**aquatherm Australia Pty. Limited**

**Ecological pipe systems: just say yes to a better world!**

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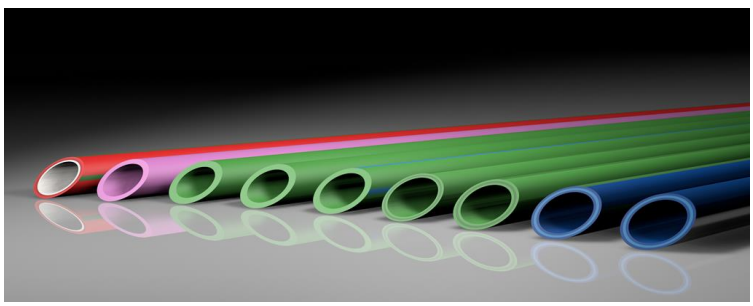
# Chemical Resistance PP pipes and fittings

The following chemical resistance document can be used as a general guideline, but should not be considered a formal recommendation or approval by aquatherm. The actual behavior of the piping system when exposed to a specific chemical is very dependent on the exposure conditions (temperature, pressure, flow, duration, etc.), the stresses on the piping material and system (mechanical, thermal, cyclic, etc.), and the ancillary materials in the system (o-rings, seals, gaskets, metal components, etc). Due to the comprehensive warranty provided by aquatherm, specific applications must be submitted to aquatherm for review and evaluation using the form in the technical catalog or the online submittal form. A written response will be provided once the review is completed. The attached guidance document should NOT be used as a definitive reference for determining the chemical compatibility of aquatherm piping in a specific application. This can only be determined by submitting the information to aquatherm for review.



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**Polypropylene (PP) pipes; chemical resistance of pipes and pipe fittings.**

The behavior of pipes and pipe fittings towards flow substances depends on the one hand on the particular nature and type of plastic, the design of the pipe fitting and the manufacturing conditions, and, on the other hand, on the nature of the flow substance. In particular, the duration of the action, temperatures and mechanical stresses acting at the same time and other types of influences which additionally have an effect also determine the behavior. The effects of these influences, which frequently are not clearly foreseeable at the outset, are decisive for the suitability for an application. Furthermore, special requirements on the pipe or pipe fitting (e.g. dimensional stability or mechanical strength) shall be taken into consideration, depending on the application.

For these reasons, the suitability of pipes and pipe fittings for a flow substance can be evaluated only from case to case.

The chemical resistance indicates the gradual behavior of the material of the pipe wall towards the action of the flow substance. It depends in each case on the type of interacting substances, their composition, the temperature and the duration of the action.

In an application, the chemical resistance can be influenced by further stresses (e.g. of a mechanical nature).

Note: The chemical resistance does not correspond to the term "chemical stability" hitherto used in everyday language, because this contains an evaluation for the particular application.

**Data on chemical resistance**

Various processes may occur when the flow substances come into contact with the material of the pipe wall, such as absorption of the liquid (swelling), extraction of soluble constituents of the material (shrinkage) and chemical reactions (hydrolysis, oxidation and the like), which in certain circumstances may cause changes in the properties of the pipes and pipe fittings.

The behavior of the pipes and pipe fittings towards the flow substances is classified into the following groups:

●: **resistant**
The material of the pipe wall is generally evaluated as suitable.

◐: **conditionally resistant**
The suitability of the material of the pipe wall for the particular application shall be investigated; if necessary, further experiments shall be carried out.

○: **not resistant**
The material of the pipe wall is generally evaluated as unsuitable.

–: No data on the chemical resistance is available

## Enquiry for the chemical resistance

**Installer:**

Company:
Contact
Street
PC / City
Phone
Fax
E-mail

**Building project:**

**Address:**
Street
PC / City

Place, Date / Signature

**Field of application:**

Fluid transported
Operating temperature °C / °F
Working pressure bar / psi
Service life h / d
Concentration %

**Ambient medium:**

Ambient temperature °C / °F
Ambient pressure bar / psi

| Data sheets | enclosed | not enclosed |
|---|---|---|
| Fluid transported | ☐ | ☐ |
| Ambient medium | ☐ | ☐ |

# Chemical resistance aquatherm transition fittings

Due to their special material properties **aquatherm** pipes and fittings are generally chemical resistant. However **aquatherm** transition fittings, with **brass** inserts are not suitable for all media.

For chemical application of the **aquatherm PP-R** system it is advisable to use **aquatherm PP-R** flanges (Art.-No. 155..) and/or **aquatherm PP-R** union screw joints (Art.-No. 158..).



If required **aquatherm** can also supply **PP-R**/**Stainless Steel** transition fittings.


[1] Table taken from the English translation of DIN 8078 Supplement 1, Feb. 1982, Chemical resistance of (PP-) pipes and pipe fittings. Reproduction with the permission of DIN Deutsches Institut für Normung e. V.. Important: When applying said standard the edition with the most recent release date should be used (can be purchased at Beuth Verlag GmbH, Burggrafenstrasse 6, 10787 Berlin, Germany).

[1] The following designations are used for the composition of the flow substances:

a) If the content data is not followed by "(Vol.)", the data is the weight in % (previously % by weight) .
VL: aqueous solution, the weight content of which is ≤ 10%.
L: aqueous solution, the weight content of which is greater than 10%.
GL: saturated (at 20 °C) aqueous solution.
TR: flow substance is as least technically pure.
H: commercially available composition.

b) Volume content in % (previously % by volume): this is characterized specially by "(Vol)".
The chemical resistance of pipes and pipe fittings is generally not reduced for weight or volume con- tents and temperatures lower than those given in the table.

[2] These flow substances and/or chemical resistance data are not contained in ISO/TR 7471.

[3] The chemical resistance is evaluated as one group lower in ISO/TR 7471.

[4] The chemical resistance is evaluated as one group higher in ISO/TR 7471.

| Flow Substance | Content [1] % | Behavior at 20°C / 68 °F | 60°C / 140 °F | 100°C / 212 °F |
|---|---|---|---|---|
| Waste gases [2] or air/gas mixtures | | | | |
| - containing hydrogen fluoride | traces | ● | ● | – |
| - containing carbon dioxide | any | ● | ● | – |
| - containing carbon monoxide | any | ● | ● | – |
| - containing nitroses (nitrogen oxide) | traces | ● | ● | – |
| - containing hydrochloric acid | any | ● | ● | – |
| - containing sulphur dioxide | any | ● | ● | – |
| - containing sulphuric acid | any | ● | ● | – |
| - containing sulphur: trioxide (oleum) | traces | ○ | ○ | ○ |
| Acetaldehyde [2] | TR | ◐ | – | – |
| Acetaldehyde, aqueous [2] | 40% | ● | ● | – |
| Acetic anhydric (acetic acid anhydride) | TR | ● | – | – |
| Acetone | TR | ● | ● | – |
| Acetophenone | TR | ● | ◐ | – |
| Acrylonitrile | TR | ● | ● [2] | – |
| Adipic acid [2] | GL | ● | ● | – |
| Malic acid | L | ● | ● | – |
| | | | | |
| Caustic soda see sodium hydroxide solution | up to 60% | ● | ● | ● |
| Battery acid [2] | H | ● | ● | – |
| Alums (Me(I)-Me(III)-sulphates) [2] | GL | ● | ● | – |
| Allyl alcohol (prop-2-en-1-0l), aqueous [2] | 96% | ● | ● | – |
| Aluminium chloride [2] | GL | ● | ● | – |
| Aluminium sulphate [2] | GL | ● | ● | – |
| Formic acid, aqueous | 10% | ● | ● | ◐ |
| Formic acid, aqueous | 85% | ● | ◐ [3] | ○ |
| 2 - Aminoethanol (ethanolamine) | TR | ● | – | – |
| Ammonia, liquid | TR | ● | – | – |
| Ammonia, gaseous | TR | ● | ● [2] | – |
| Aqueous ammonia (ammonia solution) | GL | ● | ● [2] | – |
| Ammonium acetate | GL | ● | ● | – |
| Ammonium carbonate [2] and bicarbonate | GL | ● | ● | – |
| Ammonium chloride | GL | ● | ● [2] | – |
| Ammonium fluoride | L | ● | ● | – |
| Ammonium nitrate | GL | ● | ● | ● |
| Ammonium phosphate [2] | GL | ● | ● | ● |
| Ammonium sulphate | GL | ● | ● | ● |
| Ammonium sulphide [2] | GL | ● | ● | – |
| Amyl acetate (acetate (acetic acid isoamyl ester) | TR | ◐ | – | – |
| Amyl alcohol (fermentation amyl alcohol) | TR | ● | ● | ● |
| Aniline | TR | ◐ [4] | ◐ [4] | – |
| Anilium chloride (aniline hydrochloride) | GL | ● | ● | – |
| Anisole [2] | TR | ◐ | ◐ | – |
| Anone see cyclohexanone | TR | ◐ | ○ | ○ |
| Antimony(III) chloride, aqueous [2] | 90% | ● | ● | – |
| Apple juice | H | ● | ● [2] | ● [2] |

| Flow Substance | Content [1] % | Behavior at | | |
|---|---|---|---|---|
| | | 20°C / 68 °F | 60°C / 140 °F | 100°C / 212 °F |
| Malic acid | L | ● | ● | – |
| | | | | |
| Apple wine [2] | H | ● | ● | – |
| Arsenic acid, ortho, aqueous [2] | 10% | ● | ● | – |
| Arsenic acid, ortho, aqueous [2] | 80% | ● | ● | ◐ |
| | | | | |
| Barium hydroxide | GL | ● | ● | ● |
| Barium salts [2] | GL | ● | ● | ● |
| Cottonseed oil | TR | ● | ● | – |
| Benzaldehyde [2] | GL | ● | ● | – |
| Benzaldehyde [2] | L | ● | – | – |
| Benzine (aliphatic hydrocarbons) | H | ◐ [3] | ○ | ○ |
| Benzine/benzene mixture [2] | 80%/20% (Vol.) | ◐ | ○ | ○ |
| Benzoic acid | GL | ● | ● [2] | – |
| Benzene | TR | ◐ | ○ | ○ |
| Benzoyl chloride [2] | TR | ◐ | – | – |
| Benzyl alcohol | TR | ● | ◐ | – |
| Succini acid | GL | ● | ● | – |
| Beeswax [2] | H | ● | ◐ | – |
| Beer [2] | H | ● | ● | ● |
| Caramel [2] | VL | ● | ● | – |
| Hydrocyanic acid [2] (hydrogen cyanide) | TR | ● | ● | – |
| Lead acetate [2] | GL | ● | ● | ◐ |
| Bleaching liquor (sodium hypochlorite) | 20% | ◐ [4] | ◐ | ○ [2] |
| Lead tetraethyl (tetraethyl-lead) [2] | TR | ● | – | – |
| Borax (sodium tetraborate) | L | ● | ● | – |
| Boric acid | GL | ● | ● [2] | ● [2] |
| All types of spirits [2] | H | ● | ● | – |
| Bromine (bromine water) [2] | GL | ◐ | ○ | ○ |
| Bromine, gaseous | any | ◐ | ○ | ○ |
| Bromine, liquid | TR | ○ | ○ | ○ |
| Bromomethyl see methyl bromide | TR | ○ | ○ | ○ |
| Hydrobromic acid, aqueous | 48% | ● | ◐ | ○ |
| Butane, gaseous | TR | ● | ● [2] | – |
| Butadiene, gaseous [2] | TR | ◐ | ○ | ○ |
| Butanols (butyl alcohols) | TR | ● | ◐ | ◐ |
| Butane-1,2,4-triol [2] | TR | ● | ● | – |
| But-2-ene-1,4-diol [2] | TR | ● | ● | – |
| But-2-ine-1,4-diol [2] | TR | ● | – | – |
| Butyric acids, aqueous | 20% | ● | – | – |
| Butyl acetates(acetic acid butyl esters) | TR | ◐ | ○ | ○ |
| Butylenes, liquid [2] (butenes) | TR | ◐ | – | – |
| Butylene glycols (butanediols) aqueous [2] | 10%(Vol.) | ● | ◐ | – |
| Butylene glycols (butanediols) [2] | TR | ● | ● | – |
| Butylglycol (ethylene glycol monobutyl ether) | TR | ● | – | – |
| Butylphenols | GL | ● | – | – |

| Flow Substance | Content [1] % | Behavior at | | |
|---|---|---|---|---|
| | | 20°C / 68 °F | 60°C / 140 °F | 100°C / 212 °F |
| Butylphenone [2] | TR | ○ | – | – |
| Butyl phthalate (dibutyl phthalate) | TR | ● | ◐ | ◐ |
| | | | | |
| Calcium carbonate | GL | ● | ● | ● |
| Calcium chloride | GL | ● | ● | ● |
| Calcium hydroxide | GL | ● | ● | – |
| Calcium hypochlorite | L | ● | – | – |
| Calcium nitrate | GL | ● | ● | – |
| Camphor oil | TR | ○ | ○ | ○ |
| Carbolineum [2] | H | ● | – | – |
| Chlorine, gaseous, dry | TR | ○ | ○ | ○ |
| Chlorine, gaseous, moist [2] | 0.50% | ◐ | – | – |
| Chlorine, gaseous, moist [2] | 1% | ○ | ○ | ○ |
| Chlorine, liquid | TR | ○ | ○ | ○ |
| Chlorine (chlorine water) | GL | ◐ [4] | ○ | ○ |
| Chloral [2] (trichloroacetaldehyde) | TR | ● | ● | – |
| Chloral hydrate [2] | TR | ◐ | ○ | ○ |
| Chloramine [2] | L | ● | – | – |
| Chlorobenzene [2] | TR | ◐ | – | – |
| Chloroacetic acid, mono, aqueous | L | ● | ● [2] | – |
| Chloroacetic, mono, aqueous | 85% 2) | ● | ● | – |
| Chloroethane (ethyl chloride) | TR | ○ | ○ | ○ |
| 2-Chloroethanol (ethylene chlorohydrin) | TR | ● | ● [2] | – |
| Bleaching powder suspension in water [2] | any | ● | ● | – |
| Chloroform (trichloromethane) | TR | ◐ | ○ | ○ |
| Chloric acid, aqueous [2] | 1% | ● | ◐ | ○ |
| Chloric acid, aqueous [2] | 10% | ● | ◐ | ○ |
| Chloric acid, aqueous | 20% | ● | ○ | ○ |
| Chlorosulphonic acid (chlorosulphuric acid) | TR | ○ | ○ | ○ |
| Chlorine water (chlorine) | GL | ◐ [4] | ○ | ○ |
| Hydrogen chloride, dry gas | TR | ● | ● | – |
| Hydrogen chloride, moist gas [2] (hydrochloric acid) | TR | ● | ● | – |
| Chrome alum (alums) | GL | ● | ● | – |
| Chromic acid, aqueous | 40% | ◐ [4] | ◐ | ○ |
| Chromic acid/sulphuric acid/water [2] (chromic/sulphuric acid) | 15/35/50% | ○ | ○ | ○ |
| Citric acid | VL | ● | ● | ● |
| Crotonaldehyde [2] (2-butenal) | TR | ● | – | – |
| Potassium cyanide | L | ● | ● [2] | – |
| Cyclohexane | TR | ● | – | – |
| Cyclohexanol | TR | ● | ◐ | – |
| Cyclohexanone | TR | ◐ | ○ | ○ |
| | | | | |
| Dekalin (decahydronaphthalene) | TR | ◐ [3] | ○ | ○ |
| Dextrin (starch gum) | L | ● | ● | – |
| Dextrose (glucose) | 20% | ● | ● | ● |
| 1,2-Diaminoethane (ethylenediamine) [2] | TR | ● | ● | – |

| Flow Substance | Content [1] % | Behavior at | | |
|---|---|---|---|---|
| | | 20°C / 68 °F | 60°C / 140 °F | 100°C / 212 °F |
| Di-n-butyl ether [2] | TR | ◐ | ○ | ○ |
| Dibutyl phthalate (phehalic acid dibutyl ester) | TR | ● | ◐ | ○ |
| Dichloroethylene (1,1- and 1, 2-) | TR | ◐ | – | – |
| Dichlorobenzenes [2] | TR | ◐ | – | – |
| Dichloroacetic acid | TR | ◐ | – | – |
| Dichloroacetic acid, aqueous [2] | 50% | ● | ● | – |
| Dichloroacetic acid methyl ester [2] | TR | ● | ● | – |
| Diesel fuel [2] | H | ● | ◐ | – |
| Diethanolamine | TR | ● | – | – |
| Diethyl ether (ether) | TR | ● | ◐ | – |
| Diglycollic acid | GL | ● | ● [2] | – |
| Dihexyl phthalate [2] | TR | ● | ◐ | – |
| Diisobutyl ketone [2] (2,6-dimethylheptan-4-one) | TR | ● | ○ | ○ |
| Diisopropyl ether | TR | ◐ | ○ [2] | – |
| Diisooctyl phthalate | TR | ● | ◐ | – |
| Dimethylamine, gaseous | 100% | ● | – | – |
| N, N-Dimethylformamide | TR | ● | ● | – |
| Dinonyl phthalate [2] (DNP) | TR | ● | ◐ | – |
| Dioctyl phthalate (DOP) | TR | ● [3] | ◐ | – |
| 1,4-dioxane (diethylene dioxide) | TR | ◐ | ◐ | – |
| Fertilizer salts [2] | GL | ● | ● | – |
| | | | | |
| Iron (II) and (III) chloride [2] | GL | ● | ● | – |
| Natural gas | TR | ● | – | – |
| Peanut oil | TR | ● | ● | – |
| Vinegar (wine vinegar) | H | ● | ● | ● |
| Acetic acid, aqueous (glacial acetic acid) | TR | ● | ◐ | ○ |
| Acetic acid, aqueous and vinegar essence | 50% | ● | ● | ◐ |
| Acetic acid, aqueous | up to 40% | ● | ● | – |
| Acetic acid anhydride | TR | ● | – | – |
| Acetic acid ethyl ester (ethyl acetate) | TR | ● [3] | ◐ [3] | ○ |
| Acetic acid methyl ester (methyl acetate) | TR | ● | ● | – |
| Ethanol (ethyl alcohol) | TR | ● | ● | ● |
| Ethanol, denatured with 2% of toluene [2] | 96%(Vol.) | ● | – | – |
| Ethylbenzene [2] | TR | ◐ | ○ | ○ |
| Ethyl chloride, gaseous (chloroethane) | TR | ○ | ○ | ○ |
| Ethylene chlorohydrin (chloroethanol) | TR | ● | ● [2] | – |
| Ethylenediamine (1,2-diaminoethane) | TR | ● | ● | – |
| Ethylene glycol | TR | ● | ● | ● |
| Ethylene oxide, liquid [2] (oxirane) | TR | ○ | – | – |
| | | | | |
| Fatty acids (from $C_4$) [2] | TR | ● | ◐ | – |
| Pine-needle oil [2] | H | ● | ◐ | – |
| Fluorine, dry [2] | TR | ◐ | – | – |
| Fluorosilicic acid [2], aqueous | 32% | ● | ● | – |
| Hydrofluoric acid, aqueous [2] | 40% | ● | ● | – |

| Flow Substance | Content [1] % | Behavior at | | |
|---|---|---|---|---|
| | | 20°C / 68 °F | 60°C / 140 °F | 100°C / 212 °F |
| Hydrofluoric acid, aqueous [2] | 70% | ● | ◐ | – |
| Formaldehyde, aqueous | 40% | ● | ● [2] | – |
| Photo emulsions [2] | H | ● | ● | – |
| Photo developer baths [2] | H | ● | ● | – |
| Photo fixing baths [2] | H | ● | ● | – |
| Antifreeze (automobiles) [2] | H | ● | ● | ● |
| Fruit drinks and fruit juices | H | ● | ● | ● |
| Fructose (fruit sugar) | L | ● | ● | ● |
| Furfuryl alcohol [2] | TR | ● | ◐ | – |
| | | | | |
| Fermentation mash [2] | H | ● | ● | – |
| Gelatine | L | ● | ● | ● [2] |
| Tannin extract, vegetable [2] | H | ● | ○ | – |
| Tannic acid (tannin), aqueous [2] | 10% | ● | ○ | – |
| Glucose, aqueous | 20% | ● | ● | ● |
| Glycerol | TR | ● | ● | ● |
| Glycollic acid, aqueous | 30% | ● | ◐ [2] | – |
| | | | | |
| Urea | GL | ● | ● [2] | – |
| Yeast [2] | any | ● | – | – |
| Heating Oil [2] | H | ● | ◐ | – |
| Heptanes | TR | ● [3] | ◐ [3] | ○ |
| Hexanes | TR | ● | ◐ | – |
| Hexane-1,2,6-triol [2] | TR | ● | ● | – |
| Hydrazine hydrate [2] | TR | ● | – | – |
| Hydroquinone [2] | L | ● | – | – |
| Hydroxylammonium sulphate [2] | 12% | ● | ● | – |
| | | | | |
| Isooctane | TR | ● [3] | ◐ [3] | ○ |
| Isopropanol (propan-2-01) | TR | ● | ● | ● |
| Tincture of iodine | H | ● | ◐ [2] | – |
| | | | | |
| Potassium hydroxide solution, aqueous | 50% | ● | ● | ● |
| Potassium bromate, aqueous | 10% | ● | ● | – |
| Potassium bromide | GL | ● | ● | – |
| Potassium carbonate (potash) | GL | ● | ● [2] | – |
| Potassium chlorate | GL | ● | ● | – |
| Potassium chloride | GL | ● | ● [2] | – |
| Potassium chromate | GL | ● | ● | – |
| Potassium cyanide | L | ● | ● [2] | – |
| Potassium dichromate [2] | GL | ● | ● | – |
| Potassium fluoride | GL | ● | ● | – |
| Potassium hexacyanoferrate-(II) and -(III) [2] (yellow and red potassium ferro- and ferricyanide) | GL | ● | ● | – |
| Potassium bicarbonate | GL | ● | ● | – |
| Potassium iodide | GL | ● | ● [2] | – |
| Potassium nitrate | GL | ● | ● | – |

| Flow Substance | Content [1] % | Behavior at | | |
|---|---|---|---|---|
| | | 20°C / 68 °F | 60°C / 140 °F | 100°C / 212 °F |
| Potassium perchlorate, aqueous | 10% | ● | ● | – |
| Potassium permanganate | GL | ● | ○ [2] | – |
| Potassium peroxodisulphate (potassium persulphate) | GL | ● | ● [2] | – |
| Potassium sulphate | GL | ● | ● [2] | – |
| Fluoro silicic acid | 32% | ● | ● | – |
| Silicic acid, aqueous [2] | any | ● | ● | – |
| Common salt (sodium chloride) | VL | ● | ● | ● |
| Aqua regia ($HCl/HNO_3$) | 75%/25% | ○ | ○ | ○ |
| Carbon dioxide, gaseous | any | ● | ● | – |
| Carbon dioxide (carbonic acid), aqueous [2] | any | ● | ● | – |
| Coconut fat alcohol [2] | TR | ● | ◐ | – |
| Coconut oil (coconut fat, copra) | TR | ● | – | – |
| Cresols | 90%2 | ● | ● | – |
| Cresols | >90% | ● | – | – |
| Copper(II) chloride | GL | ● | ● | – |
| Copper(I) cyanide [2] | GL | ● | ● | – |
| Copper(II) nitrate, aqueous | 30% | ● | ● | ● |
| Copper(II) sulphate | GL | ● | ● | – |
| | | | | |
| Lanolin (wool fat) | H | ● | ◐ | – |
| Linseed oil | H | ● | ● | ● |
| Illuminating gas [2] | H | ● | – | – |
| Air | TR | ● | ● | ● |
| | | | | |
| Magnesium chloride | GL | ● | ● | ● [2] |
| Magnesium hydroxide carbonate | GL | ● | ● | ● |
| Magnesium salts [2] | GL | ● | ● | – |
| Magnesium sulphate | GL | ● | ● | ● [2] |
| Maize germ oil | TR | ● | ◐ | – |
| Machine oil [2] | TR | ● | ◐ | ○ |
| Sea-water | H | ● | ● | ● |
| Molasses [2] | H | ● | ● | ● |
| Menthol [2] | TR | ● | ◐ | – |
| Methanol (methyl alcohol) | TR | ● | ● | – |
| Methanol (methyl alcohol) | 5% | ● | ● [3] | ◐ |
| Methanesulphonic acid, aqueous [2] (methylsulphuric acid) | 50% | ◐ | ◐ | ○ |
| Methanesulphonic acid, aqueous [2] (methylsulphuric acid) | 50 bis 100% | ◐ | ○ | ○ |
| Methoxybutanol [2] | TR | ● | ◐ | – |
| Methyl acetate see (acetic acid methyl ester) | TR | ● | ● | – |
| Methylamine, aqueous | 32% | ● | – | – |
| Methyl bromide (bromomethyl) | TR | ○ | ○ | ○ |
| Methyl chloride, gaseous [2] (chloromethyl) | TR | ○ | ○ | ○ |
| Methylene chloride (dichloromethane) | TR | ◐ | ○ | ○ |
| Methyl ethyl ketone [2] | TR | ● | ◐ | – |
| Milk | H | ● | ● | ● |
| Lactic acid | 90% | ● | ● | – |

| Flow Substance | Content [1] % | Behavior at 20°C / 68 °F | 60°C / 140 °F | 100°C / 212 °F |
|---|---|---|---|---|
| Mineral water | H | ● | ● | ● |
| Engine lubrication oils [2] | TR | ● | ◐ | – |
| | | | | |
| Naphtha | H | ● | ○ | ○ |
| Sodium acetate | GL | ● | ● | ● |
| Sodium benzoate, aqueous | 35% | ● | ● [2] | – |
| Sodium borate-hydrogen peroxide (sodium perbarate) | GL | ● | – | – |
| sodium carbonate, aqueous | 50% | ● | ● | ◐ |
| Sodium chlorate | GL | ● | ● [2] | – |
| Sodium chloride | VL | ● | ● | ● |
| Sodium chlorite, aqueous | 2 to 20% | ● | ◐ | ○ |
| Sodium dichromate | GL | ● | ● | ● |
| Sodium hexametaphosphate | L | ● | ● [2] | – |
| Sodium bicarbonate | GL | ● | ● | ● |
| Sodium bisulphate | GL | ● | ● | – |
| Sodium bisulphite | L | ● | – | – |
| Sodium hypochlorite, aqueous | 10% | ● | – | – |
| Sodium hypochlorite, aqueous | 20% | ◐ [4] | ◐ | ○ [2] |
| Sodium nitrate | GL | ● | ● | – |
| Sodium nitrite [2] | G | ● | ● | – |
| Sodium phosphate, tri | GL | ● | ● | ● |
| Sodium silicate, (water-glass) | L | ● | ● | – |
| Sodium sulphate | GL | ● | ● | – |
| Sodium sulphide | GL | ● | ● [2] | – |
| Sodium sulphite, aqueous | 40% | ● | ● | ● |
| Sodium tetraborate | L | ● | ● | – |
| Sodium thiosulphate | GL | ● | ● [2] | – |
| Sodium hydroxide solution, aqueous | up to 60% | ● | ● | ● |
| Nickel salts [2] | GL | ● | ● | – |
| Nitrobenzene | TR | ● | ◐ | – |
| 2-Nitrotoluene [2] | TR | ● | ◐ | ○ |
| | | | | |
| Fruit pulps [2] | H | ● | – | – |
| Octylcresol [2] | TR | ◐ | ○ | ○ |
| Oils and fats (animal and vegetable) | TR | ● | ◐ | – |
| Oleic acid | TR | ● | ◐ | – |
| Oleum ($H_2SO_4 + SO_3$) | TR | ○ | ○ | ○ |
| Olive oil | TR | ● | ● | ◐ |
| Oxalic acid | GL | ● | ● [3] | ○ |
| Ozone [2] | 0.5ppm | ● | ◐ | – |
| | | | | |
| Paraffin emulsions [2] | H | ● | ● | – |
| Paraffin oil | TR | ● | ◐ | ○ |
| Perchloroethylene (tetrachloroethylene) [2] | TR | ◐ | ◐ | – |
| Perchloric acid, aqueous | 20% | ● | ● [2] | – |
| Petroleum ether | TR | ● [3] | ◐ | – |

| Flow Substance | Content [1] % | Behavior at | | |
|---|---|---|---|---|
| | | 20°C / 68 °F | 60°C / 140 °F | 100°C / 212 °F |
| Petroleum | TR | ● | ◐ | – |
| Peppermint oil | TR | ● | – | – |
| Phenol, aqueous | 5% | ● | ● | – |
| Phenol, aqueous | 90% | ● | – | – |
| Phenylhydrazine [2] | TR | ◐ | ◐ | – |
| Phenylhydrazinium chloride [2] | TR | ● | ◐ | – |
| Phosgene, gaseous [2] (carbonyl chloride) | TR | ◐ | ◐ | – |
| Phosphates [2] (inorganic) | GL | ● | ● | – |
| Phosphorus(III) chloride [2] | TR | ◐ | – | – |
| Phosphorus oxychloride | TR | ◐ | – | – |
| Phosphoric acid, ortho | 85% | ● | ● | ● |
| Phthalic acid [2] | GL | ● | ● | – |
| Picric acid (2, 4, 6 - trinitrophenol) | GL | ● | – | – |
| Propane, gaseous | TR | ● | – | – |
| Propan-l-ol [2] (propyl alcohol) | TR | ● | ● | – |
| Propargyl alcohol, aqueous [2] | 7% | ● | ● | – |
| Propionic acid, aqueous | >50% | ● | ● [2] | – |
| Propylene glycols [2] | TR | ● | ● | – |
| Pyridine | TR | ◐ | ◐ [2] | – |
| | | | | |
| Mercury | TR | ● | ● | – |
| Mercury salts [2] | GL | ● | ● | – |
| | | | | |
| Castor oil | TR | ● | ● | – |
| | | | | |
| Aqueous ammonia (ammonia water) | GL | ● | ● [2] | – |
| Nitric acid, aqueous | 10% | ● | ◐ [3] | ○ |
| Nitric acid, aqueous | 10-50% | ◐ | ○ [2] | ○ [2] |
| Nitric acid, aqueous | >50% | ○ | ○ | ○ |
| Hydrochloric acid, aqueous | up to 20% | ● | ● | – |
| Hydrochloric acid, aqueous | >20 to 36% | ● | ◐ [2] | ◐ [2] |
| Oxygen | TR | ● | – | – |
| Lubricating oils [2] | H | ◐ | – | – |
| Sulphur dioxide, gaseous | TR | ● | ● [2] | – |
| Sulphur dioxide, gaseous (sulphurous acid) | any | ● | ● [2] | – |
| Carbon disulphide | TR | ○ | ○ | ○ |
| Sulphuric acid, aqueous | 10% | ● | ● | ● |
| Sulphuric acid, aqueous | >10 to 80% | ● | ● | – |
| Sulphuric acid, aqueous | >80 to TR | ◐ | ○ | – |
| Sulphuric acid, fuming (oleum) | | ○ | ○ | ○ |
| Hydrogen sulphide, gaseous | TR | ● | ● | – |
| Sea-water | H | ● | ● | ● |
| Silver nitrate | GL | ● | ● | ◐ |
| Silver salts [2] | GL | ● | ● | – |
| Silicone oil | TR | ● | ● | ● |
| Silicone emulsion [2] | H | ● | ● | – |

| Flow Substance | Content [1] % | Behavior at | | |
|---|---|---|---|---|
| | | 20°C / 68 °F | 60°C / 140 °F | 100°C / 212 °F |
| Soda (sodium carbonate) | 50% | ● | ● | ◐ |
| Soybean oil | TR | ● | ◐ | – |
| Spindle oil [2] | TR | ● | ◐ | ○ |
| Starch | any | ● | ● | – |
| Starch gum (dextrin) | L | ● | ● | – |
| Startch syrup [2] | any | ● | ● | – |
| Sulphuryl chloride [2] | TR | ○ | ○ | ○ |
| | | | | |
| Terpentine oil | TR | ○ | ○ | ○ |
| White spirit [2] | TR | ● | ◐ | ○ |
| Tetrachloroethane [2] | TR | ◐ | ○ | ○ |
| Tetrachloroethylene (perchloroethylene) | TR | ◐ | ◐ | – |
| Carbon tetrachloride (tetrachloromethane) | TR | ○ | ○ | ○ |
| Tetrahydrofuran | TR | ◐ | ○ | ○ |
| Tetrahydronaphthalene (tetralin) | TR | ○ | ○ | ○ |
| Thionyl chloride [2] | TR | ◐ | ○ | ○ |
| Thiophene | TR | ● | ◐ | – |
| Toluene | TR | ◐ | ○ | ○ |
| Transformer oil (insulating oil) [2] | TR | ◐ | ○ | – |
| Grape sugar (glucose) | 20% | ● | ● | ● |
| Triethanolamine | L | ● | – | – |
| Trichloroethylene | TR | ○ | ○ | ○ |
| Trichloroacetic acid, aqueous | 50% | ● | ● | – |
| Tricresyl phosphate [2] (phosphoric acid tritolyl ester) | TR | ● | ◐ | – |
| Drinking water, chlorinated [2] | TR | ● | ● | ● |
| Triocyl phosphate [2] | TR | ● | – | – |
| | | | | |
| Vaseline oil [2] | TR | ● | ◐ | – |
| Vinyl acetate [2] | TR | ● | ◐ | – |
| Vinylidene chloride (1,1-dichloroethylene) | TR | ◐ | – | – |
| | | | | |
| Detergents [2] | VL | ● | ● | – |
| Water, pure | H | ● | ● | ● |
| Hydrogen | TR | ● | ● [2] | – |
| Hydrogen peroxide, aqueous | 30% | ● | ◐ | – |
| Wines | H | ● | ● [2] | – |
| Wine vinegar, table vinegar | H | ● | ● | ● |
| Tartaric acid, aqueous | 10% | ● | ● | – |
| Xdylene (all isomers) | TR | ◐ [3] | ○ | ○ |
| | | | | |
| Zinc salts [2] | GL | ● | ● | – |
| Tin(II) chloride | GL | ● | ● | – |
| Tin(IV) chloride | GL | ● | ● | – |
| Citric acid | VL | ● | ● | ● |
| Sugar syrup [2] | H | ● | ● | – |