

Chemical Performance of PP

Abbreviations

S Satisfactory Resistance

L Limited Resistance

U Unsatisfactory Resistance

dil.sol. dilute aqueous solution at a concentration equal to or less than 10%

sol. Aqueous solution at a concentration greater than 10% but not saturated

sat.sol. saturated aqueous solution prepared at 20°C

tg-g technical grade, gas

tg-l technical grade, liquid

tg-s technical grade, solid

work.sol. working solution of the concentration usually used in the industry concerned

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

Chemical	Formula	Temp. (°C)	Conc. (%)	Resistance PP
Acetic acid -glacial	CH ₃ COOH	20	up to	S
		60	10	S
		100		S
		20	40-60	S
		60		S
		100		L
		20	>96	S
		60		L
		100		U
Acetic anhydride	(CH ₃ CO) ₂ O	20 60	100	S
Acetone	CH ₃ COCH ₃	20 60	100	S S
Acetophenone	CH ₃ COC ₆ H ₅	20 60		S L
Acrylonitrile	CH ₂ CHCN	20 60		S
Adipic acid	(CH ₂ CH ₂ CO ₂ H) ₂	20 60	sat. sol	S S
Air		20 60 100		S S S
Allyl alcohol	CH ₂ CHCH ₂ OH	20 60	96	S S
Alum (Aluminium potassium sulphate)	Al ₂ (SO ₄) ₃ .K ₂ SO ₄ .nH ₂ O	20 60	sat. sol	S S
Aluminium -chloride	AlCl ₃	20 60	sat. sol	S S
Aluminium -fluoride -hydroxide -nitrate	AlF ₃	20	susp.	S
		60		S
	Al(OH) ₃	20	susp.	S
		60		S
Al(NO ₃) ₃	20	sat. sol	S	
	60		S	

Chemical	Formula	Temp. (°C)	Conc. (%)	Resistance PP		
Aluminium -oxychloride -phosphate (meta) -sulphate	$Al_2(SO_4)_3$	20	susp.	S		
		60		S		
		20		S		
		60		S		
		20	sat. sol	S		
		60		S		
Ammonia (aqueous) (gaseous) (liquid)	NH_3	20	sat. sol	S		
		60		S		
		20	100	S		
		60	dry	S		
		20	100	S		
		60		S		
		Ammonium -acetate -bromide -carbonate -chloride -fluoride -hydrogen carbonate -hydrosulphide -hydroxide -nitrate -persulphate -phosphate (dibasic) (meta) -sulphate -sulphide -sulphydrate -thiocyanate	CH_3COONH_4	20	sat	S
				60		S
NH_4Br	20					
	60					
$(NH_4)_2CO_3$	20		sat. sol	S		
	60			S		
NH_4Cl	20		sat. sol	S		
	60			S		
NH_4F	20		up to 20	S		
	60			S		
NH_4HCO_3	20		sat. sol	S		
	60			S		
	20			S		
	60			S		
$NH_4(OH)$	20			S		
	60			S		
NH_4NO_3	20		sat. sol	S		
	60			S		
	100			S		
$(NH_4)_2S_2O_8$	20		sat. sol	S		
	60			S		
$NH_4(HPO_4)_2$	20			S		
	60					
$(NH_4)_4P_4O_{12}$	20		sat. sol.	S		
	60			S		
	100			S		
$(NH_4)_2SO_4$	20		sat. sol.	S		
	60			S		
	100			S		
$(NH_4)_2S$	20		sat. sol.	S		
	60			S		
NH_4OHSO_4	20		dil/sat	S		
	60		S			
	20	sat. sol	S			
	60		S			

Chemical	Formula	Temp. (°C)	Conc. (%)	Resistance PP	
Amyl acetate	$\text{CH}_3\text{CO}_2\text{CH}_2(\text{CH}_2)_3\text{CH}_3$	20	100	L	
		60			
Amyl alcohol	$\text{CH}_3(\text{CH}_2)_3\text{CH}_2\text{OH}$	20	100	S	
		60		S	
		100		S	
Antimony chloride		20		S	
		60		S	
Barium	BaBr_2	20	sat. sol	S	
		60		S	
-bromide		100		S	
		20		susp	S
		60			S
100	S				
-carbonate	BaCO_3	20	susp	S	
		60		S	
		100		S	
-chloride	BaCl_2	20	sat. sol	S	
		60		S	
		100		S	
-hydroxide	$\text{Ba}(\text{OH})_2$	20	sat. sol	S	
		60		S	
		100		S	
-sulphate	BaSO_4	20	susp	S	
		60		S	
		100		S	
-sulphide	BaS	20	sat. sol	S	
		60		S	
		100		S	
Beer		20		S	
		60		S	
Benzene	C_6H_6	20	100	L	
		60		U	
Benzoic acid	$\text{C}_6\text{H}_5\text{COOH}$	20	sat. sol	S	
		60		S	
Benzyl alcohol	$\text{C}_6\text{H}_5\text{CH}_2\text{OH}$	20		S	
		60		L	
Bismuth carbonate		20	sat. sol	S	
		60		S	
Borax		20	sat. sol	S	
		60		S	
Boric acid	H_3BO_3	20	dil/sat	S	
		60			
Boron trifluoride	BF_3	20	sat. sol	S	
		60			
Brine saturated		20		S	
		60		S	
Bromine (dry gas) (liquid)	Br_2	20	100	U	
		60		U	
		20	100	U	
		60		U	

Chemical	Formula	Temp. (°C)	Conc. (%)	Resistance PP
Butane	C ₄ H ₁₀	20		S
		60		
Butanol (butyl alcohol)	C ₄ H ₉ OH	20	100	S
		60		L
Butyl acetate	CH ₃ CO ₂ CH ₂ CH ₂ CH ₂ C H ₃	20		L
		60		U
Butylene glycol	C ₄ H ₆ (OH) ₂	20	100	S
		60		
Butylphenols		20	sat. soln.	S
		60		
Butylbenzyl phthalate		20		S
		60		L
Calcium -carbonate	CaCO ₃	20	susp	S
		60		S
-chloride	CaCl ₂	100	sat. sol.	S
		20		S
		60		S
-hydroxide	Ca(OH) ₂	20	sat. sol.	S
		60		S
-hypochlorite	Ca(OCl) ₂	20	sol	S
		60		
-nitrate	Ca(NO ₃) ₂	20	sat. sol	S
		60		S
-oxide		20		S
		60		S
-sulphate	CaSO ₄	20	susp	S
		60		S
- hydrogen sulphide	CaS	20	dil	S
		60		S
Camphor oil		20	Sol.	U
		60		U
		100		U
Carbon dioxide	CO ₂	20	dry/wet gas	S
		60		S
Carbon disulphide	CS ₂	20		S
		60		U
Carbon monoxide	CO	20		S
		60		S
Carbon tetrachloride	CCl ₄	20		U
		60		U
Castor Oil		20		S
		60		S
Chlorine (aqueous) (dry gas)	Cl ₂	20	sat. sol	S
		60		L
		20		U
		60		U

Chemical	Formula	Temp. (°C)	Conc. (%)	Resistance PP
Chloroacetic acid	ClCH ₂ COH	20	>10	S
		60		
-ethyl ester		20		S
		60		S
-methyl ester		20		S
		60		S
Chloroethanol		20		S
		60		
Chloroform		20	100	L
		60		U
Chlorosulphonic acid	ClHSO ₃	20	100	U
		60		U
Chrome alum	KCr(SO ₄) ₂	20	sol	S
		60		S
Chromic acid	CrO ₃ + H ₂ O	20	40	S
		60		L
		100		U
Citric acid	C ₃ H ₄ (OH)(CO ₂ H) ₃	20	sat. sol	S
		60		S
		100		S
Copper -chloride	CuCl ₂	20	sat. sol	S
		60		S
-cyanide	CuCN ₂	20	sat. sol	S
		60		S
-fluoride	CuF ₂	20	sat. sol	S
		60		S
-nitrate	Cu(NO ₃) ₂	20	sat. sol	S
		60		S
		100		S
-sulphate	CuSO ₄	20	sat. sol	S
		60		S
Corn oil		20	work. sol.	S
		60		L
CottoUeed oil		20	work. sol.	S
		60		S
Cresol	CH ₃ C ₆ H ₄ OH	20		S
		60		
Cyclohexane	C ₆ H ₁₂	20		S
		60		
Cyclohexanol		20	100	S
		60		L
Cyclohexanone	C ₆ H ₁₀ O	20		L
		60		U
Decalin		20		U
		60		U
Dextrin	C ₆ H ₁₂ OCH ₂ O	20	sol	S
		60		S

Chemical	Formula	Temp. (°C)	Conc. (%)	Resistance PP
Dextrose		20	sol	S
		60		S
		100		S
Dichloroacetic acid	Cl ₂ CHCOOH	20	50	
		60		
Dichloroethylene	ClCH ₂ Cl	20	100	L
		60		
Diethylene glycol		20		S
		60		S
Diglycolic acid	(CH ₂) ₂ O(CO ₂ H) ₂	20		S
		60		
Diisooctyl phthalate		20		S
		60		L
Dimethylamine	(CH ₃) ₂ NH	20	gas	S
		60		
Dimethyl formamide		20	100	S
		60		S
Dimethyl sulphoxide		20		S
		60		S
Dioctyl phthalate		20		L
		60		L
Dioxane		20	100	L
		60		L
Ethanol	CH ₃ CH ₂ OH	20	40	
		60		
		20		
Ethanolamine		60		S
		20		S
Ethyl acetate	CH ₃ CO ₂ C ₂ H ₅	20	100	L
		60		U
Ethyl chloride	CH ₃ CH ₂ Cl	20		U
		60		U
Ethyl ether	CH ₃ CH ₂ OCH ₂ CH ₃	20		S
		60		L
Ethylene glycol	HOCH ₂ CH ₂ OH	20	100	S
		60		S
Ferric -chloride		20	sat.sol	S
		60		S
		100		S
Ferric -nitrate		20	sat.sol	S
		60		S
		100		S
-sulphate		20	sat.sol	S
		60		S
		100		S
Ferrous ammonium citrate		20		S
		60		S

Chemical	Formula	Temp. (°C)	Conc. (%)	Resistance PP
Ferrous chloride		20	sat.sol	S
		60		S
Ferrous sulphate		20	sat.sol	S
		60		S
Formaldehyde	HCOH	20 60	30-40	S
Formic acid	HCOOH	20	10	S
		60		S
		100		L
Formic acid	HCOOH	20	>85	S
		60		U
		100		U
Fructose		20		S
		60		S
		100		S
Gasoline (fuel)		20	work.sol	U
		60		U
Gelatine		20	sol	S
		60		S
Glucose		20	sol	S
		60		S
		100		S
Glycerine		20		S
		60		S
		100		S
Glycolic acid	HOCH ₂ COOH	20 60	30	S
Heptane	C ₇ H ₁₆	20	100	L
		60		U
Hexane	C ₆ H ₁₄	20		S
		60		L
Hydrobromic acid	HBr	20	up to 48	S
		60		L
		100		U
Hydrochloric acid	HCl	20	up to 20	S
		60		S
		100		S
		20	>30	S
		60		L
		100		L
		20	conc	S
Hydrochloric acid		60		
Hydrochloric acid	dry gas	20		S
		60		S
Hydrochloric acid	wet gas	20		S
		60		S
Hydrofluoric acid	HF	20	up to 10	S
		60		
		20 60	40	S

Chemical	Formula	Temp. (°C)	Conc. (%)	Resistance PP		
Hydrogen	H ₂	20 60	100	S		
Hydrogen peroxide	H ₂ O ₂	20 60	up to 10	S		
		20 60		30	S L	
		20 60	90			
Hydrogen phosphide		20 60		S S		
Hydrogen sulphide gas		20 60	100	S S		
Hydroquinone		20 60	sat. sol	S S		
Iodine (in potassium iodide) (in alcohol)	I ₂	20 60	sat. sol			
		20 60		work sol (in alcohol)	S	
Isooctane	C ₈ H ₁₈	20 60		L U		
Isopropanol		20 60 100		S S S		
Isopropyl alcohol	(CH ₃) ₂ CHOH	20 60		S S		
Isopropyl ether	(CH ₃) ₂ CHOCH(CH ₃) ₂	20 60		L		
Lactic acid	CH ₃ CHOHCOOH	20 60	10-90	S S		
Lanolin		20 60		S L		
Lead acetate	Pb(CH ₃ COO) ₂	20 60	dil/sat. sol	S S		
Linseed oil		60 60 100		S S S		
Lithium Bromide		20 60		S S		
-carbonate -chloride -hydroxide -nitrate	MgCO ₃	20 60 100	susp	S S S		
		MgCl ₂		20 60	sat. sol	S S
				Mg(OH) ₂		20 60
	MgNO ₃	20 60	sat. sol		S S	

Chemical	Formula	Temp. (°C)	Conc. (%)	Resistance PP
Magnesium -sulphate	MgSO ₄	20	sat. sol	S
		60		S
Maleic acid	COOHCHCHOH	20	sat. sol	S
		60		S
Malic acid	CH ₂ CHOH(COOH) ₂	20	sat. sol	S
		60		S
Mercuric -chloride -cyanide	HgCl ₂	20	sat. sol	S
		60		S
	HgCN ₂	20	sat. sol	S
		60		S
Mercurous nitrate	HgNO ₃	20		S
		60		S
Mercury -cyanide	Hg	20	100	S
		60		S
		20		S
		60		S
Methyl acetate		20		S
		60		S
Methanol	CH ₃ OH	20	100	S
		60		L
Methylamine		20		S
		60		
Methylene chloride		20		L
		60		U
Methyl ethyl ketone	CH ₃ COCH ₂ CH ₃	20		S
		60		
Methylbenzene		20		L
		60		U
Methylcyclohexane		20		U
		60		U
Methylpyrrolidone		20		S
		60		S
Monochloroacetic acid		20	>85	S
		60		S
Naptha		20		S
		60		U
Nickel -chloride -nitrate	NiCl ₂	20	sat. sol	S
		60		S
	Ni(NO ₃) ₂	20	sat. sol	S
		60		S
Nickel -sulphate	NiSO ₄	20	sat. sol	S
		60		S
Nitric acid	HNO ₃	20	5	S
		60		
		20	10	S
		60		U
		20	50	L
		60		U
20	>50	U		

Chemical	Formula	Temp. (°C)	Conc. (%)	Resistance PP
Nitric acid -fuming (with nitrogen dioxide)		60	>50	U
		20		U
		60		U
Nitrobenzene	C ₆ H ₅ NO ₂	20		S
		60		L
Oleic acid	C ₈ H ₁₇ CHCH(CH ₂) ₇ CO ₂ H	20	100	S
		60		L
Oleum		20		U
		60		U
Olive Oil		20		S
		60		S
		100		L
Orthophosphoric acid		20	50	S
		60		S
		20	95	S
Oxalic acid	HO ₂ CCO ₂ H	60		L
		100		U
		20	sat. sol	S
Oxygen	O ₂	20		S
		60		
Parafin Oil		20		S
		60		L
		100		U
Peppermint oil		20		S
		60		
Perchloric acid	HClO ₄	20	20	S
		60		
Petroleum -ether		20		L
		60		L
Phenol	C ₆ H ₅ OH	20	5	S
		60		S
		20	90	S
Phosphine		20		S
		60		S
Phosphoric -acid	H ₃ PO ₄	20	up to 85	S
		60		S
		100		S
		20	95	S
Phosphorous oxychloride		60		L
		20		
Picric acid	HO ₆ H ₂ (NO ₂) ₃	20	sat. sol	S
		60		
Potassium -bicarbonate		20	sat. sol	S
		60		S
		100		S
-bisulphate		20	sat. sol	S
		60		S

Chemical	Formula	Temp. (°C)	Conc. (%)	Resistance PP
Potassium	K_3BO_3	20	sat. sol	S
		60		S
-borate	$KBrO_3$	20	up to 10	S
		60		S
-bromide	KBr	20	sat. sol	S
		60		S
-carbonate	K_2CO_3	20	sat. sol	S
		60		S
-chlorate		20	sat. sol	S
		60		S
-chloride	KCl	20	sat. sol	S
		60		S
-chromate	K_2CrO_4	20	sat. sol	S
		60		S
-cyanide	KCN	20	sat. sol	S
		60		S
-dichromate	$K_2Cr_2O_7$	20	sat. sol	S
		60		S
		100		S
-ferricyanide		20	sat. sol	S
		60		S
-ferrocyanide (-hexacyanoferrate (II))	$K_4Fe(CN)_6 \cdot 3H_2O$	20	sat. sol	S
		60		S
-fluoride	KF	20	sat. sol	S
		60		S
-hydrogen sulphite		20	sol	S
		60		S
-hydroxide	KOH	20	up to 50	S
		60		S
		100		S
-iodide		20		S
		60		
-nitrate	KNO_3	20	sat. sol	S
		60		S
-perchlorate		20	10	S
		60		S
-permanganate	$KMnO_4$	20	30	S
		60		S
-persulphate	$K_2S_2O_8$	20	sat. sol	S
		60		S
-sulphate	K_2SO_4	20	sat. sol	S
		60		S
-sulphide		20	sat. sol	S
		60		S
-sulphite		20	sat. sol	S
		60		S
-thiosulphate		20	sat. sol	S
		60		S

Chemical	Formula	Temp. (°C)	Conc. (%)	Resistance PP	
Propane (gas) (liquid)	C ₃ H ₈	20	100	S	
		60			
Propionic acid		20	50	S	
		60		S	
		20	100	S	
		60		L	
Pyridine	CH(CHCH) ₂ N	20	100	L	
Salicylic acid		20	sat. sol	S	
		60			
Silicone oil		20		S	
		60		S	
		100		S	
Silver -acetate -cyanide -nitrate	AgCH ₃ COO	20	sat. sol	S	
		60		S	
	AgCN	20	sat. sol	S	
		60		S	
	AgNO ₃	20	sat. sol	S	
		60		S	
Sodium -acetate -aluminium sulphate -antimonate -arsenite -benzoate -bicarbonate -bisulphate -bromide -carbonate	CH ₃ COONa	20	sat. sol	S	
		60		S	
		100		S	
		20		S	
		60		S	
		20	sat. sol	S	
		60		S	
		20	sat. sol	S	
		60		S	
		20	35	S	
		60		S	
	NaHCO ₃	20	sat. sol	S	
		60		S	
		100		S	
	NaHSO ₄	20	sat. sol	S	
		60		S	
	NaBr	20	sat. sol	S	
		60		S	
	Na ₂ CO ₃	20	sat. sol	S	
		60		S	
	Sodium -chlorate -chloride -chlorite -chromate	NaClO ₃	20	sat. sol	S
			60		S
		NaCl	20	sat. sol	S
			60		S
		20	20	S	
		60		L	
	100		U		
	20	dil. sol	S		
	60		S		

Chemical	Formula	Temp. (°C)	Conc. (%)	Resistance PP
Sodium -cyanide	NaCN	20	sat. sol	S
		60		
-dichromate		20	sat. sol	S
		60		S
		100		S
-ferricyanide		20	sat. sol	S
		60		S
-ferrocyanide	Na ₄ Fe(CN) ₆	20	sat. sol	S
		60		S
-fluoride	NaF	20	sat. sol	S
		60		S
-hexacyanoferrate		20		S
		60		S
-hydrogen sulphide		20	sat. sol	S
		60		
-hydroxide	NaOH	20	1 to 60	S
		60		S
		100		S
-hypochlorite	NaOCl	20	5	S
		60		S
-metaphosphate		20	sol.	S
-nitrate	NaNO ₃	20	sat. sol	S
		60		S
-nitrite	NaNO ₂	20	sat. sol	S
		60		S
-perborate	NaBO ₃ .H ₂ O	20		S
		60		
-phosphate (acid)		20	sat. sol	S
		60		S
-phosphate (neutral)		20	sat. sol	S
		60		S
-phosphate (tri)	Na ₃ PO ₄	20		S
		60		S
-silicate		20	sol	S
		60		S
-sulphate	Na ₂ SO ₄	20	sat. sol	S
		60		S
-sulphide	Na ₂ S	20	sat. sol	S
		60		
-sulphite	NaSO ₃	20	sat. sol	S
-sulphite	NaSO ₃	60		S
		100		S
-thiosulphate	Na ₂ S ₃ O ₃	20		S
		60		
Soybean oil		20		S
		60		L
Stannic chloride (Tin (IV) chloride)	SnCl ₄	20		S
		60		S

Chemical	Formula	Temp. (°C)	Conc. (%)	Resistance PP
Stannous chloride (Tin (II) chloride)	SnCl ₂	20		S
		60		S
Sulphur dioxide	wet / dry gas	20 60	Sol.	S
Sulphuric acid		20	up to 10	S
		60		S
		100		S
		20	10 to 50	S
		60		S
		20	50	S
		60		L
		20	96	S
		60		L
		100		U
20	fuming	L		
60		U		
Sulphurous acid		20 60	up to 30	S
Sulphurous ether		20		S
		60		L
Tallow emulsion		20		S
		60		L
Tannic acid	C ₁₄ H ₁₀ O ₉	20	sol	S
		60		S
Tartaric acid	HOOC(CHOH) ₂ COOH H	20	sat. sol	S
		60		S
Tetraethyllead	Pb(C ₂ H ₅) ₄	20		S
Tetrahydrofuran	C ₄ H ₈ O	20		L
		60		U
Tetralin		20		U
		60		U
Thiophene	C ₄ H ₄ S	20	100	S
		60		L
Titanium tetrachloride		20		U
		60		U
Toluene	C ₆ H ₅ CH ₃	20	100	L
		60		U
Tributyl phosphate		20		S
Trichloroacetic acid	CCl ₃ COOH	20	≤50	S
		60		L
Trichloroethylene	Cl ₂ CCHCl	20	100	U
		60		U
Triethanolamine	N(CH ₂ CH ₂ OH) ₂	20 60	sol	S
Trioctyl phosphate		20		S
		60		L
Trisodium phosphate		20		S
		60		S

Chemical	Formula	Temp. (°C)	Conc. (%)	Resistance PP
Turpentine		20		U
		60		U
Urea	CO(NH ₂) ₂	20	sol	S
		60		
Urine		20		S
		60		S
Vinegar		20	work.sol	S
		60		S
Water	H ₂ O brackish, distilled, fresh, mineral, sea	20		S
		60		S
		100		S
Wines and Spirits		20		S
		60		S
Xylene	C ₈ H ₁₀	20	100	U
		60		U
Zinc -carbonate	ZnCO ₃	20	susp	S
		60		S
-chloride	ZnCl ₂	20	sat. sol	S
		60		S
-nitrate	Zn(NO ₃) ₂	20	sat. sol	S
		60		S
-oxide	ZnO	20	susp.	S
		60		S
-sulphate	ZnSO ₄	20	sat. sol	S
		60		S

Sources for Chemical Resistances of PE

1. Chemical Resistance Guide For Thermoplastic Pipe and Fitting Systems, Vinidex Pty Limited
2. ISO/TR 10358 Technical Report: Plastic Pipes and Fittings-Combined Chemical-resistance Classification Table, First Edition, International Organisation for Standardisation, 1993
3. Chemical Resistance Data Sheets, Volume 1-Plastics,Rapra Technology Limited, 1993