Physical properties and chemical resistance of plastics

These icons provide a quick guide as to the chemical resistance of the polymers and can be found throughout the catalogue where appropriate.

Moderate resistance to common aqueous laboratory chemicals, but avoid organic solvents, strong acids and bases

Excellent resistance to most laboratory chemicals

Good general resistance to a range of laboratory chemicals including acids, bases and some solvents

Can be subjected to autoclaving at 121°C without damage to the polymer.

Please note - where no resistance icon is shown, this product is made from several materials. In this instance please refer to the chemical resistance/ physical properties chart for each polymer.

Polypropylene, PP

- Translucent rigid polymer
- Temperature range -20 to +135°C
- Autoclavable at 121°C
- Good to excellent chemical resistance
- Resistant to fatigue making it tough
- Typically used for beakers, bottles and cylinders

Polytetrafluoroethylene, PTFE

- Opaque rigid polymer
- Wide temperature range –200 to +260°C
- Autoclavable at 121°C
- Unrivalled resistance to almost all chemicals
- Extremely low friction coefficient
- Typically used for bottles, beakers and stirrers

Low Density Polyethylene, LDPE

- Translucent flexible polymer
- Narrow temperature range of -50 to +80°C
- Not autoclavable at 121°C
- Good to excellent chemical resistance
- Robust and virtually unbreakable
- Typically used for wash bottles

Polymethylmethacrylate, Acrylic (PMMA)

- Transparent rigid polymer
- Narrow temperature range -60 to +50°C
- Not autoclavable at 121°C
- Moderate chemical resistance
- Very tough and high clarity
- Typically used for radiation shields

High Density Polyethylene, HDPE

- Translucent rigid polymer
- Broad temperature range of -100 to +120°C
- Not autoclavable at 121°C
- Good to excellent chemical resistance
- High tensile strength making it very tough
- Typically used for bottles

Polystyrene, PS

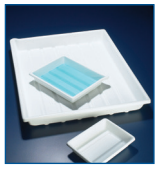
- Transparent rigid polymer
- Narrow temperature range -40 to +90°C
- Not autoclavable at 121°C
- Moderate chemical resistance
- Brittle yet has excellent clarity
- Typically used for container ware

Polymethylpentene, PMP (TPX)

- Transparent rigid polymer
- Broad temperature range -180 to +145°C
- Autoclavable at 121°C
- Good to excellent chemical resistance
- Has a low density and a high clarity
- Typically used for beakers and cylinders

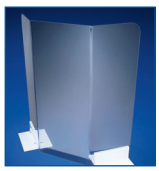
Polyvinylchloride, PVC

- Rigid polymer
- Narrow temperature range -25 to +70°C
- Not autoclavable at 121°C
- Moderate chemical resistance
- Rigid or flexible, coloured or clear
- Typically used for trays and troughs



Polycarbonate, PC

- Transparent rigid polymer
- Broad temperature range -135 to +135°C
- Autoclavable at 121°C
- Moderate chemical resistance
- High impact strength
- Typically used for safety shields



Polybutylene terephthalate, PBT

- Opaque rigid polymer
- Wide temperature range -40°C to +180°C
- Autoclavable at 121°C
- Mechanically strong engineering polymer
- Good resistance to chemicals
- Typically used for screw caps and connectors

For ordering information see inside back cover

		LDPE	HDPE	PP	PMP (TPX)	PC	PS	PMMA	PTFE	PBT
	Max usage Temp. °C	80	120†	135	145	135	90	50	260	150
	Min usage Temp. °C	-50	-100	-20††	-180	-135	-40	-60	-200	-40
	Transparency	Translucent	Translucent	Translucent	Clear	Clear	Clear	Clear	Opaque	Opaque
	Flexibility	Flexible	Rigid	Rigid	Rigid	Rigid	Rigid	Rigid	Rigid	Rigid
	Specific Gravity	0.92	0.95	0.9	0.83	1.2	1.05	1.2	2.2	1.31
	Microwaveable	Yes	No	Yes	Yes	Marginal	No	No	Yes	No
Sterilisation	Autoclavable	No	No	Yes	Yes	Yes	No	No	Yes	Yes
Sterilisation	Gas	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Sterilisation	Dry Heat	No	No	No	Yes	No	No	No	Yes	No
Sterilisation	Radiation (Gamma)	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes
Sterilisation	Disinfection	Yes	Yes	Yes	Yes	Yes	Some	Some	Yes	Yes
Permeability*	N_2	180	42	48	8,000	50	25	3	Unknown	Unknown
Permeability*	O_2	500	185	240	32,000	300	400	12	308	Unknown
Permeability*	CO_2	2,700	580	800	115,000	1,075	1,500	68	Unknown	Unknown
	Water Absorbtion (%)	<0.01	<0.03	<0.2	0.01	0.35	0.05	0.35	<0.01	Unknown
	Cytotoxic	No	No	No	No	No	No	No	No	Unknown

* Permeability (cc-mm/m^2-24hr.Bar).
† Polymer may be malleable at temperatures above 80°C if the product is under structural stress.
†† Material may become brittle at low temperatures.

Food Contact

Food Contact/Animal Derivative Statement

We can confirm that, with respect to the contact of plastic materials with foodstuffs, our products, where indicated in the catalogue, comply with one, or both, of the following:

European Regulations (EU) No 10/2011 up to (EU) No 2015/174 relating to plastic materials and articles intended to come into contact with foodstuffs.

Code of Federal Regulation (CRF), Title 21, Food and Drug Administration (FDA), Part 177.1520 "Olefin Polymers" , (a) 2)(i) and (c) 2.1 and 2.2.

We can confirm that in respect to Bovine Spongiform Encephalopathy (BSE) / Transmissible Spongiform Encephalopathy (TSE), that our suppliers do not use tallow derived from animal sources in the manufacture of our products.

Please contact us if you require further information. It is the responsibility of the user to ensure that the products are suitable for their intended use.

REACH

EU Regulation 1907/2006/EC including amendments

Regulation EC no. 1907/2006 of the European Parliament and of the council concerning the Registration, Evaluation, Authorisation and restriction of CHemicals (REACH) is continually being reviewed and updates implemented.

After consultation with the UK Health and Safety Executive (HSE) and Smithers REACH Services (SRS), we are deemed to be a 'Distributor of Articles' (Finished Products) for laboratory products.

Laboratory Plastics (Azlon®)

The laboratory plastics we supply are deemed as articles under REACH and therefore require no (Pre-) registration as there is 'no intended release of chemicals from these products'. Azlon products, to the best of our knowledge and that of our suppliers, do not contain SVHC's above thresholds of 0.1% on a weight/ weight basis.

Lipsol® Detergent

We are in constant communication with the manufacturers of Lipsol® to ensure that any relevant REACH (Pre) registration requirements are met. We confirm that Lipsol® does not contain any SVHCs above the threshold of 0.1% on a weight/weight basis and is compliant with REACH.

Recycling plastics

Although our products are designed for the reusable market you may wish to dispose of them at some point. Therefore here is some advice on recycling of our plastics.

Recycling involves the segregation of plastic products by specific resin types ready for the process of converting them into new raw materials for use in other products.

In order to assist with this segregation, the Society of the Plastics Industry (SPI) had adopted a classification system to identify the seven main types of plastic where each resin is assigned a number.

A large proportion of our products also have the following SPI code permanently moulded into them: -

The seventh classification, or "other" denotes that the product is either not of the preceding plastics or it is a mixture.

We do not currently supply any products made from PET.

Before recycling any items, please consider the environment and further handling. All items should be washed, cleaned and/or disinfected prior to disposal.

Chemical resistance of plastics

● Excellent resistance:
continuous exposure to the substance does not cause damage within 30 days.

	LDPE		HDPE		PP		PMP (TPX)		PVC		PC		PS		SAN		PMMA		PTFE		POM		PBT	
Temperature °C	20	50	20	50	20	50	20	50	20	50	20	50	20	50	20	50	20	50	20	50	20	50	20	50
Acetaldehyde	●	▲	●	■	■	▲	■	▲	▲	▲	■	▲	▲	▲	▲	▲	▲	▲	●	●	●	●	□	□
Acetic Acid (Glacial)	■	▲	●	●	●	■	■	■	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	▲	▲	▲	□
Acetic Anhydride	▲	▲	■	■	■	■	●	■	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	■	■	▲	▲	□	□
Acetone	■	▲	▲	▲	■	▲	●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	●	●	■	□
Ammonium Chloride (10%)	●	●	●	●	●	●	●	●	●	■	■	■	●	●	●	●	■	■	●	●	□	□	□	□
Ammonium Hydroxide (30%)	●	●	●	●	●	●	●	●	●	▲	▲	■	■	■	■	■	■	■	●	●	●	●	□	□
Amyl Acetate	■	▲	●	■	■	▲	●	■	▲	▲	▲	▲	▲	▲	▲	▲	●	●	●	●	●	●	●	□
Aniline (Phenylamine)	●	■	●	●	●	●	●	■	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	■	■	■	□
Aqua Regia	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	■	▲	▲	▲	●	●	●	●	▲	□
Benzaldehyde	●	■	■	▲	▲	■	●	■	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	●	●	□	□
Benzene	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	●	■	●	□
Benzoic Acid	●	●	●	●	●	■	●	●	●	■	●	■	■	■	●	●	●	●	●	●	□	□	▲	□
Boric Acid (10%)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	□
Butyl Acetate	■	■	■	■	■	■	■	■	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	●	■	■	□
Butyric Acid (Butanoic acid)	▲	▲	■	▲	▲	▲	▲	▲	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	□	□	●	□
Calcium Hydroxide (Saturated)	●	●	●	●	●	●	●	●	●	●	▲	▲	■	■	●	●	■	▲	●	●	●	●	●	□
Carbon Disulphide	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	●	●	□	□
Carbon Tetrachloride	■	▲	■	▲	■	▲	▲	▲	●	▲	▲	▲	▲	▲	■	▲	▲	▲	●	●	■	■	□	□
Chloroform	■	▲	■	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	▲	▲	▲	□
Citric Acid (1M)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	□	●	●	□	□	□	□
Cresol	▲	▲	■	▲	■	■	▲	▲	▲	▲	▲	▲	■	▲	▲	▲	▲	▲	●	●	□	□	▲	□
Cyclohexane	■	▲	■	▲	■	▲	▲	▲	▲	▲	●	■	▲	▲	■	▲	■	□	●	●	●	●	□	□
Dibutyl Phthalate	■	▲	■	▲	■	▲	■	■	▲	▲	■	▲	▲	▲	▲	▲	▲	▲	●	●	●	●	●	□
Dichlorobenzene	■	▲	■	▲	■	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	▲	▲	□	□
Diethyl Ether	▲	▲	■	▲	■	▲	▲	▲	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	●	●	●	□
Diethylene Glycol	●	●	●	●	●	●	●	●	■	▲	■	■	●	●	●	●	▲	▲	●	●	●	●	▲	□
Dimethyl Formamide (DMF)	●	●	●	●	●	●	●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	●	●	●	□
Dimethyl Sulfoxide (DMSO)	●	●	●	●	●	●	●	●	▲	▲	▲	▲	□	■	▲	▲	▲	▲	●	●	□	□	●	□
Dioxane	■	■	■	■	▲	▲	■	■	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	■	■	■	▲
Ethyl Acetate (Ethyl Ester)	●	●	●	●	■	▲	■	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	■	■	□	□	▲	□
Ethyl Alcohol (Absolute Ethanol)	●	■	●	●	●	●	●	■	●	●	●	■	●	■	▲	▲	▲	▲	●	●	●	●	●	□
Ethyl Chloride (Chloroethane)	■	▲	▲	▲	■	▲	■	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	□	□	□	□
Ethylene Chloride	■	▲	▲	▲	■	▲	■	▲	■	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	▲	▲	□	□
Ethylene Oxide (Pure)	■	■	■	■	■	▲	■	▲	▲	▲	■	▲	▲	▲	▲	▲	●	●	●	●	●	●	■	□
Ethylene Oxide (Gas)	■	■	●	●	●	●	■	■	■	■	●	●	●	■	■	■	●	●	●	●	□	□	□	□
Formaldehyde (Formalin) 40%	●	■	●	■	●	●	●	●	●	●	●	●	■	■	■	▲	●	■	●	●	●	●	●	□
Formic Acid (50%)	■	■	●	●	●	■	●	●	●	▲	■	■	■	■	●	■	□	□	●	●	□	□	■	□
Formic Acid (100%)	■	■	●	●	●	■	●	●	●	▲	■	▲	■	■	▲	▲	□	□	●	●	▲	▲	□	□
Glycerine (Glycerol)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	■	■	●	□

For ordering information see inside back cover

Chemical resistance of plastics

Good resistance;
continuous exposure to the substance causes minor damage within 7 - 30 days

Poor resistance:
not suitable for continuous exposure to the substance. Immediate damage may occur

No information available

	LDPE		HDPE		PP		PMP (TPX)		PVC		PC		PS		SAN		PMMA		PTFE		POM		PBT	
Temperature °C	20	50	20	50	20	50	20	50	20	50	20	50	20	50	20	50	20	50	20	50	20	50	20	50
Hexane	▲	▲	■	■	■	■	■	▲	●	▲	■	▲	▲	▲	●	●	●	□	●	●	●	●	●	□
Hydrobromic Acid (69%)	●	●	●	■	●	■	●	●	●	●	■	■	■	■	■	■	▲	▲	●	●	▲	▲	▲	□
Hydrochloric Acid (5%)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	■	□	●	●	▲	▲	▲	□
Hydrochloric Acid (35%)	●	●	●	●	●	■	●	■	●	●	■	▲	●	●	●	■	▲	▲	●	●	▲	▲	▲	□
Hydrofluoric Acid (48%)	●	●	●	●	●	■	●	■	■	■	■	▲	▲	▲	●	■	▲	▲	●	●	▲	▲	■	□
Hydrogen Peroxide (30%)	●	●	●	●	●	■	●	■	●	●	●	●	●	■	●	●	■	▲	●	●	●	▲	●	□
Lactic Acid (85%)	●	●	●	●	●	■	●	■	●	■	●	■	●	●	●	●	●	●	●	●	●	▲	●	□
Methyl Acetate	●	▲	●	●	●	■	■	▲	▲	▲	▲	▲	▲	▲	▲	▲	□	□	●	●	□	□	▲	□
Methyl Alcohol (Methanol)	●	■	●	●	●	●	●	■	●	●	■	■	■	■	▲	▲	▲	▲	●	●	●	●	●	□
Methyl Ethyl Ketone (Butanone)	▲	▲	▲	▲	●	●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	□	□	●	□
Methylene Chloride (Dichloro Methane)	▲	▲	●	▲	●	▲	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	▲	▲	▲	□
Mineral Oil	■	●	●	●	●	■	●	■	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	□
Nitric Acid (10%)	●	●	■	■	■	■	■	■	■	●	●	■	■	●	■	■	●	□	●	●	▲	▲	■	□
Nitric Acid (70%)	●	▲	●	▲	▲	▲	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	▲	▲	■	□
Nitrobenzene	▲	▲	▲	▲	▲	▲	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	■	▲	●	□
Oxalic Acid (10%)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	□
Perchloric Acid (70%)	■	▲	■	▲	■	▲	■	▲	■	▲	▲	▲	■	■	■	■	●	●	■	■	▲	▲	□	□
Phenol (100%)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	▲	▲	▲	□
Phosphoric Acid (85%)	●	▲	●	●	●	■	●	■	●	■	●	■	●	■	●	●	■	▲	●	●	●	▲	□	□
Picric Acid	▲	▲	▲	▲	▲	▲	●	●	▲	▲	▲	▲	■	■	●	●	□	□	●	●	□	□	□	□
Potassium Hydroxide (30%)	●	●	●	●	●	●	●	●	●	●	▲	▲	■	■	●	●	●	●	●	●	●	●	▲	□
Potassium Permanganate	●	●	●	●	●	■	●	●	●	■	●	●	●	■	■	■	■	▲	●	●	■	■	●	□
Propylene Glycol	●	●	●	●	●	●	●	●	■	■	■	■	●	●	●	●	□	□	●	●	●	●	□	□
Pyridine	▲	▲	▲	▲	●	●	■	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	●	■	□	□
Salicylic Acid	●	●	●	●	●	●	●	●	■	■	●	■	●	■	●	■	□	□	●	●	▲	▲	●	□
Silver Nitrate	●	■	●	●	●	●	●	●	●	■	●	●	●	●	●	■	□	□	●	●	■	■	□	□
Sodium Hydroxide (50%)	■	■	●	●	●	●	●	●	●	●	▲	▲	●	■	●	■	●	▲	●	●	●	●	▲	□
Sodium Hypochlorite (15%)	●	■	●	■	■	▲	●	●	●	●	■	■	●	■	●	●	●	●	●	●	□	□	▲	□
Sulphuric Acid (20%)	●	●	●	●	●	●	●	●	●	■	●	■	●	●	●	■	●	●	●	●	□	□	□	□
Sulphuric Acid (60%)	●	■	●	■	■	■	●	■	●	■	■	■	●	■	▲	▲	▲	▲	●	●	▲	▲	□	□
Sulphuric Acid (98%)	■	■	■	■	■	●	■	■	■	▲	▲	▲	■	■	▲	▲	▲	▲	●	●	▲	▲	▲	□
Tetrahydrofuran (THF)	■	▲	■	●	■	■	■	■	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	■	■	●	□
Toluene	■	▲	▲	▲	▲	▲	■	■	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	▲	▲	●	□
Trichloroacetic Acid	■	▲	■	▲	■	■	●	●	■	▲	■	▲	■	▲	▲	▲	□	□	●	●	□	□	▲	□
Trichloroethylene	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	▲	▲	▲	▲
Turpentine	■	▲	■	▲	■	▲	■	▲	■	■	■	▲	▲	▲	■	▲	■	▲	●	●	●	●	●	□
Xylene	▲	▲	■	▲	▲	▲	■	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●	●	●	▲	□
Zinc Chloride (10%)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	■	●	□
Zinc Sulphate (10%)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	■	▲	□	□

This chart gives general guidelines only on the chemical resistance of plastics. There are many factors that influence chemical resistance, we therefore recommend that you test for your own application before selecting the appropriate Azlon® product. If you have any doubts please contact us for assistance.

Care and maintenance of laboratory plasticware

The following guidelines are provided to ensure your plastic laboratory-ware is maintained in the best possible condition.

These guidelines are not definitive and care must be taken as each polymer has its own unique properties. Please also consult the chemical and physical properties charts in this catalogue. If you are still unsure please contact us for advice.

General Precautions

- Chemicals can adversely affect the performance of laboratory plasticware resulting in cracking, loss of strength and flexibility etc.
- If in any doubt, note the type of polymer the product is manufactured from, the chemical that is to be used, then confirm compatibility by checking against the chemical resistance chart. (See pages 6-7).

Washing and cleaning

- Most laboratory plasticware is readily cleaned in warm water with a detergent and soft cloth or sponge.
- Avoid using abrasive cleaners or scouring pads which can result in surfaces becoming scratched.
- A low or non-alkaline detergent is suitable for cleaning most plasticware.

  Note however that polystyrene and polycarbonate products are susceptible to attack by alkalis and a neutral detergent is recommended.
- If using an automatic laboratory washing machine to wash plastic volumetric ware, such as measuring cylinders, employ a wash temperature below 60°C. High temperatures can affect volumetric accuracy.
- Ultrasonic baths may be used for cleaning plasticware. However do take care that the products do not directly touch the transducer membrane.

Heating

- Never place plasticware in direct contact with a flame or place onto a hotplate surface.
- Most plastics allow the transmission of microwaves.

  However, as with any microwave vessel, be sure it holds a microwave absorbing material, such as water, before placing in the oven.

Sterilisation

- If the plasticware is to be sterilised by autoclaving always pre-check that the polymer can withstand repeated exposure to temperatures of 121°C.
- Azlon® plastic products that are autoclavable are identified by an *A* symbol in this catalogue.
- When autoclaving bottles always ensure the caps are loosened or removed to prevent accidental collapse or deformation.

Disposal

- If the disposal of an item of plasticware is unavoidable, always follow local laws and regulations.

  Where reclamation facilities are offered it can be helpful to segregate the products by polymer type: many Azlon® products are marked with an SPI code to help identification.

For ordering information see inside back cover