

# Thermo-plastics

Name	Examples	Test observations /properties	Pictures
<p>High Density Polyethene (HDPE)</p> 	<p>Rigid: buckets, bowels, sterilised containers Milk Bottle crates, drainage pipes</p>	<p>Chemical resistant, transparent as a thin film, translucent in thicker sections. Flammable, blue flame with yellow tip and little smoke. Very easily and smoothly cut, smell of burning candle when flame is extinguished.</p>	
<p>Low Density Polyethene (LDPE)</p>   <p>L.L.D.P.E.</p>	<p>Flexible: Bags, bottles, cable sheathing, toys</p>	<p>Soft and Plyable, feels waxy, transparent as a thin film, translucent in thicker sections. Very easily and smoothly cut. Floats in water. Flammable, blue flame with yellow tip and little smoke, smell of burning candle when the flame is extinguished.</p>	

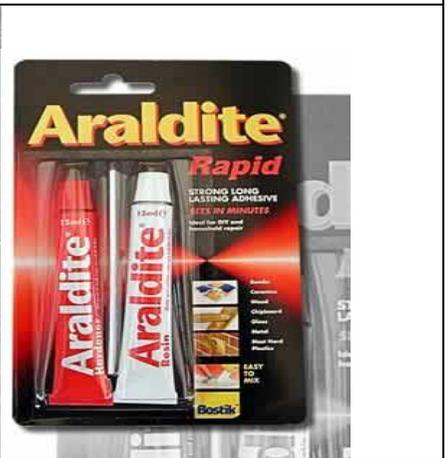
<p>Expanded Polystyrene Poly (Phenylethene)</p>  <p>PS</p>	<p>Packaging (expanded), containers, insulation, Ceiling tiles, bean bag filling</p>	<p>Opaque, usually white Can be crumbled in hand and does not recover. Tends to crumble on cutting, very buoyant in water, burns readily not self extinguishing, drips continue to burn, orange-yellow flame with black sooty smuts, odour in small amounts said to resemble that of marigolds.</p>	
<p>Polystyrene Poly (Phenylethene)</p>  <p>PS</p>	<p>Toys, containers, Food containers, yoghurt cartons, disposable cups, airfix kits. Rigid plastic cover on Bicycle helmets</p>	<p>Transparent (unless fillers or pigments added) Stiff, hard, metallic ring when tapped, hard to cut. Very flammable, not self extinguishing, drips continue to burn, orange - yellow flame with black sooty smuts, odour in small amounts resembles marigolds.</p>	
<p>Polypropene (PP) AKA Polypropylene</p>  <p>PP</p>	<p>Crates, Seats, String, Rope, Clothing, medical equipment, plastic hinges, kitchenware, film</p>	<p>Rigid, light, good chemical resistance, resistance to fatigue, bending. Transparent only as a thin film, translucent in thicker sections, stiff, hard, easily ct, fairly smooth edges, floats, Flammable, not self extinguishing, molten droplets usually go out when they reach the bench or floor yellow flame with a trace of blue at the bottom, smell of a candle when put out.</p>	

<p>Rigid Polyvinyl Chloride (uPVC)</p>	<p>Pipes, gutters, , roofing, window frames.</p>	<p>Transparent unless fillers or pigments have been added. Stiff, hard. Fairly easy to cut, smooth edges, sinks in water, burns with difficulty, self extinguishing, yellow flame blue green at bottom edges, unpleasant acrid odour of hydrochloric acid.</p>	
<p>Plasticised Polyvinyl chloride (PVC)</p> 	<p>Wire and cable insulation Vinyl leathercloth for upholstery, garden hosepipes.</p>	<p>Transparent unless fillers or pigments have been added. Flexible, soft. Very easily cut, smooth edges, sinks in water, burning behaviour will depend on the plasticiser, may continue to burn after flame has been removed. May drip, yellow smoky flame unpleasant acrid odour of hydrochloric acid underlying an aromatic odour due to the plasticiser.</p>	
<p>PET (Polyethylene terephthalate)</p> 	<p>Credit cards, Plastic drinks bottles, food packaging.</p>	<p>resistant to biochemical attack Environmentally benign, packaging of foods. PET is easy to process by simple heating and stretching treatments forming trays, sheets, foils, tubs, and glass clear bottles that do not break. Transparent, stiffer than most films, fairly hard, fairly easy to cut, burns readily smoky flame, odour said to resemble that of burnt raspberry jam.</p>	

<p>Poly-methacrylate Acrylic, Perspex</p>	<p>Signs, Lighting, reflectors/lenses, cases, jewellery, Most common plastic used in school projects.</p>	<p>Stiff, Hard, Clear unless pigment is added, durable, scratches easily, Burns readily, not self extinguishing; drips continue to burn; yellow flame with clear edges, strong, vaguely fruity odour. Frothing especially just after the flame is extinguished.</p>	
<p>Polyamide (PA) Nylon</p>	<p>Bearings, gears, bristles, textiles, clothing, upholstery, curtain rail fittings, hinges, casings for power tools.</p>	<p>Opaque, except as a thin film. Stiff, hard Fairly easily cut, smooth edges, Difficult to ignite, not self-extinguishing, melts to a free flowing liquid, which drips carrying the flame with it, blue flame with yellow tip, characteristic odour of burning hair. Tough, durable, machines well, self lubricating.</p>	
<p>Acrylonitrile butadiene styrene (ABS) Propenonitrile /but-1,3diene/phenylethene copolymer</p> 	<p>Kitchenware, toys, cases, telephones, computers, Car bumpers, hub caps, helmets,</p>	<p>Opaque, fairly stiff, fairly hard. Fairly easily cut, smooth edges, Sinks in water; Burns readily; normally not self extinguishing; orange-yellow flame with black soot; odour similar to polystyrene mixed with a bitter odour due to acrylonitrile and rubbery odour due to but butadiene</p>	

<p>Cellulose Acetate</p>	<p>Photos film, packaging, lids, containers, table workshop tools handles, flexible, box lids.</p>	<p>Hard, tough, can be made flexible, transparent, easily cut, smooth edges, sinks in water, burns readily; may or may not be self extinguishing, dark yellow flame, with some smoke, odour of acetic acid (viniger like) or really rancid smell of butyric acid.</p>		
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## Thermosetting Polymers

<p>Epoxy Resin (ER) Araldite</p>	<p>Bonding, encapsulation, laminating, surface coating, bonding materials for glass fibre, carbon fibre and Kevlar.</p>	<p>Excellent adhesive qualities, low shrinkage, strong when reinforced. Very strong in compression, weak in tension unless fibres (glass, Kevlar, carbon) are added. Excellent heat resistance.</p>		
<p>Polyester resin (PR) Orel, beetle</p>	<p>Panels for car bodies, boat hulls, casting and embedding. Surfboards, wakeboards, snowboards, kayaks.</p>	<p>Stiff, Hard, Brittle, Resilient as laminated GRP, formed without heat or pressure. Difficult to cut, solid feel. Sinks in water, burns readily; often formulated to be self-extinguishing, smoky flame fruity odour</p>		

<p>Melamine formaldehyde (MF) Formica , Melaware</p>	<p>Worktops, tableware, buttons, electrical insulation eg distributor caps. Cups and utensils, laminate flooring</p>	<p>, mark and scratch resistant, opaque usually light in colour, stiff hard 'solid' feel, flakes on cutting, sinks in water, burns with difficulty, self extinguishing, swells cracks and turns white at the edges of burnt portion; pale yellow flame with light blue-green edges; pungent odour of formaldehyde</p>	
<p>Phenol formaldehyde Bakelite</p>	<p>Saucepan handles, Electrical fittings, one of the first plastics developed, adaptors, switch covers. used for many commercial products in the past, radios, TVs, jewellery etc</p>	<p>Dark, Brittle, opaque, stiff, hard, 'solid' feel. Flakes on cutting, Sinks in water, Burns with difficulty; self extinguishing, odour of carbolic acid.</p>	
<p>Urea Formaldehyde. Urea Methanal</p>	<p>Light coloured domestic electric fittings (eg plug tops, adaptors, switch covers.</p>	<p>White normally tough and attractive. Opaque stiff, hard 'solid' feel, flakes on cutting, sinks in water. Burns with difficulty, self extinguishing, swells, cracks and turns white at edges of burnt portion; pale yellow flame with light blue-green edges; pungent odour of formaldehyde</p>	

