

Chemical resistance of high and low density polyethylene

Based on an evaluation carried out on pipes and fittings
(Reference : technical report ISO/TR 7474 : 1981)

Introduction

The table in this document summarizes data, obtained from both practical experience and laboratory test results, on the chemical resistance performance of both high and low density polyethylene.

The evaluation is based on values obtained by immersion of the polyethylene test specimens in the relevant fluid at 20 °C and 60 °C (and atmospheric pressure) followed by the determination of tensile characteristics.

A "standardized" classification has been adopted in many countries which is explained below.

Standardization Utilization

This document suggests a preliminary classification for the chemical resistance of high and low density polyethylene.

It should be used only as a general guideline on the possible use of these substances in contact with the polyethylene, based on

- a) temperatures of 20 °C and 60 °C
 - b) the absence of internal pressure and external mechanical stress
 - c) good part manufacturing principles and procedures
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Definitions

The following symbols and abbreviations have been used in this document :

S	=	satisfactory
L	=	limited
NS	=	not satisfactory
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 equal to, or lower than, 10%
Work sol.	=	aqueous solution having the usual concentration for industrial use

Where solution concentrations are given in the table, they are expressed as a percentage by mass.

Polyethylene Packaging Information

As explained, this document is only a guideline. The packaging of substances within polyethylene is actually dependent on many factors.

For example :

- a) chemical resistance of polyethylene
- b) permeation rate of the substance through polyethylene
- c) stress cracking nature of the substance
- d) effect of oxidation on the substance
- e) change in internal pressure due to the generation of gases from the substance, especially at higher temperatures
- f) container size, design, shape and wall thickness.

Polyethylene is basically an inert plastic and is not subject to attack by most chemicals. However, those substances that do attack the polyethylene, may still be "packageable" under certain conditions. In general terms, high density polyethylene is more chemical resistant than low density.

CHEMICAL RESISTANCE OF LOW AND HIGH DENSITY POLYETHYLENE, NOT SUBJECTED TO MECHANICAL STRESS, TO VARIOUS FLUIDS AT 20 AND 60 C

CHEMICAL OR PRODUCT	CONCENTRATION	LDPE		HDPE	
		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	> 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 hydrocarbons		L	NS	L	L
allyl acetate		S	L	S	L
allyl alcohol	100%	L	NS		
allyl alcohol	96%			S	S
allyl alcohol	100%	L	NS		
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	S
ammonium hexafluoro silicate	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
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	sat 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

CHEMICAL OR PRODUCT	CONCENTRATION	LDPE		HDPE	
		20	60	20	60
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	(HC1/HN03=3/1)	NS	NS	NS	NS
aromatic 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
borax	sat sol	S	S	S	S
boric acid	sat sol	S	S	S	S
boron trifluoride		S	S	S	S
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

CHEMICAL OR PRODUCT	CONCENTRATION	LDPE		HDPE	
		20	60	20	60
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 hypochloride	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
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
carbonic acid		S	S	S	S
carbon monoxide	100%	S	S	S	S
carbon tetrachloride	100%	NS	NS	L	NS
Castor oil	conc	S	S	S	S
chlorine, dry gas	100%	NS	NS	L	NS
chlorine water	2% sat sol	L	L	S	S
chlorine, aqueous	sat sol	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
chlorometane, gas	100%	L		L	
chloropropene		NS		L	
chlorosulphonic acid	100%	NS	NS	NS	NS
chlorotoluene		NS	NS	NS	NS
chrome alum	sol	S	S	S	S
chromic acid	sat sol	S	S	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 II cyanide	sat sol	S	S	S	S
copper II fluoride	2%	S	S	S	S
copper II fluoride	sat sol	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	LDPE		HDPE	
		20	60	20	60
corn oil		S	S	S	S
cottonseed oil		S	S	S	S
creylic 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
dextose	sol	S	S	S	S
diacetone alcohol		L	L	L	L
diazo salts		S	S	S	S
dibutyl amine		NS	NS	L	NS
dibutyl 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		
dimethylformamid		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
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	L	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

CHEMICAL OR PRODUCT	CONCENTRATION	LDPE		HDPE	
		20	60	20	60
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
fluoroboric 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
fluorosilicic acid	40%	S	S	S	S
fluorosilicic acid	conc	S	L	S	L
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 pulp	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
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		NS	NS	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	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

CHEMICAL OR PRODUCT	CONCENTRATION	LDPE		HDPE	
		20	60	20	60
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
isopropanol		S	S	S	S
iso propyl 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
mercury II cyanide	sat sol	S	S	S	S
mercury	100%	S	S	S	S
methyl alcohol	100%	S	L	S	S
methanol	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
molasses	work conc	S	S	S	S
motor oil		S	L	S	S
naphtha		L	NS	L	NS
naphthalene		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	S	S	S	S
nicotinic acid	dil sol	L	L	S	

CHEMICAL OR PRODUCT	CONCENTRATION	LDPE		HDPE	
		20	60	20	60
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
oils and fats		L	NS	S	L
oleic acid	100%	L	NS	S	S
oleum (H2SO4 + 10% SO3)		NS	NS	NS	NS
oleum (H2SO4 + 50% SO3)		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
perchloroethylene		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
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
phthalic acid	50%	S	S	S	S
picric acid	sat sol	S	L	S	
plating solutions		S	S	S	S
pluming cleaner, Drano		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

CHEMICAL OR PRODUCT	CONCENTRATION	LDPE		HDPE	
		20	60	20	60
potassium cyanide	sol	S	S	S	S
potassium dichromate	sat sol	S	S	S	S
potassium fluoride	sat sol	S	S	S	S
potassium hexacyano					
- ferrate II	sat sol	S	S	S	S
- ferrate III	sat sol	S	S	S	S
potassium hexafluoro silicate	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
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	S	S
potassium thiocyanate	sat sol	S	S	S	S
potassium thiosulphate	sat sol	S	S	S	S
propargyl 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	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	S	S
soap solution	100%	S	S	S	S
sodium acetate	sat sol	S	S	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	sat sol	S	S	S	S

CHEMICAL OR PRODUCT	CONCENTRATION	LDPE		HDPE	
		20	60	20	60
sodium bromide	sat sol	S	S	S	S
sodium carbonate	sat sol	S	S	S	S
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 hexacyano					
- ferrate II	sat sol			S	S
- ferrate III	sat sol			S	S
sodium hexafluoro silicate	sat sol	S	S	S	S
sod hydrogen carbonate	sat sol	S	S	S	S
sod hydrogen sulphate	sat sol	S	S	S	S
sod 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
sodium hypochlorite	available C1			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
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

CHEMICAL OR PRODUCT	CONCENTRATION	LDPE		HDPE	
		20	60	20	60
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	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
vegetable 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
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 nitrate	sat sol	S	S	S	S
zinc oxide	sat sol	S	S	S	S
zinc stearate	sat sol	S	S	S	S
zinc sulphate	sat sol	S	S	S	S
o-zylene		NS	NS	NS	NS
p-zylene		NS	NS	NS	NS