

# ThermoPlastics Properties Chart

Material	Properties (Re: Lab Use)	Clarity	Autoclave Results	Heat Distortion Point	Burning Rate	Effect of Laboratory Reagents (Routine Storage or Contact Periods)					Gas Permeability of Thin-Wall Products*		
						Weak Acids	Strong Acids	Weak Alkalies	Strong Alkalies	Organic Solvents	O <sub>2</sub>	N <sub>2</sub>	CO
Polystyrene (Styrene)	Biologically inert, hard, excellent optical qualities	Clear	Melts	147-175°F 64-80°C	Slow	None	Oxidizing acids attack	None	None	Soluble in aromatic chlorinated hydrocarbons	Low	Very low	High
High-Impact Polystyrene	Rubber content gives improved strength to styrene	Opaque	Melts	147-195°F 64-90°C	Slow	None	Oxidizing acids attack	None	None	Soluble in aromatic chlorinated hydrocarbons	—	—	—
Styrene Acrylonitrile	Improved strength over polystyrene	Clear	Melts	195-200°F 90-93°C	Slow	None	Oxidizing acids attack	None	None	Soluble-ketones, esters, and chlorinated hydrocarbons	Very low	Very low	Low
Polyethylene (High-Density)	Biologically inert, high chemical resistance	Opaque	Withstands several cycles	250°F 121°C	Slow	None	Oxidizing acids attack	None	None	Resistant below 80°C	High	Low	Very high
Polyethylene (Low-Density)	Biologically inert, high chemical resistance	Opaque	Melts	105-120°F 40-49°C	Slow	None	Oxidizing acids attack	None	None	Resistant below 60°C	High	Low	Very high
Polypropylene	Biologically inert, high chemical resistance, exceptional toughness	Translucent	Withstands several cycles	250°F 121°C	Slow	None	Oxidizing acids attack	None	None	Resistant below 175°F	High	Low	Very high
Polycarbonate	Clear, very tough, inert, high temperature resistance	Clear	OK	280-290°F 138-143°C	Self-extinguishing	None	None	None	Slowly attacked	Soluble in chlorinated hydrocarbons—part soluble in aromatics	Very low	Very low	Low
Methyl, Methacrylate (Plexiglass, Lucite)	Finest optical qualities, easily fabricated Clear, tough,	Clear	Melts	160-190°F 71-88°C	Slow	Slight	Oxidizing acids attack	Slight	Slight	Soluble in ketones, esters, aromatic hydrocarbons	Very high	Very low	—
Cellulose Acetate (Acetate)	somewhat flexible	Clear	Melts	110-194°F 43-90°C	Slow	Slight	Decomposes	Slight	Decomposes	Softens in alcohol, Soluble in ketones, esters	Very low	Very low	High
Nylon	Tough, heat resistant, machineable, high moisture vapor transmission	Opaque	OK	300-356°F 150-180°C	Self-extinguishing	None	Attacked	None	None	Resistant	Very low	Very low	—
P.T.F.E.	Biologically and chemically inert, high heat resistant, surface	Opaque	OK	250°F 121°C	None	None	None	None	None	Resistant	—	—	—
P.V.C. (Plasticized)	Inert, tough, clear, high chemical resistance	Clear	Melts	110-175°F 43-80°C	Self-extinguishing	None	None	None	None	Soluble in ketones, esters	Low	—	High
Vinyl-Chloride (Goen, Saran)	Clear, popular as film material	Clear	Melts	130-150°F 54-66°C	Self-extinguishing	None	None	None	None	Slightly resistant to hydrocarbons, ketones, etc.	Low	—	High
Cellulose Nitrate (Celluloid)	Tough, fairly clear	Clear	Melts	140-160°F 60-71°C	Fast (explosive)	Slight	Decomposes	Slight	Decomposes	Soluble in ketones and esters, softens in alcohol, slightly affected by hydrocarbons	—	—	—
Polypropylene Film	Clear film material	Clear	OK	260°F 126°C	Slow	None	Oxidizing acids attack	None	None	Resistant below 175°F	High	Low	Very high
Thermosetting Polyester Films (Mylar)	Clear film material	Clear	OK	258°F 121°C	Self-extinguishing	None	None	None	None	Good to excellent	Very low	Very low	Very low

The following are Tradenames: Plexiglass (Rohm & Hass Co.), Lucite & Mylar (E.I. duPont & Co.), Geon (B. F. Goodrich Chem. Co.), Celluloid (Mazzucchelli Celluloide S.p.A.).

Portions of this table courtesy of Modern Plastics Encyclopedia. Most data are from tests by ASTM methods. Tables show averages or ranges. Many properties vary with manufacturer, formulation, and testing laboratory.

\*Obtained from a table that lists gas permeability in cc/100 sq. in. per 24 hrs/mil.