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23 March 2016

**Subject: Chemical Compatibility—Plastics**

Dear Customer:

Chemical compatibility is an important aspect when using BioProcess Container (BPC) products.

The publicly available reference document provided should quickly and easily answer these questions.

In referencing this document, please note that all film used to manufacture Thermo Scientific BPC products have a product contact layer of low-density polyethylene.

It is strongly recommended that customers conduct testing under their specific requirements and/or end use conditions.

If you have questions or need assistance regarding this change, please contact our Technical Support team by e-mail at techsupport.bioprocessing@thermofisher.com or by phone at 1-435-792-8500 and press 2.

Thank you for your continued support of Thermo Scientific BPC products.

Sincerely,

Donald Young
Senior Product Manager, BioProcess Containers
Thermo Scientific BioProduction

# *Chemicals Resistance Table*
# *Low Density and High Density Polyethylene*

## INTRODUCTION

The table in this document summarises the data given in a number of chemical resistance tables at present in use in various countries, derived from both practical experience and test results.

Source: ISO/TR 7472, 7474; Carlowitz: “Kunststofftabellen-3. Auflage”.

The table contains an evaluation of the chemical resistance of a number of fluids judged to be either aggressive or not towards low and high density polyethylene. This evaluation is based on values obtained by immersion of low and high density polyethylene test specimens in the fluid concerned at 20 and 60°C and atmospheric pressure, followed in certain cases by the determination of tensile characteristics.

A subsequent classification will be established with respect to a restricted number of fluids deemed to be technically or commercially more important, using equipment which permits testing under pressure and the determination of the ìcoefficient of chemical resistanceî for each fluid. These tests will thus furnish more complete indications on the use of low and high density polyethylene products for the transport of stated fluids, including their use under pressure.

## SCOPE AND FIELD APPLICATION

This document establishes a provisional classification of the chemical resistance of low and high density polyethylene with respect to about 300 fluids. It is intended to provide general guidelines on the possible utilisation of low and high density polyethylene:

– at temperatures up to 20 och 60°C
– in the absence of internal pressure and external mechanical stress (for example flexural stresses, stresses due to thrust, rolling loads etc).

## DEFINITIONS, SYMBOLS AND ABBREVIATIONS

The criteria of classification, definitions, symbols and abbreviations adopted in this document are as follows:

S = Satisfactory

The chemical resistance of low or high density polyethylene exposed to the action of a fluid is classified as “satisfactory” when the results of test are acknowledged to be ìsatisfactoryî by the majority of the countries participating in the evaluation.

L = Limited

The chemical resistance of low or high density polyethylene exposed to the action of a fluid is classified as “limited” when the results of tests are acknowledged to be “limited” by the majority of the countries participating in the evaluation.

Also classified as “limited” are the resistance to the action of chemical fluids for which judgements “S” and “NS” or “L” are pronounced to an equal extent.

NS = Not satisfactory

The chemical resistance of low or high density polyethylene exposed to the action of a fluid is classified as “not satisfactory” when the results of tests are acknowledged to be “not satisfactory” by the majority of the countries participating in the evaluation.

Also classified as “not satisfactory” are materials for which judgements “L” and “NS” are pronounced to an equal extent.

| | |
|---|---|
| Sat.sol | Saturated aqueous solution, prepared at 20°C |
| Sol | Aqueous solution at a concentration higher than 10 %, but not saturated |
| Dil.sol | Dilute aqueous solution at a concentration equel to or lower than 10 % |
| Work.sol | Aqueous solution having the usual concentration for industrial use |

Solution concentrations reported in the text are expressed as a percentage by mass.
The aqueous solutions of sparingly soluble chemicals are considered, as far as chemical action towards low or high density polyethylene is concerned, as saturated solutions.

In general, common chemical names are used in this document.

The table is made as a first guideline for user of polyethylene. If a chemical compound is not to be found or if there is an uncertainty on the chemical resistance in an application, please contact Borealis for advise and proposal on testing.

## Chemical resistance of low density and high density polyethylene, not subjected to mechanical stress, to various fluids at 20 and 60°C

| Chemical or product | Concentration | LD °C | | HD °C | |
|---|---|---|---|---|---|
| | | 20 | 60 | 20 | 60 |
| Acetaldehyde | 100 % | L | NS | S | L |
| Acetanilide | – | | | S | S |
| Acetic acid | 10 % | S | S | S | S |
| Acetic acid | 60 % | S | L | S | S |
| Acetic acid, glacial | Greater than 96 % | L | NS | S | L |
| Acetic anhydride | 100 % | L | NS | S | L |
| Acetone | 100 % | L | NS | L | L |
| Acrylnitrile | – | S | S | S | S |
| Acetylsilicacid | – | S | S | S | S |
| Adipic acid | Sat.sol | S | S | S | S |
| After shave | – | NS | NS | NS | NS |
| Aliphatic hydocarbons | – | L | NS | L | L |
| Allyl acetate | – | S | L | S | L |
| Allyl alcohol | 100 % | L | NS | – | – |
| Allyl alcohol | 96 % | – | – | S | S |
| Allyl chloride | – | L | NS | L | NS |
| Aluminium chloride | Sat.sol | S | S | S | S |
| Aluminium fluoride | Sat.sol | S | S | S | S |
| Aluminium hydroxide | Sat.sol | S | S | S | S |
| Aluminium nitrate | Sat.sol | S | S | S | S |
| Aluminium oxychloride | Sat.sol | S | S | S | S |
| Al/potassium sulphate | Sat.sol | S | S | S | S |
| Aluminium sulphate | Sat.sol | S | S | S | S |
| Alums | Sol | S | S | S | S |
| Aminobenzoic acid | – | S | S | S | S |
| Ammonia, dry gas | 100 % | S | S | S | S |
| Ammonia, liquid | 100 % | L | L | S | S |
| Ammonia, aqueous | Dil.sol | S | S | S | S |
| Ammonium acetate | – | S | S | S | S |
| Ammonium carbonate | Sat.sol | S | S | S | S |
| Ammonium chloride | Sat.sol | S | S | S | S |
| Ammonium fluoride | Sol | S | – | S | S |
| Ammonium hexafluorosilicate | Sat.sol | S | S | S | S |
| Ammonium hydrogen carbonate | Sat.sol | S | S | S | S |
| Ammonium hydroxide | 10 % | S | S | S | S |
| Ammonium hydroxide | 30 % | S | S | S | S |

| Chemical or product | Concentration | LD °C | | HD °C | |
|---|---|---|---|---|---|
| | | 20 | 60 | 20 | 60 |
| Ammonium metaphosphate | Sat.sol | S | S | S | S |
| Ammonium nitrate | Sat.sol | S | S | S | S |
| Ammonium oxalate | Sat.sol | S | S | S | S |
| Ammonium phosphate | Sat.sol | S | S | S | S |
| Ammonium persulphate | Sat.sol | S | S | S | S |
| Ammonium sulphate | Sat.sol | S | S | S | S |
| Ammonium sulphide | Sol | S | S | S | S |
| Ammonium thiocyanate | Sat.sol | S | S | S | S |
| Amyl acetate | 100 % | NS | NS | L | L |
| Amyl alcohol | 100 % | L | L | S | L |
| Amyl chloride | 100 % | NS | NS | – | – |
| Amyl phthalate | – | L | L | S | L |
| Aniline | 100 % | NS | NS | S | L |
| Anilinchlorohydrate | – | L | – | – | – |
| Antimony (III) chloride | 90 % | – | – | S | S |
| Antimony (III) chloride | Sat.sol | S | S | S | S |
| Antimony trichloride | Sol | S | S | S | S |
| Apple juice | Sol | – | – | S | L |
| Aqua regia | $HCl/HNO_3$ = 3/1 | NS | NS | NS | NS |
| Aromaitic hydrocarbons | – | NS | NS | NS | NS |
| Arsenic acid | Sat.sol | S | S | S | S |
| Asorbic acid | 10 % | S | S | S | S |
| | | | | | |
| Barium bromide | Sat.sol | S | S | S | S |
| Barium carbonate | Sat.sol | S | S | S | S |
| Barium chloride | Sat.sol | S | S | S | S |
| Barium hydroxide | Sat.sol | S | S | S | S |
| Barium sulphate | Sat.sol | S | S | S | S |
| Barium sulphide | Sat.sol | S | S | S | S |
| Beer | – | S | S | S | S |
| Benzaldehyde | 100 % | L | NS | S | L |
| Benzene | 100 % | NS | NS | L | L |
| Benzoic acid | Sat.sol | S | S | S | S |
| Benzoylchloride | – | S | L | S | L |
| Benzyl alcohol | – | S | L | S | S |
| Benzylsulphonic acid | 10 % | S | S | S | S |
| Bismuth carbonate | Sat.sol | S | S | S | S |
| Bitumen | – | S | L | S | S |
| Bleach lye | 10 % | S | S | S | S |

| Chemical or product | Concentration | LD °C | | HD °C | |
|---|---|---|---|---|---|
| | | 20 | 60 | 20 | 60 |
| Borax | Sat.sol | S | S | S | S |
| Boric acid | Sat.sol | S | S | S | S |
| Boron trifluoride | – | L | NS | L | NS |
| Brake fluid | – | L | NS | L | NS |
| Brine | – | S | S | S | S |
| Bromine, dry gas | 100 % | NS | NS | NS | NS |
| Bromine, liquid | 100 % | NS | NS | NS | NS |
| Bromoform | 100 % | NS | NS | NS | NS |
| Butandiol | 10 % | S | S | S | S |
| Butandiol | 60 % | S | S | S | S |
| Butandiol | 100 % | S | S | S | S |
| Butane, gas | 100 % | – | – | S | S |
| Butanol | 100 % | S | L | S | S |
| Butter | – | S | S | S | S |
| Butyl acetate | 100 % | S | L | S | L |
| Butyl alcohol | 100 % | S | S | S | S |
| Butyl chloride | – | S | – | S | – |
| Butylene glycol | 10 % | S | S | S | S |
| Butylene glycol | 60 % | S | S | S | S |
| Butylene glycol | 100 % | S | S | S | S |
| Butyraldehyde | – | – | – | S | L |
| Butyric acid | 100 % | L | L | S | L |
| | | | | | |
| Calcium arsenate | – | S | S | S | S |
| Calcium benzoate | – | S | S | S | S |
| Calcium bisulphide | – | S | S | S | S |
| Calcium bromate | 10 % | S | S | S | S |
| Calcium bromide | Sat.sol | S | S | S | S |
| Calcium carbonate | Sat.sol | S | S | S | S |
| Calcium chlorate | Sat.sol | S | S | S | S |
| Calcium chloride | Sat.sol | S | S | S | S |
| Calcium chromate | 40 % | S | S | S | S |
| Calcium cyanide | – | S | S | S | S |
| Calcium hydrosulphide | Sol | S | S | S | S |
| Calcium hydroxide | Sat.sol | S | S | S | S |
| Calcium hypochlorite | Sol | S | S | S | S |
| Calcium nitrate | Sat.sol | S | S | S | S |
| Calcium oxide | Sat.sol | S | S | S | S |
| Calcium perchlorate | 1 % | S | – | S | S |

| Chemical or product | Concentration | LD °C | | HD °C | |
|---|---|---|---|---|---|
| | | 20 | 60 | 20 | 60 |
| Calcium permanganate | 20 % | S | S | S | S |
| Calcium persulphate | Sol | S | S | S | S |
| Calcium sulphate | Sat.sol | S | S | S | S |
| Calcium sulphide | Dil.sol | – | – | L | L |
| Camphor oil | – | NS | NS | L | L |
| Carbon dioxide, dry gas | 100 % | – | – | S | S |
| Carbon dioxide, wet | – | S | S | S | S |
| Carbon disulphide | 100 % | NS | NS | L | NS |
| Carbon monoxide | 100 % | S | S | S | S |
| Carbon tetrachloride | 100 % | NS | NS | L | NS |
| Carbonic acid | | S | S | S | S |
| Castor oil | Sol | S | S | S | S |
| Chlorine, water | 2 % Sat.sol | L | L | S | S |
| Chlorine, aqueous | Sat.sol | NS | NS | L | NS |
| Chlorine, dry gas | 100 % | NS | NS | L | NS |
| Chloroacetic acid | Sol | – | – | S | S |
| Chlorobenzene | 100 % | NS | NS | NS | NS |
| Chloroethanol | 100 % | S | S | S | S |
| Chloroform | 100 % | NS | NS | NS | NS |
| Chloromethane, gas | 100 % | L | – | L | – |
| Chlorosulphonic acid | 100 % | NS | NS | NS | NS |
| Chloropropene | – | NS | – | L | – |
| Chrome alum | Sol | S | S | S | S |
| Chromic acid | Sat.sol | S | S | – | – |
| Chromic acid | 20 % | – | – | S | L |
| Chromic acid | 50 % | – | – | S | L |
| Chromium VI oxide | Sat.sol | S | S | S | S |
| Cider | – | S | S | S | S |
| Citric acid | Sat.sol | S | S | S | S |
| Citric acid | 10 % | S | S | S | S |
| Citric acid | 25 % | S | S | S | S |
| Coconut oil alcoholic | – | S | S | S | S |
| Coffee | – | S | S | S | S |
| Copper (II) chloride | Sat.sol | S | S | S | S |
| Copper cyanide | Sat.sol | S | S | S | S |
| Copper (II) fluoride | Sat.sol | S | S | S | S |
| Copper (II) fluoride | 2 % | S | S | S | S |
| Copper (II) nitrate | Sat.sol | S | S | S | S |
| Copper (II) sulphate | Sat.sol | S | S | S | S |

| Chemical or product | Concentration | LD °C | | HD °C | |
|---|---|---|---|---|---|
| | | 20 | 60 | 20 | 60 |
| Corn oil | – | S | S | S | S |
| Cottonseed oil | – | S | S | S | S |
| Cresylic acid | Sat.sol | – | – | L | – |
| Crotonaldehyde | Sat.sol | L | – | – | – |
| Cyclanone | – | S | S | S | S |
| Cyclohexane | – | NS | NS | NS | NS |
| Cyclohexanol | Sat.sol | L | NS | – | – |
| Cyclohexanol | 100 % | – | – | S | S |
| Cyclohexanone | 100 % | NS | NS | S | L |
| Decahydronaphthalene | 100 % | L | NS | S | L |
| Decane | – | NS | NS | L | NS |
| Decalin | 100 % | – | – | S | L |
| Detergents, synthetic | – | S | S | S | S |
| Developers (photographic) | Work.conc | – | – | S | S |
| Dextrin | Sol | S | S | S | S |
| Dextrose | Sol | S | S | S | S |
| Diacetone alcohol | – | L | L | L | L |
| Diazo salts | – | S | S | S | S |
| Dibutyl amine | – | NS | NS | L | NS |
| Dibuthyl ether | – | NS | NS | L | – |
| Dibutylphthalate | – | L | L | S | L |
| Dichlorobenzene | – | NS | NS | NS | NS |
| Dichloroethylene | – | NS | NS | NS | NS |
| Dichloropropylene | – | NS | NS | NS | NS |
| Diesel oil | – | S | NS | S | L |
| Diethyl ether | 100 % | NS | NS | L | – |
| Diethyl ketone | – | L | NS | L | L |
| Diethylene glycol | – | S | S | S | S |
| Diglycolic acid | – | S | S | S | S |
| Diisobutylketone | 100 % | S | L | S | L |
| Dimethyl amine | 100 % | NS | NS | – | – |
| Dimethyl formamid | – | S | L | S | S |
| Dioctyl phthalate | 100 % | L | NS | S | L |
| Dioxan | 100 % | – | – | S | S |
| Dipentene | – | NS | NS | NS | NS |
| Disodium phosphate | – | S | S | S | S |
| Drano, plumbing cleaner | – | S | S | S | S |

| Chemical or product | Concentration | LD °C | | HD °C | |
|---|---|---|---|---|---|
| | | 20 | 60 | 20 | 60 |
| Emulsions, photographic | – | S | S | S | S |
| Ethandiol | 100 % | S | S | S | S |
| Ethanol | 40 % | S | L | S | L |
| Ethanol | 96 % | L | L | – | – |
| Ethyl acetate | 100 % | L | NS | S | NS |
| Ethyl acrylate | 100 % | NS | NS | L | NS |
| Ethyl alcohol | 35 % | S | S | S | S |
| Ethyl alcohol | 100 % | S | S | S | S |
| Ethyl benzene | – | NS | NS | NS | NS |
| Ethyl chloride | 100 % | NS | NS | NS | NS |
| Ethylene chloride | 100 % | NS | NS | NS | NS |
| Ethylene diamine | 100 % | S | L | S | S |
| Ethyl ether | – | NS | NS | NS | NS |
| Ethylene glycol | 100 % | S | S | S | S |
| Ethyl mercaptan | – | NS | NS | NS | NS |
| Ferric chloride | Sat.sol | S | S | S | S |
| Ferric nitrate | Sat.sol | S | S | S | S |
| Ferric sulphate | Sat.sol | S | S | S | S |
| Ferrous chloride | Sat.sol | S | S | S | S |
| Ferrous sulphate | Sat.sol | S | S | S | S |
| Fish solubles | Sol | S | S | S | S |
| Fluoboric acid | – | S | S | S | S |
| Fluorine gas | 100 % | L | NS | NS | NS |
| Fluorine gas, dry | 100 % | NS | NS | NS | NS |
| Fluorine gas, wet | 100 % | NS | NS | NS | NS |
| Fluorosilic acid | Conc | S | L | S | L |
| Fluorosilic acid | 40 % | S | S | S | S |
| Formaldehyde | 40 % | S | S | S | S |
| Formic acid | 40 % | S | S | S | S |
| Formic acid | 98 to 100 % | S | S | S | S |
| Fructose | Sat.sol | S | S | S | S |
| Fruit pulps | Sol | S | S | S | S |
| Furfural | 100 % | NS | NS | NS | NS |
| Furfuryl alcohol | 100 % | L | NS | S | L |
| Gallic acid | Sat.sol | S | S | S | S |
| Gasoline, petrol | – | L | NS | L | L |
| Gelatine | – | S | S | S | S |

| Chemical or product | Concentration | LD °C | | HD °C | |
|---|---|---|---|---|---|
| | | 20 | 60 | 20 | 60 |
| Glucose | Sat.sol | S | S | S | S |
| Glycerine | 100 % | S | S | S | S |
| Glycerol | 100 % | S | S | S | S |
| Glycolic acid | 30 % | S | L | – | – |
| Glycolic acid | Sol | – | – | S | S |
| | | | | | |
| n-Heptane | 100 % | NS | NS | L | NS |
| Hexachlorobenzene | – | S | S | S | L |
| Hexachlorophene | – | NS | NS | L | L |
| Hexamethylenetriamine | 40 % | S | – | S | – |
| Hexane | – | S | L | S | L |
| Hexanol, tertiary | – | S | S | S | S |
| Hydrobromic acid | 50 % | S | S | S | S |
| Hydrobromic acid | Up to 100 % | S | S | S | S |
| Hydrochloric acid | Up to 36 % | S | S | S | S |
| Hydrochloric acid | Conc | S | S | S | S |
| Hydrochlorous acid | Conc | S | S | S | S |
| Hydrocyanic acid | 10 % | S | S | S | S |
| Hydrocyanic acid | Sat.sol | S | S | S | S |
| Hydrofluoric acid | 40 % | S | S | S | S |
| Hydrofluoric acid | 60 % | S | L | S | L |
| Hydrogen | 100 % | S | S | S | S |
| Hydrogen chloride | Dry gas | S | S | S | S |
| Hydrogen peroxide | 30 % | S | L | S | S |
| Hydrogen peroxide | 90 % | S | NS | S | NS |
| Hydrogen sulphide gas | 100 % | S | S | S | S |
| Hydroquinone | Sat.sol | S | S | – | – |
| Hydroxylamine | up to 12 % | S | S | S | S |
| | | | | | |
| Inks | – | S | S | S | S |
| Iodine (in potassium sol) | – | L | NS | NS | NS |
| Iodine (in alcohol) | – | NS | NS | NS | NS |
| Iron (II) chloride | Sat.sol | S | S | S | S |
| Iron (II) sulphate | Sat.sol | S | S | S | S |
| Iron (III) chloride | Sat.sol | S | S | S | S |
| Iron (III) nitrate | Sol | S | S | S | S |
| Iron (III) sulphate | Sat.sol | S | S | S | S |
| Iso octane | 100 % | S | NS | S | L |
| Iso pentane | – | NS | NS | NS | NS |

| Chemical or product | Concentration | LD °C | | HD °C | |
|---|---|---|---|---|---|
| | | 20 | 60 | 20 | 60 |
| Isopropanol | – | S | S | S | S |
| Isopropyl amine | – | NS | NS | NS | NS |
| Isopropyl ether | 100 % | L | NS | S | NS |
| Kerosene | – | NS | NS | NS | NS |
| Lactic acid | 10 % | S | S | S | S |
| Lactic acid | 28 % | S | S | S | S |
| Lactic acid | up to 100 % | S | S | S | S |
| Latex | – | S | S | S | S |
| Lead acetate | Dil.sol | S | S | S | S |
| Lead acetate | Sat.sol | S | S | S | S |
| Lead arsenate | – | S | S | S | S |
| Lubricating oil | – | S | S | S | S |
| Lysol | – | NS | NS | L | NS |
| Magnesium carbonate | Sat.sol | S | S | S | S |
| Magnesium chloride | Sat.sol | S | S | S | S |
| Magnesium hydroxide | Sat.sol | S | S | S | S |
| Magnesium nitrate | Sat.sol | S | S | S | S |
| Magnesium sulphate | Sat.sol | S | S | S | S |
| Maleic acid | Sat.sol | S | S | S | S |
| Mercury | – | S | S | S | S |
| Mercury (I) nitrate | Sol | S | S | S | S |
| Mercury (II) chloride | Sat.sol | S | S | S | S |
| Mecury (II) cyanide | Sat.sol | S | S | S | S |
| Mercury | 100 % | S | S | S | S |
| Methanol | 100 % | S | L | S | S |
| Methyl alcohol | 100 % | S | L | S | S |
| Methyl benzoic acid | Sat.sol | NS | NS | L | – |
| Methyl bromide | 100 % | NS | NS | NS | NS |
| Methyl chloride | 100 % | NS | NS | NS | NS |
| Methylcyclohexane | – | L | NS | L | NS |
| Methyl ethyl ketone | 100 % | – | – | S | L |
| Methylene chloride | – | NS | NS | NS | NS |
| Methoxybutanol | 100 % | S | L | S | L |
| Milk | – | S | S | S | S |
| Milk of Magnesia | – | S | L | S | L |
| Mineral oils | – | L | NS | S | L |

| Chemical or product | Concentration | LD °C | | HD °C | |
|---|---|---|---|---|---|
| | | 20 | 60 | 20 | 60 |
| Molasses | Work.conc | S | S | S | S |
| Motor oil | – | S | L | S | S |
| | | | | | |
| Naphtha | – | L | NS | L | NS |
| Naphtahalene | – | NS | NS | L | – |
| Nickel chloride | Sat.sol | S | S | S | S |
| Nickel nitrate | Sat.sol | S | S | S | S |
| Nickel sulphate | Sat.sol | S | S | S | – |
| Nicotine | Dil.sol | S | S | S | S |
| Nicotinic acid | Dil.sol | L | L | S | – |
| Nitric acid | 25 % | S | S | S | S |
| Nitric acid | 50 % | S | L | S | L |
| Nitric acid | 70 % | S | L | S | L |
| Nitric acid | 95 % | NS | NS | NS | NS |
| Nitric acid | 100 % | NS | NS | NS | NS |
| Nitrobenzene | 100 % | NS | NS | NS | NS |
| Nitroethane | 100 % | S | NS | S | NS |
| Nitromethane | 100 % | S | – | S | – |
| Nitrotoluene | – | NS | NS | NS | NS |
| | | | | | |
| n-Octane | – | S | S | S | S |
| Octyl alcohol | – | S | NS | S | NS |
| Oil and fats | | L | NS | S | L |
| Oleic acid | 100 % | L | NS | S | S |
| Oleum ($H_2SO_4$ + 10 % $SO_3$) | | NS | NS | NS | NS |
| Oleum ($H_2SO_4$ + 50 % $SO_3$) | | NS | NS | NS | NS |
| Olive oil | – | S | NS | S | NS |
| Orthophosphoric acid | 50 % | S | S | S | S |
| Orthophosphoric acid | 95 % | S | L | S | L |
| Oxalic acid | Sat.sol | S | S | S | S |
| Oxygen | 100 % | S | – | S | L |
| Ozone | 100 % | NS | NS | L | NS |
| | | | | | |
| Paraffin oil | – | S | L | S | S |
| n-Pentane | – | NS | NS | NS | NS |
| Pentane-2 | – | NS | NS | NS | NS |
| Perchloric acid | 20 % | S | S | S | S |
| Perchloric acid | 50 % | S | L | S | L |
| Perchloric acid | 70 % | S | NS | S | NS |

| Chemical or product | Concentration | LD °C | | HD °C | |
|---|---|---|---|---|---|
| | | 20 | 60 | 20 | 60 |
| Perchloroethylene | – | NS | NS | NS | NS |
| Phenol | Sol | L | NS | S | S |
| Phosphine | 100 % | S | S | S | S |
| Phosphoric acid | up to 25 % | S | S | S | S |
| Phosphoric acid | 25 to 50 % | S | S | S | S |
| Phosphoric (III) chloride | 100 % | S | L | S | L |
| Phosphorous (II) chloride | 100 % | – | – | S | L |
| Phosphorous pentoxide | 100 % | S | S | S | S |
| Phosphorous trichloride | 100 % | S | L | S | L |
| Photographic solutions | – | S | S | S | S |
| Phtalic acid | 50 % | S | S | S | S |
| Picric acid | Sat.sol | S | L | S | – |
| Plating solutions | – | S | S | S | S |
| Potassium acetate | – | S | S | S | S |
| Potassium aluminium sulphate | Sat.sol | S | S | S | S |
| Potassium benzoate | – | S | S | S | S |
| Potassium bicarbonate | Sat.sol | S | S | S | S |
| Potassium borate | Sat.sol | S | S | S | S |
| Potassium bromate | Sat.sol | S | S | S | S |
| Potassium bromide | Sat.sol | S | S | S | S |
| Potassium carbonate | Sat.sol | S | S | S | S |
| Potassium chlorate | Sat.sol | S | S | S | S |
| Potassium chloride | Sat.sol | S | S | S | S |
| Potassium chromate | Sat.sol | S | S | S | S |
| Potassium cyanide | Sol | S | S | S | S |
| Potassium dichromate | Sat.sol | S | S | S | S |
| Potassium fluoride | Sat.sol | S | S | S | S |
| Potassium hexacyanoferrate (III) | Sat.sol | S | S | S | S |
| Potassium hexacyanoferrate (II) | Sat.sol | S | S | S | S |
| Potassium hexafluorosilicate | Sat.sol | S | S | S | S |
| Potassium hydrogen carbonate | Sat.sol | S | S | S | S |
| Potassium hydrogen sulphate | Sat.sol | S | S | S | S |
| Potassium hydrogen sulphide | Sol | – | – | S | S |
| Potassium hydroxide | 10 % | S | S | S | S |
| Potassium hydroxide | Sol | S | S | S | S |
| Potassium hypochlorite | Sol | S | L | S | L |
| Potassium iodate | 10 % | S | S | S | S |
| Potassium iodide | Sat.sol | S | S | S | S |
| Potassium nitrate | Sat.sol | S | S | S | S |

| Chemical or product | Concentration | LD °C | | HD °C | |
|---|---|---|---|---|---|
| | | 20 | 60 | 20 | 60 |
| Potassium orthophosphate | Sat.sol | S | S | S | S |
| Potassium oxalate | Sat.sol | S | S | S | S |
| Potassium perchlorate | Sat.sol | S | S | S | S |
| Potassium permanganate | 20 % | S | S | S | S |
| Potassium persulphate | Sat.sol | S | S | S | S |
| Potassium phosphate | Sat.sol | S | S | S | S |
| Potassium sulphate | Sat.sol | S | S | S | S |
| Potassium sulphide | Sol | S | S | S | S |
| Potassium sulphite | Sat.sol | S | S | – | – |
| Potassium thiocyanate | Sat.sol | S | S | S | S |
| Potassium thiosulphate | Sat.sol | S | S | S | S |
| Propargul alcohol | – | S | S | S | S |
| n-Propyl alcohol | – | S | S | S | S |
| Propionic acid | 50 % | – | – | S | S |
| Propionic acid | 100 % | – | – | S | L |
| Propylene dichloride | 100 % | NS | NS | NS | NS |
| Propylene glycol | – | S | S | S | S |
| Pyridine | 100 % | – | – | S | L |
| Quinol (hydroquinone) | Sat.sol | S | S | S | S |
| Resorcinol | Sat.sol | S | S | S | S |
| Salicylic acid | Sat.sol | S | S | S | S |
| Sea water | – | S | S | S | S |
| Selenic acid | – | S | S | S | S |
| Silicon oil | – | S | S | S | S |
| Silver acetate | Sat.sol | S | S | S | S |
| Silver cyanide | Sat.sol | S | S | S | S |
| Silver nitrate | Sat.sol | S | S | – | – |
| Soap solution | 100 % | S | S | S | S |
| Sodium acetate | Sat.sol | S | S | – | – |
| Sodium antimonate | Sat.sol | S | S | S | S |
| Sodium arsenite | Sat.sol | S | S | S | S |
| Sodium benzoate | Sat.sol | S | S | S | S |
| Sodium bicarbonate | Sat.sol | S | S | S | S |
| Sodium bisulphate | Sat.sol | S | S | S | S |
| Sodium bisulphite | Sat.sol | S | S | S | S |
| Sodium borate | – | S | S | S | S |
| Sodium bromide | Sat.sol | S | S | S | S |
| Sodium carbonate | Sat.sol | S | S | S | S |

| Chemical or product | Concentration | LD °C | | HD °C | |
|---|---|---|---|---|---|
| | | 20 | 60 | 20 | 60 |
| Sodium chlorate | Sat.sol | S | S | S | S |
| Sodium chloride | Sat.sol | S | S | S | S |
| Sodium chlorite | Sat.sol | L | – | – | – |
| Sodium cyanide | Sat.sol | S | S | S | S |
| Sodium dichromate | Sat.sol | S | S | S | S |
| Sodium fluoride | Sat.sol | S | S | S | S |
| Sodium hexacyanoferrate (III) | Sat.sol | – | – | S | S |
| Sodium hexacyanoferrate (II) | Sat.sol | – | – | S | S |
| Sodium hexafluorosilicate | Sat.sol | S | S | S | S |
| Sodium hydrogen carbonate | Sat.sol | S | S | S | S |
| Sodium hydrogen sulphate | Sat.sol | S | S | S | S |
| Sodium hydrogen sulphite | Sol | S | S | S | S |
| Sodium hydroxide | 40 % | S | S | S | S |
| Sodium hydroxide | Sol | – | – | S | S |
| Sodium hypochloride | – | L | NS | S | S |
| Sodium hypochlorite | 15 % | – | – | S | S |
| | available Cl | – | – | S | S |
| Sodium iodate | 10 % | S | S | S | S |
| Sodium iodide | Sat.sol | S | S | S | S |
| Sodium nitrate | Sat.sol | S | S | S | S |
| Sodium nitrite | Sat.sol | S | S | S | S |
| Sodium ortophosphate | Sat.sol | S | S | S | S |
| Sodium oxalate | Sat.sol | S | S | S | S |
| Sodium phosphate | Sat.sol | S | S | S | S |
| Sodium silicate | Sol | S | S | S | S |
| Sodium sulphate | Sat.sol | S | S | S | S |
| Sodium sulphide | Sat.sol | S | S | S | S |
| Sodium sulphite | Sat.sol | S | S | S | S |
| Sodium thiocyanate | Sat.sol | S | S | S | S |
| Stannic chloride | Sat.sol | S | S | S | S |
| Stannous chloride | Sat.sol | S | S | S | S |
| Starch solution | Sat.sol | S | S | S | S |
| Stearic acid | Sat.sol | S | L | S | – |
| Styrene | Sol | L | NS | L | NS |
| Sulphur dioxide, dry | 100 % | S | S | S | S |
| Sulphur trioxide | 100 % | NS | NS | NS | NS |
| Sulphur acid | 10 to 50 % | S | S | S | S |
| Sulphuric acid | 10 % | S | S | S | S |
| Sulphuric acid | 50 % | S | S | S | S |

| Chemical or product | Concentration | LD °C | | HD °C | |
|---|---|---|---|---|---|
| | | 20 | 60 | 20 | 60 |
| Sulphuric acid | 70 % | S | L | S | L |
| Sulphuric acid | 80 % | S | NS | S | NS |
| Sulphuric acid | 98 % | L | NS | S | NS |
| Sulphuric acid | Fuming | NS | NS | NS | NS |
| Sulphurous acid | 30 % | S | S | S | S |
| Sulphurous acid | Sol | S | S | S | S |
| | | | | | |
| Tallow | – | S | L | S | L |
| Tannic acid | Sol | S | S | S | S |
| Tartaric acid | Sat.sol | S | S | S | S |
| Tartaric acid | Sol | – | – | S | S |
| Tetrachloroethylene | 100 % | NS | NS | NS | NS |
| Tetrachloromethane | 100 % | NS | NS | L | NS |
| Tetradecane | | NS | NS | NS | NS |
| Tetrahydrofuran | – | NS | NS | NS | NS |
| Tetrahydronaphthalene | 100 % | L | NS | S | L |
| Thionyl chloride | 100 % | NS | NS | NS | NS |
| Tin (II) chloride | Sat.sol | S | S | S | S |
| Tin (IV) chloride | Sol | S | S | S | S |
| Tin (IV) chloride | Sat.sol | – | – | S | S |
| Titanium tetrachloride | Sat.sol | NS | NS | NS | NS |
| Toluene | 100 % | NS | NS | L | NS |
| Tribromomethane | – | NS | NS | NS | NS |
| Trichloroacetaldehyde | – | S | – | S | – |
| Trichlorobenzene | – | NS | NS | – | – |
| Trichloroethylene | 100 % | NS | NS | NS | NS |
| Triethanolamine | 100 % | S | – | S | – |
| Triethanolamine | Sol | – | – | S | L |
| Triethylene glycol | – | S | S | S | S |
| Trisodium phosphate | Sat.sol | S | S | – | – |
| Turpentine | – | NS | NS | NS | NS |
| | | | | | |
| Urea | up to 30 % | S | S | S | S |
| Urea | Sol | S | S | S | S |
| Urine | - | S | S | S | S |
| | | | | | |
| Vanilla extract | – | S | S | S | S |
| Vaseline | – | S | L | S | S |
| Vegetables oils | | S | L | S | S |
| Vinegar | | S | S | S | S |
| Water | | S | S | S | S |
| Wetting agents | – | S | S | S | S |
| Wines and spirits | | S | S | S | S |

| Chemical or product | Concentration | LD °C | | HD °C | |
|---|---|---|---|---|---|
| | | 20 | 60 | 20 | 60 |

| | | | | | |
|---|---|---|---|---|---|
| Xylene | 100 % | NS | NS | L | NS |
| Yeast | Sol | S | S | S | S |
| Zinc bromide | Sat.sol | S | S | S | S |
| Zinc carbonate | Sat.sol | – | – | S | S |
| Zinc chloride | Sat.sol | S | S | S | S |
| Zinc oxide | Sat.sol | S | S | S | S |
| Zinc stearate | – | S | S | S | S |
| Zinc sulphate | Sat.sol | S | S | S | S |
| o-Zylene | | NS | NS | NS | NS |
| p-Zylene | – | NS | NS | NS | NS |