# Chemical Resistance Chart

| Chemical & Formula | Concentration | ABS | PP | PVC | HDPE |
|---|---|---|---|---|---|
| Acetic acid, Aqueous | 25% | N | 82 | 60 | 60 |
| $CH_3COOH$ | 40% | - | - | - | - |
| | 60% | N | 82 | 23 | 23 |
| | 85% | N | 49 | 23 | 23 |
| Ammonium Sulfate (Alum) $AlNH_4(SO_4)_2$ $I2H_2O$ | Sat'd | - | 60 | 60 | 60 |
| Amonium Hydroxide | 10% | 49 | 100 | 60 | 60 |
| $NH_4OH$ | 30% | - | - | - | R to 60 |
| Ammonium Nitrate $NH_4NO_3$ | Sat'd | 49 | 100 | 60 | 60 |
| Ammonium Phosphate (Monobasic) $NH_4H_2PO_4$ | All | 49 | 100 | 60 | 60 |
| Ammonium Sulfate $(NH_4)_2SO_4$ | Sat'd | 49 | 100 | 60 | 60 |
| Borax $Na_3B_4O_7O10H_2O$ | Sat'd | 71 | 100 | 60 | 60 |
| Calcium Carbonate $CaCO_3$ | Sat'd | - | 82 | 60 | 60 |
| Calcium Chloride | 5% | - | - | - | - |
| $CaCl_2$ | Sat'd | 49 | 82 | 60 | 60 |
| Calcium Hypochlorite | 30% | 71 | 60 | 60 | 60 |
| $Ca(OCl)_2$ | Sat'd | - | - | - | - |
| Copper Sulfate $CuSO_4$ $o5H_2O$ | Sat'd | 49 | 49 | 60 | 60 |
| Chlorine Gas (Moisture Content) | 0-20 ppm | N | N | C to 23 | C to 23 |
| | 20 - 50 | N | N | N | C to 23 |
| | 50+ ppm | N | N | N | C to 23 |
| Chlorine | Liquid | N | N | N | N |
| Chlorinated Water | 10 ppm | - | 82 | 60 | 60 |
| Chlorinated Water | Sat'd | - | 82 | 60 | C to 49 |
| Detergents | - | - | 82 | 60 | R to 60 |
| Ferrous Sulfate $FeSO_4$ | - | 71 | 60 | 60 | 60 |
| Hydrochloric Acid HCl | 1% | - | - | - | - |
| | 10% | C to 49 | 60 | 60 | 60 |
| | 20% | - | - | - | - |
| | 30% | C to 23 | 60 | 60 | 60 |
| | Conc. | - | - | - | - |
| Hypochlorous Acid | 10% | 23 | 23 | 60 | 60 |
| HOCl | 70% | - | - | - | - |
| Nitric Acid $HNO_3$ | 5% | - | - | - | - |
| | 10% | C to 23 | 82 | 60 | 23 |
| | 20% | - | - | - | - |
| | 30% | N | 60 | 60 | 23 |
| | 35% | - | - | - | - |
| | 40% | N | 23 | 60 | 23 |
| | 50% | N | N | 38 | C to 23 |
| | 70% | N | N | 23 | C to 23 |
| | 100% | N | N | N | N |
| Lubricating Oil | - | - | C to 60 | 60 | 23 |
| Phosphoric Acid $H_3PO_4$ | 10% | - | 100 | 60 | 60 |
| | 50% | 23 | 100 | 60 | 60 |
| | 85% | - | 100 | 60 | 23 |
| | 98% | - | - | - | - |

| | | | | | |
|---|---|---|---|---|---|
| Potassium Permanganate $KmnO_4$ | 10% | - | 82 | 23 | 60 |
| | 25% | - | 23 | 23 | 60 |
| Soap | - | 23 | 60 | 60 | R to 60 |
| Sodium Bicarbonate $NaHCO_3$ | - | 23 | 100 | 60 | 60 |
| Sodium Carbonate $Na_2CO_3$ | - | 23 | 100 | 60 | 60 |
| Sodium Chloride NaCl | - | 49 | 100 | 60 | 60 |
| Sodium HypoChlorite $NaOClO\ 5H_2O$ | - | 49 | 23 | 23 | 60 |
| Sulfur S | - | - | 100 | 60 | 60 |
| Sulfuric Acid $H_2SO_4$ | 30% | 49 | 82 | 60 | 60 |
| | 50% | 23 | 82 | 60 | 49 |
| | 60% | C to 23 | 23 | 60 | 49 |
| | 70% | C to 23 | 23 | 60 | R to 49 |
| | 80% | C to 23 | 82 | 60 | R to 49 |
| | 90% | C to 23 | 66 | 23 | 49 |
| | 93% | N | C to 23 | 23 | C to 23 |
| | 94% - 98% | N | C to 23 | N | C to 23 |
| | 100% | N | C to 23 | N | C to 23 |
| Urea | - | - | 82 | 60 | 60 |
| Urine | - | 71 | 82 | 60 | 60 |
| Water, Acid Mild $H_20$ | - | 71 | 60 | 60 | 60 |
| Water, Deionized $H_20$ | - | 71 | 60 | 60 | 60 |
| Water, Distilled $H_20$ | - | 71 | 100 | 60 | 60 |
| Water, Potable $H_20$ | - | 71 | 100 | 60 | 60 |
| Water, Salt $H_20$ | - | 71 | 100 | 60 | 60 |
| Water, Sea $H_20$ | - | 71 | 100 | 60 | 60 |
| Water, Soft $H_20$ | - | 71 | 100 | 60 | 60 |
| Zinc Sulfate | - | 71 | 82 | 60 | 60 |

## Resistance Codes

| Code | Meaning | Typical Results |
|---|---|---|
| 60 | Plastic type is generally resistant to temperature (ºC) indicated by code. | Swelling < 3% or weight loss < 0.5% and elongation at break not significantly changed. |
| R to 23 | Plastic type is generally resistant to temperature (ºC) indicated by code and may have limited resistance at higher temperatures. | Swelling < 3% or weight loss < 0.5% and elongation at break not significantly have limited resistance at higher temperatures. changed. |
| C to 23 | Plastic type is generally resistant to temperature (ºC) indicated by code and may be suitable for some conditions | Swelling 3-8% or weight loss < 0.5-5% and / or elongation at break decreased by suitable for some conditions. < 50%. |
| N | Plastic type is not resistant. | Swelling < 8% or weight loss < 5% and / or elongation at break decreased by > 50%. |
| -- | Data not available | |

- Chemicals that to do not normally affect the properties of an unstressed thermoplastic may cause completely different behavior (such as stress cracking) when under thermal or mechanical stress (such as constant internal pressure or frequent thermal or mechanical stress cycles).
- Unstressed immersion test chemical resistance information is applicable only when the thermoplastic pipe will not be subject to mechanical or thermal stress that is constant or cycles frequently.
- When the pipe will be subject to a continuous applied mechanical or thermal stress or to combinations of chemicals, testing that duplicates the expected field conditions as closely as possible should be performed on representative samples of the pipe product to properly evaluate plastic pipe for use in this application.