

Chemical resistance of low density polyethylene (LDPE)

Introduction

The table in this document summarises data contained in technical report ISO/TR10358:1993 (E/F) (Plastic pipes and fittings – chemical-resistance classification table) (the Technical Report) issued by the International Organisation for Standards (ISO). The data were obtained from both practical experience and laboratory test results on the probable chemical resistance performance under normal conditions of low density polyethylene (LDPE).

As noted in the Technical Report, the data in the table are based on values obtained by exposing the polyethylene test specimens in the relevant chemicals at 20°C and 60°C (at atmospheric pressure), followed by a determination of the tensile characteristics of the polyethylene and polypropylene test specimens.

A “standardised” classification has been adopted in many countries, which are explained below in the “Symbols used to describe the chemicals” section.

Based on the Technical Report, this document suggests the chemical resistance of low density polyethylene (LDPE). The information and data contained in this document should be used only as a general guideline on the possible use of the chemicals in contact with the specified polymers under normal conditions as detailed in the table. The data presented are not intended as guidance for any specific application, purpose or use.

Normal conditions include the following:

- a) Temperatures of 20°C and 60°C;
- b) The absence of internal and external mechanical stress; and
- c) Good manufacturing principles and procedures.

Symbols used for the chemical resistance of the materials

S = Satisfactory

L = Limited

NS = Not Satisfactory

Symbols used to describe the chemicals

The chemicals are listed by their most customary names, including common and trade names, in alphabetical order.

The concentration and/or the purity of each chemical is indicated in the table using the following symbols:

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 less than 10 %.

Work. Sol. = Working solution of the concentration usually used in the industry concerned,

Susp. = Suspension of solid in a saturated solution at 20°C.

tg = At least technical grade purity.

tg-s = Technical grade, solid.

tg-l = Technical grade, liquid.

tg-g = Technical grade, gas.

The concentrations are expressed as a percentage by mass at 20°C, unless otherwise stated.

Chemical resistance of low density polyethylene (LDPE)

Chemical	Concentrations %	T°C	LLDPE
Acetaldehyde	40	20	S
		60	L
	tg-l	20	S
		60	L
Acetic_Acid	Up_to_10	20	S
		60	S
	10_to_40	20	S
		60	
	50	20	S
		60	
	40_to_60	20	S
		60	
		60	S
		60	
	80	20	S
		60	
Acetic_acid,_glacial	>_96	20	S
		60	L
Acetic_anhydrique	tg-l	20	S
		60	L
Acetone	tg-l	20	L
		60	L
Acetophenone	tg-s	20	
		60	
Acrylonitrile	tg-l	20	
Adipic_acid	Sat._sol._(1.4%)	20	S
		60	S
Air	tg-g	20	S
		60	S
Allyl_alcohol	tg-l	20	S
		60	S
Aluminum_chloride	Sat._sol.	20	S
		60	S
Aluminum_fluoride	Susp.	20	S
		60	S
Aluminum_hydroxide	Susp.	20	S
		60	S
Aluminum_nitrate	Sat._sol.	20	S
		60	S
Aluminum_oxychloride	Susp.	20	S
		60	S
Aluminum_Potassium sulphate	Sat._sol.	20	S
		60	S
Aluminum_sulphate	Sat._sol.	20	S
		60	S
Ammonia,_aqueous	Sat._sol.	20	S
		60	S
Ammonia,_dry_gas	tg-g	20	S
		60	S
Ammonia,_liquid	tg-g	20	S
		60	S

Chemical resistance of low density polyethylene (LDPE)

Chemical	Concentrations %	T°C	LLDPE
Ammonium_acetate	Sat. Sol.	20	
		60	
Ammonium_carbonate	Sat. Sol.	20	S
		60	S
Ammonium_chloride	Sat. Sol.	20	S
		60	S
Ammonium_fluoride	Up to 20	20	S
		60	S
Ammonium_hydrogen_carbonate	Sat. Sol.	20	S
		60	S
Ammonium_metaphosphate	Sat. Sol.	20	S
		60	S
Ammonium_nitrate	Sat. Sol.	20	S
		60	S
Ammonium_persulphate	Sat. Sol.	20	S
		60	S
Ammonium_phosphate	Sat. Sol.	20	
		60	
Ammonium_sulphate	Sat. Sol.	20	S
		60	S
Ammonium_sulphide	Sat. Sol.	20	S
		60	S
Ammonium_thiocyanate	Sat. Sol.	20	S
		60	S
Amyl_acetate	tg-l	20	S
		60	L
Amyl_alcohol	tg-l	20	S
		60	L
Amyl_chloride	tg-l	20	
		60	
Aniline	Sat. Sol.	20	
		60	
		tg-l	20
		60	L
Antimony_(III)_chloride	Sat. Sol.	20	S
		60	S
Apple_juice	Work. Sol.	20	S
Aqua_regia	HCl/HNO3_(3/1)	20	NS
		60	NS
Arsenic_acid	Sat. Sol.	20	S
		60	S
Barium_bromide	Sat. Sol.	20	S
		60	S
Barium_carbonate	Susp.	20	S
		60	S
Barium_chloride	Sat. Sol.	20	S
		60	S
Barium_hydroxide	Sat. Sol.	20	S
		60	S
Barium_sulphate	Susp.	20	S
		60	S

Chemical resistance of low density polyethylene (LDPE)

Chemical	Concentrations %	T°C	LLDPE
Barium_sulphide	Sat._Sol.	20	S
		60	S
Beer	Work._Sol.	20	S
		60	S
Benzaldehyde	tg-l	20	S
		60	L
Benzene	tg-l	20	L
		60	L
Benzoic_acid	Sat._Sol.	20	S
		60	S
Benzoyl_chloride	tg-l	20	
		60	
Benzyl_alcohol	tg-l	20	
		60	
Bismuth_carbonate	Sat._Sol.	20	S
		60	S
Borax	Sol.	20	S
		60	S
	Sat._Sol.	20	S
		60	S
Boric_acid	Dil._Sol.	20	S
		60	S
	Sat._Sol.	20	S
		60	S
Boron_trifluoride	Sat._Sol.	20	S
		60	
Bromine,_gas	tg-g	20	NS
		60	NS
Bromine,_liquid	tg-l	20	NS
		60	NS
Butane,_gas	tg-g	20	S
		60	S
n-Butanol	tg-l	20	S
		60	S
Butyl_acetate	tg-l	20	
		60	
Butyl_glycol	tg-l	20	
		60	
Butylphenols	Sat._Sol.	20	
		60	
Butyl_phtalate	tg-l	20	
		60	
Butyric_acid	tg-l	20	S
		60	L
Calcium_carbonate	Susp.	20	S
		60	S
Calcium_chlorate	Sat._Sol.	20	S
		60	S
Calcium_chloride	Sat._Sol.	20	S
		60	S

Chemical resistance of low density polyethylene (LDPE)

Chemical	Concentrations %	T°C	LLDPE
Calcium_hydroxide	Sat. Sol.	20	S
		60	S
Calcium_hypochlorite_Sol.		20	S
		60	S
Calcium_nitrate	Sat. Sol.	20	S
		60	S
Calcium_sulphate	Susp.	20	S
		60	S
Calcium_sulphide	Dil. Sol.	20	L
		60	L
Calcium_hydrogen_sulphide	Sol.	20	S
		60	S
Camphor_oil	tg-l	20	
		60	
Carbon_dioxide,_tg-g		20	S
dry_gas		60	S
Carbon_dioxide,_tg-g		20	S
wet_gas		60	S
Carbon_disulphide	tg-l	20	L
		60	NS
Carbon_monoxide,_tg-g		20	S
gas		60	S
Carbon_tetrachloride	tg-l	20	L
		60	NS
Castor_oil	tg-l	20	
		60	
Chlorine,_dry_gas	tg-g	20	L
		60	NS
Chlorine_water	Sat. Sol.	20	L
		60	NS
Chloroacetic_acid	Sol.	20	S
		60	S
Chlorobenzene	tg-l	20	
		60	
Chloroethanol	tg-l	20	
		60	
Chloroform	tg-l	20	NS
		60	NS
Chloromethane,_gas	tg-g	20	L
		60	
Chlorosulphonic_acid	tg-s	20	NS
		60	NS
Chrome_alum	Sol.	20	S
(chromium_Potassium_sulphate)		60	S

Chemical resistance of low density polyethylene (LDPE)

Chemical	Concentrations %	T°C	LLDPE
Chromic_acid	Sat._Sol.	20	
		60	
	20	20	S
		60	L
	40	20	
		60	
	50	20	S
		60	L
Citric_acid	Sat._Sol.	20	S
		60	S
Coconut_oil	Work._Sol.	20	
		60	
Copper_(II)_chloride	Sat._Sol.	20	S
		60	S
Copper_(II)_cyanide	Sat._Sol.	20	S
		60	S
Copper_(II)_fluoride	Sat._Sol.	20	
		60	
	2	20	S
		60	S
Copper_(II)_nitrate	Sat._Sol.	20	S
		60	S
Copper_(II)_sulphate	Sat._Sol.	20	S
		60	S
Corn_oil	Work._Sol.	20	
		60	
Cottonseed_oil	Work._Sol.	20	
		60	
Cresols	tg-l	20	
		60	
Cresylic_acid	Sat._Sol.	20	L
		60	
Crotonaldehyde	Sat._Sol.	20	
		60	
Cyclohexane	tg-l	20	
		60	
Cyclohexanol	Sat._Sol.	20	
		60	
	tg-s	20	S
		60	S
Cyclohexanone	tg-l	20	S
		60	L
Decalin	tg-l	20	S
		60	L
Developers_(photographic)	Work._Sol.	20	S
		60	S
Dextrin	Sol.	20	S
		60	S
Dextrose	Sol.	20	S
		60	S

Chemical resistance of low density polyethylene (LDPE)

Chemical	Concentrations %	T°C	LLDPE
Dichloroacetic_acide	tg-l	20	
		60	
Dichloroethylenes	tg-l	20	
		60	
Diethylene_glycol	tg-l	20	
		60	
Diisooctyl_phtalate	tg-l	20	
		60	
Dimethylamine,_gas	tg-g	20	
		60	
Dimethylformamide	tg-l	20	
		60	
Dioctyl_phtalate	tg-l	20	S
		60	L
Dioxane	tg-l	20	S
		60	S
Ethanol	40	20	S
		60	L
	95	20	L
		60	L
	tg-l	20	
		60	
Ethanolamine	tg-l	20	
Ethyl_acetate	tg-l	20	S
		60	NS
Ethyl_chloride,_gas	tg-g	20	
		60	
1,1_Ethylene_dichloride	tg-l	20	
		60	
Ethylene_glycol	tg-l	20	S
		60	S
Ethyl_ether	tg-l	20	L
		60	
Ferric_chloride	Sat._Sol.	20	S
		60	S
Ferric_nitrate	Sat._Sol.	20	S
		60	S
Ferric_sulphate	Sat._Sol.	20	S
		60	S
Ferrous_chloride	Sat._Sol.	20	S
		60	S
Ferrous_sulphate	Sat._Sol.	20	S
		60	S
Fluorine_gas,_dry	tg-g	20	NS
		60	NS
Fluorine_gas,_wet	tg-g	20	NS
		60	NS
Fluosilicic_acid	40	20	S
		60	S
Formaldehyde	30_to_40	20	S
		60	S

Chemical resistance of low density polyethylene (LDPE)

Chemical	Concentrations %	T°C	LLDPE
Formic_acid	10	20	S
		60	S
	40	20	S
		60	S
	50	20	S
		60	S
Formic_acid	85_to_tg-l	20	S
		60	S
Freon_-_F12	Work._Sol.	20	
		60	
Fructose_Sol.		20	
		60	
Fruit_juice	Work._Sol.	20	
		60	
Furfuryl_alcohol	tg-l	20	S
		60	L
Gas,_manufactured	tg-g	20	S
		60	
Gas,_Natural,_dry	tg-g	20	S
		60	S
Gas,_natural,_wet	tg-g	20	S
		60	
Gasoline_(fuel)	Work._Sol.	20	S
		60	L
Gelatine_Sol.		20	S
		60	S
Glucose_Sol.		20	S
		60	S
Glycerine	tg-l	20	S
		60	S
Glycolic_acid	Sol.	20	S
		60	S
	30	20	
		60	
Grapefruit_juice	Work._Sol.	20	S
Heptane	tg-l	20	S
		60	NS
Hexane	tg-l	20	
		60	
Honey	Work._Sol.	20	S
		60	S
Horseradish	Work._Sol.	20	S
		60	S
Hydrobromic_acid	Up_to_20	20	S
		60	S
	Up_to_48	20	S
		60	S
	50	20	S
		60	S
	tg-g	20	S
		60	S

Chemical resistance of low density polyethylene (LDPE)

Chemical	Concentrations %	T°C	LLDPE
Hydrochloric_acid	Up_to_10	20	S
		60	S
	20	20	S
		60	S
	10_to_20	20	S
		60	S
	Up_to_25	20	S
		60	S
	30	20	S
		60	S
	>_30	20	S
		60	S
	36	20	S
		60	S
	Conc.	20	S
		60	S
Hydrochloric_acid,_wet_gas	tg-g	20	
		60	
Hydrochloric_acid,_wet_gas	tg-g	20	
		60	
Hydrocyanic_acid	10	20	S
		60	S
Hydrofluoric_acid	Up_to_10	20	S
		60	S
	40	20	
		60	
		60	S
		60	L
Hydrogen	tg-g	20	S
		60	S
Hydrogen_peroxide	Up_to_10	20	S
		60	S
	30	20	S
		60	S
Hydrogen_peroxide	90	20	S
		60	NS
Hydrogen_sulphide,_dry_gas	tg-g	20	S
		60	S
Hydroquinone	Sat._Sol.	20	S
		60	S
Iodine_(in_potassium_iodide)	Sat._Sol.	20	NS
		60	NS
Iodine,_in_alcohol	Work._Sol.	20	NS
		60	NS
Isooctane	tg-l	20	
		60	
Isopropyl_alcohol	tg-l	20	
		60	
Isopropyl_ether	tg-l	20	
		60	

Chemical resistance of low density polyethylene (LDPE)

Chemical	Concentrations %	T°C	LLDPE
Lactic_acid	10	20	S
		100	S
Magnesium_sulphate	Sat. Sol.	20	S
		60	S
Maleic_acid	Sat. Sol.	20	S
		60	S
Mayonnaise	Work. Sol.	20	
Mercuric_chloride	Sat. Sol.	20	S
		60	S
Mercurous_nitrate	Sol.	20	S
		60	S
Mercurous_nitrate	Sol.	20	S
		60	S
	Sat. Sol.	20	S
		60	S
Mercury	tg-l	20	S
		60	S
Methyl_acetate	tg-l	20	
		60	
Methyl_alcohol	5	20	
		60	
	65	20	S
		60	S
Methylamine	Up_to_32	20	
Methyl_ethyl_ketone	tg-l	20	
		60	
Methylene_chloride	tg-l	20	
		60	
Milk	Work. Sol.	20	S
		60	S
Mineral_oils	Work. Sol.	20	S
		60	L
Molasses	Work. Sol.	20	S
		60	S
Mustard,_aqueous	Work. Sol.	20	S
Naphtha	Work. Sol.	20	
		60	
Nickel_chloride	Sat. Sol.	20	S
		60	S
Nickel_nitrate	Sat. Sol.	20	S
		60	S
Nickel_sulphate	Sat. Sol.	20	S
		60	S
Nicotinic_acid	Susp.	20	S
		60	
Nitric_acid	5	20	S
		60	S
	10	20	S
		60	S
	20	20	S
		60	S

Chemical resistance of low density polyethylene (LDPE)

Chemical	Concentrations %	T°C	LLDPE
Nitric_acid	25	20	S
		60	S
	30	20	
		60	
	35	20	
		60	
	40	20	
		60	
	Up_to_45	20	
		60	
	50	20	L
		60	NS
	>_50	20	NS
		60	NS
Nitric_acid_fuming		20	NS
		60	NS
Nitrobenzene	tg-l	20	
		60	
Oils_and_fats	tg-l	20	S
		60	L
Oleic_acid	tg-l	20	S
		60	S
Oleum		20	NS
		60	NS
Olive_oil	Work._Sol.	20	
		60	
Oxalic_acid	Sat._Sol.	20	S
		60	S
Oxygen_gas	tg-g	20	S
		60	L
Ozone_gas	tg-g	20	L
		60	NS
Paraffin_oil_(F65)	tg-l	20	
		60	
Peanut_oil	Work._Sol.	20	
		60	
Peppermint_oil	Work._Sol.	20	
Perchloric_acid_(2N)	20	20	
Petroleum_ether_(ligroin)	Work._Sol.	20	
		60	
Phenol	Sol.	20	S
		60	S
	5	20	
		60	
	90	20	
		60	
Phosphine	tg-g	20	S
		60	S
Phosphoric_acid	Up_to_50	20	S
		60	S

Chemical resistance of low density polyethylene (LDPE)

Chemical	Concentrations %	T°C	LLDPE
Phosphoric_acid	50_to_75	20	
		60	
	25_to_85	20	
		60	
Phosphorus_(III)_chloride	tg-l	20	S
		60	L
Phosphorus_oxychloride	tg-l	20	
		60	
Picric_acid	Sat._Sol.	20	S
		60	
Potassium_bicarbonate	Sat._Sol.	20	S
		60	S
Potassium_bisulphate	Sat._Sol.	20	S
		60	S
Potassium_borate	Sat._Sol.	20	S
		60	S
Potassium_bromate	Sat._Sol.	20	S
		60	S
	Up_to_10	20	S
		60	S
Potassium_bromide	Sat._Sol.	20	S
		60	S
Potassium_carbonate	Sat._Sol.	20	S
		60	S
Potassium_chlorate	Sat._Sol.	20	S
		60	S
Potassium_chloride	Sat._Sol.	20	S
		60	S
Potassium_chromate	Sat._Sol.	20	S
		60	S
	40	20	S
		60	S
Potassium_cyanide	Sol.	20	S
		60	S
	Sat._Sol.	20	S
		60	S
Potassium_dichromate	Sat._Sol.	20	S
		60	S
	40	20	S
		60	S
Potassium_ferricyanide	Sat._Sol.	20	S
		60	S
Potassium_fluoride	Sat._Sol.	20	S
		60	S
Potassium_(II)_ferrocyanide	Sat._Sol.	20	S
		60	S
Potassium_hydrogen	sulphite_Sol.	20	S
		60	S

Chemical resistance of low density polyethylene (LDPE)

Chemical	Concentrations %	T°C	LLDPE
Potassium_hydroxide	Sol.	20	S
		60	S
	10	20	S
		60	S
Potassium_hydroxide	20	20	
		60	
	Up_to_50	20	
		60	
Potassium_hypochlorite	Sol.	20	S
		60	L
Potassium_iodide	Sat._Sol.	20	
		60	
Potassium_nitrate	Sat._Sol.	20	S
		60	S
Potassium_orthophosphate	Sat._Sol.	20	S
		60	S
Potassium_perchlorate	Sat._Sol.	20	S
		60	S
Potassium_permanganate	20	20	S
		60	S
Potassium_persulphate	Sat._Sol.	20	S
		60	S
Potassium_sulphate	Sat._Sol.	20	S
		60	S
Potassium_sulphide	Sat._Sol.	20	S
		60	S
Potassium_sulphite	Sat._Sol.	20	S
		60	S
Potassium_thiosulphate	Sat._Sol.	20	S
		60	S
Propane_gas	tg-g	20	
Propionic_acid	50	20	S
		60	S
	>_50	20	
	tg-l	20	S
		60	L
Pyridine	tg-l	20	S
		60	L
Salicylic_acid	Sat._Sol.	20	S
		60	S
Silicne_oil	tg-l	20	
		60	
Silver_acetate	Sat._Sol.	20	S
		60	S
Silver_cyanide	Sat._Sol.	20	S
		60	S
Silver_nitrate	Sat._Sol.	20	S
		60	S
Sodium_acetate	Sat._Sol.	20	S
		60	S

Chemical resistance of low density polyethylene (LDPE)

Chemical	Concentrations %	T°C	LLDPE	
Sodium_antimonate	Sat. Sol.	20	S	
		60	S	
Sodium_arsenite	Sat. Sol.	20	S	
		60	S	
Sodium_benzoate	Sat. Sol.	20	S	
		60	S	
		35		
Sodium_bicarbonate	Sat. Sol.	20	S	
		60	S	
Sodium_bisulphate	Sat. Sol.	20	S	
		60	S	
Sodium_bromide	Sat. Sol.	20	S	
		60	S	
Sodium_carbonate	Sat. Sol.	20	S	
		60	S	
		25	20	S
		60	S	
		Up_to_50	20	S
Sodium_chlorate	Sat. Sol.	20	S	
		60	S	
Sodium_chloride	Sat. Sol.	20	S	
		60	S	
		10	20	S
Sodium_chlorite	2	20	S	
		60		
		20	20	
		60		
Sodium_chromate	Dil. Sol.	20	S	
		60	S	
Sodium_cyanide	Sat. Sol.	20	S	
		60	S	
Sodium_dichromate	Sat. Sol.	20	S	
		60	S	
Sodium_ferricyanide	Sat. Sol.	20	S	
		60	S	
Sodium_ferrocyanide	Sat. Sol.	20	S	
		60	S	
Sodium_fluoride	Sat. Sol.	20	S	
		60	S	
Sodium_hydrogen_sulphite	Sat. Sol.	20	S	
		60	S	
Sodium_hydroxide	Sol.	20	S	
		60	S	
		Sat. Sol.	20	
		60		
	1	20	S	
		60	S	
		10_to_35	20	S
		60	S	

Chemical resistance of low density polyethylene (LDPE)

Chemical	Concentrations %	T°C	LLDPE
Sodium_hydroxide	40	20	S
		60	S
	10_to_60	20	
		60	
Sodium_hypchlorite	5	20	
		60	
	10_to_15	20	S
		60	S
Sodium_hypchlorite	12.5%_Cl	20	S
		60	S
Sodium_metaphosphate	Sol.	20	
Sodium_nitrate	Sat._Sol.	20	S
		60	S
Sodium_nitrite	Sat._Sol.	20	S
		60	S
Sodium_perborate	Sat._Sol.	20	
Sodium_phosphate,_acid	Sat._Sol.	20	S
		60	S
Sodium_phosphate,_neutral	Sat._Sol.	20	S
		60	S
Sodium_silicate	Sat._Sol.	20	S
		60	S
Sodium_sulphate	Sat._Sol.	20	S
		60	S
	0,1	20	S
		60	S
Sodium_sulphide	Sat._Sol.	20	S
		60	S
Sodium_sulphite	Sat._Sol.	20	S
		60	S
	40	20	S
		60	S
Sodium_thiosulphate	Sat._Sol.	20	
		60	
Soybean_oil	Work._Sol.	20	
		60	
Sulphur_dioxide,_dry_gas		20	S
		60	S
Suphur_dioxide,_wet_gas		20	
		60	
Sulphur_trioxide	tg-l	20	NS
		60	NS
Sulphuric_acid	Up_to_10	20	S
		60	S
	15	20	S
		60	S
	10_to_30	20	S
		60	S
	10_to_50	20	S
		60	S
	50	20	S

Chemical resistance of low density polyethylene (LDPE)

Chemical	Concentrations %	T°C	LLDPE
Sulphuric_acid		60	S
	50_to_75	20	S
		60	S
	50_to_90	20	
		60	
	75_to_90	20	
		60	
	95	20	
		60	
	96	20	
		60	
	98	20	S
		60	NS
	Fuming	20	NS
		60	NS
Sulphurous_acid	Up_to_30	20	S
		60	S
Tannic_acid	Sol.	20	S
		60	S
Tartaric_acid	Sol.	20	S
		60	S
	Fuming	20	S
		60	S
Tetrahydrofuran	tg-l	20	
		60	
Tetralin	tg-l	20	
		60	
Thionyl_chloride	tg-l	20	NS
		60	NS
Tiophene	tg-l	20	
		60	
Tin_(II)_chloride	Sat._Sol.	20	S
		60	S
Tin_(IV)_chloride	Sol.	20	S
		60	S
Toluene	tg-l	20	L
		60	NS
Trichloroacetic_acid	Up_to_50	20	
		60	
Trichlorobenzene	Work._Sol.	20	
		60	
Trichloroethylene	tg-l	20	NS
		60	NS
Triethanolamine	Sol.	20	S
		60	L
	tg-l	20	
		60	
Turpentine	tg-l	20	
		60	

Chemical resistance of low density polyethylene (LDPE)

Chemical	Concentrations %	T°C	LLDPE	
Urea	Sol.	20	S	
		60	S	
	Sat. Sol.	20		
		60		
Urine		20	S	
		60	S	
Vegetable_oils	tg-l	20		
		60		
Vinegar	Work. Sol.	20	S	
		60	S	
Water		20	S	
		60	S	
Water,_brackish		20	S	
		60	S	
Water,_distilled		20	S	
		60	S	
Water,_fresh		20	S	
		60	S	
Water,_mineral	Work. Sol.	20	S	
		60	S	
Water,_potable	Work. Sol.	20	S	
		60	S	
Water,_sea		20	S	
		60	S	
Whiskey	Work. Sol.	20	S	
		60	S	
Wine	Work. Sol.	20	S	
		60	S	
Wines_and_spirits	Work. Sol.	20	S	
		60	S	
Xylenes	tg-l	20	L	
		60	NS	
Yeast	Susp.	20	S	
		60	S	
Zinc_carbonate	Susp.	20	S	
		60	S	
Zinc_chloride	Sat. Sol.	20	S	
		60	S	
		58	20	S
		60	S	
Zinc_nitrate	Sat. Sol.	20	S	
		60	S	
Zinc_oxide	Susp.	20	S	
		60	S	
Zinc_sulphate	Sat. Sol.	20	S	
		60	S	