

Polyethylene (PE) [®] **Hostalen**
Polypropylene (PP) [®] **Hostalen PP**

Polymer materials
[®] *Hoechst High Chem*

Resistance
to chemicals
and other media

Resistance to chemicals and other media

®Hostalen and ®Hostalen PP, the polyolefins produced by Hoechst AG, have exceptionally high resistance to chemicals and other media because of their non-polar structure. They are resistant to aqueous solutions of salts, to non-oxidizing acids¹⁾ and alkalis.

Up to 60 °C, Hostalen and Hostalen PP are resistant to many solvents but are swollen by aromatic and halogenated hydrocarbons and certain oils, fats and waxes. Up to ≈ 30 °C, this swelling is only slight.

Hostalen and Hostalen PP have limited or no resistance to strong oxidizing agents such as nitric acid, ozone, fuming sulphuric acid, hydrogen peroxide or halogen. Further details are available on request.

Internal stresses introduced during manufacture, external stresses due to applied load and high temperatures may greatly reduce chemical resistance in a given environment. The interaction of mechanical stress and detergent solutions or other wetting agents can lead to stress cracking, particularly with Hostalen.

Hostalen PP grades whose codes start with 21, 22, 41, 42, 52 or 54 have remarkably good long-term resistance to solutions of the normal, commercially available detergents at temperatures up to 100 °C under mechanical load.

The heat ageing resistance of Hostalen PP is affected by copper, manganese and cobalt, particularly if the polymer melt comes in contact with these metals. Inserts should therefore be made of light metal or be chromium- or nickel-plated. In trials lasting more than ten years with pipes made from Hostalen PPH 2250 and Hostalen PPH 2222, no adverse effect with brass screw fittings has been detected at temperatures below 100 °C.

Where Hostalen and Hostalen PP are to be used for packaging substances containing solvents or with a strong odour (e. g. perfume), the possibility of migration (permeation) of the solvent or perfuming substance with consequent weight loss of the contents after prolonged storage must be taken into account.

Design testing

The results of numerous chemical resistance trials are shown in the following table which gives information on changes observed due to the effect of the substances tested. This does not however obviate the need to check the chemical resistance²⁾ of the particular finished article under the specific service conditions as part of overall design testing, e. g. of drums for the transport of dangerous substances. The data quoted are not necessarily valid for all applications. The polymer testing department of Hoechst AG is an officially approved centre for the design testing of containers for the transport of dangerous goods.

Table

Plastic test specimens were immersed for 60 days in the test substance without mechanical stress and then tested for swelling, weight loss and tensile properties.

Test specimen: 50 mm × 25 mm × 1 mm and test specimen 3 according to DIN 53 455, with dimensions in the ratio 1 : 4, both taken from compression moulded sheet.

Explanation of symbols

+ = resistant	swelling < 3 % or weight loss < 0.5 %, elongation at break not substantially altered
/ = limited resistance	swelling 3–8 % or weight loss 0.5–5 % and/or elongation at break reduced by < 50 %
– = not resistant	swelling > 8 % or weight loss > 5 % and/or elongation at break reduced by > 50 %

D = discoloration possible

* or boiling point

** does not apply to welded joints (including joints produced by thermal bending); information available from us or the semi-finished product manufacturer

¹⁾ Strong acids can cause shade changes, particularly in coloured material

²⁾ in accordance with RM 001 (sea transport)
GGVE/RID, Appendix V (railway transport)
GGVS/ADR, Appendix A 5 (road transport)

® = registered trademark

Table: Resistance to chemicals and other media

Substance	Concentration	Behaviour of Hostalen at		Behaviour of Hostalen PP at		
		20°C	60°C	20°C	60°C	100°C
Acetaldehyde	techn. grade	+	/	/		
Acetaldehyde, aqueous	any	+	/	+	+	
Acetaldehyde + acetic acid	90:10	+				
Acetamide		+	+	+	+	
Acetic acid	100%	+	/D	+	/D	-
Acetic acid, aqueous	70%	+	+	+	+	+
Acetic anhydride	techn. grade	+	/D	+	/D	-
Acetoacetic acid		+				
Acetone	techn. grade	+	+*	+	+*	
Acetophenone		+		+	/	
Acetylene		+				
Acids, aromatic		+	+	+	+	
*Acronal dispersions	as supplied commercially	+	/			
Acrylonitrile	techn. grade	+	+	+		
Adipic acid, aqueous	saturated	+	+	+	+	
Adipic ester		+	/			
Air	techn. grade	+	+	+	+	+
*Aktivin (chloramine, aqueous 1%)		+	+			
Allyl acetate		+	+to/			
Allyl alcohol (2-propenol-1)	96%	+	+	+	+	
Allyl chloride		/	-			
Aluminium chloride, aqueous	any	+	+	+	+	+
Aluminium chloride, solid		+	+	+	+	
Aluminium fluoride	conc.	+	+			
Aluminium hydroxide		+	+	+	+	
Aluminium metaphosphate		+	+	+	+	
Aluminium sulphate, aqueous	saturated	+	+	+	+	+
Aluminium sulphate, solid		+	+	+	+	
Alum, aqueous	any	+	+	+	+	
Amino acids		+	+	+	+	
2-aminoethanol (ethanolamine)	techn. grade			+		
Ammonia, gaseous		+	+	+	+	
Ammonia, liquid		+		+		
Ammonia water	any	+	+	+	+	
Ammonium acetate, aqueous	any	+	+	+	+	+
Ammonium carbonate, aqueous	any	+	+	+	+	+
Ammonium chloride, aqueous	any	+	+	+	+	+
Ammonium fluoride, aqueous	saturated	+	+	+	+	
Ammonium hydrogen carbonate, aqueous	saturated	+	+	+	+	
Ammonium hydrosulphide, aqueous	any	+	+	+	+	
Ammonium metaphosphate		+	+	+	+	
Ammonium nitrate, aqueous	any	+	+	+	+	+
Ammonium phosphate, aqueous	any	+	+	+	+	+
Ammonium sulphate, aqueous	any	+	+	+	+	+
Ammonium sulphide, aqueous	any	+	+	+	+	
Ammonium thiocyanate		+	+	+	+	
Amyl acetate	techn. grade	+	+	/	-	
Amyl alcohol (C ₅ alcohols)	techn. grade	+	+	+	+	+
Amyl chloride	100%	/	-			
Amyl phthalate		+	/			
Aniline	any	+	+	+	+	
Aniline hydrochloride, aqueous	any	+	+	+	+	
Animal oils		+	/	+	/	
Aniseed		/	/to-	/	/	
Aniseed oil		/	-			

Table: Resistance to chemicals and other media

Substance	Concentration	Behaviour of Hostalen at		Behaviour of Hostalen PP at		
		20°C	60°C	20°C	60°C	100°C
Anon (cyclohexanone)		+	/	+	/	
Anthraquinone sulphonic acid, aqueous (susp.)		+	+	+	+	
Antifreeze (automotive)	as supplied commercially	+	+	+	+	+
Antimony chloride, anhydrous		+	+	+	+	
Antimony pentachloride		+	+	+	+	
Antimony trichloride		+	+	+	+	
Aqua regia (HCl + HNO ₃)		-		-		
Aromatic oils		/	-	/	-	
Arsenic acid, aqueous	any	+	+	+	+	
Arsenic acid anhydride		+	+	+	+	
Ascorbic acid		+	+	+	+	
Asphalt		+	/D	+	/D	
Aspirin		+		+		
Barium hydroxide, aqueous	any	+	+	+	+	
Barium salts, aqueous	any	+	+	+	+	+
Battery acid		+	+	+	+	
Beater glue (animal glue)	as supplied commercially	+	+	+	+	
Beef tallow		+	+to/	+	+	
Beer		+	+	+	+	
Beer sugar colouring	as supplied commercially	+	+	+	+	
Beeswax		+	/to-	+	/to-	
Benzaldehyde, aqueous	any	+	+to/	+		
Benzaldehyde in isopropyl alcohol	1%	+	+			
Benzene	techn. grade	+	-	/	-	
Benzene sulphonic acid		+	+	+	+	
Benzoic acid, aqueous	any	+	+	+	+	+
Benzoyl chloride		/	/	/		
Benzyl alcohol		+	+	+	+	
Benzyl chloride		/	-	/		
Bichromate - sulphuric acid	conc.	-		-		
Bismuth salts		+	+	+		
Bisulphite liquor		+	+	+	+	
Bitumen		+	/D	+	/D	
Bleaching solution containing 12.5 % active chlorine**		/	-	/	/	-
Bone oil		+	+	+	+	
Borax (sodium tetraborate), aqueous	saturated	+	+	+	+	+
Boric acid, aqueous	any	+	+	+	+	+
Boron trifluoride		+	+to/			
Brake fluid		+	+	+	+	
Brandy		+	+	+	+	
Bromic acid	conc.	-		/		
Bromine, liquid	100%	-		-		
Bromine vapours		-		-		
Bromine water	cold saturated	+		/		
1,3-butadiene, gaseous	techn. grade	/	-	/	-	
Butanediol, aqueous	any	+	+	+	+	
Butanetriol, aqueous	any	+	+	+	+	
Butane, gaseous		+		+	+	
Butanol, aqueous	any	+	+	+	+	
Butanone		+	/to-	+	/	
2-Butenediol-1,4	techn. grade	+		+	+	
2-Butynediol-1,4	techn. grade	+		+		
Butoxyl (methoxybutylacetate)		+	/	+		
Butter		+		+	+	

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Substance	Concentration	Behaviour of Hostalen at		Behaviour of Hostalen PP at		
		20 °C	60 °C	20 °C	60 °C	100 °C
Butylene glycol	techn. grade	+	+	+		
Butylene (butene), liquid	techn. grade			/		
Butyl acetate	techn. grade	+	/	/	-	
Butyl acrylate		+	/	+		
Butyl alcohol		+	+	+		
Butyl benzyl phthalate		+	+			
Butyl phenol	techn. grade	+	+	+		
Butyl phenone	techn. grade	-		-		
Butyl phthalate (dibutyl phthalate)	techn. grade	+	/	+	/	
Butyric acid, aqueous	any	+	/	+		
Calcium carbide		+	+	+	+	
Calcium carbonate		+	+	+	+	+
Calcium chlorate, aqueous	saturated	+	+	+	+	
Calcium chloride, aqueous	saturated	+	+	+	+	+
Calcium hydroxide		+	+	+	+	
Calcium hypochlorite, aqueous (suspension)	any	+	+	+	+	
Calcium nitrate, aqueous	50 %	+	+	+	+	
Calcium oxide (powder)		+	+	+	+	
Calcium phosphate		+	+	+	+	
Calcium sulphate		+	+	+	+	
Calcium sulphide, aqueous	≤ 10 %	/	/			
Camphor		+	/	+		
Camphor oil		-		-		
Cane sugar, aqueous	any	+	+	+	+	
Carbazole		+	+	+	+	
Carbolic acid (phenol)		+	+D	+	+D	
Carbolineum	as supplied commercially	+		+		
Carbolineum, aqueous (for fruit trees)		+D	/D	+D	/D	
Carbonic acid, aqueous	any	+	+	+	+	
Carbonic acid, dry	100 %	+	+	+	+	
Carbon dioxide	100 %	+	+	+	+	
Carbon disulphide		/		/		
Carbon monoxide, gaseous	techn. grade	+	+			
Castor oil		+	+	+	+	
Caustic soda solution	any	+	+	+	+	+
Cetyl alcohol (hexadecanol)		+	+	+		
Chloral hydrate, aqueous	any	+	+D	/	-	
Chloral (trichloroacetaldehyde)	techn. grade	+	+	+	+	
Chloramine, aqueous	saturated	+		+		
Chloric acid, aqueous	1 %	+	+	+	/	-
Chloric acid, aqueous	10 %	+	+	+	/	-
Chloric acid, aqueous	20 %			+	-	
Chlorinated lime		+	+	+	+	
Chlorine, aqueous solution (chlorine water)	saturated	+	/	/	-	
Chlorine, gaseous, dry		/	-	-		
Chlorine, gaseous, moist		/	-	-		
Chlorine, liquid		-		-		
Chlorine bleaching solution with 12.5 % active chlorine ^{20%}		/	-	/	/	-
Chloroacetic acid, aqueous	≤ 85 %	+	+	+	+	
Chloroacetic acid (mono), aqueous	any	+	+	+	+	
Chlorobenzene		/	-	/	-	
Chloroformic acid ester		+	/			
Chloroform	techn. grade	/to-	-	/	-	
Chloropicrin		+to/	-			

Table: Resistance to chemicals and other media

Substance	Concentration	Behaviour of Hostalen at		Behaviour of Hostalen PP at		
		20°C	60°C	20°C	60°C	100°C
Chlorosulphonic acid	techn. grade	-		-		
Chrome alum (potassium chromic sulphate), aqueous	saturated	+	+	+	+	
Chrome anode slime		+	+	+		
Chrome salts, aqueous	any	+	+	+	+	
Chromic acid, aqueous**	50%	/	-D	/D	/D	
Chromium trioxide, aqueous**	50%	/	-D	/D	/D	
Chromosulphuric acid		-		-		
Cider		+	+	+	+	
Citric acid, aqueous	saturated	+	+	+	+	+
Citrus fruit juices		+	+	+	+	
*Clophen A50 and A60		+	/to-	+	/	-
Coal tar oil		+D	/D	+D		
Coconut oil		+		+		
Coconut oil alcohol	techn. grade	+	/	+	/	
Cod liver oil		+	/	+		
Coffee extract		+	+	+	+	
Cognac		+		+		
Cola concentrates		+	+	+	+	
Common salt, aqueous	any	+	+	+	+	
Coolants and lubricants for metalworking "Hoechst"		/	/	/	/	
Copper chloride, aqueous	saturated	+	+	+		
Copper cyanide, aqueous	saturated	+		+	+	
Copper fluoride, aqueous	saturated	+	+	+		
Copper nitrate, aqueous	30%	+	+	+	+	
Copper salts, aqueous	cold saturated	+	+	+	+	
Copper sulphate, aqueous	any	+	+	+	+	
Corn oil		+	/	+	/	
Cottonseed oil	techn. grade	+	+	+	+	
Coumarone resins		+	+	+		
Creosote		+	+D	+	+D	
Cresol	100%	+	/D	+	/D	
Cresol, aqueous	dilute	+	+D	+	+D	
Crotonaldehyde	techn. grade	+	/	+		
Crude oil		+	/	/		
Cyclanone (fatty alcohol sulphonate)	as supplied commercially	+	+	+	+	
Cyclohexane		+	+	+		
Cyclohexanol		+	+	+	+	
Cyclohexanone (anon)		+	/	+	/	
Decahydronaphthalene (*Dekalin)	techn. grade	+	/	/	/	
Defoamers		+	+to/	+		
Detergents		+	+	+	+	
Detergents, synthetic	end use concentration	+	+	+	+	
Developer solutions (photographic)		+D	+D	+D	+D	
Dextrin (starch gum), aqueous	18%	+	+	+	+	
Dextrose		+	+	+	+	
Dextrose, aqueous	any	+	+	+	+	
1,2-Diaminoethane (ethylenediamine)	techn. grade	+	+	+	+	
1,2-Dibromoethane		/	-	/		
Dibutyl ether		+to/	-	/	-	
Dibutyl phthalate (butyl phthalate)	techn. grade	+	/	+	/	
Dibutyl sebacate		+	/	+		
Dichloroacetic acid	techn. grade	+	/D	+		
Dichloroacetic acid	50%	+	+	+		

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Substance	Concentration	Behaviour of Hostalen at		Behaviour of Hostalen PP at		
		20°C	60°C	20°C	60°C	100°C
Dichloroacetic acid methyl ester		+	+	+	+	
Dichlorobenzene		/	-	/		
Dichlorodiphenyltrichloroethane (DDT, powder)		+	+	+	+	
Dichloroethane		/	/	+		
1,1-Dichloroethylene (vinylidene chloride)	techn. grade	-		-		
Dichloropropane		/	-			
Dichloropropene		/	-			
Diesel fuel		+	/	+	/	
Diethanolamine	techn. grade	+		+		
Diethylene glycol		+	+	+	+	
2-Diethylhexylphthalate (DOP)		+	/	+	/	
Diethylketone		+	/			
Diethyl ether		+to/	/*	/		
Diglycolic acid, aqueous	30%	+	+	+	+	
Dihexyl phthalate	techn. grade			+	/	
Diisobutylketone	techn. grade	+	/to-	+	-	
Diisooctyl phthalate	techn. grade	+	/	+	/	
Diisopropyl ether		+to/	-			
Dimethylamine		+	/	+		
Dimethyl formamide	techn. grade	+	+to/	+	+	
Dimethyl sulphoxide		+	+			
Dinonyl phthalate (DNP)	techn. grade	+	/	+	/	
Diocetyl phthalate		+	/	+	/	
Dioxane		+	+	/	/	-
Diphenylamine		+	/			
Diphenyl oxide		+	/			
Disodium phosphate		+	+	+	+	
Disodium sulphate		+	+	+	+	
Dodecylbenzenesulphonic acid		+	/	+		
Drinking water, also chlorinated		+	+	+	+	+
Dyes		+D	+D			
Eau de Javelle (potassium hypochlorite bleaching solution)		+to/	-	+to/	/	
Eau de Labarraque (sodium hypochlorite bleaching solution)		+to/		+to/	/	
Electrolytic baths for electroplating		+to/	/			
Emulsifiers		+	+	+	+	
Emulsions (photographic)		+	+	+	+	
®Ephetin, aqueous	10%	+	+	+	+	+
Epichlorohydrin		+	+	+		
Esters, aliphatic	techn. grade	+	+to/			
Ethane		+	+			
Ethanolamine (2-aminoethanol)	techn. grade	+		+		
Ethanol	96%	+	+	+	+	+
Ethanol denatured with toluene	96% (v/v)	+		+		
Ethereal oils		/	-	/	-	
Ether		+to/	/*	/		
Ethylenediamine tetraacetic acid		+	+	+	+	
Ethylene		+	+			
Ethylene chlorohydrin (chloroethanol)	techn. grade	+	+	+	+	
Ethylene diamine (1,2-diaminoethane)	techn. grade	+	+	+	+	
Ethylene dibromide		/	-			
Ethylene dichloride (dichloroethane)		/	-	/		
Ethylene glycol		+	+	+	+	+
Ethylene glycol monobutyl ether (butyl glycol)	techn. grade	+		+		
Ethylene oxide, gaseous		+	+	+		

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Substance	Concentration	Behaviour of Hostalen at		Behaviour of Hostalen PP at		
		20 °C	60 °C	20 °C	60 °C	100 °C
Ethyl acetate	techn. grade	+	/	+	/	
Ethyl alcohol	96 %	+	+	+	+	+
Ethyl alcohol + acetic acid (fermentation mixture)	as used in production	+	+	+	+	
Ethyl benzene	techn. grade	/		/	-	
Ethyl chloride (chloroethane)	techn. grade	/*		/		
Ethyl ether (diethyl ether)	techn. grade	+to/	/*	/		
•Euron B		/	/			
•Euron G		+	+			
Fatty acids (>C ₆)		+	+to/	+	+	
Fatty acid amides		+	/	+		
Fatty alcohols		+	/	+		
Fertilizer salts, aqueous	any	+	+	+	+	
Fixing salt, aqueous	any	+	+	+	+	
Fixing salt, solid		+	+	+	+	
Fluorine, gaseous		-		-		
Fluoroboric acid, aqueous		+	/			
Fluorosilicic acid	any	+	+			
Fluorosilicic acid, aqueous	any	+	+			
Formaldehyde, aqueous	up to 40 %	+	+	+	+	
Formamide		+	+	+	+	
Formic acid, aqueous	10 %	+	+	+	+	
Formic acid, aqueous	85 %	+	+	+	/	
•Frigen 12 (•Freon 12)	100 %	/	-	/		
Fructose (fruit sugar), aqueous	any	+	+	+	+	+
Fruit juices	any	+	+	+	+	+
Fruit pulp		+	+	+	+	
Fuel oil		+	/	+	/	
Fuming sulphuric acid (H ₂ SO ₄ + SO ₃)	any	-		-		
Furfural		+	/			
Furfuryl alcohol		+	+D	+	/D	
Gas, manufactured	as supplied commercially	+		+		
Gas, natural	techn. grade	+		+		
Gelatin		+	+	+	+	
•Genantin		+	+	+	+	+
Gin		+		+		
Glacial acetic acid (100 % acetic acid)	techn. grade	+	/D	+	/D	-
Glauber's salt, aqueous	any	+	+	+	+	+
Glucose, aqueous	any	+	+	+	+	+
Glue		+	+	+		
Glycerin, aqueous	any	+	+	+	+	+
Glycerin chlorohydrin		+	+	+		
Glycine (aminoacetic acid)		+	+	+	+	
Glycolic acid, aqueous	up to 70 %	+	+	+		
Glycolic acid butyl ester		+	+			
Glycol, aqueous	as supplied commercially	+	+	+	+	+
•Glysantin		+	+	+	+	+
•Grisiron 8302		/	/			
•Grisiron 8702		+	+			
•Halothan		/	/to-			
Heptane		+	/	/	/	
Hexafluorosilicic acid, aqueous	40 %	+	+			
Hexane		+	/	+	/	

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Substance	Concentration	Behaviour of Hostalen at		Behaviour of Hostalen PP at		
		20 °C	60 °C	20 °C	60 °C	100 °C
Hexanetriol		+	+	+	+	+
Honey		+	+	+	+	
Hydraulic fluid		+	/			
Hydrazine hydrate		+	+	+		
Hydrobromic acid, aqueous	50 %	+	+	+	+	
Hydrochloric acid, aqueous	any	+	+	+D	+D	/D
Hydrocyanic acid		+	+	+	+	
Hydrofluoric acid, aqueous	40–85 %	+	/	+		
Hydrogen		+	+	+	+	
Hydrogen bromide, gaseous	techn. grade	+	+			
Hydrogen chloride gas, dry and moist		+	+	+	+D	
Hydrogen peroxide, aqueous	10 %	/	–	+	+	
Hydrogen peroxide, aqueous	30 %	/	–	+	/	
Hydrogen sulphide, aqueous	saturated	+	+	+	+	
Hydrogen sulphide, gaseous		+	+	+	+	
Hydroquinone		+D	+D	+D		
Hydrosulphite, aqueous	up to 10 %	+	+	+	+	
Hydroxylamine sulphate, aqueous	12 %	+	+	+	+	
Hypochlorous acid		+	/	+to/	/	
Ink		+	+	+	+	
Iodine in potassium iodide solution	3 % iodine	+	+	+	+	
Iodine tincture, DAB 6	as supplied commercially	+	/D	+		
Iron ammonium sulphate, aqueous	saturated	+	+	+	+	
Iron (II) chloride, aqueous	saturated	+	+	+	+	
Iron (III) chloride, aqueous	saturated	+	+	+	+	+
Iron (III) nitrate, aqueous	saturated	+	+	+	+	
Iron (II) sulphate, aqueous	saturated	+	+	+	+	
Iron (III) sulphate, aqueous	saturated	+	+	+	+	
Isoamyl alcohol	techn. grade	+	/			
Isobutyl alcohol (isobutanol)		+	+	+		
Isobutyric acid	techn. grade	+	/			
Isooctane		+	/	+	/	
Isopropanol	techn. grade	+	+	+	+	+
Isopropyl acetate	100 %	+	/			
Isopropyl ether	techn. grade	+to/	–	/	–	
Jam		+	+	+	+	+
Jet fuel		+	/	/	/	–
Kerosene		+	/	+	–	
Ketones		+to/	/to–	+to/		
Lactic acid, aqueous	any	+	+	+	+	+
Lactose (milk sugar)		+	+	+	+	
Lanolin (wool fat)		+	+	+	/	
Latex		+	+	+	+	
Lead acetate, aqueous	any	+	+	+	+	
Lead tetraethyl		+		+		
Lime		+	+	+	+	+
Lime water		+	+	+	+	
Linseed oil	techn. grade	+	+	+	+	+
Liqueur		+		+		
Liquid manure		+	+	+	+	
Liquid soaps		+	+	+	+	

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Substance	Concentration	Behaviour of Hostalen at		Behaviour of Hostalen PP at		
		20°C	60°C	20°C	60°C	100°C
Lithium bromide	techn. grade	+	+	+	+	
Lubricating oils		+	+to/	+		
*Lysol		+	/	+	/	
Machine oil		+	/	+	/	
Magnesium carbonate		+	+	+	+	
Magnesium chloride, aqueous	any	+	+	+	+	
Magnesium fluorosilicate		+	+			
Magnesium hydroxide		+	+	+	+	
Magnesium iodide		+	+	+	+	
Magnesium salts, aqueous	any	+	+	+	+	
Magnesium sulphate, aqueous	any	+	+	+	+	
Maleic acid, aqueous	up to 100%	+	+	+	+	
Manganese sulphate		+	+	+	+	
Margarine		+	+	+	+	
Mash	as supplied	+	+	+	+	
Mayonnaise		+		+		
Menthol		+	/	+		
Mercury		+	+	+	+	
Mercury chloride		+	+			
Mercury salts		+	+	+	+	
Metal soaps		+	+	+	+	
Methacrylic acid		+	+	+	+	
Methanol	techn. grade	+	+	+	+	
Methoxybutanol		+	/	+		
Methoxybutyl acetate (*Butoxyl)		+	/	+		
Methylamine, aqueous	32%	+		+		
2-Methylbutanol-2	techn. grade	+	/			
Methylene chloride** (dichloromethane)		/	/*	/	→	
Methylisobutyl ketone		+	/to-	+		
Methyl acetate (acetic acid methyl ester)	techn. grade	+		+	+	
Methyl acrylate		+	+			
Methyl alcohol		+	+	+	+	
Methyl benzene		/	-	/	-	
Methyl benzoic acids (toluyl acids)	saturated	/				
Methyl bromide, gaseous	techn. grade	-		-		
Methyl bromide (bromomethane), gaseous	techn. grade	-		-		
Methyl chloride (chloromethane), gaseous	techn. grade	/		-		
Methyl cyclohexane		/	/to-	/		
Methyl ethyl ketone	techn. grade	+	/	+	/	
Methyl glycol		+	+	+	+	
Methyl methacrylate		+	+			
4-Methyl pentanol-2		+	+to/D	+		
Methyl propyl ketone		+	/	+		
N-Methyl pyrrolidone		+	+			
Methyl salicylate (salicylic acid methyl ester)		+	/	+		
Methyl sulphuric acid	50%	+	+	+	+	
Milk		+	+	+	+	+
Mineral oil	without additives	+	+to/	+	/	-
Mineral water		+	+	+	+	+
Molasses		+	+	+	+	
Molasses wort		+	+	+	+	
Monochloroacetic acid		+	+	+	+	
Monochloroacetic acid ethyl ester		+	+	+	+	
Monochloroacetic acid methyl ester		+	+	+	+	

Table: Resistance to chemicals and other media

Substance	Concentration	Behaviour of Hostalen at		Behaviour of Hostalen PP at		
		20 °C	60 °C	20 °C	60 °C	100 °C
Monochlorobenzene		/	-	+		
Mordants, metallic		+				
Morpholine		+	+	+	+	
Motor oil (heavy duty oil)		+	+to/	+	/	
[®] Mowilith emulsions		+	+	+		
Mustard		+	+	+		
Must		+	+	+	+	
Nail polish remover		+	/	+	/	
Naphthalene		+	/	+		
Naphtha	techn. grade	+	/	/	-	
Naphtha		+	/	+	/	
Naphtha/benzene mixture	80/20	+	/	/	-	
Nickel chloride		+	+	+	+	
Nickel nitrate		+	+	+	+	
Nickel salts, aqueous		+	+	+	+	
Nickel sulphate, aqueous	any	+	+	+	+	
Nicotine		+	+			
Nicotinic acid	≤10 %	+		+		
Nitric acid ^{10*}	25 %	+	+	+	-	
Nitric acid ^{20*}	50 %	/	-	/	-	
2,2',2''-Nitrilotriethanol (triethanolamine), aqueous	any	+	/	+		
Nitrobenzene		+	/	+	+	
Nitrocellulose		+		+		
o-Nitrotoluene		+	/	+	/	
Nonyl alcohol (nonanol)		+	+	+		
Nut oil		+		+		
Octyl cresol	techn. grade	/	-	/	-	
Oils, ethereal		/	-	/	-	
Oils, vegetable and animal		+	+to/	+	+to/	-
Oleic acid		+	/	+	/	-
Olive oil		+	+	+	+to/	-
Optical brighteners		+	+	+	+	
Orange juice		+	+	+	+	
Oxalic acid, aqueous	any	+	+	+	+	+
Oxygen		+	+	+	+	
Ozone	50 pphm	/	-	+	/	
Palmitic acid		+	+	+	+	
Palmityl alcohol		+	+	+	+	
Palm nut oil		+		+		
Paraffin, liquid		+	+	+	/	-
Paraffin emulsions	as supplied commercially	+	/	+	+	
Paraformaldehyde		+	+	+		
Peanut oil	techn. grade	+		+	+	
Pentanol		+		+		
Peppermint oil		+		+		
Perchloric acid, aqueous	20 %	+	+	+	+	
Perchloric acid, aqueous	50 %	+	/			
Perchloric acid, aqueous	70 %	+	-			
Perchloroethylene		/	-	/	-	
Petroleum ether		+	/	+	/	
Petrol, regular-grade (DIN 51635)		+	/	/	-	
Phenolic resin moulding compounds		+	+	+	+	

Table: Resistance to chemicals and other media

Substance	Concentration	Behaviour of Hostalen at		Behaviour of Hostalen PP at		
		20 °C	60 °C	20 °C	60 °C	100 °C
Phenol		+	+D	+	+D	
Phenol (carbolic acid)		+	+D	+	+D	
Phenyl ethyl alcohol		+	+	+		
Phenyl hydrazine	techn. grade	/	/to-	/		
Phenyl hydrazine hydrochloride		+	-	+		
Phenyl sulphionate (sodium dodecyl benzene sulphonate)		+	+	+	+	
Phosgene, gaseous		/		/	/	
Phosgene, liquid	100 %	-		-		
Phosphates, aqueous	any	+	+	+	+	
Phosphoric acid, aqueous	50 %	+	+D	+	+D	+D
Phosphoric acid, aqueous	80 % ... 95 %	+	/D	+	+D	+D
Phosphorus oxychloride		+	/	+	/	
Phosphorus pentoxide	100 %	+	+	+		
Phosphorus trichloride		+	/	+		
Photographic developers		+D	+D	+D	+D	
Photographic emulsions	as supplied commercially	+		+	+	
Photographic fixing baths	as supplied commercially	+		+	+	
Phthalic acid, aqueous	50 %	+	+	+	+	
Phthalic acid dibutyl ester (dibutyl phthalate)	techn. grade	+	/	+	/	
Phthalic acid ester		+	+to/	+	/	
Picric acid, aqueous	1 %	+		+		
Pineapple juice		+	+	+	+	
Pine needle oil		+		+	+	
Plant protection agents, aqueous	as supplied commercially	+	+	+		
Plasticizers		+	/	+	/	
Polyacrylic acid emulsions		+	+			
Polyester plasticizers		+	+to/	+		
Polyester resins		/		/		
Polyglycols		+	+	+	+	
*Polysolvan O (glycolic acid butyl ester)		+	+			
Potassium aluminium sulphate, aqueous	any	+	+	+	+	+
Potassium borate, aqueous	1 %	+	+	+	+	
Potassium bromate, aqueous	up to 10 %	+	+	+	+	+
Potassium bromide, aqueous	any	+	+	+	+	+
Potassium carbonate, aqueous	any	+	+	+	+	
Potassium chlorate, aqueous	any	+	+	+	+	+
Potassium chloride, aqueous	any	+	+	+	+	+
Potassium chromate, aqueous	40 %	+	+	+	+	+
Potassium chrome (III) sulphate (chrome alum), aqueous		+	+	+	+	
Potassium cyanide, aqueous	any	+	+	+	+	
Potassium dichromate, aqueous	saturated	+	+	+	+	
Potassium iron (II) cyanide and iron (III) cyanide	any	+	+	+	+	
Potassium fluoride, aqueous	any	+	+	+	+	
Potassium hexacyanoferrate, aqueous	any	+	+	+	+	
Potassium hydrogen carbonate, aqueous	saturated	+	+	+	+	
Potassium hydrogen sulphate, aqueous	saturated	+	+	+	+	+
Potassium hydrogen sulphite, aqueous	saturated	+	+			
Potassium hydroxide		+	+	+	+	
Potassium hydroxide, aqueous	any	+	+	+	+	
Potassium hydroxide solution	50 %	+	+	+	+	+
Potassium hypochlorite, aqueous	saturated	/	-			
Potassium iodide, aqueous	any	+	+	+	+	
Potassium nitrate, aqueous	any	+	+	+	+	
Potassium perborate		+	+			

Table: Resistance to chemicals and other media

Substance	Concentration	Behaviour of Hostalen at		Behaviour of Hostalen PP at		
		20°C	60°C	20°C	60°C	100°C
Potassium perchlorate, aqueous	up to 10%	+	/			
Potassium perchlorate, aqueous	1%	+		+	+	
Potassium permanganate		+	+	+		
Potassium permanganate, aqueous	up to 6%	+	+D	+	+D	
Potassium persulphate, aqueous	any	+	+	+	+	
Potassium phosphate, aqueous	saturated	+	+			
Potassium sulphate, aqueous	any	+	+	+	+	
Potassium sulphide, aqueous	saturated	+	+	+	+	
Potassium sulphite, aqueous	saturated	+	+	+	+	
Potassium tetracyanocuprate, aqueous	saturated	+	+			
Potassium thiosulphate, aqueous	saturated	+	+	+	+	
Propane, gaseous	techn. grade	+		+		
i-Propanol (i-propyl alcohol)		+	+	+	+	
n-Propanol (n-propyl alcohol)		+	+	+	+	
Propargyl alcohol, aqueous	7%	+	+	+	+	
Propionic acid, aqueous	any	+	+	+	+	
Propylene dichloride	100%	-		-		
Propylene glycol		+	+	+	+	
Propylene oxide		+	+			
Pseudocumene		/	/			
Pyridine		+	/	/	/	
Quinine		+	+	+	+	
Release agents		+	+	+	+	
Roasting gases, dry	any	+	+	+	+	
Rubber dispersions (latex)		+	+	+	+	
*Sagrotan		+	/	+	/	
Salicylic acid		+	+	+	+	
Salt brines	saturated	+	+	+	+	
Saturated steam condensate		+	+	+	+	
Sauerkraut (pickled cabbage)		+	+	+	+	+
Sea water		+	+	+	+	+
Silicic acid, aqueous	any	+	+	+	+	
Silicone emulsion	as supplied commercially	+	+	+	+	
Silicone oil	technical grade	+	+	+	+	+
Silver nitrate		+	+	+	+	
Silver nitrate, aqueous	any	+	+	+	+	+
Silver salts, aqueous	cold saturated	+	+	+	+	
Soap solution, aqueous	any	+	+	+	+	
Soda (sodium carbonate), aqueous	any	+	+	+	+	+
Sodium acetate, aqueous	any	+	+	+	+	+
Sodium aluminium sulphate		+	+	+	+	
Sodium benzoate, aqueous	any	+	+	+	+	
Sodium borate		+	+	+	+	
Sodium bromide		+	+	+	+	
Sodium carbonate, aqueous	any	+	+	+	+	+
Sodium chlorate, aqueous	saturated	+	+	+	+	
Sodium chloride, aqueous	any	+	+	+	+	+
Sodium chlorite, aqueous	50%	+		+	/	
Sodium chromate		+	+	+	+	
Sodium cyanide		+	+	+	+	
Sodium dichromate		+	+	+	+	
Sodium dodecylbenzenesulphonate		+	+	+	+	

Table: Resistance to chemicals and other media

Substance	Concentration	Behaviour of Hostalen at		Behaviour of Hostalen PP at		
		20°C	60°C	20°C	60°C	100°C
Potassium perchlorate, aqueous	up to 10%	+	/			
Potassium perchlorate, aqueous	1%	+		+	+	
Potassium permanganate		+	+	+		
Potassium permanganate, aqueous	up to 6%	+	+D	+	+D	
Potassium persulphate, aqueous	any	+	+	+	+	
Potassium phosphate, aqueous	saturated	+	+			
Potassium sulphate, aqueous	any	+	+	+	+	
Potassium sulphide, aqueous	saturated	+	+	+	+	
Potassium sulphite, aqueous	saturated	+	+	+	+	
Potassium tetracyanocuprate, aqueous	saturated	+	+			
Potassium thiosulphate, aqueous	saturated	+	+	+	+	
Propane, gaseous	techn. grade	+		+		
i-Propanol (i-propyl alcohol)		+	+	+	+	
n-Propanol (n-propyl alcohol)		+	+	+	+	
Propargyl alcohol, aqueous	7%	+	+	+	+	
Propionic acid, aqueous	any	+	+	+	+	
Propylene dichloride	100%	-		-		
Propylene glycol		+	+	+	+	
Propylene oxide		+	+			
Pseudocumene		/	/			
Pyridine		+	/	/	/	
Quinine		+	+	+	+	
Release agents		+	+	+	+	
Roasting gases, dry	any	+	+	+	+	
Rubber dispersions (latex)		+	+	+	+	
*Sagrotan		+	/	+	/	
Salicylic acid		+	+	+	+	
Salt brines	saturated	+	+	+	+	
Saturated steam condensate		+	+	+	+	
Sauerkraut (pickled cabbage)		+	+	+	+	+
Sea water		+	+	+	+	+
Silicic acid, aqueous	any	+	+	+	+	
Silicone emulsion	as supplied commercially	+	+	+	+	
Silicone oil	technical grade	+	+	+	+	+
Silver nitrate		+	+	+	+	
Silver nitrate, aqueous	any	+	+	+	+	+
Silver salts, aqueous	cold saturated	+	+	+	+	
Soap solution, aqueous	any	+	+	+	+	
Soda (sodium carbonate), aqueous	any	+	+	+	+	+
Sodium acetate, aqueous	any	+	+	+	+	+
Sodium aluminium sulphate		+	+	+	+	
Sodium benzoate, aqueous	any	+	+	+	+	
Sodium borate		+	+	+	+	
Sodium bromide		+	+	+	+	
Sodium carbonate, aqueous	any	+	+	+	+	+
Sodium chlorate, aqueous	saturated	+	+	+	+	
Sodium chloride, aqueous	any	+	+	+	+	+
Sodium chlorite, aqueous	50%	+		+	/	
Sodium chromate		+	+	+	+	
Sodium cyanide		+	+	+	+	
Sodium dichromate		+	+	+	+	
Sodium dodecylbenzenesulphonate		+	+	+	+	

Table: Resistance to chemicals and other media

Substance	Concentration	Behaviour of Hostalen at		Behaviour of Hostalen PP at		
		20°C	60°C	20°C	60°C	100°C
Sodium ironcyanide		+	+	+	+	
Sodium fluoride		+	+	+	+	
Sodium hexacyanoferrate (III), aqueous		+	+	+	+	
Sodium hexacyanoferrate (II)		+	+	+	+	
Sodium hexametaphosphate, aqueous	saturated	+	+	+	+	+
Sodium hydrogen carbonate, aqueous		+	+	+	+	+
Sodium hydrogen sulphate, aqueous	saturated	+	+	+	+	
Sodium hydrogen sulphite, aqueous	saturated	+	+	+	+	
Sodium hydroxide, aqueous	any	+	+	+	+	
Sodium hydroxide, solid		+	+	+	+	
Sodium hypochlorite, aqueous with 12.5 % active chlorine		/	-	/	/	-
Sodium nitrate, aqueous	any	+	+	+	+	
Sodium nitrite, aqueous	any	+	+	+	+	
Sodium perborate, aqueous	any	+	/	+	+	+
Sodium perchlorate, aqueous	any	+	+			
Sodium peroxide, aqueous	saturated	/				
Sodium peroxide, aqueous	10 %	+	+			
Sodium phosphate, aqueous	saturated	+	+	+	+	+
Sodium silicate		+	+	+	+	
Sodium silicate, aqueous	any	+	+	+	+	
Sodium sulphate, aqueous	cold saturated	+	+	+	+	+
Sodium sulphide, aqueous	saturated	+	+	+	+	+
Sodium sulphite, aqueous	40 %	+	+	+	+	+
Sodium tetraborate (borax), aqueous	saturated	+	+	+	+	+
Sodium thiosulphate, aqueous	saturated	+	+	+	+	
Soft soap		+	+	+	+	
Soya bean oil		+	+	+	/	
Spermaceti		+	/	+		
Spindle oil		+to/	/	+	-	
Spirits		+		+		
Stain remover		+to/	/			
Starch, aqueous	any	+	+	+	+	
Starch gum (dextrin), aqueous	18 %	+	+	+	+	
Starch syrup		+	+	+	+	
Stearic acid		+	/	+	/	
Styrene		/	-	/	-	
Succinic acid, aqueous	50 %	+	+	+	+	
Sugar beet juice		+	+	+	+	+
Sugar syrup		+	+	+	+	+
Sulphates, aqueous solutions	any	+	+	+	+	
Sulphuric acid, aqueous	up to 50 %	+	+	+	+	
Sulphuric acid, aqueous	70 %	+	+	+	/	
Sulphuric acid, aqueous	80 %	+	+	+	/	
Sulphuric acid, aqueous	98 %	/ ¹⁾	-	/	-	
Sulphur		+	+	+	+	+
Sulphurous acid		+	+	+	+	
Sulphuryl chloride (sulphonyl chloride)	techn. grade	-				
Sulphur dioxide, aqueous	any	+	+	+	+	
Sulphur dioxide, gaseous		+	+	+	+	
Sulphur trioxide		-		-		

¹⁾ Hostalen blow mouldings that have been approved for use with dangerous filling substances are suitable for contact with e.g. 98 % sulphuric acid

Table: Resistance to chemicals and other media

Substance	Concentration	Behaviour of Hostalen at		Behaviour of Hostalen PP at		
		20 °C	60 °C	20 °C	60 °C	100 °C
Tallow	techn. grade	+	+	+	+	
Tannic acid (tannin), aqueous	10%	+	+	+	+	
Tanning extracts, vegetable	as supplied	+		+	/	
Tartaric acid, aqueous	any	+	+	+	+	
Tetrabromomethane		/to-	-	/to-		
Tetrachloroethane		/to-	-	/	-	
Tetrachloroethylene		/to-	-	/	-	
Tetrachloromethane (carbon tetrachloride)	techn. grade	/	-	-		
Tetrahydrofuran	techn. grade	/to-	-	/	-	
Tetrahydronaphthalene ([®] Tetralin)	techn. grade	+	-	-		
Thioglycolic acid		+	+	+	+	
Thionyl chloride		-		-		
Thiophene		/	-	/	-	
Tin (II) chloride, aqueous	saturated	+	+	+	+	
Tin (IV) chloride, aqueous	any	+	+	+	+	
Toluene	techn. grade	/	-	/	-	
Toluic acids (methyl benzoic acids)	saturated	/				
Tomato juice		+	+	+	+	
Transformer oil	techn. grade	+	/	+	/	
Tributyl phosphate		+	+	+	+	
Trichloroacetaldehyde (Chloral)	techn. grade	+	+	+	+	
Trichloroacetic acid	techn. grade	+	/to-	+		
Trichloroacetic acid, aqueous	50%	+	+	+	+	
Trichlorobenzene		-	-			
Trichloroethylene	techn. grade	+to/	-	/	/	
Tricresyl phosphate		+	+	+	/	
Triethanolamine		+	+D	+	+D	
Triethanolamine (2,2',2"-nitrotriethanol), aqueous	saturated	+	/	+		
Triethylene glycol		+	+	+	+	
[®] Trilon		+	+			
Trimethylol propane, aqueous		+	+	+	+	
Trimethyl borate		+	/to-			
Trioctyl phosphate		+	/	+		
Trisodium phosphate		+	+	+	+	
Tri-β-chloroethylphosphate		+	+	+		
Turpentine oil	techn. grade	+to/	/	-		
[®] Tutogen U		+	+	+	+	
[®] Tween 20 and 80		+	-	+	+	
Two-stroke oil		+	/	+		
Urea, aqueous	up to 33%	+	+	+	+	
Uric acid		+	+	+		
Urine		+	+	+	+	
Vaseline	techn. grade	+to/	/	+	/	
Vaseline oil	techn. grade	+to/	/	+	/	-
Vinegar (wine vinegar)	as supplied commercially	+	+	+	+	
Vinylidene chloride (1,1-dichloroethylene)	techn. grade	-		-		
Vinyl acetate		+	+	+	/	
Viscose spinning solutions		+	+	+	+	
Vitamin C		+		+		
Vitamin preparations, dry (powder)		+		+		
Walnut oil		+	/	+		
Washing up liquids	usual	+	+	+	+	

Table: Resistance to chemicals and other media

Substance	Concentration	Behaviour of Hostalen		Behaviour of Hostalen PP		
		at 20°C	60°C	at 20°C	60°C	100°C
Waste gases containing carbonic acid derivatives	any	+	+	+	+	
Waste gases containing carbon dioxide	any	+	+	+	+	
Waste gases containing carbon monoxide	any	+	+	+	+	
Waste gases containing hydrochloric acid	any	+	+	+	+	
Waste gases containing hydrogen fluoride	trace	+	+			
Waste gases containing nitrose	trace	+	+			
Waste gases containing sulphur dioxide	low	+	+	+	+	
Waste gases containing sulphuric acid (moist)	any	+	+	+	+	
Waste gases containing sulphur trioxide (fuming sulphuric acid)	trace	-		-		
Water, distilled		+	+	+	+	+
Waxes		+	+to/	+	+to/	
Wax alcohols	techn. grade	/	/	/	-	
Whey		+	+	+	+	
Whisky		+		+		
White spirit	techn. grade	+	/	/	-	
Wine		+		+	+	
Wine vinegar (table vinegar)	as supplied commercially	+	+	+	+	
Wood stains	end use concentration	+	+to/			
Xylene		/	-	-		
Yeast		+	+	+		
Zinc carbonate		+	+	+	+	
Zinc chloride, aqueous	any	+	+	+	+	
Zinc oxide		+	+	+	+	+
Zinc salts, aqueous	any	+	+	+	+	
Zinc sludge		+	+	+	+	
Zinc stearate		+	+	+	+	+
Zinc sulphate, aqueous	any	+	+	+	+	+

Resistance factor for pressure pipes

A special assessment is required when mechanical, chemical and, perhaps, thermal stresses occur together as in the case of pressure pipes or large tanks. Here the resistance factor (f_{CR}) gives vital information. It characterizes the long-term behaviour of pipes in contact with a certain substance under pressure in relation to their long-term behaviour in contact with water under pressure. Resistance factors have been determined for Hostalen and Hostalen PP pipes in contact with a whole range of substances [1] [2] [3].

Literature

- [1] E. Gaube, W. Müller, G. Diedrich: "Zeitstandfestigkeit von Rohren aus Hartpolyethylen und Polypropylen unter Einfluß von Chemikalien" *Kunststoffe* 56 (1966), pp. 673 ... 679
- [2] G. Diedrich, B. Kempe, K. Graf: "Zeitstandfestigkeit von Rohren aus Polyethylen (HDPE) und Polypropylen (PP) unter Chemikalieneinwirkung" *Kunststoffe* 69 (1979), pp. 470 ... 476
- [3] B. Kempe: "Prüfmethoden zur Ermittlung des Verhaltens von Polyolefinen bei der Einwirkung von Chemikalien" *Werkstofftechnik* 15 (1984), pp. 157 ... 172
- [4] DIN ISO 175, DIN 53 756, DIN 16 888 Part 1 (Draft), DIN 16 889 Part 1 (Draft), DIN 8075 Supplementary Sheet No. 1, DIN 8078 Supplementary Sheet No. 1

This information is based on our present state of knowledge and is intended to provide general notes on our products and their uses. It should not therefore be construed as guaranteeing specific properties of the products described or their suitability for a particular application. Any existing industrial property rights must be observed. The quality of our products is guaranteed under our General Conditions of Sale.

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® Hostalit	polyvinyl chloride (PVC)*)
® Hostalen	polyethylene (PE)
® Hostalen GUR	ultrahigh molecular weight polyethylene (PE-UHMW)
® Hostalen PP	polypropylene (PP)
® Hostacom	reinforced polypropylene (PP)
® Hostaform · ® Kematal	acetal copolymers (POM)
® Celanese Nylon	polyamide 66 (PA 66)
® Vandar	impact-modified polybutylene terephthalate (PBT-HI)
® Celanex	polybutylene terephthalate (PBT)
® Impet	polyethylene terephthalate (PET)
® Celstran	long-strand-fibre-reinforced polymers
® Fortron	polyphenylene sulphide (PPS)
® Vectra	liquid crystal polymers (LCP)
® Hostaflon	fluoropolymers (PTFE/PFA/FEP/ETFE)