PVC Plates

(A comparison between heat-resistant, impact-resistant, and PP plates)

⚠Caution **Handle all chemicals with care.**

Chemical Resistance of PVC Plates (1)

■ Chemical Resistance of Takiron PVC Plates

The rigid PVC plates are one of the most chemical resistant anti-corrosion materials. They are resistant to most strong acids, weak acids, alkalis, salts, and vegetable or animal oils. However, ketone, ester, ether, or benzoyl organic solvents, chlorinated hydrocarbons, and similar elements can cause significant swelling damage on such plates. Their tensile strength and other aspects of durability performance can get compromised in a very short time. In some rare cases, those elements can even cause the plates to melt, which is why they need to be handled with caution. This table provides general information about the chemical resistance of the plates. However, these figures are merely estimates for use under constant conditions, which means that the evaluation results may change drastically if the load increases or if mixed chemicals are used instead. Please keep that in mind when using the plates.

<Symbols and abbreviations used>

Conc: High concentration / sat: Saturated concentration　　Evaluation ◎: No change / ○: Still usable despite slight changes / △: Use with care / x: Corroded

Names of Chemicals	Concentration	Standard Plates			Heat-Resistant Plates			Impact-Resistant Plates			PP Plates		
		20ºC	40ºC	60ºC	20ºC	60ºC	80ºC	20ºC	40ºC	60ºC	20ºC	60ºC	80ºC
A													
Acetaldehyde	100%	×	×	×	×	×	×	×	×	×	△	×	×
Acetic acid	30%	◎	◎	○	◎	◎	△	◎	○	○	◎	◎	△
Acetic acid	60%	○	△	△	○	△	△	○	△	×	◎	○	△
Acetic acid	95%	△	×	×	×	×	×	×	×	×	◎	×	×
Acetic anhydride	–	×	×	×	×	×	×	×	×	×	×	×	×
Acetone	100%	×	×	×	×	×	×	×	×	×	○	○	△
Aluminum chloride	25%	◎	◎	○	◎	◎	○	◎	◎	◎	◎	◎	◎
Aluminum sulfate	25%	◎	◎	○	◎	○	○	◎	◎	◎	◎	◎	◎
Ammonia gas (dry)	Conc	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	○
Ammonia water	sat	◎	○	○	◎	○	○	○	△	×	◎	◎	○
Ammonium carbonate	sat	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	○
Ammonium chloride	25%	◎	◎	○	◎	○		◎	◎		◎	◎	◎
Ammonium phosphate	sat	◎	◎	○	◎	○	○	◎	◎	○	◎	◎	◎
Ammonium sulfate	40%	◎	◎	△	◎	△		◎	○	△			
Amyl acetate	100%	×	×	×	×	×	×	×	×	×	×	×	×
Aniline	100%	×	×	×	×	×	×	×	×	×	○	△	×
Antimony trichloride	75%	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	○
Arsenic acid	30%＞	◎	○	△	◎	×	×	○	○	×	◎	◎	△
Arsenic acid	75%	○	△	×	◎	×	×	○	△	×	◎	○	×
B													
Barium chloride	sat	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	◎
Benzaldehyde	100%	×	×	×	×	×	×	×	×	×	○	×	×
Benzene	100%	×	×	×	×	×	×	×	×	×	△	×	×
Benzine	100%	○	○	△	○	△		○	△		◎	×	×
Benzine - benzole mixture	20%	×	×	×	×	×	×	×	×	×	○	×	×
Benzine alcohol	100%	◎			◎			◎			◎	◎	
Benzoic acid	50%	◎	○	△	◎	○	×	○	○	△			
Boric acid	sat	◎	○	△	◎	△	×	○	○	△	◎	◎	◎
Bromine	Conc	×	×	×	×	×	×	×	×	×	×	×	×
Butadiene	100%	◎	◎	◎	◎	◎	△	◎	◎	◎	◎	◎	◎

Chemical Resistance of PVC Plates (2)

<Symbols and abbreviations used>

Conc: High concentration / sat: Saturated concentration　　Evaluation ◎: No change / ○: Still usable despite slight changes / △: Use with care / x: Corroded

Names of Chemicals	Concentration	Standard Plates			Heat-Resistant Plates			Impact-Resistant Plates			PP Plates		
		20ºC	40ºC	60ºC	20ºC	60ºC	80ºC	20ºC	40ºC	60ºC	20ºC	60ºC	80ºC
Butane	Conc	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
Butyl acetate	100%	×	×	×	×	×	×	×	×	×	○	△	×
Butyl alcohol	100%	◎	◎	○	◎	○	△	◎	◎	○	◎	◎	◎
Butyric acid	20%	○	△	×	○	×	×	○	△	×	◎	◎	○
Butyric acid	100%	×	×	×	×	×	×	×	×	×	○	△	×
C													
Cadmium sulfate	sat	◎	◎	○	◎	○	○	◎	◎	◎			
Calcium chlorate (Note 1)	sat	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	○
Calcium chloride	sat	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	◎
Calcium hydroxide	sat	◎	◎	◎	◎	◎	○	◎	◎	○	◎	◎	◎
Carbon dioxide	–	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
Carbon disulfide	100%	×	×	×	×	×	×	×	×	×	×	×	×
Carbon tetrachloride	100%	×	×	×	×	×	×	×	×	×	×	×	×
Carbonic acid	100%	◎	◎	○	◎	○	○	◎	◎	○	◎	◎	◎
Chlorine gas (dry)	10%	○	△	×	○	○	×	○	△	×	×	×	×
Chlorine gas (dry)	Conc	△	×	×	△	×	×	△	×	×	×	×	×
Chlorine gas (wet)	1%	△	×	×	△	×	×	△	×	×	×	×	×
Chlorine gas (wet)	Conc	×	×	×	×	×	×	×	×	×	×	×	×
Chlorobenzene	100%	×	×	×	×	×	×	×	×	×	×	×	×
Chloroform	100%	×	×	×	×	×	×	×	×	×	△	×	×
Chlorosulfonic acid (Note 2)	100%	△	×	×	△	×	×	×	×	×	×	×	×
Chromic acid (Note 3)	10%	◎	◎	○	○	×	×	○	×	×	○	×	×
Chromic acid (Note 3)	50%	○	○	△	×	×	×	×	×	×	△	×	×
Citric acid	25%	◎	◎	○	◎	○	○	◎	◎	○	◎	○	△
Copper (I) chloride	sat	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	◎
Copper (II) chloride	sat	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	◎
Copper sulfate	sat	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	◎
Creosol	50%	○	△	×	×	×	×	×	×	×			
Cyclohexanol	100%	×	×	×	×	×	×	×	×	×	○	△	×
Cyclohexanone	100%	×	×	×	×	×	×	×	×	×	×	×	×
D													
Diethyl ether	100%	×	×	×	×	×	×	×	×	×	×	×	×
Diglycolic acid	20%	◎	◎	○				◎	◎	○	◎	◎	
Dimethyl ether	100%	×	×	×	×	×	×	×	×	×	×	×	×
Dimethylamine	100%	×	×	×	×	×	×	×	×	×	×	×	×
Dimethylformamide	100%	×	×	×	×	×	×	×	×	×	◎	×	×

Note 1: In neutral or alkaline solutions, chlorates do not have any oxidizing effects. In acid solutions, however, they turn into strong oxidants. If hydrochloric acid is added and the mixture is heated, chlorine and chlorine dioxide are generated.

Note 2: Also known as chlorosulfuric acid, this chemical triggers a strong reaction when it comes into contact with water, generating sulfuric and hydrochloric acid. In other words, it represents a mixed acid that consists of sulfuric and hydrochloric acid. Furthermore, concentrated sulfuric acid generates hydrochloric acid and fuming sulfuric acid.

Note 3: While this chemical is not highly corrosive in isolation, it becomes more so in mixed acids containing sulfuric or nitric acid.

PVC Plates

(A comparison between heat-resistant, impact-resistant, and PP plates)

⚠Caution **Handle all chemicals with care.**

Chemical Resistance of PVC Plates (3)

<Symbols and abbreviations used>

Conc: High concentration / sat: Saturated concentration　　Evaluation ◎: No change / ○: Still usable despite slight changes / △: Use with care / x: Corroded

Names of Chemicals	Concentration	Standard Plates			Heat-Resistant Plates			Impact-Resistant Plates			PP Plates		
		20°C	40°C	60°C	20°C	60°C	80°C	20°C	40°C	60°C	20°C	60°C	80°C
E													
Ethyl acetate	100%	×	×	×	×	×	×	×	×	×	○	△	×
Ethyl alcohol	100%	◎	○	△	◎	○		◎	○	△	◎	◎	
Ethylbenzene	100%	×			×			×					
Ethylene glycol	100%	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	
F													
Fluorosilicic acid	30%	◎	◎	○	◎	◎	○	◎	○	○	◎	◎	△
Formalin	36%	◎	○	○	◎	○	○	◎	○	○	◎	◎	○
Formic acid	50%>	◎	○	○	◎	○	×	○	△	△	◎	○	○
Formic acid	>50%	○	○	×	○	△	×	×	×	×	○	×	×
Fuming nitric acid (Note 4)		×	×	×	×	×	×	×	×	×	×	×	×
Fuming sulfuric acid (Note 5)		×	×	×	×	×	×	×	×	×	×	×	×
Fuming sulfuric acid gas	Conc	△	△	×	△	△	×	△	×	×	×	×	×
G													
Gasoline	100%	○	△	×	○	×	×	○	×	×	×	×	×
Glycerine	100%	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
Glycolic acid	–	◎	◎	◎							◎	◎	
H													
Hydrobromic acid	40%	◎	◎	○	◎	○	○	△	×	×	◎	◎	○
Hydrochloric acid	10%	◎	◎	◎	◎	◎	○	◎	○	○	◎	◎	△
Hydrochloric acid	36%	◎	◎	○	◎	◎	○	△	×	×	◎	△	△
Hydrofluoric acid	10%	○	△	×	△	×	×	△	×	×	◎	◎	◎
Hydrofluoric acid	35%	△	×	×	△	×	×	△	×	×	◎	◎	△
Hydrofluoric acid	40%	△	×	×	△	×	×	△	×	×	◎	○	△
Hydrogen	–	◎	◎	◎	◎	◎	○	◎	◎	○	◎	◎	◎
Hydrogen cyanide	100%	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	◎
Hydrogen peroxide	30%>	◎	◎	○	◎	○	×	○	○	△	○	△	×
Hydrogen sulfide	Conc	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	○
I													
Iron (II) chloride	50%	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	◎
Iron (II) sulfate	sat	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	◎
Iron (III) chloride	50%	◎	◎	○	◎	◎	○	◎	○	○	◎	◎	○
Iron (III) sulfate	sat	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	○
Isobutyl alcohol	100%	◎	◎	○	◎	○	○	◎	○	○	◎	◎	
Isopropyl alcohol	100%	◎	○	○	◎	○	○	◎	○	○	◎	◎	
K													
Kerosene (paraffin)	100%	○	○	×	○	×	×	○	○	×	○	×	×
L													
Lactic acid	50%	◎	◎	○	◎	○	○	◎	◎	◎	◎	◎	◎
Lactic acid	75%	◎	○	△	◎	×	×	◎	○	×	◎	◎	◎

Note 4: This chemical is extremely oxidative since it contains concentrated nitric acid that has absorbed nitrogen dioxide.
Note 5: This chemical is extremely oxidative since it contains 97% to 98% concentrated sulfuric acid that has absorbed a large quantity of sulfur trioxide.

Chemical Resistance of PVC Plates (4)

<Symbols and abbreviations used>

Conc: High concentration / sat: Saturated concentration　　Evaluation ◎: No change / ○: Still usable despite slight changes / △: Use with care / x: Corroded

Names of Chemicals	Concentration	Standard Plates			Heat-Resistant Plates			Impact-Resistant Plates			PP Plates		
		20°C	40°C	60°C	20°C	60°C	80°C	20°C	40°C	60°C	20°C	60°C	80°C
M													
Magnesium chloride	25%	◎	◎	◎	◎	○	○	○	○	○	◎	◎	◎
Magnesium hydroxide	sat	◎	◎	◎	◎	◎	○	◎	◎	○	◎	◎	◎
Magnesium sulfate	sat	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	◎
Mercury (I) sulfate	sat	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	◎
Mercury (II) chloride	sat	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	◎
Mercury (II) sulfate	sat	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	◎
Methyl alcohol	100%	◎	○	△	◎	△	×	◎	○	△	◎	◎	○
Methyl chloride	100%	×	×	×	×	×	×	×	×	×	△	×	×
Methyl ethyl ketone	100%	×	×	×	×	×	×	×	×	×			
Methyl sulfate	50%	◎	○	△	○	△		○	○	△	◎	○	×
Methylene chloride	100%	×	×	×	×	×	×	×	×	×	×	×	×
Monochloroacetic acid	100%	◎	○	△	○	×	×	○	×	×	×	×	×
N													
Nickel chloride	50%	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	○
Nickel nitrate	50%	○	○	○	○	△	×	○	○	○	◎	◎	◎
Nickel sulfate	sat	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	○
Nitric acid (Note 6)	30%	◎	◎	○	◎	△	×	○	△	×	◎	△	×
Nitric acid (Note 6)	50%	◎	○	○	◎	△	×	△	×	×	△	×	×
Nitric acid (Note 6)	60%	◎	○	△	○	△	×	△			×		
Nitric acid (Note 6)	70%	◎	○	×	○	×		×					
Nitrobenzene	100%	×	×	×	×	×	×	×	×	×	○	△	×
O													
Octanol	100%	◎	○	○									
Oleic acid	100%	◎	◎	○	○	○		◎	◎	○			
Oxalic acid	sat	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
P													
Perchloric acid (Note 7)	10%	◎	◎	○	◎	○	×	◎	○	○	◎	◎	×
Perchloric acid (Note 7)	20%	◎	○	○	◎	○	×	○	△	×	◎	×	×
Phenol	sat	△	×	×	△	×	×	×	×	×	×	×	×
Phenylhydrazine	100%	×	×	×	×	×	×	×	×	×	×	×	×
Phosphoric acid	30%>	◎	◎	○	◎	◎	○	◎	○	○	◎	◎	○
Phosphoric acid	>30%	◎	○	○	◎	○	△	◎	○	○	○	○	△
Picric acid	5%	◎	○	○									
Potassium carbonate	sat	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	◎
Potassium chlorate (Note 1)	15%	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	○
Potassium chloride	sat	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	◎
Potassium dichromate (Note 8)	40%	◎	◎	○	◎	○	△	○	○	△	◎	◎	○

Note 6: Although this acid is weaker than hydrochloric acid, it is still highly oxidative and becomes even more so at high concentrations.
Note 7: This chemical is highly oxidative and represents the strongest acid among oxyacids of chlorine. Diluted aqueous solutions are stable. Concentrated aqueous solutions, on the other hand, are hygroscopic and tend to emit fumes into the air.
Note 8: Mixtures with strong acids such as sulfuric acid are highly oxidative and need to be handled with caution.

PVC Plates

(A comparison between heat-resistant, impact-resistant, and PP plates)

⚠Caution **Handle all chemicals with care.**

Chemical Resistance of PVC Plates (5)

<Symbols and abbreviations used>

Conc: High concentration / sat: Saturated concentration　　Evaluation ◎: No change / ○: Still usable despite slight changes / △: Use with care / x: Corroded

Names of Chemicals	Concentration	Standard Plates			Heat-Resistant Plates			Impact-Resistant Plates			PP Plates		
		20ºC	40ºC	60ºC	20ºC	60ºC	80ºC	20ºC	40ºC	60ºC	20ºC	60ºC	80ºC
Potassium dichromate mixture	–	△	×	×	△	×	×	×	×	×			
Potassium ferrocyanide	30%	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	◎
Potassium hydroxide (Note 9)	5%	◎	◎	○	○	×	×	◎	◎	○	◎	○	△
Potassium hydroxide (Note 9)	sat	◎	◎	○	◎	◎	○	◎	◎	○	◎	◎	○
Potassium hypochlorite (Note 10)	15%	○	△	△	○	×	×	○	△	×	◎	○	△
Potassium iodide	sat	◎	◎	○	◎	○	○	◎	◎	○	◎	◎	◎
Potassium perchlorate	2%	◎	○	△	○	△	×	○	△	×	◎	◎	○
Potassium permanganate (Note 11)	20%	◎	◎	○	◎	○		○	○	○	◎	○	○
Propane	Conc	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
Pyridine	100%	×	×	×	×	×	×	×	×	×	◎	○	×
S													
Seawater	–	◎	◎	△	◎	△		◎	◎	△	◎	◎	◎
Silver nitrate	5%	◎	◎	○	◎	○	○	◎	◎	○			
Sodium bisulfate	sat	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	○
Sodium bisulfite	sat	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	○
Sodium carbonate	sat	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	◎
Sodium chlorate (Note 1)	25%	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	○
Sodium chloride	sat	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	○
Sodium dichromate	40%	◎	◎	○	◎	○	△	○	○	△	◎	○	×
Sodium hydrogen carbonate	25%	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	◎
Sodium hydroxide (Note 9)	5%	◎	◎	○	○	×	×	◎	◎	○	◎	○	△
Sodium hydroxide (Note 9)	15%	◎	◎	○	◎	×	×	◎	◎	○	◎	○	△
Sodium hydroxide (Note 9)	30%	◎	◎	○	◎	○	○	◎	◎	○	◎	○	△
Sodium hydroxide (Note 9)	50%	◎	◎	○	◎	○	○	◎	◎	○	◎	○	△
Sodium hypochlorite (Note 10)	5%	○	△	△	○	△	×	○	△	×	○	×	×
Sodium hypochlorite (Note 10)	15%	×	×	×	×	×	×	×	×	×	×	×	×
Sodium iodide	sat	◎	◎	○	◎	○	○	◎	◎	○	◎	○	△
Sodium nitrate	sat	◎	◎	○	◎	○	○	◎	◎	○	◎	◎	◎
Sodium perchlorate	50%	◎	○	△	◎	△	×	◎	△	×	◎	◎	○
Sodium phosphate	sat	◎	◎	○	◎	○	○	◎	◎	○	◎	◎	○
Sodium sulfate	sat	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	◎
Sodium sulfide	sat	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	◎
Succinic acid	–	◎	◎	○	◎	○	○	◎	◎	○	◎	◎	○
Sulfur dioxide	Conc	◎	◎	◎	◎	○	○	◎	○	○	◎	○	
Sulfuric acid	30%	◎	◎	○	◎	○	○	◎	○	○	◎	◎	○
Sulfuric acid	80%	◎	◎	○	◎	○	○	○	○	×	◎	△	
Sulfuric acid - nitric acid - water	10-20-70	◎	◎	○	◎	◎	○						
Sulfuric acid - nitric acid - water	15-20-65	◎	◎	○									

Note 9: Solutions that contain surfactant need to be handled with care because they tend permeate through surfaces more easily.
Note 10: Hypochlorite aqueous solutions are strong oxidizing agents and generate chlorates at high temperatures.
Note 11: Mixtures with strong acids such as sulfuric acid are highly oxidative and need to be handled with caution.

Chemical Resistance of PVC Plates (6)

<Symbols and abbreviations used>

Conc: High concentration / sat: Saturated concentration　　Evaluation ◎: No change / ○: Still usable despite slight changes / △: Use with care / x: Corroded

Names of Chemicals	Concentration	Standard Plates			Heat-Resistant Plates			Impact-Resistant Plates			PP Plates		
		20ºC	40ºC	60ºC	20ºC	60ºC	80ºC	20ºC	40ºC	60ºC	20ºC	60ºC	80ºC
Sulfuric acid - nitric acid - water	50-33-17	◎	○										
Sulfuric acid - nitric acid - water	50-50-0	△	×		△			×	×	×			
Sulfuric acid - nitric acid - water	57-28-15	◎	○		◎	○							
Sulfuric acid - nitric acid - water (Note 12)	48-49-3	△	×		△								
Sulfuric acid (Note 13)	95%	○	△	×	△	×	×	△	×	×	○	×	×
Sulfurous acid (Note 14)	100%	○	×	×	○	×	×	○	×	×			
T													
Tannic acid	100%	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	◎
Tartaric acid	50%	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	○
Tetrachloroethylene	100%	×	×	×	×	×	×	×	×	×	△	×	×
Tetramethylammonium hydroxide (TMAH)	25%	△			×			△			◎		
Tin (II) chloride	25%	◎	○	○	◎	○	○	◎	○	○	◎	◎	○
Tin (IV) chloride	50%	◎	○	○	◎	○	○	◎	○	○	◎	◎	○
Toluene	100%	×	×	×	×	×	×	×	×	×	△	×	×
Trichloroethylene	100%	×	×	×	×	×	×	×	×	×	△	×	×
Triethanolamine	100%	×	×	×	×	×	×	×	×	×	×		
U													
Urea	10%>	◎	◎	○	◎	○	○	○	○	○	◎	◎	◎
X													
Xylene	100%	×	×	×	×	×	×	×	×	×	×	×	×
Z													
Zinc chloride	50%	◎	◎	○	◎	◎	○	◎	◎	◎	◎	◎	◎
Zinc sulfate	28%	◎	◎	◎	◎	◎	○	◎	◎	◎			

Note 12: The oxidizing power intensifies as the nitric acid ratio increases and the water ratio decreases.
Note 13: The oxidizing power intensifies as the concentration and temperature increase.
Note 14: This chemical works as a strong reducing agent and turns into sulfuric acid when oxidized by oxygen, halogen, hydrogen peroxide, or other elements. It also works as an oxidizing agent, and its oxidizing power intensifies if an excessive amount of inorganic acid is added.