

Properties of United Scientific Glassware and Plasticware



Properties of United Glassware

Chemical Composition: Our glassware is manufactured from low-expansion Type 1, Class A Borosilicate 3.3 glass that complies with ASTM E438 Standard Specification for Glasses in Laboratory Apparatus. It is low alkali glass with a typical chemical composition of approximately 81% silica, 13% boric oxide, 4% sodium oxide, and 2% aluminum oxide. It is virtually free of magnesia-lime-zinc group, and contains only traces of heavy metals.

Thermal Properties: Borosilicate glass has a low coefficient of thermal expansion. Therefore, the thermal stresses under a given temperature gradient are low, and the glass can withstand higher temperature gradients as well as sudden temperature changes / thermal shocks. However, even minute scratching of glass surface can reduce its thermal resistance. The 'Strain Point' (about 500°C) is generally recommended as the maximum safe operating temperature for United glassware. The glass may acquire permanent stresses upon cooling if it is heated above 500°C. Our glassware is annealed in modern ovens under strictly controlled conditions to ensure minimal residual stress.

Chemical Durability: United glassware is highly resistant to water, neutral and acid solutions, concentrated acids and their mixtures, as well as to chloride, bromine, iodine, and organic matters. Even during extended period of reaction and at temperatures above 100°C, its chemical resistance exceeds that of most metals and other materials. Our glassware can withstand repeated dry and wet sterilization and offers good resistance against various chemicals, except for hydrofluoric acid, hot phosphoric acid and alkaline solutions.

Optical Properties: United glassware has a clear and colorless appearance, and shows no noticeable absorption in the visible region of the spectrum.

Safety: Treated with proper care, United glassware will offer long-term, reliable service in the laboratory. Please contact us for detailed recommendations regarding heating and cooling, mixing and stirring, vacuum and pressure, cleaning, and safety precautions that must be followed while using glassware.

Physical Properties of United Plastic Labware

Our plastic labware is manufactured from high-quality resins. Treated with proper care, United plasticware will offer long-term satisfactory service in the laboratory.

Please refer to the chart below for physical properties of United plasticware.

Resin	Maximum Use Temperature (°C)	Brittleness Temperature (°C)	Transparency	Autoclavable*
High Density Polyethylene (HDPE)	120	-100	Translucent	No
Low Density Polyethylene (LDPE)	80	-100	Translucent	No
Polycarbonate (PC)	135	-135	Clear	Yes
Acrylic (PMMA)	50	20	Clear	No
Polymethylpentene (PMP)	175	20	Clear	Yes
Polypropylene (PP)	135	0	Translucent	Yes
Polystyrene (PS)	90	20	Clear	No
Polytetrafluoroethylene (PTFE)	270	-200	Opaque	Yes
Polyvinyl Chloride (PVC)	70	-30	Clear	No

* Autoclave at 121°C, 15 psi for 20 minutes. Clean and rinse item with distilled water before autoclaving. Certain chemicals which have no appreciable effect on resins at room temperature may cause deterioration at autoclaving temperatures.

Class of Substance at Room Temperature

HDPE LDPE PC PMMA PP PS PSF PTFE PMP

Acids, Dilute or Weak	E	E	E	G	E	E	E	E	E
Acids, Strong and Concentrated	E	E	N	N	E	F	G	E	E
Alcohols, Aliphatic	E	E	G	N	E	E	G	E	E
Aldehydes	G	G	F	G	G	N	F	E	G
Bases	E	E	N	F	E	E	E	E	E
Esters	G	G	N	N	G	N	N	E	G
Hydrocarbons, Aliphatic	G	F	F	G	G	N	G	E	F
Hydrocarbons, Aromatic	G	F	N	N	F	N	N	E	F
Hydrocarbons, Halogenated	F	N	N	N	F	N	N	E	N
Ketones	G	G	N	N	G	N	N	E	F
Oxidizing Agents, Strong	F	F	N	N	F	N	G	E	F

Resin Code

HDPE	High-density polyethylene
LDPE	Low-density polyethylene
PC	Polycarbonate
PMMA	Polymethyl methacrylate
PP	Polypropylene
PS	Polystyrene
PSF	Polysulfone
PTFE	Polytetrafluoroethylene
PMP	Polymethylpentene

Chemical Resistance Classification

- E = Excellent - 30 days of constant exposure cause no damage. Plastics may even tolerate for years.
- G = Good - Little or no damage after 30 days of constant exposure to the reagent.
- F = Fair - Some effect after 7 days of constant exposure to the reagent like crazing, cacking, loss of strength or discoloration.
- N = Not Recommended - Not for continuous use. Immediate damage may occur.