

Appendix A Chemical resistance

The chemical resistance of HDPE is depicted per medium at a number of different temperatures. In general we can define the resistance as follows:

For standard soil and waste systems the resistance of HDPE is perfect. In these pipes systems hardly ever aggressive fluids are drained. When transporting chemical waste waters, the following factors have to be taken in account:

- medium
- concentration of this medium
- temperature
- duration of exposure
- volume

The chemical resistance list of the electrometric seals is to aid in establishing the suitability of a certain seal. This is only an indication of its suitability. The chemical deterioration of the polymer chain can lead to changes in the mechanical characteristics like tensile strength and elongation at break etc. The data is valid for a temperature of 20°C. At higher temperatures or longer duration of exposure a more aggressive condition can occur which shortens the lifespan of the seal.

Used symbols

HDPE pipe and fittings:

- +** Resistant, based on the test carried out I.
- a** Suitable material for this application.
- /** Limited resistance, further research necessary.
- No resistance.

Empty field No data available.

Elastomeric seals:

- 1** Little or no effect, volume change <10%. In heavy conditions this elastomere can show a small increase in volume and /or loss of physical properties.
 - 2** Possible change of physical properties, volume change 10%-20%, the elastomere can show increase in volume and a change in physical properties but can be suitable for static applications.
 - 3** Noticeable change of physical properties, large change in volume, and physical properties.
 - 4** Elastomeric seal is not suitable. Influence too much.
- Empty field** No data available.

Abbreviations:

- Comm. Comp. = Commercial composition
- HDPE = High density polyethylene
- NBR = Acryl nitrile-butadiene rubber
- EPDM = Ethylene propylene copolymer
- FPM = Vinylidene fluoride copolymer
- SBR = Styrol butadiene rubber

Appendix A

Component			Concentration	Pipe and fittings			Elastomeric seals			
Name	Formula	Remark		HDPE °C			NBR °C	EPDM °C	FPM °C	SBR °C
			20	40	60	20	20	20	20	
Acetaldehyde	CH ₃ CHO	Aqueous solution	40%	+	+	/	4	2	4	3
Acetaldehyde	CH ₃ CHO	Technically pure	100%	+	/	/	4	2	4	3
Acetic Acid	CH ₃ COOH	Aqueous solution	10%	+	+	+	4	3/4	4	4
Acetic Acid	CH ₃ COOH	Aqueous solution	30%	+	+	+	4	4	4	4
Acetic Acid	CH ₃ COOH	Aqueous solution	60%	+	+	+	4	4	4	4
Acetic Acid	CH ₃ COOH	Aqueous solution	80%	/	/	-	4	4	4	4
Acetic Acid	CH ₃ COOH	Technically pure	100%	+	+	/	4	4	4	4
Acetic Acid Anhydride	(CH ₃ CO) ₂ O	Technically pure	100%	+	/		4	2	4	2
Acetone	CH ₃ COCH ₃	Aqueous solution	10%	+	+	+	4	1	4	2/3
Acetone	CH ₃ COCH ₃	Technically pure	100%	/	/		4	1	4	2/4
Acetophenone	CH ₃ COC ₆ H ₅	Technically pure	Indetermined	+	+	+	4	1	4	4
Acrylonitrile	CH ₂ =CH-CN	Technically pure	100%	+	+	+	4	4	4	3
Adipic Acid	HOOC(CH ₂) ₄ COOH	Aqueous solution	Saturated	+	+	+	1	1	1	1
Alcohol			40%	+						
Alcoholic Spirits			Comm. Comp.	+	+					
Allyl Alcohol	CH ₂ =CH-CH ₂ OH	Aqueous solution	96%	+	+	+				
Alum	Al ₂ (SO ₄) ₃ ·K ₂ SO ₄ ·4H ₂ O	Aqueous solution	Solution	+	+	+	2	1	1	1
Alum	Al ₂ (SO ₄) ₃ ·K ₂ SO ₄ ·4H ₂ O	Aqueous solution	Saturated	+	+	+	2	1	1	1
Aluminium Acetate	(CH ₃ COO) ₃ Al	Aqueous solution	Saturated	+	+	+	2	1	4	4
Aluminium Bromide	AlBr ₃	Aqueous solution	Saturated	+	+	+	1	1	1	1
Aluminium Chloride	AlCl ₃	Aqueous solution	All	+	+	+	2	1	1	1
Aluminium Fluoride	AlF ₃	Aqueous solution	Saturated	+	+	+	2	1	1	1
Aluminium Nitrate	Al(NO ₃) ₃	Aqueous solution	Saturated	+			1	1	1	1
Aluminium Sulfate	Al ₂ (SO ₄) ₃	Aqueous solution	10%	+	+	+	2	1	1	1
Aluminium Sulfate	Al ₂ (SO ₄) ₃	Aqueous solution	Saturated	+	+	+	2	1	1	1
Ammonia	NH ₃	Aqueous solution	Solution	+	+	+	2	1	3	2
Ammonia Gas	NH ₃	Aqueous solution	Saturated	+	+	+	2	1	3	2
Ammonia Gas	NH ₃	Technically pure	100%	+	+	+	2	1	3	2
Ammonium Acetate	CH ₃ COONH ₄	Aqueous solution	Saturated	+	+	+				
Ammonium Bifluoride	NH ₄ FHF	Aqueous solution	Saturated	+	+	+				
Ammonium Carbonate	(NH ₄) ₂ CO ₃	Aqueous solution	100%	+	+	+	2	1	2	2
Ammonium Chloride	NH ₄ Cl	Aqueous solution	Saturated	+	+	+	1	1	1	1
Ammonium Fluoride	NH ₄ F	Aqueous solution	25%	+	+	+	1	1	1	1
Ammonium Fosfate	(NH ₄) ₃ PO ₄ ·X H ₂ O		All	+	+	+	1	1	1	1
Ammonium Hydroxide	NH ₄ OH	Aqueous solution	Solution	+	+	+	4	1	2	4
Ammonium Hydroxide	NH ₄ OH	Aqueous solution	Saturated	+	+	+	4	1	2	4
Ammonium Nitrate	NH ₄ NO ₃	Aqueous solution	Saturated	+	+	/	2	1	1	1
Ammonium Sulfate	(NH ₄) ₂ SO ₄	Aqueous solution	All	+	+	+	1	1	1	1
Ammonium Sulphhydrate	NH ₄ OH(NH ₄) ₂ SO ₄	Aqueous solution	Solution	+						
Ammonium Sulphhydrate	NH ₄ OH(NH ₄) ₂ SO ₃	Aqueous solution	Saturated	+						
Ammonium Sulfide	(NH ₄) ₂ S	Aqueous solution	10%	+	+	+	1	1	1	1
Ammonium Sulfide	(NH ₄) ₂ S	Aqueous solution	Saturated	+	+	+	1	1	1	1
Amyl Acetate	CH ₃ COO(CH ₂) ₄ CH ₃	Technically pure	100%	+	+	+	4	2	4	3
Amyl Alcohol	CH ₃ (CH ₂) ₃ CH ₂ OH		100%	+	+	/	2	2	2	1
Amyl Chloride	CH ₃ (CH ₂) ₄ Cl	Technically pure	100%	-			4	1	4	4
Aniline	C ₆ H ₅ NH ₂	Technically pure	100%	/			4	2/3	1	3
Aniline Chlorhydrate	C ₆ H ₅ NH ₂ ·HCl	Aqueous solution	Saturated	/	/	/	2	2	1	1
Anthraquinone Sulfonic Acid			Solution	+						
Antimony Trichloride	SbCl ₃	Aqueous solution	90%	+	+	+	1	1	1	1
Aqua Regia	3HCl+HNO ₃		100%	-	-	-	4	4	2/3	4
Arsenic Acid	H ₃ AsO ₄		Saturated	+	+					
Barium Carbonate	BaCO ₃	Aqueous solution	All	+	+	+				
Barium Chloride	BaCl ₂	Aqueous solution	All	+	+	+	1	1	1	1
Barium Hydroxide	Ba(OH) ₂	Aqueous solution	Saturated	+	+	+	1	1	1	1
Barium Nitrate	Ba(NO ₃) ₂	Aqueous solution	Saturated	+	+	+				
Barium Sulfate	BaSO ₄	Aqueous solution	Saturated	+	+	+	1	1	1	1
Barium Sulfide	BaS	Aqueous solution	Saturated	+	+	+	1	1	1	2
Beer			100%	+	+	+	1	1	1	1
Benzaldehyde	C ₆ H ₅ CHO	Aqueous solution	Saturated	+	+	+	4	2	4	3
Benzene	C ₆ H ₆	Technically pure	100%	/	-	-	4	4	3	4
Benzene + Benzine			20/80%	/	-	-	2/3	4	2	4

Appendix A

Component		Concentration	Pipe and fittings	Elastomeric seals						
Name	Formula			Remark	HDPE °C	NBR °C	EPDM °C	FPM °C	SBR °C	
			20	40	60	20	20	20	20	
Benzene Sulfonic Acid	C ₆ H ₅ SO ₃ H	Aqueous solution	10%	-	4	4	1	4		
Benzine (Free Of Pb And Aromatic)	C ₅ H ₁₂ +C ₁₂ H ₂₆		100%	+	+	/	4	4	1	4
Benzoic Acid	C ₆ H ₅ COOH	Aqueous solution	Saturated	+	+	+	4	4	1	4
Benzyl Alcohol	C ₆ H ₅ CH ₂ OH	Technically pure	100%	+	+	/	4	1	1	4
Bleaching Lye	NaClO+NaCl	12,5%	Cl	/	/		4	1	1	4
Borax	Na ₂ B ₄ O ₇	Aqueous solution	All	+	+	+	1	1	1	1
Boric Acid	H ₃ BO ₃	Aqueous solution	Saturated	+	+	+	1	1	1	1
Brine			Comm. Comp.	+						
Bromic Acid	HBrO ₃	10%	+	+			4	1	1	4
Bromine, Liquid	Br ₂	Technically pure	100%	-			4	3	2	4
Bromine, Liquid	Br ₂		High	-			4	4	1	4
Butadiene	CH ₂ =CH-CH=CH ₂	Gas	100%	+			3	4	2	4
Butane Gas	CH ₃ CH ₂ CH ₂ CH ₃	100%	+	+			2	4	2	4
Butanediol	OHCH ₂ CH ₂ CH ₂ CH ₂ OH	Aqueous solution	10%	+	+	+				
Butanediol	OHCH ₂ CH ₂ CH ₂ CH ₂ OH	Aqueous solution	Concentrated	/	-	-				
Butyl Acetate	CH ₃ COOCH ₂ CH ₂ CH ₂ CH ₃	Technically pure	100%	/	/	/	4	2	4	4
Butyl Alcohol	CH ₃ (CH ₂) ₃ OH	Technically pure	100%	+	+	+	1	2	1	1
Butyl Ether	(CH ₃ (CH ₂) ₃) ₂ O	Technically pure	100%	/	-	-	4	3	4	4
Butyl Phenol	C ₄ H ₉ C ₆ H ₄ OH	Technically pure	100%	-			4	4	2	4
Butyl Phthalate	HOOC-C ₆ H ₄ -COOC ₄ H ₉	Technically pure	100%	+	/	/				
Butylene	CH ₂ =CH-CH ₂ CH ₄	Liquid	100%	-			2	4	1	4
Butylene Glycol	OHCH ₂ -CH=CH-CH ₂ OH	Technically pure	100%	+	+	+	1	1	1	1
Butylene	CH ₂ =CH-CH ₂ CH ₃	Technically pure	100%	-			2	4	1	4
Butyric Acid	CH ₃ CH ₂ CH ₂ COOH	Aqueous solution	20%	+	+	/				
Butyric Acid	CH ₃ CH ₂ CH ₂ COOH	Technically pure	100%	+	+	/				
Calcium Acetate	Ca(CH ₃ COO) ₂	Aqueous solution	Saturated	+	+	+	2	1	4	4
Calcium Bisulfite	Ca(HSO ₃) ₂	Aqueous solution	Saturated	+	+	+	2	1	2	2
Calcium Carbonate	CaCO ₃	Aqueous solution	All	+	+	+	1	1	1	1
Calcium Chlorate	Ca(ClO ₃) ₂	Aqueous solution	Saturated	+	+	+	1	1	1	1
Calcium Chloride	CaCl ₂	Aqueous solution	All	+	+	+	1	1	1	1
Calcium Hydroxide	Ca(OH) ₂	Aqueous solution	All	+	+	+	1	1	1	1
Calcium Hypochloride	Ca(ClO) ₂	Aqueous solution	Saturated	+	+	+	4	1	1	4
Calcium Nitrate	Ca(NO ₃) ₂	Aqueous solution	50%	+	+	+	1	1	1	1
Calcium Sulfate	CaSO ₄	Aqueous solution	Saturated	+	+	+				
Calcium Sulfide	CaS	Aqueous solution	Saturated	/	/	/	1	1	1	2
Camphor Oil			Comm. Comp.	-	-					
Carbon Dioxide	CO ₂ +H ₂ O	Aqueous solution	Indetermined	+	+	+	1	1	1	1
Carbon Dioxide	CO ₂	Gas	100%	+	+	+	1	1	1	1
Carbon Disulfide	CS ₂	Technically pure	100%	/	-	4	4	1	4	
Carbon Monoxid	CO	Gas	100%	+	+	+	2	2	1	2
Carbon Tetrachloride	CCl ₄	Technically pure	100%	-						
Carbonic Acid	H ₂ CO ₃	Aqueous solution	Saturated	+	+	+				
Chloramine	C ₆ H ₅ SO ₂ NNaCl	Aqueous solution	Solution	+						
Chloric Acid	HClO ₃	Aqueous solution	20%	/						
Chlorine	Cl ₂	Wet	All	/	-	4	3	1	4	
Chlorine	Cl ₂	Gas	100%	/	/	-	4	2	4	4
Chlorine	Cl ₂	Technically pure	100%	-						
Chlorine Water	Cl ₂ +H ₂ O	Saturated	/	/						
Chloro Benzene	C ₆ H ₅ Cl	Technically pure	100%	/	-	-				
Chloro Sulfonic Acid	HClSO ₃	Technically pure	100%	-	-	-				
Chloroform	CHCl ₃	Technically pure	100%	-			4	4	2	4
Chrome Alum	KCr(SO ₄) ₂	Aqueous solution	Saturated	+	+	+				
Chrome Alum	KCr(SO ₄) ₂	Indetermined	+	+	+					
Chromic Acid	CrO ₃ +H ₂ O	Aqueous solution	10%	/	-	-	4	2/3	1	4
Chromic Acid	CrO ₃ +H ₂ O	Aqueous solution	30%	/	-	-	4	2/3	1	4
Chromic Acid	CrO ₃ +H ₂ O	Aqueous solution	50%	/	-	-	4	2/3	1	4
Citric Acid	C ₃ H ₄ (OH)(COOH) ₃	Aqueous solution	50%	+	+	+	2	1	1	2
Compressed Air with Oil			100%	+	+					
Copper Acetate	Cu(COOCH ₃) ₂		Saturated	+			2	1	4	4
Copper Chloride	CuCl ₂	Aqueous solution	Saturated	+	+	+	1	1	1	1
Copper Fluoride	CuF ₂	Aqueous solution	All	+	+	+	2	1	1	1

Appendix A

Component			Concentration	Pipe and fittings			Elastomeric seals			
Name	Formula	Remark		HDPE °C			NBR °C	EPDM °C	FPM °C	SBR °C
			20	40	60	20	20	20	20	
Copper Nitrate	Cu(NO ₃) ₂	Aqueous solution	Indetermined	+	+	+	2	1	1	1
Copper Sulfate	CuSO ₄	Aqueous solution	Solution	+	+	+	1	1	1	1
Copper Sulfate	CuSO ₄	Aqueous solution	Saturated	+	+	+	1	1	1	1
Cresol	CH ₃ C ₆ H ₄ OH	Aqueous solution	>=90%	+	+	/				
Cresol	CH ₃ C ₆ H ₄ OH	Aqueous solution	Solution	+	+	/				
Croton Aldehyde	CH ₃ -CH=CH-CHO	Technically pure	100%	/						
Cryolite	Na ₃ AlF ₆	Aqueous solution	Saturated	/	/	-				
Cyclohexane	C ₆ H ₁₂	Technically pure	100%	+	+	+	2	4	1	4
Cyclohexanol	C ₆ H ₁₁ OH	Technically pure	100%	+	/	/	2	4	2	3
Cyclohexanone	C ₆ H ₁₀ O	Technically pure	100%	+	/	/	4	3	4	4
Decalin (Decahydronaftalene)	C ₁₀ H ₁₈	Technically pure	100%	+	/	/				
Detergents		Aqueous solution	Comm. Comp.	+	+	+				
Dextrine			Comm. Comp.	+	+	+				
Dextrose	C ₆ H ₁₂ O ₆	Aqueous solution	All	+	+	+				
Dextrose	C ₆ H ₁₂ O ₆	Aqueous solution	Saturated	+	+	+				
Dextrose	C ₆ H ₁₂ O ₆	Aqueous solution	All	+	+	+	1	1	1	1
Dibutyl Phthalate	C ₆ H ₄ (COOC ₄ H ₉) ₂	Technically pure	100%	-			4	2	2	4
Dibutyl Sebacate	C ₈ H ₁₆ (COOC ₄ H ₉) ₂	Technically pure	100%	+			4	2	2	4
Dichloro Benzene	C ₆ H ₄ Cl ₂	Technically pure	100%	/			4	4	2	4
Dichloroacetic Acid	Cl ₂ CHCOOH	Aqueous solution	50%	+	+	+	2	2	2	2
Dichloroacetic Acid	Cl ₂ CHCOOH	Technically pure	100%	+	+	/	3	2	3	3
Dichloroacetic Acid Methyl Ester	Cl ₂ CHCOOH ₃	Technically pure	100%	+	+	+				
Dichloroethylene	CHCl=CHCl	Technically pure	100%	-				2	2	4
Diesel Oil			100%	+	/	/	1	4	1	4
Diethylether	C ₂ H ₅ OC ₂ H ₅	Technically pure	100%	-	-		4	4	4	4
Diglycolic Acid	HOOCCH ₂ OCH ₂ COOH	Aqueous solution	Saturated	+						
Di-Isobutyl Ketone	(CH ₃) ₂ CHCH ₂ COCH ₂ CH(CH ₃) ₂	Technically pure	100%	+	/	-	4	2	4	2/3
Dimethyl Amine	(CH ₃) ₂ NH	Technically pure	100%	/	-					
Dimethyl Formamide	HCON(CH ₃) ₂	Technically pure	100%	+	+	/	4	2	4	3
Diocetyl Phthalate	C ₆ H ₄ (COOC ₈ H ₁₇) ₂	Technically pure	100%	+	/	/	4	2	2	4
Dioxane	(CH ₂) ₄ O ₂	Technically pure	100%	+	+	+	4	2/3	4	4
Ethyl Acetate	CH ₃ COOCH ₂ CH ₃	Technically pure	100%	+	/	-	4	2/3	4	4
Ethyl Alcohol	CH ₃ CH ₂ OH	Aqueous solution	96%	+	+	/	2	1	2	1
Ethyl Benzene	C ₆ H ₅ C ₂ H ₅	Technically pure	100%	/	/	/	4	4	2	4
Ethyl Chloride	CH ₃ CH ₂ Cl	Technically pure	100%	/	-	2/3	4	2	4	
Ethyl Ether	CH ₃ CH ₂ OCH ₂ CH ₃	Technically pure	100%	/	3	3	4	4		
Ethylene Chlorohydrin	ClCH ₂ CH ₂ OH	Technically pure	100%	+	+	/	4	2	2	2
Ethylene Diamina	NH ₂ CH ₂ CH ₂ NH ₂	Technically pure	100%	-	-	-	2	1	4	2
Ethylene Dichloride	CH ₂ ClCH ₂ Cl	Technically pure	100%	/	/	4	4	2/3	4	
Ethylene Glycol	HOCH ₂ -CH ₂ OH	Technically pure	100%	+	+	+	1	1	1	1
Ethylene Oxide	C ₂ H ₄ O	Technically pure	100%	-			3	3	4	4
Exhaust fumes			Traces	+	+	+				
Fatty Acids	R>C ₆	Technically pure	100%	+	+	/				
Ferric Chloride	FeCl ₃	Aqueous solution	Saturated	+	+	+	2	1	1	2
Ferric Nitrate	Fe(NO ₃) ₃	Indetermined	+	+	+					
Ferric Sulfate	Fe ₂ (SO ₄) ₃	Aqueous solution	Saturated	+	+	+				
Ferrous Chloride	FeCl ₂	Aqueous solution	Saturated	+	+	+	2	1	1	2
Ferrous Nitrate	Fe(NO ₃) ₂	Aqueous solution	Saturated	+	+	+				
Ferrous Sulfate	FeSO ₄	Aqueous solution	Saturated	+	+	+	2	1	1	2
Fertilizer Salts		Aqueous solution	10%	+	+	+				
Fertilizer Salts		Aqueous solution	Saturated	+	+	+				
Fluoboric Acid	HBF ₄	Technically pure	100%	+	+	+		1	1	1
Fluorine Gas Dry	F ₂		100%	-				4	1	4
Fluosilicic Acid	H ₂ SiF ₆	Aqueous solution	32%	+	+	+				
Formaldehyde	CH ₂ O	Aqueous solution	37%	+	+	+	1	1	1	1
Formamide	HCONH ₂	Technically pure	100%	+	+	+	2	2	1	1
Formic Acid	HCOOH	Aqueous solution	50%	+	+	+	4	2	4	2
Formic Acid	HCOOH	Technically pure	100%	+	+	+	4	2	4	2
Freon F-12	CCl ₂ F ₂	Technically pure	100%	-			2	2/3	2	4
Fruit pulp and juice			Comm. Comp.	+						

Appendix A

Component			Concentration	Pipe and fittings			Elastomeric seals			
Name	Formula	Remark		HDPE °C			NBR °C	EPDM °C	FPM °C	SBR °C
				20	40	60	20	20	20	20
Furfuryl Alcohol	C ₅ H ₆ O ₂	Technically pure	100%	+	+	/	4	2		4
Gelatine			100%	+	+	+	1	1	1	1
Glycerine	C ₃ H ₅ (OH) ₃	Aqueous solution	All	+	+	+	1	1	2	1
Glycocoll	NH ₂ CH ₂ COOH	Aqueous solution	10%	+	+					
Glycolic Acid	HOCH ₂ COOH	Aqueous solution	37%	+	+	+				
Gas containing:										
- Carbon Dioxide	CO ₂	Gas	All	+	+	+				
- Carbon Monoxid	CO	Gas	All	+	+	+				
- Hydrochloric Acid	HCL	Gas	All	+	+	+				
- Hydrochloric Acid	HCL	Gas	All	+	+	+				
- Hydrofluoric Acid	HF	Gas	< 0,1%	+	+	+				
- Nitrous Vapours	NO, NO ₂ , N ₂ O ₃ , NOx	Gas	< 0,1%	+	+	+				
- Nitrous Vapours	NO, NO ₂ , N ₂ O ₃ , NOx	Gas	5%	+	+	+				
- Oleum	H ₂ SO ₄ + SO ₃	Gas	< 0,1%	-	-	-				
- Oleum	H ₂ SO ₄ + SO ₃	Gas	5%	-	-	-				
- Sulphur Dioxide Liquid	SO ₂	Gas	All	+	+	+				
- Sulphur Trioxide	SO ₃	Gas	< 0,1%	-	-	-				
- Sulphuric Acid	H ₂ SO ₄	Gas	All	+	+	+				
Heptane	C ₇ H ₁₆	Technically pure	100%	+	/	-	1	4	1	4
Hexane	C ₆ H ₁₄	Technically pure	100%	+	/	/	1	4	1	4
Hydrazine Hydrate	NH ₂ -NH ₂ ·H ₂ O	Aqueous solution	Solution	+	+	+		2	1	1
Hydrobromic Acid	HBr		10%	+	+	+	3	2	1	3
Hydrobromic Acid	HBr		48%	+	+	+	4	1	1	4
Hydrochloric Acid	HCl	Aqueous solution	10%	+	+	+				
Hydrochloric Acid	HCl	Aqueous solution	30%	+	+	+	2/3	1	2	2/3
Hydrochloric Acid	HCl	Aqueous solution	5%	+	+	+				
Hydrochloric Acid	HCl	Aqueous solution	Saturated	+	+	+				
Hydrocyanic Acid	HCN	Aqueous solution	Solution	+	+	+	2	2	1	2
Hydrocyanic Acid	HCN	Technically pure		+	+	+	2	2	1	2
Hydrofluoric Acid	HF	Aqueous solution	10%	+	+	/	4	3	2/3	3
Hydrofluoric Acid	HF	Aqueous solution	40%	+	/	/	4	3	2/3	3
Hydrofluoric Acid	HF	Aqueous solution	70%	+	/	/	4	3	2/3	3
Hydrogen Gas	H ₂		100%	+	+	+	2	1	1	4
Hydrogen Peroxide	H ₂ O ₂	Aqueous solution	10%	+	+	+	2	1	1	2
Hydrogen Peroxide	H ₂ O ₂	Aqueous solution	50%	+	+	/	2	1	1	2
Hydrogen Peroxide	H ₂ O ₂	Aqueous solution	90%	+	-	-	2	1	1	2
Hydrogen Sulfide	H ₂ S	Aqueous solution	Saturated	+	+	+				
Hydrogen Sulfide	H ₂ S		100%	+	+	/				
Hydroquinone	C ₆ H ₄ O ₂	Aqueous solution	Saturated	+	+	+	3	4	2	4
Hydroxylamine Sulphate	(NH ₂ OH) ₂ ·H ₂ SO ₄	Aqueous solution	All	+	+	+				
Iodine Dry And Wet	I ₂		3%	/	-		1	2	1	1
Iso-Octane	C ₈ H ₁₈		100%	/	/	-	1	4	1	4
Isopropyl Alcohol	(CH ₃) ₂ CHOH	Technically pure	100%	+	+	+	2	1	1	2
Isopropyl Ether	(CH ₃) ₂ CHOCH(CH ₃) ₂	Technically pure	100%	/	-	-	2/3	3	4	4
Lactic Acid	CH ₃ CHOHCOOH	Aqueous solution	<=28%	+	+	+	2	1	1	3
Lanoline			Comm. Comp.	+	+	+	1	4	1	4
Lard Oil			Comm. Comp.	+						
Lead Acetate	Pb(CH ₃ COO) ₂	Aqueous solution	Saturated	+	+	+	1	1	4	4
Lead Chloride	PbCl ₂	Aqueous solution	Saturated	+	+					
Lead Nitrate	Pb(NO ₃) ₂	Aqueous solution	Saturated	+			1	1	1	1
Lead Sulfate	PbSO ₄	Aqueous solution	Saturated	+	+	+				
Linseed Oil			Comm. Comp.	/			1	3	1	4
Lubricating Oils			Comm. Comp.	-			2	4	1	4
Lubricating Oils, Free Of Aromatic			Comm. Comp.	+	+	/	1	4	1	4
Magnesium Carbonate	MgCO ₃	Aqueous solution	All	+	+	+	1	1	1	1
Magnesium Chloride	MgCl ₂	Aqueous solution	Saturated	+	+	+	2	1	1	1
Magnesium Nitrate	Mg(NO ₃) ₂	Aqueous solution	Indetermined	+	+	+				
Magnesium Sulfate	MgSO ₄		Saturated	+	+	+	2	1	1	1
Maize Oil			Comm. Comp.	+	+	/	1	1	1	4
Maleic Acid	HOOC-CH=CH-COOH	Aqueous solution	Saturated	+	+	+	1	1	1	1
Malic Acid	HOOCCH ₂ CHOHCOOH	Aqueous solution	Saturated	+			1	4	1	2

Appendix A

Component		Concentration	Pipe and fittings			Elastomeric seals				
Name	Formula		Remark	HDPE			NBR	EPDM	FPM	SBR
				°C	°C	°C	°C	°C	°C	°C
			20	40	60	20	20	20	20	
Sodium Bisulfite	NaHSO ₃	Aqueous solution	100%	+	+	+	1	1	1	2
Sodium Bromate	NaBrO ₃	Aqueous solution	All	+	/					
Sodium Bromide	NaBr	Aqueous solution	Saturated	+	+	+				
Sodium Carbonate (Soda)	Na ₂ CO ₃	Aqueous solution	Saturated	+	+	+	2	1	1	1
Sodium Chlorate	NaClO ₃	Aqueous solution	All	+	+	+	2/3	2	1	4
Sodium Chloride	NaCl	Aqueous solution	Solution	+	+	+	1	1	1	1
Sodium Chloride	NaCl	Aqueous solution	Saturated	+	+	+	1	1	1	1
Sodium Chromate	Na ₂ CrO ₄	Aqueous solution	Solution	+						
Sodium Cyanide	NaCN	Aqueous solution	All	+	+	+	2	1	1	1
Sodium Disulphite	Na ₂ S ₂ O ₅	Aqueous solution	All	+			1	1	1	2
Sodium Ferrocyanide	Na ₄ FeCN ₆	Aqueous solution	Saturated	+	+					
Sodium Fluoride	NaF	Aqueous solution	Saturated	+						
Sodium Hydroxide	NaOH	Aqueous solution	10%	+	+	+	3	1	2	2
Sodium Hydroxide	NaOH	Aqueous solution	30%	+	+	+	4	1	3	2
Sodium Hydroxide	NaOH	Aqueous solution	50%	+	+	+	1	1	3	2
Sodium Hypochlorite	NaClO	Aqueous solution	12,50%	/	-		4	1	1	4
Sodium Hypochlorite	NaClO	Aqueous solution	3%	+	/	/	4	1	1	4
Sodium Iodide NaI	Aqueous solution		All	+						
Sodium Metasilicate	Na ₂ SiO ₃	Aqueous solution	<5%	+	+	+				
Sodium Metasilicate	Na ₂ SiO ₃	Aqueous solution	Saturated	+	+	+	1	1	1	1
Sodium Nitrate	NaNO ₃	Aqueous solution	Saturated	+	+	+	1	1	1	1
Sodium Nitrite	NaNO ₂	Aqueous solution	Saturated	+						
Sodium Oxalate	Na ₂ C ₂ O ₄	Aqueous solution	Saturated	+						
Sodium Perborate	NaBO ₃	Aqueous solution	All	+			2	1	1	2
Sodium Perchlorate	NaClO ₄	Aqueous solution	Indetermined	+						
Sodium Peroxide	Na ₂ O ₂		Solution	+			2	1	1	2
Sodium Persulphate	Na ₂ S ₂ O ₈	Aqueous solution	Saturated	+	+	+				
Sodium Phosphate	Na ₃ PO ₄	Aqueous solution	Saturated	+	+	+	1	1	1	1
Sodium Phosphate Monoacid	Na ₂ HPO ₄	Aqueous solution	Saturated	+	+	1	1	1		
Sodium Sulfate	Na ₂ SO ₄	Aqueous solution	Saturated	+	+	+	1	1	1	1
Sodium Sulfide	Na ₂ S	Aqueous solution	Solution	+	+	+	2	1	1	3
Sodium Sulfide	Na ₂ S	Aqueous solution	Saturated	+	+	+	2	1	1	3
Sodium Sulfite	Na ₂ SO ₃	Aqueous solution	Saturated	+	+	+				
Sodium Thiocyanate	NaSCN	Aqueous solution	Indetermined	+	+	+				
Sodium Thiosulphate	Na ₂ S ₂ O ₃	Aqueous solution	Saturated	+	+	+	3	1	1	2
Stannic Chloride	SnCl ₄	Aqueous solution	Saturated	+	+	+	1	1	1	2
Stannous Chloride	SnCl ₂	Aqueous solution	Saturated	+	+	+	1	1	1	1
Stearic Acid	C ₁₇ H ₃₅ COOH	Technically pure	100%	+	/		1	1	1	1
Styrene	C ₆ H ₅ CH=CH ₂		100%	/	-	-	4	4	1	4
Sugar Syrup			Saturated	+	+	+	1	1	1	1
Sulfamic Acid	HSO ₃ NH ₂	Aqueous solution	20%	-						
Sulphur	S		100%	+	+	+				
Sulphur Dioxide Liquid	SO ₂	Aqueous solution	Saturated	+	+	+	+			
Sulphur Dioxide Liquid	SO ₂	Technically pure	100%	-						
Sulphur Dioxide Liquid	SO ₂	Technically pure	100%	+	+	+	+			
Sulphur Trioxide	SO ₃		100%	-						
Sulphuric Acid	H ₂ SO ₄	Aqueous solution	10%	+	+	+	2	1	2	2
Sulphuric Acid	H ₂ SO ₄	Aqueous solution	50%	+	+	+	4	1	2	4
Sulphuric Acid	H ₂ SO ₄	Aqueous solution	80%	+	+	/	4	2	2	4
Sulphuric Acid	H ₂ SO ₄	Aqueous solution	90%	/	/	-				
Sulphuric Acid	H ₂ SO ₄	Aqueous solution	96%	-	-	-	4	4	2	4
Sulphuric Acid	H ₂ SO ₄	Aqueous solution	98%	-	-	-				
Sulphuric Acid	H ₂ SO ₄	Technically pure	100%	-	-	-				
Sulphurous Acid	H ₂ SO ₃	Aqueous solution	Saturated	+	+	+	2	2	1	2
Tallow Emulsion			Comm. Comp.	+	/	/	2	2	1	4
Tannic Acid	C ₇₆ H ₅₂ O ₄₆	Aqueous solution	All	+	+	+	2	2	2	2
Tartaric Acid	COOH(CHOH) ₂ COOH	Aqueous solution	All	+	+	+				
Tetrachloroethane	CHCl ₂ CHCl ₂	100%	/	-			4	4	1	4
Tetrachloroethylene	Cl ₂ C=CCl ₂	100%	/	-			4	4	2	4
Tetraethyl Lead	Pb(C ₂ H ₅) ₄	Technically pure	100%	+			2	4	1	4

Appendix A

Component		Concentration	Pipe and fittings			Elastomeric seals				
Name	Formula		Remark	HDPE °C			NBR °C	EPDM °C	FPM °C	SBR °C
			20	40	60	20	20	20	20	
Tetrahydrofurane	(CH ₂) ₄ O	100%	/	-		4	4	4	4	
Tetrahydronaphthalene	C ₁₀ H ₁₂	100%	/							
Thionyl Chloride	SOCl ₂	Technically pure	100%	-		2/3	1	1	2/3	
Thiophene	C ₄ H ₄ S	100%	/	/		4	4	4	4	
Toluene	C ₆ H ₅ CH ₃	Technically pure	100%	/	-	-	4	4	2	4
Toluic Acid	CH ₃ C ₆ H ₄ COOH	50%	/							
Transformer Oil		Comm. Comp.	+	/	/		4	2	4	
Tributylphosphate	(C ₄ H ₉) ₃ PO ₄	Technically pure	100%	+	+	+	4	2	3	4
Trichlorethylene	CICH=CCl ₂	Technically pure	100%	-	-	-	4	4	2	4
Trichloroacetic Acid	CCl ₃ COOH	Aqueous solution	50%	+	/	/	2	2	4	4
Trichloroacetic Acid	CCl ₃ COOH	Technically pure	100%	+	/	-	2	2	4	4
Trichloroethane	CH ₃ CCl ₃	Technically pure	100%	/			4	4	1	4
Tricresylphosphate	(CH ₃ C ₆ H ₄ O) ₃ PO ₄	Technically pure	100%	+	+	+	4	2	2	4
Triethanolamine	N(CH ₂ CH ₂ OH) ₃	Technically pure	100%	+	+	/	3	1	4	2
Triocetylphosphate	(C ₈ H ₁₇) ₃ PO ₄	Technically pure	100%	/			4	1	2	4
Turpentine Oil		Technically pure	100%	/	-	-	2	4	1	4
Urea	NH ₂ CONH ₂	Aqueous solution	<=10%	+	+	+	1	1	1	1
Urea	NH ₂ CONH ₂	Aqueous solution	33%	+	+	+	1	1	1	1
Urine Indetermined				+	+	+				
Vaseline Oil		Comm. Comp.	+	+	/		1	1	4	
Vegetable Oils and fats		Comm. Comp.	+	/			1	4	1	3
Water	H ₂ O	100%	+	+	+	1	1	1	1	
Water	H ₂ O	100%	+	+	+	1	1	1	1	
Water	H ₂ O	100%	+	+	+	1	1	1	1	
Water	H ₂ O	100%	+	+	+	2	1	2	2	
Water	H ₂ O	100%	+	+	+	2	1	2	2	
Water, Rain	H ₂ O	100%	+	+	+	1	1	1	1	
Water, Salt	H ₂ O+NaCl	Saturated	+	+	+	1	1	1	1	
Water, Sea		100%	+	+	+	1	1	1	1	
Wine		Comm. Comp.	+	+	+	1	1	1	1	
Wine Vinegar		Technically pure	Comm. Comp.	+	+	+				
Xylene	C ₆ H ₄ (CH ₃) ₂	100%	-	4	4	2	4			
Zinc Acetate	Zn(CH ₃ COO) ₂	Indetermined	+	+	+	2	1	4	4	
Zinc Chloride	ZnCl ₂	Aqueous solution	Solution	+	+	+	2	1	1	2
Zinc Chloride	ZnCl ₂	Aqueous solution	Saturated	+	+	+	2	1	1	2
Zinc Chromate	ZnCrO ₄	Aqueous solution	Indetermined	+	+	+				
Zinc Cyanide	Zn(CN) ₂	Aqueous solution	All	+	+	+				
Zinc Nitrate	Zn(NO ₃) ₂	Aqueous solution	Indetermined	+	+	+				
Zinc Sulfate	ZnSO ₄	Aqueous solution	Solution	+	+	+	1	1	1	1
Zinc Sulfate	ZnSO ₄	Aqueous solution	Saturated	+	+	+	1	1	1	1

The data is based on the latest knowledge. When in doubt please contact our Technical Support department.

