

# Ultrasint® PA11 chemical resistance as a function of temperature

## Chemical Resistance

In general, Ultrasint® PA11 has good resistance to inorganic salts, alkalis, most solvents, and organic acids. Greater caution must be observed in applications involving inorganic acids, phenols and certain chlorinated solvents. In such cases, please contact Forward AM technical staff for assessment, specifying the practical problem involved: e.g nature of metal to be protected and the temperature and chemical composition of the liquid.

Resistance (°C)	20	40	60	90
<b>Inorganic bases</b>				
ammonium hydroxide (concentrated)	G	G	G	G
ammonia (liquid or gas)	G	G		
lime-wash	G	G	G	
potassium hydroxide (50%)	G	L	P	P
sodium hydroxide (5%)	G	G	L	
sodium hydroxide (10%)	G	L	L	
sodium hydroxide (50%)	G	L	P	P
<b>Inorganic acids</b>				
chromic acid (10%)	P	P	P	P
hydrochloric acid (1%)	G	L	P	P
hydrochloric acid (10%)	G	L	P	P
nitric acid (all concentrations)	P	P	P	P
phosphoric acid (50%)	G	L	P	P
sulphuric acid (1%)	G	L	L	P
sulphuric acid (10%)	G	L	P	P
sulphuric trioxide	L	P	P	P
<b>Inorganic salts</b>				
alum	G	G	G	
aluminium sulphate	G	G	G	G
ammonium nitrate	G	G	G	
ammonium sulphate	G	G	L	
chlorides (barium/ calcium /saturated sodium)	G	G	G	G
calcium arsenate	G	G	G	
calcium sulphate	G	G	L	
copper sulphate	G	G	G	G
diammonium phosphate	G	G	L	
magnesium chloride (50%)	G	G	G	G
potassium ferrocyanide	G	G	G	
potassium nitrate	G <sup>1</sup>	G <sup>1</sup>	P	P
potassium sulphate	G	G	G	G
sodium carbonate	G	G	L	P
sodium silicate	G	G	G	
sodium sulphide	G	L	L	
trisodium phosphate	G	G	G	G

Resistance (°C)	20	40	60	90
<b>Other inorganic products</b>				
agricultural sprays	G	G		
bleach solution	L	P	P	P
bromine / chlorine / fluorine	P	P	P	P
hydrogen	G	G	G	G
hydrogen peroxide (20 volumes)	G	L		
mercury	G	G	G	G
oxygen	G	G	L	P
ozone	L	P	P	P
potassium permanganate (5%)	P	P		
sea water	G	G	G	
soda water	G	G	G	G
sulphur	G	G		
<b>Hydrocarbons</b>				
acetylene	G	G	G	G
alkanes (methane, propane, butane, hexane)	G	G	G	
benzene	G	G <sup>2</sup>	L	
cyclohexane	G	G	L	
decalin	G	G	L	
HFA	G			
naphthalene	G	G	G	L
styrene / toluene / xylene	G	G <sup>3</sup>	L	L
<b>Various products</b>				
beer, cider, fruit juices, milk, mustard, vinegar, wine	G			
crude petroleum, high-octane petrol, kerosene (paraffin), normal petrol, solvent naphta, town gas	G	G	G <sup>3</sup>	
greases	G	G	G	G
oils	G	G	G	G
solutions or emulsions D.D.T. or lindane	G	G		
hydroxy-quionoline (agricultural sprays)	G			
soap solution	G			
stearin	G	G	G	
turpentine	G	G	G <sup>3</sup>	

Condition after 18 months contact:

G: Good - L: Limited - P: Poor

1: Slight yellowing - 2: Yellowing - 3: Swelling action

Resistance (°C)	20	40	60	90
<b>Organic acids and anhydrides</b>				
acetic acid	L	P	P	P
acetic anhydride	L	P	P	P
citric acid	G	G	L	P
formic acid	P	P	P	P
lactic acid	G	G	G	L
oleic / stearic acid	G	G	G	L
oxalic acid	G	G	L	P
picric acid	L	P	P	P
tartaric acid (saturated solution)	G	G	G	L
uric acid	G	G	G	L
<b>Various organic compounds</b>				
anethole	G			
carbon disulphide	G <sup>3</sup>			
diacetone alcohol	G	G <sup>3</sup>	L	
dimethyl formamide	G	G	L	
ethylene chlorhydrin	P	P		
ethylene oxide	G	G	L	P
furfural	G	G <sup>3</sup>	L	P
glucose	G	G	G	G
tetraethyl lead	G			
tetrahydrofurane	G	G	L	
phenols	P	P	P	P
<b>Organic bases</b>				
aniline (pure)	L	P	P	P
diethanolamine (20%)	G	G <sup>3</sup>	G <sup>3</sup>	L
pyridine (pure)	L	P	P	P
urea	G	G	L	L

Resistance (°C)	20	40	60	90
<b>Salts, esters, ethers</b>				
acetate esters (amyl, butyl, methyl)	G	G	G	L
phosphate esters (dioctyl, tributyl, tricesyl)	G	G	G	L
diethyl ether	G			
dioctylphthalate	G	G	G	L
fatty acid esters	G	G	G	G
methyl sulfate	G	L		
<b>Alcohols</b>				
benzyl alcohol	L	P	P	P
butanol	G <sup>3</sup>	L	P	P
ethanol (pure)	G <sup>3</sup>	G <sup>3</sup>	L	
glycerin (pure)	G	G	L	P
glycol	G	G	G	P
methanol (pure)	G <sup>3</sup>	L	P	
<b>Chlorinated solvents</b>				
carbon tetrachloride	P	P		
methyl bromide	G	P		
methyl chloride	G	P		
perchloroethylene	G	G	L	
trichloroethane	L	P		
trichloroethylene	G	L		
<b>Aldehydes and ketones</b>				
aldehydes (acetaldehyde / benzaldehyde / formaldehyde)	G	L	P	
acetone (pure)	G	G	L	P
cyclohexanone	G	L	P	
methylethylketone (MEK)				
methylisobutylketone (MIBK)	G	G	L	P

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\*\*Any guidance provided on chemical resistance is not a guarantee and should be used as a general reference only.