ICO Polymers Technical Centre
3 route de la Grande Paroisse
77130 Montereau Fault Yonne
Tel: 00 33 160735361 / Fax: 00 33 164324467

ICORENE Chemical Resistance

Chemical resistance of high and low density polyethylene

Based on an evaluation carried out on plastic pipes and fittings
(Reference : technical report ISO/TR 10358 : 1993-06-01)

Introduction

The table in this document summarizes data, obtained from both practical experience and laboratory test results from ISO/TR 10358 (Plastic pipes and fittings – chemical-resistance classification table), on the chemical resistance performance of both high (HDPE) [1] and low density (LDPE) polyethylene, of crosslinked polyethylene (X-PE)[2] and polypropylene (PP).
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.

(1) - The old designations PELD and PEHD have been maintained, since the majority of tests were conducted before the new designations were adopted for PE. For LLDPE, the values indicated for PEHD maybe assumed to be valid.

(2) - The values reported in the PE-X column have been obtained on silane-crosslinked PE; however, in the majority of cases they will also be valid for PE-X prepared using other cross-linking agents (peroxides, irradiations, etc.).

Standardization Utilization

This document suggests a preliminary classification for the chemical resistance of both high (HDPE) [1] and low density (LDPE) polyethylene, of crosslinked polyethylene (X-PE)[2] and polypropylene (PP).
It should be used only as a general guideline on the possible use of these substances in contact with the polymers presented before, based on

a) temperatures of 20 °C and 60 °C

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b) the absence of internal and external mechanical stress

c) good part 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 fluids

The fluids are listed by their most common names, including trivial and trade names, in English alphabetical order.

The concentration and/or the purity of the fluids is indicated, 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.

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Chemical resistance classification Data

Chemical	Concentrations %	T °C	PELD	PEHD	PP	PE-X
Acetaldehyde	40	20	L	S		
		60	NS	L		
	tg-l	20	L	S		
		60	NS	L		
Acetic Acid	Up to 10	20	S	S	S	S
		60	S	S	S	S
	10 to 40	20	S	S	S	S
		60			S	S
	50	20	S	S	S	S
		60			S	S
	40 to 60	20	S	S		S
		60				S
	60	20	S	S		
		60	L			
	80	20		S		
Acetic acid, glacial	> 96	20	L	S	S	S
		60	NS	L	L	
Acetic anhydrique	tg-l	20	L	S	S	
		60	NS	L		
Acetone	tg-l	20	L	L	S	S
		60	NS	L	S	L
Acetophenone	tg-s	20			S	
		60			L	
Acrylonitrile	tg-l	20			S	
Adipic acid	Sat. sol. (1.4%)	20	S	S	S	
		60	S	S	S	
Air	tg-g	20	S	S	S	
		60	S	S	S	
Allyl alcohol	tg-l	20	L	S	S	
		60	NS	S	S	
Aluminum chloride	Sat. sol.	20	S	S	S	
		60	S	S	S	
Aluminum fluoride	Susp.	20	S	S	S	
		60	S	S	S	

Chemical resistance classification Data

Chemical	Concentra-tions %	T °C	PELD	PEHD	PP	PE-X
Aluminum hydroxide	Susp.	20	S	S	S	
		60	S	S	S	
Aluminum nitrate	Sat. sol.	20	S	S	S	
		60	S	S	S	
Aluminum oxychloride	Susp.	20	S	S	S	
		60	S	S	S	
Aluminum potassium sulphate	Sat. sol.	20	S	S	S	
		60	S	S	S	
Aluminum sulphate	Sat. sol.	20	S	S	S	
		60	S	S	S	
Ammonia, acqueous	Sat. sol.	20	S	S	S	
		60	S	S	S	
Ammonia, dry gas	tg-g	20	S	S	S	
		60	S	S		
Ammonia, liquid	tg-g	20	L	S	S	
		60	L	S		
Ammonium acetate	Sat. Sol.	20			S	
		60			S	
Ammonium carbonate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Ammonium chloride	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Ammonium fluoride	Up to 20	20	S	S	S	
		60	S	S	S	
Ammonium hydrogen carbonate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Ammonium metaphosphate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Ammonium nitrate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Ammonium persulphate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Ammonium phosphate	Sat. Sol.	20			S	
		60				
Ammonium sulphate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Ammonium sulphide	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Ammonium thiocyanate	Sat. Sol.	20	S	S	S	
		60	S	S	S	

Chemical resistance classification Data

Chemical	Concentrations %	T °C	PELD	PEHD	PP	PE-X
Amyl acetate	tg-l	20	NS	S	L	L
		60	NS	L		L
Amyl alcohol	tg-l	20	L	S	S	S
		60	L	L	S	S
Amyl chloride	tg-l	20	NS			
		60	NS			
Aniline	Sat. Sol.	20	NS			
		60	NS			
	tg-l	20	NS	S	S	S
		60	NS	L	S	
Antimony (III) chloride	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Apple juice	Work. Sol.	20	S	S	S	
Aqua regia	HCl/HNO_3 (3/1)	20	NS	NS	NS	
		60	NS	NS	NS	
Arsenic acid	Sat. Sol.	20	S	S		
		60	S	S		
Barium bromide	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Barium carbonate	Susp.	20	S	S	S	
		60	S	S	S	
Barium chloride	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Barium hydroxide	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Barium sulphate	Susp.	20	S	S	S	
		60	S	S	S	
Barium sulphide	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Beer	Work. Sol.	20	S	S	S	
		60	S	S	S	
Benzaldehyde	tg-l	20	L	S		
		60	NS	L		
Benzene	tg-l	20	NS	L	L	S
		60	NS	L	NS	

Chemical resistance classification Data

Chemical	Concentrations %	T °C	PELD	PEHD	PP	PE-X
Benzoic acid	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Benzoyl chloride	tg-l	20	NS			
		60	NS			
Benzyl alcohol	tg-l	20	NS		S	
		60	NS		L	
Bismuth carbonate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Borax	Sol.	20	S	S	S	
		60	S	S	S	
	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Boric acid	Dil. Sol.	20	S	S	S	
		60	S	S		
	Sat. Sol.	20	S	S	S	
		60	S	S		
Boron trifluoride	Sat. Sol.	20	S	S	S	
		60				
Bromine, gas	tg-g	20	NS	NS	NS	
		60	NS	NS	NS	
Bromine, liquid	tg-l	20	NS	NS	NS	
		60	NS	NS	NS	
Butane, gas	tg-g	20		S	S	
		60		S		
n-Butanol	tg-l	20	S	S	S	
		60	L	S	L	
Butyl acetate	tg-l	20			L	
		60			NS	
Butyl glycol	tg-l	20			S	
		60				
Butylphenols	Sat. Sol.	20			S	
		60				
Butyl phtalate	tg-l	20			S	
		60			L	
Butyric acid	tg-l	20	L	S		
		60	L	L		
Calcium carbonate	Susp.	20	S	S	S	
		60	S	S	S	

Chemical resistance classification Data

Chemical	Concentra-tions %	T °C	PELD	PEHD	PP	PE-X
Calcium chlorate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Calcium chloride	Sat. Sol.	20	S	S	S	S
		60	S	S	S	S
Calcium hydroxide	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Calcium hypochlorite	Sol.	20	S	S	S	
		60	S	S		
Calcium nitrate	Sat. Sol.	20	S	S	S	S
		60	S	S	S	S
Calcium sulphate	Susp.	20	S	S	S	
		60	S	S	S	
Calcium sulphide	Dil. Sol.	20		L		
		60		L		
Calcium hydrogen sulphide	Sol.	20	S	S	S	
		60	S	S	S	
Camphor oil	tg-l	20			NS	
		60			NS	
Carbon dioxide,	tg-g	20	S	S	S	
dry gas		60	S	S	S	
Carbon dioxide,	tg-g	20	S	S	S	
wet gas		60	S	S	S	
Carbon disulphide	tg-l	20	NS	L	S	S
		60	NS	NS	NS	
Carbon monoxide,	tg-g	20	S	S	S	
gas		60	S	S	S	
Carbon tetrachloride	tg-l	20	NS	L	NS	L
		60	NS	NS	NS	NS
Castor oil	tg-l	20			S	
		60			S	
Chlorine, dry gas	tg-g	20	NS	L	NS	
		60	NS	NS	NS	
Chlorine water	Sat. Sol.	20	NS	L	S	
		60	NS	NS	L	
Chloroacetic acid	Sol.	20		S	S	
		60		S		
Chlorobenzene	tg-l	20	NS			S
		60	NS			L
Chloroethanol	tg-l	20			S	
		60				

Chemical resistance classification Data

Chemical	Concentra-tions %	T °C	PELD	PEHD	PP	PE-X
Chloroform	tg-l	20	NS	NS	L	NS
		60	NS	NS	NS	NS
Chloromethane, gas	tg-g	20	L	L		
		60				
Chlorosulphonic acid	tg-s	20	NS	NS	NS	
		60	NS	NS	NS	
Chrome alum	Sol.	20	S	S	S	
(chromium potassium sulphate)		60	S	S	S	
Chromic acid	Sat. Sol.	20	S			
		60	S			
	20	20		S		
		60		L		
	40	20			S	
		60			L	
	50	20		S		
		60		L		
Citric acid	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Coconut oil	Work. Sol.	20			S	
		60				
Copper (II) chloride	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Copper (II) cyanide	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Copper (II) fluoride	Sat. Sol.	20	S			
		60	S			
	2	20	S	S	S	
		60	S	S	S	
Copper (II) nitrate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Copper (II) sulphate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Corn oil	Work. Sol.	20			S	
		60			L	
Cottonseed oil	Work. Sol.	20			S	
		60			S	

Chemical resistance classification Data

Chemical	Concentrations %	T °C	PELD	PEHD	PP	PE-X
Cresols	tg-l	20			S	
		60				
Cresylic acid	Sat. Sol.	20		L		
		60				
Crotonaldehyde	Sat. Sol.	20	L			
		60				
Cyclohexane	tg-l	20			S	
Cyclohexanol	Sat. Sol.	20	L			
		60	NS			
	tg-s	20		S	S	
		60		S	L	
Cyclohexanone	tg-l	20	NS	S	S	L
		60	NS	L	NS	L
Decalin	tg-l	20		S	NS	
		60		L	NS	
Developers (photographic)	Work. Sol.	20		S		
		60		S		
Dextrin	Sol.	20	S	S	S	
		60	S	S	S	
Dextrose	Sol.	20	S	S	S	
		60	S	S	S	
Dichloroacetic acide	tg-l	20			L	
		60				
Dichloroethylenes	tg-l	20			L	
		60				
Diethylene glycol	tg-l	20			S	
		60			S	
Diisooctyl phtalate	tg-l	20			S	
		60			L	
Dimethylamine, gas	tg-g	20	NS		S	
		60	NS			
Dimethylformamide	tg-l	20			S	
		60			S	
Dioctyl phtalate	tg-l	20	L	S	L	
		60	NS	L	L	
Dioxane	tg-l	20		S	L	
		60		S	L	
Ethanol	40	20	S	S		
		60	L	L		

Chemical resistance classification Data

Chemical	Concentrations %	T °C	PELD	PEHD	PP	PE-X
Ethanol (contd.)	95	20	L		S	S
		60	L		S	S
	tg-l	20				S
		60				S
Ethanolamine	tg-l	20			S	
Ethyl acetate	tg-l	20	L	S	L	
		60	NS	NS	NS	
Ethyl chloride, gas	tg-g	20	NS		NS	
		60	NS		NS	
1,1 Ethylene dichloride	tg-l	20			L	
		60			L	
Ethylene glycol	tg-l	20	S	S	S	S
		60	S	S	S	S
Ethyl ether	tg-l	20	NS	L	S	S
		60	NS		L	
Ferric chloride	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Ferric nitrate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Ferric sulphate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Ferrous chloride	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Ferrous sulphate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Fluorine gas, dry	tg-g	20	NS	NS		
		60	NS	NS		
Fluorine gas, wet	tg-g	20	NS	NS		
		60	NS	NS		
Fluosilicic acid	40	20	S	S		
		60	S	S		
Formaldehyde	30 to 40	20	S	S	S	
		60	S	S		
Formic acid	10	20	S	S	S	S
		60	S	S	S	S
	40	20	S	S	S	S
		60	S	S		S
	50	20	S	S	S	S
		60	S	S		S
Formic acid	85 to tg-l	20	S	S	S	
		60	S	S	NS	

Chemical resistance classification Data

Chemical	Concentra-tions %	T °C	PELD	PEHD	PP	PE-X
Freon - F12	Work. Sol.	20				S
		60				
Fructose	Sol.	20			S	
		60			S	
Fruit juuice	Work. Sol.	20			S	
		60			S	
Furfuryl alcohol	tg-l	20	L	S		
		60	NS	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	L	S	NS	
		60	NS	L	NS	
Gelatine	Sol.	20	S	S	S	
		60	S	S	S	
Glucose	Sol.	20	S	S	S	
		60	S	S	S	
Glycerine	tg-l	20	S	S	S	
		60	S	S	S	
Glycolic acid	Sol.	20		S		
		60		S		
	30	20	S		S	
		60	L			
Grapefruit juice	Work. Sol.	20		S		
Heptane	tg-l	20	NS	S	L	S
		60	NS	NS	NS	S
Hexane	tg-l	20			S	
		60			L	
Honey	Work. Sol.	20	S	S	S	
		60	S	S	S	
Horseradish	Work. Sol.	20	S	S	S	
		60	S	S	S	
Hydrobromic acid	Up to 20	20	S	S		
		60	S	S		
	Up to 48	20	S	S	S	
		60	S	S	L	
	50	20	S	S		
		60	S	S		

Chemical resistance classification Data

Chemical	Concentrations %	T °C	PELD	PEHD	PP	PE-X
Hydrobromic acid	tg-g	20	S	S		
(contd.)		60	S	S		
Hydrochloric acid	Up to 10	20	S	S	S	S
		60	S	S	S	S
	20	20	S	S	S	S
		60	S	S	S	S
	10 to 20	20	S	S	S	S
		60	S	S	S	S
	Up to 25	20	S	S	S	S
		60	S	S		S
	30	20	S	S	S	S
		60	S	S	L	S
	> 30	20	S	S	S	S
		60	S	S		S
	36	20	S	S	S	S
		60	S	S		S
	Conc.	20	S	S	S	S
		60	S	S		S
Hydrochloric acid, wet gas	tg-g	20			S	
		60			S	
Hydrochloric acid, wet gas	tg-g	20			S	
		60			S	
Hydrocyanic acid	10	20	S	S		
		60	S	S		
Hydrofluoric acid	Up to 10	20	S	S	S	
		60	S	S		
	40	20			S	
		60				
	60	20	S	S		
		60	L	L		
Hydrogen	tg-g	20	S	S	S	
		60	S	S		
Hydrogen peroxide	Up to 10	20	S	S	S	
		60	S	S		
	30	20	S	S	S	
		60	L	S	L	
Hydrogen peroxide	90	20	S	S		
(contd.)		60	NS	NS		
Hydrogen sulphide, dry gas	tg-g	20	S	S	S	
		60	S	S	S	

Chemical resistance classification Data

Chemical	Concentra-tions %	T °C	PELD	PEHD	PP	PE-X
Hydroquinone	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Iodine (in potassium iodide)	Sat. Sol.	20	NS	NS		
		60	NS	NS		
Iodine, in alcohol	Work. Sol.	20	NS	NS	S	
		60	NS	NS		
Isooctane	tg-l	20			L	
		60			NS	
Isopropyl alcohol	tg-l	20			S	
		60			S	
Isopropyl ether	tg-l	20			L	
		60				
Lactic acid	10	20	S	S	S	
		100	S	S	S	
Magnesium sulphate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Maleic acid	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Mayonnaise	Work. Sol.	20		S		
Mercuric chloride	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Mercurous nitrate	Sol.	20	S	S	S	
		60	S	S	S	
Mercurous nitrate	Sol.	20	S	S	S	
		60	S	S	S	
	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Mercury	tg-l	20	S	S	S	
		60	S	S	S	
Methyl acetate	tg-l	20			S	
		60			S	
Methyl alcohol	5	20			S	S
		60			L	S
	65	20	S	S	S	S
		60	L	S		S
Methylamine	Up to 32	20			S	
Methyl ethyl ketone	tg-l	20			S	S
		60				S
Methylene chloride	tg-l	20			L	
		60			NS	
Milk	Work. Sol.	20	S	S	S	
		60	S	S	S	

Chemical resistance classification Data

Chemical	Concentrations %	T °C	PELD	PEHD	PP	PE-X
Mineral oils	Work. Sol.	20	L	S		S
		60	NS	L		S
Molasses	Work. Sol.	20	S	S		
		60	S	S		
Mustard, aqueous	Work. Sol.	20		S		
Naphtha	Work. Sol.	20			S	S
		60			NS	S
Nickel chloride	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Nickel nitrate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Nickel sulphate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Nicotinic acid	Susp.	20	L	S		
		60	L			
Nitric acid	5	20	S	S	S	S
		60	S	S		L
	10	20	S	S	S	S
		60	S	S		L
	20	20	S	S	S	S
		60	S	S	NS	L
	25	20	S	S	S	S
		60	S	S	NS	L
	30	20			S	S
		60			NS	L
	35	20				S
		60			NS	L
	40	20				S
		60				NS
	Up to 45	20				NS
		60				NS
	50	20	L	L	L	NS
		60	NS	NS	NS	NS
Nitric acid	> 50	20	NS	NS	NS	NS
		60	NS	NS	NS	NS
Nitric acid, fuming		20	NS	NS	NS	
		60	NS	NS	NS	
Nitrobenzene	tg-l	20			S	
		60			L	
Oils and fats	tg-l	20	L	S		
		60	NS	L		

Chemical resistance classification Data

Chemical	Concentrations %	T °C	PELD	PEHD	PP	PE-X
Oleic acid	tg-l	20	L	S	S	S
		60	NS	S	L	S
Oleum		20	NS	NS	NS	NS
		60	NS	NS	NS	
Olive oil	Work. Sol.	20			S	S
		60			S	
Oxalic acid	Sat. Sol.	20	S	S	S	S
		60	S	S	L	
Oxygen, gas	tg-g	20	S	S	S	
		60		L		
Ozone, gas	tg-g	20	NS	L		
		60	NS	NS		
Paraffin oil (F65)	tg-l	20			S	
		60			L	
Peanut oil	Work. Sol.	20			S	
		60			S	
Peppermint oil	Work. Sol.	20			S	
Perchloric acid	(2N) 20	20			S	
Petroleum ether (ligroin)	Work. Sol.	20			L	
		60			L	
Phenol	Sol.	20	L	S		
		60	NS	S		
	5	20			S	
		60			S	
	90	20			S	
		60				
Phosphine	tg-g	20	S	S	S	
		60	S	S	S	
Phosphoric acid	Up to 50	20	S	S	S	
		60	S	S	S	
Phosphoric acid	50 to 75	20			S	
		60			S	
	25 to 85	20			S	
		60			S	
Phosphorus (III) chloride	tg-l	20	S	S		
		60	S	L		
Phosphorus oxychloride	tg-l	20			L	
		60				
Picric acid	Sat. Sol.	20	S	S	S	
		60	L			

Chemical resistance classification Data

Chemical	Concentra-tions %	T °C	PELD	PEHD	PP	PE-X
Potassium bicarbonate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Potassium bisulphate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Potassium borate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Potassium bromate	Sat. Sol.	20	S	S		
		60	S	S		
	Up to 10	20	S	S	S	
		60	S	S	S	
Potassium bromide	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Potassium carbonate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Potassium chlorate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Potassium chloride	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Potassium chromate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
	40	20	S	S	S	
		60	S	S	S	
Potassium cyanide	Sol.	20	S	S	S	
		60	S	S		
	Sat. Sol.	20	S	S	S	
		60	S	S		
Potassium dichromate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
	40	20	S	S		
		60	S	S		
Potassium ferricyanide	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Potassium fluoride	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Potassium (II) ferrocyanide	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Potassium hydrogen sulphite	Sol.	20	S	S	S	
		60	S	S		
Potassium hydroxide	Sol.	20	S	S		
		60	S	S		
	10	20	S	S	S	S
		60	S	S	S	S

Chemical resistance classification Data

Chemical	Concentra-tions %	T °C	PELD	PEHD	PP	PE-X
Potassium hydroxide	20	20			S	S
(condt.)		60			S	S
	Up to 50	20			S	S
		60			S	S
Potassium hypochlorite	Sol.	20	S	S		
		60	L	L		
Potassium iodide	Sat. Sol.	20			S	
		60				
Potassium nitrate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Potassium orthophosphate	Sat. Sol.	20	S	S		
		60	S	S		
Potassium perchlorate	Sat. Sol.	20	S	S		
		60	S	S		
Potassium permanganate	20	20	S	S		
		60	S	S		
Potassium persulphate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Potassium sulphate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Potassium sulphide	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Potassium sulphite	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Potassium thiosulphate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Propane, gas	tg-g	20			S	
Propionic acid	50	20		S		
		60		S		
	> 50	20			S	
	tg-l	20		S		
		60		L		
Pyridine	tg-l	20		S	L	
		60		L		
Salicylic acid	Sat. Sol.	20	S	S	S	
		60	S	S		
Silicne oil	tg-l	20			S	
		60			S	
Silver acetate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Silver cyanide	Sat. Sol.	20	S	S	S	
		60	S	S	S	

Chemical resistance classification Data

Chemical	Concentra-tions %	T °C	PELD	PEHD	PP	PE-X
Silver nitrate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Sodium acetate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Sodium antimonate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Sodium arsenite	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Sodium benzoate	Sat. Sol.	20	S	S		
		60	S	S		
	35				S	
					L	
Sodium bicarbonate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Sodium bisulphate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Sodium bromide	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Sodium carbonate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
	25	20	S	S	S	
		60	S	S	S	
	Up to 50	20	S	S	S	
		60	S	S	S	
Sodium chlorate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Sodium chloride	Sat. Sol.	20	S	S	S	
		60	S	S	S	
	10	20	S	S	S	
		60	S	S	S	
Sodium chlorite	2	20	S	S	S	
		60			L	
	20	20	S		S	
		60			L	
Sodium chromate	Dil. Sol.	20	S	S	S	
		60	S	S	S	
Sodium cyanide	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Sodium dichromate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Sodium ferricyanide	Sat. Sol.	20	S	S	S	
		60	S	S	S	

Chemical resistance classification Data

Chemical	Concentrations %	T °C	PELD	PEHD	PP	PE-X
Sodium ferrocyanide	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Sodium fluoride	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Sodium hydrogen sulphite	Sat. Sol.	20	S	S	S	
		60	S	S		
Sodium hydroxide	Sol.	20	S	S	S	
		60	S	S	S	
	Sat. Sol.	20				S
		60				S
	1	20	S	S	S	S
		60	S	S	S	S
	10 to 35	20	S	S	S	S
		60	S	S		S
	40	20	S	S	S	S
		60	S	S		S
	10 to 60	20			S	S
		60			S	S
Sodium hypchlorite	5	20			S	
		60			S	
	10 to 15	20		S	S	
		60		S		
Sodium hypchlorite	12.5% Cl	20		S		
		60		S		
Sodium metaphosphate	Sol.	20			S	
Sodium nitrate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Sodium nitrite	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Sodium perborate	Sat. Sol.	20			S	
Sodium phosphate, acid	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Sodium phosphate, neutral	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Sodium silicate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Sodium sulphate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
	0.1	20	S	S	S	
		60	S	S	S	

Chemical resistance classification Data

Chemical	Concentra-tions %	T °C	PELD	PEHD	PP	PE-X
Sodium sulphide	Sat. Sol.	20	S	S	S	
		60	S	S		
Sodium sulphite	Sat. Sol.	20	S	S	S	
		60	S	S	S	
	40	20	S	S	S	
		60	S	S	S	
Sodium thiosulphate	Sat. Sol.	20			S	
		60				
Soybean oil	Work. Sol.	20			S	
		60			L	
Sulphur dioxide, dry gas		20	S	S	S	
		60	S	S		
Suphur dioxide, wet gas		20			S	
		60				
Sulphur trioxide	tg-l	20	NS	NS		
		60	NS	NS		
Sulphuric acid	Up to 10	20	S	S	S	S
		60	S	S	S	S
	15	20	S	S	S	S
		60	S	S		S
	10 to 30	20	S	S	S	S
		60	S	S	S	S
Sulphuric acid	10 to 50	20	S	S	S	S
(contd.)		60	S	S		S
	50	20	S	S	S	S
		60	S	S	L	S
	50 to 75	20	S	S		S
		60	S	S		S
	50 to 90	20				S
		60				L
	75 to 90	20				S
		60				L
	95	20				S
		60				L
	96	20			S	S
		60			L	L
	98	20	L	S	L	S
		60	NS	NS	NS	L
	Fuming	20	NS	NS	L	
		60	NS	NS	NS	
Sulphurous acid	Up to 30	20	S	S	S	
		60	S	S		

Chemical resistance classification Data

Chemical	Concentra-tions %	T °C	PELD	PEHD	PP	PE-X
Tannic acid	Sol.	20	S	S	S	
		60	S	S	S	
Tartaric acid	Sol.	20	S	S	S	
		60	S	S	S	
	Sat. Sol.	20	S	S	S	S
		60	S	S	S	S
Tetrahydrofuran	tg-l	20	NS		L	L
		60	NS		NS	NS
Tetralin	tg-l	20			NS	
		60			NS	
Thionyl chloride	tg-l	20	NS	NS		
		60	NS	NS		
Tiophene	tg-l	20			S	
		60			L	
Tin (II) chloride	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Tin (IV) chloride	Sol.	20	S	S	S	
		60	S	S	S	
Toluene	tg-l	20	NS	L	L	S
		60	NS	NS	NS	L
Trichloroacetic acid	Up to 50	20			S	
		60			S	
Trichlorobenzene	Work. Sol.	20	NS			
		60	NS			
Trichloroethylene	tg-l	20	NS	NS	NS	L
		60	NS	NS	NS	NS
Triethanolamine	Sol.	20		S		
		60		L		
	tg-l	20	S			
		60				
Turpentine	tg-l	20			NS	
		60			NS	
Urea	Sol.	20	S	S		
		60	S	S		
	Sat. Sol.	20			S	
		60				
Urine		20	S	S	S	
		60	S	S	S	
Vegetable oils	tg-l	20	S			
		60	L			
Vinegar	Work. Sol.	20	S	S	S	
		60	S	S	S	

Chemical resistance classification Data

Chemical	Concentra-tions %	T °C	PELD	PEHD	PP	PE-X
Water		20	S	S	S	
		60	S	S	S	
Water, brackish		20	S	S	S	
		60	S	S	S	
Water, distilled		20	S	S	S	
		60	S	S	S	
Water, fresh		20	S	S	S	
		60	S	S	S	
Water, mineral	Work. Sol.	20	S	S	S	
		60	S	S	S	
Water, potable	Work. Sol.	20	S	S	S	
		60	S	S	S	
Water, sea		20	S	S	S	
		60	S	S	S	
Whiskey	Work. Sol.	20	S	S	S	
		60	S	S	S	
Wine	Work. Sol.	20	S	S	S	
		60	S	S	S	
Wines and spirits	Work. Sol.	20	S	S	S	
		60	S	S	S	
Xylenes	tg-l	20	NS	L	NS	
		60	NS	NS	NS	
Yeast	Susp.	20	S	S		
		60	S	S		
Zinc carbonate	Susp.	20	S	S	S	
		60	S	S	S	
Zinc chloride	Sat. Sol.	20	S	S	S	
		60	S	S	S	
	58	20	S	S	S	
		60	S	S	S	
Zinc nitrate	Sat. Sol.	20	S	S	S	
		60	S	S	S	
Zinc oxide	Susp.	20	S	S	S	
		60	S	S	S	
Zinc sulphate	Sat. Sol.	20	S	S	S	
		60	S	S	S	