recommendation only, and not as a guarantee for its accuracy, suitability for particular applications, or the results to be obtained there from. Materials should be tested under actual service conditions to determine suitability for a particular purpose.*

**HARVEL PLASTICS, INC.**  
**CHEMICAL RESISTANCE GUIDE FOR HARVEL®PVC AND CPVC PIPING PRODUCTS**

| CHEMICAL REAGENT                             | PVC TYPE I<br>1120<br>(12454) |       | PVC TYPE II<br>2110<br>(14333) |       | PVC CLEAR<br>2110<br>(12454) |       | CPVC TYPE IV, GRADE I<br>4120<br>(23447) |       |       |
|--|-------------------------------|-------|--------------------------------|-------|------------------------------|-------|--|-------|-------|
|  | 73°F                          | 140°F | 73°F                           | 140°F | 73°F                         | 140°F | 73°F                                     | 140°F | 180°F |
|  |                               |       |                                |       |                              |       |  |       |       |
| Acetaldehyde                                 | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Acetamide                                    | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Acetic Acid, pure                            | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Acetic Acid, 10%                             | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Acetic Acid, 20%                             | R                             | R     | R                              | NR    | R                            | NR    | NR                                       | NR    | NR    |
| Acetic Acid, Glacial                         | R                             | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Acetic Anhydride                             | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Acetone, < 5%                                | ?                             | ?     | ?                              | ?     | NR                           | NR    | R  | R     | R     |
| Acetone, > 5%                                | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Acetyl Nitrile                               | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Acetylene                                    | R                             | R     | R                              | R     | R                            | R     | C  | C     | C     |
| Acrylic Acid Ehtyl Ester<br>(ethyl acrylate) | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Adipic Acid; sat. in water                   | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Allyl Alcohol, 96%                           | R                             | NR    | NR                             | NR    | NR                           | NR    | C  | C     | C     |
| Allyl Chloride                               | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Alum, all varieties                          | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Aluminum Acetate                             | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Aluminum Alum                                | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Aluminum Chloride                            | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Aluminum Fluoride                            | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Aluminum Hydroxide                           | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Aluminum Oxychloride                         | R                             | R     | R                              | R     | R                            | R     | ?  | ?     | ?     |
| Aluminum Nitrate                             | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Aluminum Sulfate                             | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Amines                                       | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Ammonia (gas;dry)                            | R                             | R     | R                              | R     | R                            | R     | NR                                       | NR    | NR    |
| Ammonia (liquid)                             | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Ammonium Acetate                             | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Ammonium Alum                                | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Ammonium Bisulfate                           | R                             | R     | ?                              | ?     | ?                            | ?     | R  | R     | R     |
| Ammonium Carbonate                           | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Ammonium Chloride                            | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Ammonium Dichromate                          | R                             | ?     | ?                              | ?     | ?                            | ?     | R  | R     | R     |
| Ammonium Fluoride, ≤25%                      | R                             | NR    | NR                             | NR    | NR                           | NR    | R  | R     | R     |
| Ammonium Fluoride, >25%                      | ?                             | NR    | NR                             | NR    | NR                           | NR    | R  | R     | R     |
| Ammonium Hydroxide                           | R                             | R     | R                              | R     | R                            | R     | NR                                       | NR    | NR    |
| Ammonium Metaphosphate                       | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Ammonium Nitrate                             | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Ammonium Persulfate                          | R                             | R     | R                              | R     | R                            | R     | R  | ?     | ?     |
| Ammonium Phosphate                           | R                             | R     | R                              | R     | R                            | R     | R  | R     | C     |
| Ammonium Sulfate                             | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Ammonium Sulfide                             | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Ammonium Thiocyanate                         | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Ammonium Tartrate                            | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Amyl Acetate                                 | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |

C = Caution, actual testing suggested; suspect @ certain stress levels  
 ? = Incomplete Data; actual testing required

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|-----------------------------|-------------------------------|-------|--------------------------------|-------|------------------------------|-------|--|-------|-------|
|                             | 73°F                          | 140°F | 73°F                           | 140°F | 73°F                         | 140°F | 73°F                                     | 140°F | 180°F |
|                             | Amyl Alcohol                  | R     | NR                             | NR    | NR                           | NR    | NR                                       | C     | C     |
| Amyl Chloride               | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Aniline                     | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Aniline Chlorohydrate       | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Aniline Hydrochloride       | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Anthraquinone               | ?                             | ?     | R                              | NR    | ?                            | ?     | ?  | ?     | ?     |
| Anthraquinone Sulfonic Acid | R                             | R     | R                              | R     | R                            | R     | ?  | ?     | ?     |
| Antimony Trichloride        | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Aqua Regia                  | NR                            | NR    | NR                             | NR    | NR                           | NR    | R  | NR    | NR    |
| Aromatic Hydrocarbons       | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Arsenic Acid, 80%           | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Arsenic Trioxide (powder)   | R                             | ?     | ?                              | ?     | ?                            | ?     | R  | NR    | NR    |
| Arylsulfonic Acid           | R                             | R     | R                              | NR    | R                            | NR    | ?  | ?     | ?     |
| Barium Carbonate            | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Barium Chloride             | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Barium Hydroxide, 10%       | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Barium Nitrate              | R                             | ?     | ?                              | ?     | ?                            | ?     | R  | R     | R     |
| Barium Sulfate              | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Barium Sulfide              | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Beer                        | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Beet Sugar Liquors          | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Benzaldehyde;10%            | R                             | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Benzaldehyde;>10%           | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Benzalkonium Chloride       | R                             | ?     | ?                              | ?     | ?                            | ?     | NR                                       | NR    | NR    |
| Benzene                     | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Benzoic Acid                | R                             | R     | R                              | R     | R                            | R     | R  | C     | C     |
| Benzyl Alcohol              | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Benzyl Chloride             | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Bismuth Carbonate           | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Black Liquor                | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Bleach (15% CL)             | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Borax                       | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Boric Acid                  | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Brine (acid)                | R                             | ?     | ?                              | ?     | ?                            | ?     | R  | R     | R     |
| Bromic Acid                 | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Bromine Liquid              | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Bromine Vapor, 25%          | R                             | R     | R                              | R     | R                            | R     | NR                                       | NR    | NR    |
| Bromine Water               | R                             | R     | NR                             | NR    | NR                           | NR    | ?  | ?     | ?     |
| Bromobenzene                | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Bromotoluene                | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |

| Chemical           | R | R  | NR | NR | NR | NR | C  | C  | C  |
|--------------------|---|----|----|----|----|----|----|----|----|
| Butanol, primary   | R | R  | NR | NR | NR | NR | C  | C  | C  |
| Butanol, secondary | R | NR | NR | NR | NR | NR | C  | C  | C  |
| Butyl Acetate      | R | NR | NR | NR | NR | NR | NR | NR | NR |
| Butyl Carbitol     | ? | ?  | ?  | ?  | ?  | ?  | NR | NR | NR |

R = Recommended

NR = Not Recommended

C = Caution, actual testing suggested; suspect @ certain stress levels

? = Incomplete Data; actual testing required

Refer to Chemical Resistance Cover Sheet  
(Page 1 of this document) for additional  
information

**Note:** Harvel Clear® maintains its physical properties when exposed to many substances. However, exposure to certain chemicals can affect the clarity of the product over time. Certain nitrogen-containing organics, bleaches, oxidative agents and acids will result in discoloration. When investigating Harvel Clear® for potential use in chemical applications testing under actual use conditions is recommended.

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|--------------------------------------|-------------------------------|-------|--------------------------------|-------|------------------------------|-------|--|-------|-------|
|                                      | 73°F                          | 140°F | 73°F                           | 140°F | 73°F                         | 140°F | 73°F                                     | 140°F | 180°F |
|                                      | Butyl Cellosolve              | R     | ?                              | ?     | ?                            | ?     | ?  | NR    | NR    |
| Butyl Mercaptan                      | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Butyl Phenol                         | R                             | NR    | R                              | NR    | R                            | NR    | NR                                       | NR    | NR    |
| Butyl Stearate                       | R                             | ?     | ?                              | ?     | ?                            | ?     | NR                                       | NR    | NR    |
| Butyne Diol                          | R                             | ?     | ?                              | ?     | ?                            | ?     | ?  | ?     | ?     |
| Butyric Acid, <1%                    | R                             | NR    | NR                             | NR    | NR                           | NR    | R  | R     | R     |
| Butyric Acid, >1%                    | R                             | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Cadmium Acetate                      | R                             | R     | ?                              | ?     | ?                            | ?     | R  | R     | R     |
| Cadmium Chloride                     | R                             | R     | ?                              | ?     | ?                            | ?     | R  | R     | R     |
| Cadmium Cyanide                      | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Cadmium Sulfate                      | ?                             | ?     | ?                              | ?     | ?                            | ?     | R  | R     | R     |
| Caffeine Citrate                     | R                             | ?     | ?                              | ?     | ?                            | ?     | R  | R     | R     |
| Calcium Acetate                      | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Calcium Bisulfide                    | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Calcium Bisulfite                    | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Calcium Bisulfite Bleach<br>Liquor   | R                             | ?     | ?                              | ?     | ?                            | ?     | R  | R     | R     |
| Calcium Carbonate                    | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Calcium Chlorate                     | R                             | R     | ?                              | ?     | ?                            | ?     | R  | R     | R     |
| Calcium Chloride                     | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Calcium Hydroxide                    | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Calcium Hypochlorite                 | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Calcium Nitrate                      | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Calcium Oxide                        | R                             | R     | ?                              | ?     | ?                            | ?     | R  | R     | R     |
| Calcium Sulfate                      | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Camphor (crystals)                   | R                             | ?     | ?                              | ?     | ?                            | ?     | NR                                       | NR    | NR    |
| Cane Sugar Liquors                   | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Caprolactam                          | ?                             | ?     | ?                              | ?     | ?                            | ?     | NR                                       | NR    | NR    |
| Caprolactone                         | ?                             | ?     | ?                              | ?     | ?                            | ?     | NR                                       | NR    | NR    |
| Carbitol                             | R                             | ?     | ?                              | ?     | ?                            | ?     | NR                                       | NR    | NR    |
| Carbon Dioxide                       | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Carbon Dioxide<br>(aqueous solution) | R                             | R     | ?                              | ?     | ?                            | ?     | R  | R     | R     |
| Carbon Disulfide                     | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |

| Chemical Resistance     | 15 | 10N | 10N | 10N | 10N | 10N | 10N | 10N | 10N |
|-------------------------|----|-----|-----|-----|-----|-----|-----|-----|-----|
| Carbonic Acid           | R  | R   | R   | R   | R   | R   | R   | R   | R   |
| Castor oil              | R  | R   | R   | R   | R   | R   | C   | C   | C   |
| Caustic Potash          | R  | R   | R   | R   | R   | R   | R   | R   | R   |
| Caustic Soda            | R  | R   | R   | R   | R   | R   | R   | R   | R   |
| Cellosolve              | R  | NR  | R   | NR  | R   | NR  | NR  | NR  | NR  |
| Cellosolve Acetate      | R  | ?   | R   | ?   | R   | ?   | NR  | NR  | NR  |
| Chloroacetic Acid       | R  | R   | R   | NR  | R   | NR  | NR  | NR  | NR  |
| Chloral Hydrate         | R  | R   | R   | R   | R   | R   | NR  | NR  | NR  |
| Chloramine              | R  | ?   | ?   | ?   | ?   | ?   | R   | R   | R   |
| Chloric Acid, up to 20% | R  | R   | R   | R   | R   | R   | R   | R   | R   |

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|--|-------------------------------|-------|--------------------------------|-------|------------------------------|-------|--|-------|-------|
|  | 73°F                          | 140°F | 73°F                           | 140°F | 73°F                         | 140°F | 73°F                                     | 140°F | 180°F |
|  | Chloride Water                | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Chlorinated Solvents                   | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Chlorinated Water (Hypochlorite)       | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Chlorine (dry liquid)                  | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Chlorine (liquid under pressure)       | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Chlorine Gas (dry)                     | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Chlorine Gas (wet)                     | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Chlorine Dioxide, aqueous (sat'd 0.1%) | ?                             | ?     | ?                              | ?     | ?                            | ?     | R  | ?     | ?     |
| Chlorine Water (sat'd 0.3%)            | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Chlorine (trace in air)                | R                             | ?     | R                              | ?     | R                            | ?     | R  | R     | R     |
| Chloroacetyl Chloride                  | R                             | ?     | R                              | ?     | R                            | ?     | NR                                       | NR    | NR    |
| Chlorobenzene                          | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Chloroform                             | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Chloropicrin                           | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Chlorosulfonic Acid                    | R                             | NR    | R                              | NR    | R                            | NR    | NR                                       | NR    | NR    |
| Chlorox Bleach Solution                | R                             | ?     | ?                              | ?     | ?                            | ?     | C  | C     | C     |
| Chrome Alum                            | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Chromic Acid, 10%                      | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Chromic Acid, 40%                      | ?                             | ?     | ?                              | ?     | ?                            | ?     | R  | R     | R     |
| Chromic Acid, 50%                      | NR                            | NR    | NR                             | NR    | NR                           | NR    | ?  | ?     | ?     |
| Chromic/Nitric Acid (15%/35%)          | R                             | R     | NR                             | NR    | ?                            | ?     | R  | C     | NR    |

|                     |    |    |    |    |    |    |    |    |    |
|---------------------|----|----|----|----|----|----|----|----|----|
| 50%/15%/35%         |    |    |    |    |    |    |    |    |    |
| Chromium Nitrate    | R  | ?  | NR | NR | ?  | ?  | R  | R  | R  |
| Citric Acid         | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Citrus Oils         | ?  | ?  | ?  | ?  | ?  | ?  | NR | NR | NR |
| Coconut Oil Alcohol | R  | R  | ?  | ?  | ?  | ?  | C  | C  | C  |
| Copper Acetate      | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Copper Carbonate    | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Copper Chloride     | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Copper Cyanide      | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Copper Fluoride     | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Copper Nitrate      | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Copper Sulfate      | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Com Oil             | R  | ?  | R  | ?  | R  | ?  | C  | C  | C  |
| Corn Syrup          | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Cottonseed Oil      | R  | R  | R  | R  | R  | R  | C  | C  | C  |
| Creosote            | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Cresylic Acid, ≤50% | R  | R  | R  | NR | R  | NR | NR | NR | NR |
| Crotonaldehyde      | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Crude Oil           | R  | R  | R  | NR | R  | NR | NR | NR | NR |
| Cumene              | ?  | ?  | ?  | ?  | ?  | ?  | NR | NR | NR |

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## HARVEL PLASTICS, INC.

### CHEMICAL RESISTANCE GUIDE FOR HARVEL<sup>®</sup> PVC AND CPVC PIPING PRODUCTS

| CHEMICAL REAGENT             | PVC TYPE I<br>1120<br>(12454) |       | PVC TYPE II<br>2110<br>(14333) |       | PVC CLEAR<br>2110<br>(12454) |       | CPVC TYPE IV, GRADE I<br>4120<br>(23447) |       |       |
|------------------------------|-------------------------------|-------|--------------------------------|-------|------------------------------|-------|--|-------|-------|
|                              | 73°F                          | 140°F | 73°F                           | 140°F | 73°F                         | 140°F | 73°F                                     | 140°F | 180°F |
|                              | Cupric Fluoride               | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Cupric Sulfate               | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Cuprous Chloride             | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Cyclanones                   | R                             | R     | ?                              | ?     | ?                            | ?     | ?  | ?     | ?     |
| Cyclohexane                  | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Cyclohexanol                 | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Cyclohexanone                | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| D.D.T. (Xylene Base)         | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Desocyphehrine Hydrochloride | R                             | ?     | R                              | ?     | R                            | ?     | ?  | ?     | ?     |
| Detergents                   | R                             | R     | R                              | R     | R                            | R     | C  | C     | C     |
| Dextrin                      | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Dextrose                     | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Diacetone Alcohol            | R                             | ?     | ?                              | ?     | ?                            | ?     | C  | ?     | ?     |
| Diazo Salts                  | R                             | R     | R                              | R     | R                            | R     | ?  | ?     | ?     |
| Dibutoxy Ethyl Phthalate     | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Dibutyl Phthalate            | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Dibutyl Sebacate             | R                             | NR    | ?                              | ?     | ?                            | ?     | NR                                       | NR    | NR    |

| Chemical              | DN | DN | DN | DN | DN | DN | DN | DN | DN |
|-----------------------|----|----|----|----|----|----|----|----|----|
| Diesel Fuels          | R  | R  | R  | R  | R  | R  | NR | NR | NR |
| Diethylamine          | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Diethyl Ether         | R  | ?  | R  | ?  | R  | ?  | NR | NR | NR |
| Diglycolic Acid       | R  | R  | R  | R  | R  | R  | NR | NR | NR |
| Dill Oil              | ?  | ?  | ?  | ?  | ?  | ?  | NR | NR | NR |
| Dimethylformamide     | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Dimethyl Hydrazine    | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Dimethylamine         | R  | R  | NR | NR | NR | NR | NR | NR | NR |
| Diethylphthalate      | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| 1, 4 Dioxane          | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Disodium Phosphate    | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Distilled Water       | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| EDTA, Tetrasodium     | ?  | ?  | ?  | ?  | ?  | ?  | R  | R  | R  |
| Epsom Salt            | R  | ?  | R  | ?  | R  | ?  | R  | R  | R  |
| Esters                | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Ethanol, up to 5%     | R  | R  | R  | NR | R  | NR | R  | R  | R  |
| Ethanol, > 5%         | R  | R  | R  | NR | R  | NR | C  | C  | C  |
| Ethers                | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Ethyl Acetate         | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Ethyl Acrylate        | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Ethyl Alcohol         | R  | R  | R  | NR | R  | NR | C  | C  | C  |
| Ethyl Chloride        | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Ethyl Chloroacetate   | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Ethyl Ether           | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Ethylene Bromide      | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Ethylene Chlorohydrin | NR | NR | NR | NR | NR | NR | NR | NR | NR |

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**HARVEL  
PLASTICS,**

**INC.**

**CHEMICAL RESISTANCE GUIDE FOR HARVEL® PVC AND CPVC PIPING PRODUCTS**

| CHEMICAL REAGENT    | PVC TYPE I<br>1120<br>(12454) |       | PVC TYPE II<br>2110<br>(14333) |       | PVC CLEAR<br>2110<br>(12454) |       | CPVC TYPE IV, GRADE I<br>4120<br>(23447) |       |       |
|---------------------|-------------------------------|-------|--------------------------------|-------|------------------------------|-------|--|-------|-------|
|                     | 73°F                          | 140°F | 73°F                           | 140°F | 73°F                         | 140°F | 73°F                                     | 140°F | 180°F |
| Ethylene Diamine    | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Ethylene Dichloride | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Ethylene Glycol     | R                             | R     | R                              | R     | R                            | R     | C  | C     | C     |
| Ethylene Oxide      | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Fatty Acids         | R                             | R     | R                              | R     | R                            | R     | C  | C     | C     |
| Ferric Acetate      | R                             | NR    | ?                              | ?     | ?                            | ?     | R  | R     | R     |
| Ferric Chloride     | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Ferric Hydroxide    | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Ferric Nitrate      | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Ferric Sulfate      | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Ferrous Chloride    | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |

|                         |    |    |    |    |    |    |    |    |    |
|-------------------------|----|----|----|----|----|----|----|----|----|
| Ferrous Sulfate         | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Fish Solubles           | R  | R  | R  | R  | R  | R  | ?  | ?  | ?  |
| Fluoroboric Acid        | R  | R  | R  | R  | R  | R  | ?  | ?  | ?  |
| Fluorine Gas (wet)      | R  | NR | R  | NR | R  | NR | NR | NR | NR |
| Fluorine Gas            | R  | NR | NR | NR | NR | NR | NR | NR | NR |
| Fluorosilicic Acid, 25% | R  | R  | R  | R  | R  | R  | R  | C  | C  |
| Formaldehyde            | R  | R  | NR | NR | NR | NR | NR | NR | NR |
| Formic Acid, <25%       | R  | NR | R  | NR | R  | NR | R  | R  | R  |
| Formic Acid, >25%       | ?  | ?  | ?  | ?  | ?  | ?  | C  | ?  | NR |
| Freon 11                | R  | R  | NR | NR | NR | NR | NR | NR | NR |
| Freon 12                | R  | R  | R  | R  | R  | R  | NR | NR | NR |
| Freon 21                | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Freon 22                | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Freon 113               | R  | ?  | R  | ?  | R  | ?  | NR | NR | NR |
| Freon 114               | R  | ?  | R  | ?  | R  | ?  | NR | NR | NR |
| Carene 500              | R  | ?  | NR | NR | NR | NR | ?  | ?  | ?  |
| Furfural                | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Fructose                | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Fruit juices & pulp     | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Gallic Acid             | R  | R  | R  | R  | R  | R  | ?  | ?  | ?  |
| Gas (Coke Oven)         | NR | NR | NR | NR | NR | NR | ?  | ?  | ?  |
| Gasoline                | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Gasoline, HighOctane    | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Gasoline, Jet Fuel      | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Glucose                 | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Glycerine               | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Glycol                  | R  | R  | R  | R  | R  | R  | C  | C  | C  |
| Glycol Ethers           | ?  | ?  | ?  | ?  | ?  | ?  | NR | NR | NR |
| Glycolic Acid           | R  | R  | R  | R  | R  | R  | ?  | ?  | ?  |
| Grape Sugar             | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Green Liquor            | R  | R  | ?  | ?  | ?  | ?  | R  | R  | R  |
| Halocarbon Oils         | ?  | ?  | ?  | ?  | ?  | ?  | C  | C  | C  |
| Heptane                 | R  | R  | R  | NR | R  | NR | R  | ?  | ?  |

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## HARVEL PLASTICS, INC.

### CHEMICAL RESISTANCE GUIDE FOR HARVEL®PVC AND CPVC PIPING PRODUCTS

| CHEMICAL REAGENT      | PVC TYPE I<br>1120<br>(12454) |       | PVC TYPE II<br>2110<br>(14333) |       | PVC CLEAR<br>2110<br>(12454) |       | CPVC TYPE IV, GRADE I<br>4120<br>(23447) |       |       |
|-----------------------|-------------------------------|-------|--------------------------------|-------|------------------------------|-------|--|-------|-------|
|                       | 73°F                          | 140°F | 73°F                           | 140°F | 73°F                         | 140°F | 73°F                                     | 140°F | 180°F |
| Hercolyn              | R                             | ?     | ?                              | ?     | ?                            | ?     | ?  | ?     | ?     |
| Hexane                | R                             | NR    | NR                             | NR    | NR                           | NR    | C  | C     | C     |
| Hexanol, Tertiary     | R                             | R     | R                              | NR    | R                            | NR    | C  | C     | C     |
| Hydrazine             | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Hydrobromic Acid, 20% | R                             | R     | R                              | R     | R                            | R     | ?  | ?     | ?     |



| Hydrochloric Acid, 36%            | R  | R  | R  | R  | R  | R  | R  | R  | C  |
|-----------------------------------|----|----|----|----|----|----|----|----|----|
| Hydrochloric Acid, Concentrated   | R  | R  | R  | NR | R  | NR | ?  | ?  | ?  |
| Hydrochloric Acid, pickling       | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Hydrocyanic Acid                  | R  | R  | R  | R  | R  | R  | ?  | ?  | ?  |
| Hydrofluoric Acid, <3%            | R  | R  | R  | R  | R  | R  | R  | ?  | ?  |
| Hydrofluoric Acid, 48%            | R  | NR | R  | NR | R  | NR | NR | NR | NR |
| Hydrofluoric Acid, 50%            | R  | NR | NR | NR | NR | NR | NR | NR | NR |
| Hydrofluoric Acid, 70%            | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Hydrofluorosilicic Acid, 30%      | R  | R  | R  | R  | R  | R  | R  | ?  | C  |
| Hydrogen                          | R  | R  | R  | R  | R  | R  | C  | C  | C  |
| Hydrogen Peroxide, 30%            | R  | R  | R  | R  | R  | R  | R  | ?  | ?  |
| Hydrogen Peroxide, 90%            | R  | R  | R  | R  | R  | R  | ?  | ?  | ?  |
| Hydrogen Phosphide                | R  | R  | NR | NR | NR | NR | ?  | ?  | ?  |
| Hydrogen Sulfide                  | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Hydroquinone                      | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Hydroxylamine Sulfate             | R  | R  | R  | R  | R  | R  | ?  | ?  | ?  |
| Hypochlorite (Potassium & Sodium) | R  | ?  | R  | ?  | R  | ?  | R  | R  | R  |
| Hypochlorous Acid                 | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Iodine                            | NR | NR | NR | NR | NR | NR | R  | R  | R  |
| Iodine Solution, 10%              | NR | NR | NR | NR | NR | NR | ?  | ?  | ?  |
| Isopropanol                       | ?  | ?  | ?  | ?  | ?  | ?  | C  | C  | C  |
| Kerosene                          | R  | R  | R  | R  | R  | R  | C  | C  | C  |
| Ketones                           | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Kraft Liquors                     | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Lactic Acid, 25%                  | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Lactic Acid, 80%                  | R  | ?  | ?  | ?  | ?  | ?  | R  | C  | C  |
| Lard Oil                          | R  | R  | R  | R  | R  | R  | C  | C  | C  |
| Lauric Acid                       | R  | R  | R  | R  | R  | R  | C  | C  | C  |
| Lauryl Chloride                   | R  | ?  | R  | NR | R  | NR | NR | NR | NR |
| Lead Acetate                      | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Lead Chloride                     | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Lead Nitrate                      | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Lead Sulfate                      | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Lemon Oil                         | ?  | ?  | ?  | ?  | ?  | ?  | NR | NR | NR |
| Limonene                          | ?  | ?  | ?  | ?  | ?  | ?  | NR | NR | NR |
| Linoleic Acid                     | R  | R  | R  | R  | R  | R  | C  | C  | C  |
| Linoleic Oil                      | R  | R  | R  | NR | R  | NR | C  | C  | C  |

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## HARVEL PLASTICS, INC. CHEMICAL RESISTANCE GUIDE FOR HARVEL® PVC AND CPVC PIPING PRODUCTS

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| REAGENT                         | TYPE I<br>1120<br>(12454) |       | TYPE II<br>2110<br>(14333) |       | CLEAR<br>2110<br>(12454) |       | TYPE IV, GRADE I<br>4120<br>(23447) |       |       |
|---------------------------------|---------------------------|-------|----------------------------|-------|--------------------------|-------|-------------------------------------|-------|-------|
|                                 | 73°F                      | 140°F | 73°F                       | 140°F | 73°F                     | 140°F | 73°F                                | 140°F | 180°F |
|                                 |                           |       |                            |       |                          |       |                                     |       |       |
| Linseed Oil                     | R                         | R     | R                          | R     | R                        | R     | C                                   | C     | C     |
| Liquors                         | R                         | R     | NR                         | NR    | ?                        | ?     | ?                                   | ?     | ?     |
| Lithium Bromide                 | R                         | R     | R                          | R     | R                        | R     | R                                   | R     | R     |
| Lithium Sulfate                 | R                         | R     | R                          | R     | R                        | R     | R                                   | R     | R     |
| Lubricating Oils,<br>ASTM#1     | R                         | R     | R                          | R     | R                        | R     | ?                                   | ?     | ?     |
| ASTM #2                         | R                         | R     | R                          | R     | R                        | R     | ?                                   | ?     | ?     |
| ASTM#3                          | R                         | R     | R                          | NR    | R                        | NR    | ?                                   | ?     | ?     |
| Lux Liquid                      | R                         | NR    | R                          | NR    | R                        | NR    | ?                                   | ?     | ?     |
| Machine Oil                     | R                         | R     | R                          | R     | R                        | R     | C                                   | C     | C     |
| Magnesium Carbonate             | R                         | R     | R                          | R     | R                        | R     | R                                   | R     | R     |
| Magnesium Chloride              | R                         | R     | R                          | R     | R                        | R     | R                                   | R     | R     |
| Magnesium Citrate               | R                         | R     | ?                          | ?     | ?                        | ?     | R                                   | R     | R     |
| Magnesium Fluoride              | R                         | R     | R                          | R     | R                        | R     | R                                   | R     | R     |
| Magnesium Hydroxide             | R                         | R     | R                          | R     | R                        | R     | R                                   | R     | R     |
| Magnesium Nitrate               | R                         | R     | R                          | R     | R                        | R     | R                                   | R     | R     |
| Magnesium Oxide                 | R                         | R     | R                          | R     | R                        | R     | R                                   | R     | R     |
| Magnesium Salts                 | R                         | R     | R                          | R     | R                        | R     | R                                   | R     | R     |
| Magnesium Sulfate               | R                         | R     | R                          | R     | R                        | R     | R                                   | R     | R     |
| Maleic Acid, 50%                | R                         | R     | R                          | R     | R                        | R     | R                                   | R     | R     |
| Manganese Chloride              | R                         | R     | R                          | R     | R                        | R     | R                                   | R     | R     |
| Manganese Sulfate               | R                         | R     | R                          | R     | R                        | R     | R                                   | R     | R     |
| Mercural Ointment, Blue 5%      | R                         | ?     | R                          | ?     | R                        | ?     | ?                                   | ?     | ?     |
| Mercuric Chloride               | R                         | R     | R                          | R     | R                        | R     | R                                   | R     | R     |
| Mercuric Cyanide                | R                         | R     | R                          | R     | R                        | R     | R                                   | R     | R     |
| Mercuric Sulfate                | R                         | R     | R                          | R     | R                        | R     | R                                   | R     | R     |
| Mercurous Nitrate               | R                         | R     | R                          | R     | R                        | R     | R                                   | R     | R     |
| Mercury                         | R                         | R     | R                          | R     | R                        | R     | R                                   | R     | R     |
| Mercury Ointment,<br>Ammoniated | R                         | ?     | R                          | ?     | R                        | ?     | ?                                   | ?     | ?     |
| Methylene Chlorobromide         | NR                        | NR    | NR                         | NR    | NR                       | NR    | NR                                  | NR    | NR    |
| Methoxyethyl Oleate             | R                         | ?     | R                          | ?     | R                        | ?     | NR                                  | NR    | NR    |
| Methanol, <10%                  | R                         | R     | R                          | R     | R                        | R     | R                                   | R     | R     |
| Methanol, >10%                  | R                         | R     | R                          | R     | R                        | R     | NR                                  | NR    | NR    |
| Methyl Cellosolve               | NR                        | NR    | NR                         | NR    | NR                       | NR    | NR                                  | NR    | NR    |
| Methyl Chloride                 | NR                        | NR    | NR                         | NR    | NR                       | NR    | NR                                  | NR    | NR    |
| Methyl Ethyl Ketone             | NR                        | NR    | NR                         | NR    | NR                       | NR    | NR                                  | NR    | NR    |
| Methyl Formate                  | ?                         | ?     | ?                          | ?     | ?                        | ?     | NR                                  | NR    | NR    |
| Methyl Iso-Butyl Ketone         | NR                        | NR    | NR                         | NR    | NR                       | NR    | NR                                  | NR    | NR    |
| Methyl Methacrylate             | R                         | ?     | R                          | ?     | R                        | ?     | NR                                  | NR    | NR    |
| Methyl Salicylate               | R                         | ?     | R                          | ?     | R                        | ?     | NR                                  | NR    | NR    |
| Methyl Sulfate                  | R                         | NR    | R                          | NR    | R                        | NR    | ?                                   | ?     | ?     |
| Methyl Sulfuric Acid            | R                         | R     | R                          | R     | R                        | R     | ?                                   | ?     | ?     |
| Methylamine                     | NR                        | NR    | NR                         | NR    | NR                       | NR    | NR                                  | NR    | NR    |
| Methylene Bromide               | NR                        | NR    | NR                         | NR    | NR                       | NR    | NR                                  | NR    | NR    |
| Methylene Chloride              | NR                        | NR    | NR                         | NR    | NR                       | NR    | NR                                  | NR    | NR    |

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**HARVEL PLASTICS, INC.**  
**CHEMICAL RESISTANCE GUIDE FOR HARVEL® PVC AND CPVC PIPING PRODUCTS**

| CHEMICAL REAGENT       | PVC TYPE I<br>1120<br>(12454) |       | PVC TYPE II<br>2110<br>(14333) |       | PVC CLEAR<br>2110<br>(12454) |       | CPVC TYPE IV, GRADE I<br>4120<br>(23447) |       |       |
|------------------------|-------------------------------|-------|--------------------------------|-------|------------------------------|-------|--|-------|-------|
|                        | 73°F                          | 140°F | 73°F                           | 140°F | 73°F                         | 140°F | 73°F                                     | 140°F | 180°F |
|                        |                               |       |                                |       |                              |       |  |       |       |
| Methylene Iodine       | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Milk                   | R                             | R     | R                              | R     | R                            | R     | R  | R     | ?     |
| Mineral Oil            | R                             | R     | R                              | ?     | R                            | ?     | R  | ?     | ?     |
| Molasses               | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Monoethanolamine       | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Muriatic Acid          | R                             | R     | R                              | R     | R                            | R     | R  | R     | C     |
| Motor Oil              | R                             | R     | R                              | R     | R                            | R     | R  | ?     | ?     |
| Naphtha                | R                             | R     | R                              | NR    | R                            | NR    | C  | C     | C     |
| Naphthalene            | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Natural Gas            | R                             | R     | R                              | R     | R                            | R     | C  | C     | C     |
| Nickel Acetate         | R                             | ?     | R                              | ?     | R                            | ?     | R  | R     | R     |
| Nickel Chloride        | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Nickel Nitrate         | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Nickel Sulfate         | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Nicotine               | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Nicotine Acid          | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Nitric Acid, Anhydrous | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Nitric Acid, 10%       | R                             | R     | R                              | NR    | R                            | NR    | R  | R     | R     |
| Nitric Acid, 25%       | R                             | R     | R                              | NR    | R                            | NR    | R  | R     | R     |
| Nitric Acid, 25-35%    | R                             | R     | R                              | NR    | R                            | NR    | R  | C     | C     |
| Nitric Acid, 60%       | R                             | R     | R                              | NR    | R                            | NR    | R  | ?     | NR    |
| Nitric Acid, 68%       | R                             | NR    | NR                             | NR    | NR                           | NR    | R  | ?     | NR    |
| Nitrobenzene           | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Nitroglycerine         | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Nitrous Oxide          | R                             | NR    | R                              | NR    | R                            | NR    | R  | R     | R     |
| Nitroglycol            | NR                            | NR    | NR                             | NR    | NR                           | NR    | ?  | ?     | ?     |
| Ocenol                 | R                             | R     | ?                              | ?     | ?                            | ?     | ?  | ?     | ?     |
| 1- Octanol             | R                             | R     | R                              | R     | R                            | R     | C  | NR    | NR    |
| Oils, Edible           | R                             | R     | R                              | R     | R                            | R     | C  | C     | C     |
| Oils & Fats            | R                             | R     | R                              | R     | R                            | R     | C  | C     | C     |
| Oil, Sour Crude        | R                             | R     | R                              | R     | R                            | R     | NR                                       | NR    | NR    |
| Oleic Acid             | R                             | R     | R                              | R     | R                            | R     | C  | C     | C     |
| Oleum                  | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Olive Oil              | R                             | R     | R                              | R     | R                            | R     | C  | C     | C     |
| Oxalic Acid, sat'd     | R                             | R     | R                              | R     | R                            | R     | R  | C     | C     |
| Oxygen                 | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Ozone                  | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Ozonized water         | R                             | R     | R                              | R     | R                            | R     | R  | ?     | ?     |
| Palmitic Acid, 10%     | R                             | R     | R                              | R     | R                            | R     | C  | C     | C     |
| Palmitic Acid, 70%     | R                             | NR    | NR                             | NR    | ?                            | NR    | C  | C     | C     |
| Palm Oil               | R                             | R     | R                              | R     | R                            | R     | C  | C     | C     |
| Paraffin               | R                             | R     | ?                              | ?     | ?                            | ?     | R  | R     | ?     |
| Peanut Oil             | R                             | R     | R                              | R     | R                            | R     | C  | C     | C     |
| Peracetic Acid, 40%    | R                             | NR    | NR                             | NR    | ?                            | NR    | NR                                       | NR    | NR    |

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## HARVEL PLASTICS, INC. CHEMICAL RESISTANCE GUIDE FOR HARVEL® PVC AND CPVC PIPING PRODUCTS

| CHEMICAL REAGENT              | PVC TYPE I<br>1120<br>(12454) |       | PVC TYPE II<br>2110<br>(14333) |       | PVC CLEAR<br>2110<br>(12454) |       | CPVC TYPE IV, GRADE I<br>4120<br>(23447) |       |       |
|-------------------------------|-------------------------------|-------|--------------------------------|-------|------------------------------|-------|--|-------|-------|
|                               | 73°F                          | 140°F | 73°F                           | 140°F | 73°F                         | 140°F | 73°F                                     | 140°F | 180°F |
|                               |                               |       |                                |       |                              |       |  |       |       |
| Perchloric Acid, 10%          | R                             | R     | R                              | R     | R                            | R     | R  | ?     | ?     |
| Perchloric Acid, 15%          | R                             | NR    | NR                             | NR    | NR                           | NR    | ?  | ?     | ?     |
| Perchloric Acid, 70%          | R                             | NR    | NR                             | NR    | NR                           | NR    | ?  | ?     | ?     |
| Perphosphate                  | R                             | ?     | R                              | ?     | R                            | ?     | ?  | ?     | ?     |
| Petroleum Liquifier           | R                             | R     | R                              | R     | R                            | R     | ?  | ?     | ?     |
| Petroleum Oils (Sour)         | R                             | NR    | R                              | NR    | R                            | NR    | C  | C     | C     |
| Phenol                        | NR                            | NR    | NR                             | NR    | NR                           | NR    | R  | R     | R     |
| Phenylhydrazine               | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Phenylhydrazine Hydrochloride | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Phosgene, Liquid              | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Phosgene, Gas                 | R                             | ?     | R                              | R     | R                            | ?     | NR                                       | NR    | NR    |
| Phosphoric Acid, up to 85%    | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Phosphorous, (Yellow)         | R                             | NR    | R                              | NR    | R                            | NR    | R  | R     | R     |
| Phosphorous Pentoxide         | R                             | NR    | R                              | NR    | R                            | NR    | R  | R     | R     |
| Phosphorous Trichloride       | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Photographic Solutions:       |                               |       |                                |       |                              |       |  |       |       |
| DK #3                         | R                             | R     | R                              | R     | R                            | R     | ?  | ?     | ?     |
| Dektal Developer              | R                             | R     | R                              | R     | R                            | R     | ?  | ?     | ?     |
| Kodak Fixer                   | R                             | R     | R                              | R     | R                            | R     | ?  | ?     | ?     |
| Kodak Short Stop              | R                             | R     | R                              | R     | R                            | R     | ?  | ?     | ?     |
| Picric Acid                   | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Plating Solutions:            |                               |       |                                |       |                              |       |  |       |       |
| Brass                         | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Cadmium                       | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Copper                        | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Gold                          | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Indium                        | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Lead                          | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Nickel                        | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Rhodium                       | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Silver                        | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Tin                           | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Zinc                          | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Polyethylene Glycol           | ?                             | ?     | ?                              | ?     | ?                            | ?     | NR                                       | NR    | NR    |
| Potash (Sat.Aq.)              | R                             | R     | ?                              | ?     | ?                            | ?     | R  | R     | R     |
| Potassium Acetate             | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Potassium Alum                | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Potassium Amyl Xanthate       | R                             | NR    | NR                             | NR    | NR                           | NR    | ?  | ?     | ?     |
| Potassium Bicarbonate         | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Potassium Bichromate          | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Potassium Bisulfate           | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |

| Potassium Bromate   | R | R | R | R | R | R | R | R | R |
|---------------------|---|---|---|---|---|---|---|---|---|
| Potassium Bromide   | R | R | R | R | R | R | R | R | R |
| Potassium Carbonate | R | R | R | R | R | R | R | R | R |
| Potassium Chlorate  | R | R | R | R | R | R | R | R | R |

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## HARVEL PLASTICS, INC. CHEMICAL RESISTANCE GUIDE FOR HARVEL®PVC AND CPVC PIPING PRODUCTS

| CHEMICAL REAGENT               | PVC TYPE I<br>1120<br>(12454) |       | PVC TYPE II<br>2110<br>(14333) |         | PVC CLEAR<br>2110<br>(12454) |       | CPVC TYPE IV, GRADE I<br>4120<br>(23447) |       |       |
|--------------------------------|-------------------------------|-------|--------------------------------|---------|------------------------------|-------|--|-------|-------|
|                                | 73°F                          | 140°F | 73°F                           | 140°F   | 73°F                         | 140°F | 73°F                                     | 140°F | 180°F |
|                                | Potassium Chloride            | R     | R                              | R       | R                            | R     | R  | R     | R     |
| Potassium Chromate             | R                             | R     | R                              | ?       | R                            | ?     | R  | R     | R     |
| Potassium Cyanate              | R                             | R     | R                              | R       | R                            | R     | R  | R     | R     |
| Potassium Cyanide              | R                             | R     | R                              | R       | R                            | R     | R  | R     | R     |
| Potassium Dichromate           | R                             | R     | R                              | R       | R                            | R     | R  | R     | R     |
| Potassium Ethyl Xanthate       | R                             | NR    | NR                             | NR      | NR                           | NR    | ?  | ?     | ?     |
| Potassium Ferricyanide         | R                             | R     | R                              | R       | R                            | R     | R  | R     | R     |
| Potassium Ferrocyanide         | R                             | R     | R                              | R       | R                            | R     | R  | R     | R     |
| Potassium Fluoride             | R                             | R     | R                              | R       | R                            | R     | R  | R     | R     |
| Potassium Hydroxide            | R                             | R     | R                              | R       | R                            | R     | R  | R     | R     |
| Potassium Hypochlorite         | R                             | R     | R                              | R       | R                            | R     | R  | R     | R     |
| Potassium Iodide               | R                             | R     | R                              | R       | R                            | R     | R  | R     | R     |
| Potassium Nitrate              | R                             | R     | R                              | R       | R                            | R     | R  | R     | R     |
| Potassium Perborate            | R                             | R     | R                              | R       | R                            | R     | R  | R     | R     |
| Potassium Perchlorate          | R                             | R     | R                              | R       | R                            | R     | R  | R     | R     |
| Potassium Permanganate,<br>10% | R                             | R     | R                              | R       | R                            | R     | R  | R     | R     |
| Potassium Permanganate,<br>25% | R                             | NR    | R                              | R@125°F | R                            | NR    | R  | R     | C     |
| Potassium Persulfate           | R                             | R     | R                              | R       | R                            | R     | R  | ?     | ?     |
| Potassium Phosphate            | R                             | R     | R                              | R       | R                            | R     | R  | R     | R     |
| Potassium Sulfate              | R                             | R     | R                              | R       | R                            | R     | R  | R     | R     |
| Potassium Sulfide              | R                             | R     | R                              | R       | R                            | R     | R  | R     | R     |
| Potassium Sulfite              | R                             | R     | R                              | R       | R                            | R     | R  | R     | R     |
| Potassium Triphosphate         | R                             | R     | R                              | R       | R                            | R     | R  | R     | R     |
| Propane                        | R                             | R     | R                              | R       | R                            | R     | C  | C     | C     |
| Propane Gas                    | R                             | R     | R                              | R       | R                            | R     | C  | C     | C     |
| Propargyl Alcohol              | R                             | R     | R                              | NR      | R                            | NR    | C  | C     | C     |
| Propanol, ≤ 0.5%               | R                             | R     | R                              | ?       | R                            | ?     | R  | R     | R     |
| Propanol, >0.5%                | R                             | R     | R                              | NR      | R                            | NR    | C  | C     | C     |
| Propionic Acid, ≤2%            | ?                             | ?     | ?                              | ?       | ?                            | ?     | R  | R     | R     |
| Propionic Acid, >2%            | ?                             | ?     | ?                              | ?       | ?                            | ?     | NR                                       | NR    | NR    |
| Propylene Dichloride           | NR                            | NR    | NR                             | NR      | NR                           | NR    | NR                                       | NR    | NR    |
| Propylene Glycol, ≤25%         | ?                             | ?     | ?                              | ?       | ?                            | ?     | C  | C     | C     |
| Propylene Glycol, >25%         | ?                             | ?     | ?                              | ?       | ?                            | ?     | NR                                       | NR    | NR    |

| Chemical               | 73°F | 140°F | 73°F | 140°F | 73°F | 140°F | 73°F | 140°F | 180°F |
|------------------------|------|-------|------|-------|------|-------|------|-------|-------|
| Pyrogalllic Acid       | R    | NR    | R    | NR    | R    | NR    | ?    | ?     | ?     |
| Rayon Coagulating Bath | R    | R     | R    | R     | R    | R     | ?    | ?     | ?     |
| Refinery Crudes        | R    | R     | ?    | ?     | ?    | ?     | C    | C     | C     |
| Rochelle Salts         | R    | R     | ?    | ?     | ?    | ?     | R    | R     | R     |
| Salicylic Acid         | R    | R     | R    | R     | R    | R     | R    | R     | R     |
| Santicizer             | NR   | NR    | NR   | NR    | NR   | NR    | ?    | ?     | ?     |
| Sea Water              | R    | R     | R    | R     | R    | R     | R    | R     | R     |
| Selenic Acid           | R    | R     | R    | ?     | R    | ?     | ?    | ?     | ?     |
| Sewage                 | R    | R     | R    | R     | R    | R     | R    | R     | R     |
| Silicic Acid           | R    | R     | R    | R     | R    | R     | R    | ?     | ?     |
| Silicone Oil           | ?    | ?     | ?    | ?     | ?    | ?     | R    | ?     | ?     |

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### CHEMICAL RESISTANCE GUIDE FOR HARVEL® PVC AND CPVC PIPING PRODUCTS

| CHEMICAL REAGENT      | PVC TYPE I<br>1120<br>(12454) |       | PVC TYPE II<br>2110<br>(14333) |       | PVC CLEAR<br>2110<br>(12454) |       | CPVC TYPE IV, GRADE I<br>4120<br>(23447) |       |       |
|-----------------------|-------------------------------|-------|--------------------------------|-------|------------------------------|-------|--|-------|-------|
|                       | 73°F                          | 140°F | 73°F                           | 140°F | 73°F                         | 140°F | 73°F                                     | 140°F | 180°F |
|                       | Silver Chloride               | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Silver Cyanide        | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Silver Nitrate        | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Silver Sulfate        | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Soaps                 | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Sodium Acetate        | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Sodium Alum           | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Sodium Arsenate       | R                             | R     | R                              | R     | R                            | R     | R  | ?     | ?     |
| Sodium Benzoate       | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Sodium Bicarbonate    | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Sodium Bichromate     | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Sodium Bisulfate      | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Sodium Bisulfite      | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Sodium Borate         | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Sodium Bromide        | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Sodium Carbonate      | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Sodium Chlorate       | R                             | NR    | R                              | NR    | R                            | NR    | R  | R     | R     |
| Sodium Chloride       | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Sodium Chlorite       | NR                            | NR    | NR                             | NR    | NR                           | NR    | R  | R     | R     |
| Sodium Chromate       | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Sodium Cyanide        | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Sodium Dichromate     | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Sodium Ferricyanide   | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Sodium Ferrocyanide   | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Sodium Fluoride       | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Sodium Formate        | ?                             | ?     | ?                              | ?     | ?                            | ?     | R  | R     | R     |
| Sodium Hydroxide, 50% | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Sodium Hypobromite    | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |

| Sodium Iodate           | R | R  | R | R  | R | R  | R | R | R |
|-------------------------|---|----|---|----|---|----|---|---|---|
| Sodium Metaphosphate    | R | R  | R | R  | R | R  | R | R | R |
| Sodium Nitrate          | R | R  | R | R  | R | R  | R | R | R |
| Sodium Nitrite          | R | R  | R | R  | R | R  | R | R | R |
| Sodium Peroxide         | R | R  | R | R  | R | R  | R | R | R |
| Sodium Perchlorate      | R | R  | R | R  | R | R  | R | R | R |
| Sodium Silicate         | R | NR | R | NR | R | NR | R | R | R |
| Sodium Sulfate          | R | R  | R | R  | R | R  | R | R | R |
| Sodium Sulfide          | R | R  | R | R  | R | R  | R | R | R |
| Sodium Sulfite          | R | R  | R | R  | R | R  | R | R | R |
| Sodium Thiosulfate      | R | R  | R | R  | R | R  | R | R | R |
| Sodium Tripolyphosphate | ? | ?  | ? | ?  | ? | ?  | R | R | R |
| Sour Crude Oil          | R | R  | R | R  | R | R  | C | C | C |
| Soybean Oil             | R | R  | R | R  | R | R  | C | C | C |
| Stannic Chloride        | R | R  | R | R  | R | R  | R | R | R |
| Stannous Chloride       | R | R  | R | R  | R | R  | R | R | R |
| Stannous Sulfate        | R | R  | R | R  | R | R  | R | R | R |

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## HARVEL PLASTICS, INC. CHEMICAL RESISTANCE GUIDE FOR HARVEL® PVC AND CPVC PIPING PRODUCTS

| CHEMICAL REAGENT        | PVC TYPE I<br>1120<br>(12454) |       | PVC TYPE II<br>2110<br>(14333) |       | PVC CLEAR<br>2110<br>(12454) |       | CPVC TYPE IV, GRADE I<br>4120<br>(23447) |       |       |
|-------------------------|-------------------------------|-------|--------------------------------|-------|------------------------------|-------|--|-------|-------|
|                         | 73°F                          | 140°F | 73°F                           | 140°F | 73°F                         | 140°F | 73°F                                     | 140°F | 180°F |
|                         | Starch                        | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Stearic Acid            | R                             | R     | R                              | R     | R                            | R     | R  | ?     | ?     |
| Stoddards Solvent       | NR                            | NR    | NR                             | NR    | NR                           | NR    | C  | C     | C     |
| Styrene                 | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Succinic Acid           | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Sugar                   | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Sulfamic Acid           | NR                            | NR    | NR                             | NR    | NR                           | NR    | R  | R     | R     |
| Sulfite Liquor          | R                             | R     | R                              | R     | R                            | R     | ?  | ?     | ?     |
| Sulfur                  | R                             | R     | R                              | R     | R                            | R     | R  | ?     | ?     |
| Sulfur Dioxide, dry     | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Sulfur Dioxide, wet     | R                             | NR    | NR                             | NR    | NR                           | NR    | R  | R     | R     |
| Sulfur Trioxide         | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Sulfuric Acid, 70%      | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Sulfuric Acid, 80%      | R                             | R     | NR                             | NR    | NR                           | NR    | R  | R     | R     |
| Sulfuric Acid, 85%      | R                             | R     | NR                             | NR    | NR                           | NR    | R  | C     | NR    |
| Sulfuric Acid, 90%      | R                             | NR    | NR                             | NR    | NR                           | NR    | R  | C     | NR    |
| Sulfuric Acid, 98%      | ?                             | NR    | NR                             | NR    | NR                           | NR    | R  | NR    | NR    |
| Sulfuric Acid, Fuming   | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Sulfuric Acid, Pickling | R                             | R     | ?                              | ?     | ?                            | ?     | R  | R     | R     |
| Sulfurous Acid          | R                             | R     | R                              | R     | R                            | R     | ?  | ?     | ?     |
| Tall Oil                | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Tan Oil                 | R                             | R     | R                              | R     | R                            | R     | ?  | ?     | ?     |

| Painting Liquors       | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
|------------------------|----|----|----|----|----|----|----|----|----|
| Tartaric Acid          | R  | R  | R  | R  | R  | R  | R  | ?  | ?  |
| Terpenes               | ?  | ?  | ?  | ?  | ?  | ?  | NR | NR | NR |
| Terpineol              | R  | ?  | R  | ?  | R  | ?  | NR | NR | NR |
| Tetraethyl Lead        | R  | ?  | R  | NR | R  | NR | ?  | ?  | ?  |
| Texanol                | ?  | ?  | ?  | ?  | ?  | ?  | NR | NR | NR |
| Thionyl Chloride       | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Thread Cutting Oil     | R  | ?  | R  | ?  | R  | ?  | C  | C  | C  |
| Titanium Tetrachloride | R  | NR | R  | NR | R  | NR | ?  | ?  | ?  |
| Toluol or Toluene      | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Transformer Oil        | R  | R  | R  | R  | R  | R  | C  | C  | C  |
| Tributyl Citrate       | R  | ?  | R  | ?  | R  | ?  | NR | NR | NR |
| Tributyl Phosphate     | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Trichloroacetic Acid   | R  | ?  | R  | ?  | R  | ?  | NR | NR | NR |
| Trichloroethylene      | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Triethanolamine        | R  | NR | R  | NR | R  | NR | NR | NR | NR |
| Trilon                 | NR | NR | NR | NR | NR | NR | ?  | ?  | ?  |
| Trimethyl Propane      | R  | R  | R  | NR | R  | NR | ?  | ?  | ?  |
| Trisodium Phosphate    | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Turpentine             | R  | R  | NR | NR | NR | NR | NR | NR | NR |

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|----------------------|-------------------------------|-------|--------------------------------|-------|------------------------------|-------|--|-------|-------|
|                      | 73°F                          | 140°F | 73°F                           | 140°F | 73°F                         | 140°F | 73°F                                     | 140°F | 180°F |
|                      | Trimethylamine                | R     | NR                             | NR    | NR                           | R     | NR                                       | ?     | ?     |
| Urea                 | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Urine                | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Vaseline             | NR                            | NR    | NR                             | NR    | NR                           | NR    | ?  | ?     | ?     |
| Vegetable Oils       | R                             | ?     | R                              | ?     | R                            | ?     | C  | C     | C     |
| Vinegar              | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Vinyl Acetate        | NR                            | NR    | NR                             | NR    | NR                           | NR    | NR                                       | NR    | NR    |
| Water, Acid Mine     | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Water, Deionized     | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Water, Demineralized | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Water, Distilled     | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Water, Fresh & Salt  | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| Water, Swimming Pool | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |
| WD-40                | ?                             | ?     | ?                              | ?     | ?                            | ?     | C  | C     | C     |
| Whiskey              | R                             | R     | R                              | R     | R                            | R     | R  | R     | R     |



| Materials       | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
|-----------------|----|----|----|----|----|----|----|----|----|
| Xylene or Xylol | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| Zinc Acetate    | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Zinc Carbonate  | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Zinc Chloride   | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Zinc Nitrate    | R  | R  | R  | R  | R  | R  | R  | R  | R  |
| Zinc Sulfate    | R  | R  | R  | R  | R  | R  | R  | R  | R  |

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