# UNIGUARD
## MATERIALS OF CONSTRUCTION
### CHEMICAL RESISTANCE & COMPATIBILITY CHART
**Uniguard-HDPE (Black Material)**

# HDPE TECHNICAL INFORMATION

| Property* | ASTM Test Method | Typical Values | |
|---|---|---|---|
| | | English Units | Metric Units |
| **Physical Properties** | | | |
| Density | D1505 | 59.6 lbs/ft$^3$ | 0.955 g/cc |
| Melt Index, Condition 190 $^0$C / 2.16 kg | D1238 | - | 0.25 g/10 min |
| Polyethylene Classification | D4976 | Group 2, Class 3, Grade 5 | Group 2, Class 3, Grade 5 |
| **Mechanical Properties** | | | |
| Tensile Strength @ Yield | D638 | 4000 psi | 27.6 MPa |
| Ultimate Elongation | D638 | > 600% | > 600% |
| Tensile IMPact Strength | D1822 | 70 ft-lbf/in$^2$ | 147 KJ/m$^2$ |
| Notched Izod IMPact Strength | D256 | 2.99 ft-lbf/in | 159 J/m |
| Compressive Stress @Yield | D695 | 1,500 psi | 10.3 MPa |
| ESCR, Condition A (10% Igepal), $F_{50}$ | D1693 | 45 hours | 45 hours |
| ESCR, Condition B (100% Igepal),$F_{50}$ | D1693 | 35 hours | 35 hours |
| Durometer Hardness | D2240 | 64 Shore D | 64 Shore D |
| Flexural Modulus | D790 | 200,000 psi | 1379 MPa |
| Coefficient of Friction, Static | D1894 | 0.31 | 0.31 |
| Coefficient of Friction, Kinetic | D1894 | 0.22 | 0.22 |
| **Thermal Properties** | | | |
| Coefficient of Linear Thermal Expansion | E831 | 7 X 10$^{-5}$ in/in/$^o$F | 1.26 X 10$^{-4}$ cm/cm/$^o$C |
| Decomposition Temperature | Union Carbide | ~ 650 $^o$F | ~ 345 $^o$C |
| Vicat Softening Temperature | D1525 | 257 $^o$F | 125 $^o$C |
| Heat Deflection Temperature @66 psi | D648 | 171 $^o$F | 77 $^o$C |
| Brittleness Temperature | D746 | < -120 $^o$F | < -84 $^o$C |
| Glass Transition Temperature | Union Carbide | -193 $^o$F | -125 $^o$C |
| Continuous Use Temperature | --- | -100 $^o$F to 180 $^o$F | -73 $^o$C to 82 $^o$C |
| Thermal Conductivity | Private Test | 2.5 Btu-in/h-ft$^2$-$^o$F | .35 W/m-$^o$K |
| Burn Rate | D635 | 1 in/min | 25.4 mm/min |
| Ignition Temperature, Flash Conditions | D1929 | 645 $^o$F | 341 $^o$C |
| Ignition Temperature, Self Ignition Conditions | D1929 | 660 $^o$F | 349 $^o$C |
| Flame Spread | E84 Tunnel Test | 98 | 98 |
| Smoke Developed | E84 Tunnel Test | 350 | 350 |
| Fire Rating | Underwriters Labs | UL94HB | UL94HB |
| **ElectricalProperties** | | | |
| Dielectric Strength | D149 | 510 V/mil | 20.1 KV/mm |
| Dielectric Constant | D150 | 2.35 | 2.35 |
| Volume Resistivity | D257 | > 2.3 X 10$^{15}$ ohm-in | > 6 X 10$^{15}$ ohm-cm |

*The nominal properties reported herein are typical of the product but do not reflect normal testing variance and therefore should not be used for specification purposes.
Typical Properties reported herein were determined on compression molded samples prepared in accordance with Procedure C of ASTM D4703, Annex A1.

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### CHEMICAL RESISTANCE & COMPATIBILITY CHART

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# HDPE CHEMICAL RESISTANCE CHART

| Chemical resistance | G |
|---|---|
| Acetaldehyde | + |
| Acetic acid | + |
| Acetone | + |
| Acrylonitrile | + |
| Allyl alcohol | 96 + |
| Aluminum chloride | A + |
| Ammonia | A + |
| Ammonium chloride | A + |
| Aniline | + |
| Benzaldehyde | + |
| Benzene | / |
| Benzyl alcohol | + |
| Bleach (Chlorine) | – |
| Boric acid | A + |
| Butanol | + |
| Butyl acetate | + |
| Calcium chloride | + |
| Carbon disulphide | / |
| Carbon tetrachloride | / M – |
| Chlorine gas | – |
| Chlorobenzene | / |
| Chloroform | – |
| Chromic acid | 10 + |
| Citric acid | + |
| Cyclohexanol | + |
| Cyclohexanone | + |
| Dekalin | + |
| Dibutyl phthalate | + |
| Diesel fuel | + |
| Diethyl ether | / |
| Dioxane | + |
| Ethanol | 96 + |
| Ethyl acetate | + |
| Ethylene chloride | / |
| Ethylene diamine | + |
| Ferric chloride | A + |
| Fluorine | – |
| Formaldehyde | 40 + |
| Formic acid | + |
| Furfurol | + |

| Chemical resistance | G |
|---|---|
| Glycerine | + |
| Hydrochloric acid | + |
| Hydrogen peroxide | / |
| Hydrogen sulphide | + |
| Lactic acid | + |
| Magnesium chloride | A + |
| Mercury | + |
| Methanol | + |
| Methyl ethyl ketone | + |
| Methylene chloride | / |
| Mineral oil | + |
| Motor oil | + |
| Nitric acid | 25 / |
| Nitrobenzene | + |
| Oleic acid | + |
| Ozone | / |
| Perchloric acid | / |
| Petroleum | + |
| Phenol | + |
| Phosphoric acid | + |
| Potassium chromate | 40 + |
| Potassium hydroxide | 30 + |
| Potassium nitrate | A + |
| Potassium permanganate | + |
| Pyridine | + |
| Sea water | + |
| Sodium carbonate | A + |
| Sodium chloride | 50 + |
| Sodium hydroxide | A + |
| Sulphuric acid | 80 + |
| Tallow | + |
| Tetrahydrofurane | – |
| Tetralin | + |
| Thionyl chloride | – |
| Toluene | / |
| Transformer oil | + |
| Trichlorethylene | – |
| Urea, aqueous | 33 + |
| Water | + |
| Zinc chloride | A + |

**(HDPE)**
Extrusion welding melt temperature: 395°F–446°F
Hot gas welding temperature: 608°F
Thermoforming temperature range: 285°F–300°F

Values obtained at room temperature. Call for high or low temperature applications.
Number indicates concentration if < 100 %. M = Values may change under mechanical stress. A = Aqueous solution.

+ = Specimen is resistant ..... Swelling < 3% or weight loss < 0.5 %. Break elongation not significantly altered.
/ = Specimen has limited resistance ..... Swelling 3-8% or weight loss 0.5-5 % and/or break elongation decreased by < 50%.
– = Specimen is not resistant..... Swelling > 8% or weight loss > 5 % and/or break elongation decreased by > 50%.