

Corrosion resistance – GRP-Systems

Element	Concentration [%]	Max. temperature [°C]	OPR (Orthophthalic polyester resin)	IPR (Isophthalic polyester resin)	VER (Vinyl ester)
A					
Acetaldehyde	all	/	not resistant	not resistant	not resistant
Acetone	25	50	limited resistant	permanent resistant	permanent resistant
Acetone	100	all	not resistant	not resistant	not resistant
Acetic acid	25	65	permanent resistant	permanent resistant	permanent resistant
Acetic acid	75	25	permanent resistant	permanent resistant	permanent resistant
Acetic acid	75	25-60	not resistant	not resistant	permanent resistant
Acetic anhydride	all	30	not resistant	not resistant	permanent resistant
Acrylic acid	100	45	permanent resistant	permanent resistant	permanent resistant
Adipic acid	all	80	permanent resistant	permanent resistant	permanent resistant
Aluminium chloride	saturated	75	limited resistant	permanent resistant	permanent resistant
Aluminium chloride	saturated	75-90	not resistant	not resistant	permanent resistant
Aluminium fluoride	all	45	permanent resistant	permanent resistant	permanent resistant
Aluminium nitrate	10	65	permanent resistant	permanent resistant	permanent resistant
Aluminium nitrate	10	65-90	not resistant	not resistant	permanent resistant
Aluminium sulphate	100	75	permanent resistant	permanent resistant	permanent resistant
Ammonia (gas)	10	50	limited resistant	permanent resistant	permanent resistant
Ammonia (gas)	20	50	not resistant	not resistant	permanent resistant
Ammonium benzoate	100	65	limited resistant	permanent resistant	permanent resistant
Ammonium benzoate	100	65-80	not resistant	limited resistant	permanent resistant
Ammonium hydroxide	5	25	permanent resistant	permanent resistant	permanent resistant
Ammonium hydroxide	5	25-70	not resistant	not resistant	permanent resistant
Ammonium hydroxide	10	25	permanent resistant	permanent resistant	permanent resistant
Ammonium hydroxide	10	25-60	not resistant	not resistant	permanent resistant
Ammonium hydroxide	30	40	not resistant	not resistant	permanent resistant
Aniline	all	20	permanent resistant	permanent resistant	permanent resistant
Aniline	all	50	not resistant	not resistant	permanent resistant
Aqua regia (gas)	all	30	not resistant	not resistant	permanent resistant
Aque regia (liquid)	all	/	not resistant	not resistant	not resistant
Arsenic Acid	all	45	not resistant	limited resistant	permanent resistant
B					
Barium acetate	all	60	permanent resistant	permanent resistant	permanent resistant
Barium acetate	all	60-80	not resistant	limited resistant	permanent resistant
Barium hydroxide	10	80	not resistant	not resistant	permanent resistant
Benzoic acid	all	60	limited resistant	permanent resistant	permanent resistant
Benzoic acid	all	60-90	not resistant	not resistant	permanent resistant
Benzenesulphonic acid	all	60	permanent resistant	permanent resistant	permanent resistant
Benzenesulphonic acid	all	60-90	not resistant	not resistant	permanent resistant
Boric acid	all	60	limited resistant	permanent resistant	permanent resistant
Boric acid	all	60-90	not resistant	not resistant	permanent resistant
Bromine (liquid)	all	/	not resistant	limited resistant	limited resistant
Bromine (gas)	all	80	not resistant	limited resistant	permanent resistant
Butanol	100	70	limited resistant	permanent resistant	permanent resistant
Butyric acid	50	40	permanent resistant	permanent resistant	permanent resistant
Butyric acid	50	85	not resistant	not resistant	permanent resistant
Butyl alcohol	50	25	limited resistant	permanent resistant	permanent resistant
Butyl alcohol	50	45	not resistant	not resistant	permanent resistant
Butyl glycol	all	80	not resistant	not resistant	permanent resistant

Element	Concentration [%]	Max. temperature [°C]	OPR (Orthophthalic polyester resin)	IPR (Isophthalic polyester resin)	VER (Vinylester)
C					
Calcium bisulphate	all	60	permanent resistant	permanent resistant	permanent resistant
Calcium chloride	all	75	permanent resistant	permanent resistant	permanent resistant
Calcium hypochlorid	all	90	not resistant	limited resistant	permanent resistant
Calcium nitrate	all	65	permanent resistant	permanent resistant	permanent resistant
Calcium sulphate	all	75	limited resistant	permanent resistant	permanent resistant
Carbon dioxide (gas)	all	90	permanent resistant	permanent resistant	permanent resistant
Carbon monoxide (gas)	all	90	permanent resistant	permanent resistant	permanent resistant
Carbon tetrachloride	100	25	limited resistant	permanent resistant	permanent resistant
Caustic soda	10	30	not resistant	limited resistant	permanent resistant
Caustic soda	25	90	not resistant	not resistant	permanent resistant
Caustic soda	50	65	not resistant	not resistant	permanent resistant
Chlorobenzene	100	/	not resistant	not resistant	not resistant
Chlorine dioxide	all	70	not resistant	not resistant	permanent resistant
Chlorine gas	/	50	limited resistant	permanent resistant	permanent resistant
Chlorine gas	/	50-90	not resistant	not resistant	permanent resistant
Chloroform	100	/	not resistant	not resistant	not resistant
Chlorinated water	saturated	30	limited resistant	permanent resistant	permanent resistant
Chlorinated water	saturated	30-80	not resistant	not resistant	permanent resistant
Chromic acid	5	30	permanent resistant	permanent resistant	permanent resistant
Chromic acid	10	45	not resistant	not resistant	permanent resistant
Chromium sulphate	all	60	limited resistant	permanent resistant	permanent resistant
Citric acid	all	75	limited resistant	permanent resistant	permanent resistant
Copper chloride	all	75	permanent resistant	permanent resistant	permanent resistant
Cresol	all	/	not resistant	not resistant	not resistant
Crude oil	100	75	permanent resistant	permanent resistant	permanent resistant
Cyclohexane	100	25	permanent resistant	permanent resistant	permanent resistant
Cyclohexanol	all	40	not resistant	limited resistant	permanent resistant
D					
Dichloroethylene	all	/	not resistant	not resistant	not resistant
Detergents	all	75	limited resistant	permanent resistant	permanent resistant
Diallyphtalat	all	25	permanent resistant	permanent resistant	permanent resistant
Diallyphtalat	all	25-80	not resistant	not resistant	permanent resistant
Dichloroacetic acid	40	30	not resistant	limited resistant	permanent resistant
Diethylamine	all	45	not resistant	not resistant	permanent resistant
Dimethyl formamide	all	/	not resistant	not resistant	not resistant
Dinitrophenol	all	/	not resistant	not resistant	not resistant
Dipropylene glycol	all	60	limited resistant	permanent resistant	permanent resistant
E					
Ethanedioic acid	saturated	65	limited resistant	permanent resistant	permanent resistant
Ethyl acetate	all	/	not resistant	not resistant	not resistant
Ethyl alcohol	10	40	limited resistant	permanent resistant	permanent resistant
Ethyl chloride	100	/	not resistant	not resistant	not resistant
Ethylenediamine	100	45	not resistant	not resistant	permanent resistant
Ethylene glycol	all	80	limited resistant	permanent resistant	permanent resistant
Ethyl ether	all	30	not resistant	limited resistant	permanent resistant
F					
Fatty acids, saturated	all	65	permanent resistant	permanent resistant	permanent resistant
Fatty acids, unsaturated	all	65	permanent resistant	permanent resistant	permanent resistant
Fluor	all	/	not resistant	not resistant	not resistant
Fluorboric acid	10	80	not resistant	not resistant	permanent resistant
Fluorboric acid	saturated	50	not resistant	not resistant	permanent resistant
Fluorsilicic acid	10	30	not resistant	limited resistant	permanent resistant
Formaldehyde	44	45	not resistant	limited resistant	permanent resistant
Formic Acid	10	30	not resistant	limited resistant	permanent resistant
Formic Acid	50	65	not resistant	not resistant	permanent resistant

Element	Concentration [%]	Max. temperature [°C]	OPR (Orthophthalic polyester resin)	IPR (Isophthalic polyester resin)	VER (Vinylester)
G					
Glycerin	all	75	permanent resistant	permanent resistant	permanent resistant
Glycol	all	50	permanent resistant	permanent resistant	permanent resistant
Glycolic acid	all	25	limited resistant	permanent resistant	permanent resistant
Glycolic acid	all	60	not resistant	limited resistant	permanent resistant
H					
Heating oil	all	65	permanent resistant	permanent resistant	permanent resistant
Heating oil	all	90	not resistant	limited resistant	permanent resistant
Heptane	all	25	permanent resistant	permanent resistant	permanent resistant
Heptane	all	25-60	not resistant	not resistant	permanent resistant
Hexane	all	25	permanent resistant	permanent resistant	permanent resistant
Hexane	all	25-45	not resistant	not resistant	permanent resistant
Hydrobromic acid	20	60	limited resistant	permanent resistant	permanent resistant
Hydrobromic acid	50	45	not resistant	limited resistant	permanent resistant
Hydrochloric acid	20	60	permanent resistant	permanent resistant	permanent resistant
Hydrochloric acid	37	25	limited resistant	permanent resistant	permanent resistant
Hydrochloric acid	1	30	not resistant	not resistant	permanent resistant
Hydrogen chloride	35	80	permanent resistant	permanent resistant	permanent resistant
Hydrogen peroxide	5	25	limited resistant	permanent resistant	permanent resistant
Hydrogen peroxide	30	40	not resistant	not resistant	permanent resistant
Hypochlorous acid	50	90	not resistant	not resistant	permanent resistant
I					
Iron-II-acetate	all	60	permanent resistant	permanent resistant	permanent resistant
Iron-II-chloride	all	75	limited resistant	permanent resistant	permanent resistant
Iron-II-chloride	all	75-90	not resistant	not resistant	permanent resistant
Iron-II-nitrate	all	75	limited resistant	permanent resistant	permanent resistant
Iron-II-nitrate	all	75-90	not resistant	not resistant	permanent resistant
Iron-II-chloride	all	75	not resistant	permanent resistant	permanent resistant
Iron-II-chloride	all	75-90	not resistant	not resistant	permanent resistant
Iso butylic acid	100	50	limited resistant	permanent resistant	permanent resistant
Iso octane	all	50	permanent resistant	permanent resistant	permanent resistant
Isopropyl alcohol	100	25	limited resistant	permanent resistant	permanent resistant
Isopropyl alcohol	100	25-45	not resistant	not resistant	permanent resistant
K					
Kerosine	100	75	limited resistant	permanent resistant	permanent resistant
L					
Lauric acid	all	65	permanent resistant	permanent resistant	permanent resistant
Lead acetate	all	60	permanent resistant	permanent resistant	permanent resistant
Lead acetate	all	60-90	not resistant	not resistant	permanent resistant
Linoleic acid	all	75	permanent resistant	permanent resistant	permanent resistant
M					
Magnesium carbonate	saturated	30	permanent resistant	permanent resistant	permanent resistant
Magnesium chloride	saturated	60	permanent resistant	permanent resistant	permanent resistant
Magnesium nitrate	saturated	80	permanent resistant	permanent resistant	permanent resistant
Maleic acid	all	60	limited resistant	permanent resistant	permanent resistant
Methyl ethyl ketone	all	/	not resistant	not resistant	not resistant
Mineral oil	all	75	permanent resistant	permanent resistant	permanent resistant
N					
Naphtha	100	50	permanent resistant	permanent resistant	permanent resistant
Nitric acid	5	65	limited resistant	permanent resistant	permanent resistant
Nitric acid	50	45	not resistant	not resistant	permanent resistant
Sodium cyanide	15	50	permanent resistant	permanent resistant	permanent resistant
Nickel nitrate	all	75	permanent resistant	permanent resistant	permanent resistant

Element	Concentration [%]	Max. temperature [°C]	OPR (Orthophtalic polyester resin)	IPR (Isophtalic polyester resin)	VER (Vinylester)
Nickel sulphate	all	75	limited resistant	permanent resistant	permanent resistant
Nitrobenzene	all	/	not resistant	not resistant	not resistant
Nitrophenol	all	/	not resistant	not resistant	not resistant
Nitrotoluene	all	/	not resistant	not resistant	not resistant
O					
Oil, etheric	all	30	permanent resistant	permanent resistant	permanent resistant
Oleic acid	all	65	permanent resistant	permanent resistant	permanent resistant
P					
Palmitic acid	100	65	permanent resistant	permanent resistant	permanent resistant
Paraffin oil	all	60	permanent resistant	permanent resistant	permanent resistant
Petrol	all	30	permanent resistant	permanent resistant	permanent resistant
Plant oils	all	60	permanent resistant	permanent resistant	permanent resistant
Phenol, fumes	10	45	not resistant	only fumes	permanent resistant
Phosphoric acid	10	75	not resistant	permanent resistant	permanent resistant
Phthalic acid	all	60	permanent resistant	permanent resistant	permanent resistant
Phthalic anhydride	saturated	60	permanent resistant	permanent resistant	permanent resistant
Polyvinyl alcohol	all	30	limited resistant	permanent resistant	permanent resistant
Polyvinyl acetate	dissolved	30	permanent resistant	permanent resistant	permanent resistant
Potassium bicarbonate	50	40	permanent resistant	permanent resistant	permanent resistant
Potassium bichromate	all	65	permanent resistant	permanent resistant	permanent resistant
Potassium bromide	30	75	permanent resistant	permanent resistant	permanent resistant
Potassium carbonate	10	25	limited resistant	permanent resistant	permanent resistant
Potassium carbonate	saturated	30	not resistant	not resistant	permanent resistant
Potassium chloride	saturated	75	permanent resistant	permanent resistant	permanent resistant
Potassium cyanide	15	30	permanent resistant	permanent resistant	permanent resistant
Potassium hydroxide	10	65	not resistant	not resistant	permanent resistant
Potassium nitrate	saturated	75	permanent resistant	permanent resistant	permanent resistant
Potassium oxide	10	50	not resistant	limited resistant	permanent resistant
Potassium persulphate	saturated	30	permanent resistant	permanent resistant	permanent resistant
Potassium phosphate	10	80	not resistant	not resistant	permanent resistant
Potassium sulphate	100	50	permanent resistant	permanent resistant	permanent resistant
Propanol	all	40	not resistant	limited resistant	permanent resistant
Pyridine	all	/	not resistant	not resistant	not resistant
Q					
Quicksilver	all	75	permanent resistant	permanent resistant	permanent resistant
S					
Sea water	all	80	permanent resistant	permanent resistant	permanent resistant
Sodium acetate	all	75	permanent resistant	permanent resistant	permanent resistant
Sodium bicarbonate	10	60	permanent resistant	permanent resistant	permanent resistant
Sodium bromide	30	65	limited resistant	permanent resistant	permanent resistant
Sodium carbonate	10	25	permanent resistant	permanent resistant	permanent resistant
Sodium carbonate	35	70	not resistant	not resistant	permanent resistant
Sodium chloride	saturated	75	permanent resistant	permanent resistant	permanent resistant
Sodium glutamate	all	75	permanent resistant	permanent resistant	permanent resistant
Sodium hypochloride	15	50	not resistant	not resistant	permanent resistant
Sodium nitrate	all	75	permanent resistant	permanent resistant	permanent resistant
Sodium sulphate	saturated	75	limited resistant	permanent resistant	permanent resistant
Styrol	all	/	not resistant	not resistant	not resistant
Sulphuric acid	25	75	permanent resistant	permanent resistant	permanent resistant
Sulphuric acid	50	60	not resistant	permanent resistant	permanent resistant
Sulphuric acid	70	30	not resistant	limited resistant	permanent resistant
Sulphuric acid	75	40	not resistant	not resistant	permanent resistant

Element	Concentration [%]	Max. temperature [°C]	OPR (Orthophthalic polyester resin)	IPR (Isophthalic polyester resin)	VER (Vinylester)
T					
Tartaric acid	all	75	permanent resistant	permanent resistant	permanent resistant
Tetrahydrofuran	all	30	not resistant	not resistant	limited resistant
Toluene	all	30	not resistant	not resistant	limited resistant
Trichloroacetic acid	50	25	permanent resistant	permanent resistant	permanent resistant
Trichlorethylene	100	/	not resistant	not resistant	not resistant
Triethanolamine	100	30	not resistant	limited resistant	permanent resistant
Turpentine oil	all	30	not resistant	limited resistant	permanent resistant
U					
Urea	all	25	permanent resistant	permanent resistant	permanent resistant
V					
Vinyl acetate	100	/	not resistant	not resistant	not resistant
W					
Petroleum ether	all	30	not resistant	limited resistant	permanent resistant
Tartaric acid	all	75	permanent resistant	permanent resistant	permanent resistant
X					
Xyluol	all	75	limited resistant	permanent resistant	permanent resistant
Z					
Zinc chloride	all	75	permanent resistant	permanent resistant	permanent resistant
Zinc fluorborate	all	90	not resistant	not resistant	permanent resistant
Zinc nitrate	all	75	permanent resistant	permanent resistant	permanent resistant
Zinc sulphate	all	75	limited resistant	permanent resistant	permanent resistant

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