MATERIALS POLYMERS

Key Revision Facts: GCSE Technology

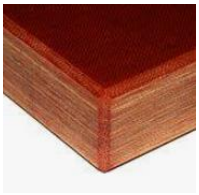
Thermoforming

Thermoforming polymers are pliable, recyclable, and can be **heated and formed repeatedly**.

Name	Characteristics	Image	Example Use	Appearance	Recyclable
Acrylic (PMMA)	Tough plastic, easy to shape, and a great alternative to the high cost and less resilient glass		Greenhouses, car windows, smartphone screens, aquariums	Transparent, available in lots of colors	PMMA is 100% recyclable
High Impact Polystyrene (HIPS)	low cost, tough plastic that is easy to thermoform and fabricate		countertop point of purchase displays and indoor signs	Matte/Smooth	Recyclable
High Density Polythene (HDPE)	Stiff, strong, lightweight, good plasticity when heated with excellent chemical resistance		Washing-up bowls, pipes, chairs, buckets, and bottles	Nontransparent	HDPE is accepted at most recycling centers
Polypropylene (PP)	Lightweight, strong and tough, it has good heat and chemical resistance		Reusable containers, flexible packaging, textiles, automotive parts, medical supplies, and toys.	White and translucent in appearance	Recyclable thermoplastic polymer
Polyvinyl Chloride (PVC)	Chemical and weather resistance, low cost, good strength, can be made to be flexible or rigid		Piping, blood bags, tubing, wire, and cable insulation	Naturally white	PVC is a type of plastic that is not recyclable
Polyethylene Terephthalate (PET)	Mechanical, thermal, chemical resistance. highly flexible, colorless		Packaging, fabrics, films, molded parts for automotive, electronics	Clear easily colored	PET products are 100% recyclable and are the most recycled plastic worldwide.

Thermosetting

Thermosetting polymers are brittle and **can only be formed once**. They are hard to recycle. They are good insulators and are resistant to heat and chemicals.

Name	Characteristics	Image	Example Use	Appearance	Recyclable
Epoxy Resin (ER)	Strong adhesive, good chemical, and heat resistance. An excellent thermal insulator		Bonds materials and can be used for waterproof coatings and lamination	Transparent	No
Melamine Formaldehyde (MF)	Excellent heat resistance, resistant to scratching and staining, hard and strong		Laminates for worktops, food-safe	Clear and colorless	No
Phenol Formaldehyde (PF)	Good thermal insulation, low density, and excellent durability		billiard balls, laboratory countertops, and coatings	Thick reddish-brown material	No
Polyester Resin (PR)	Ease of handling, low cost, dimensional stability, as well as good mechanical, chemical-resistance and electrical properties		Sheet moulding compound, bulk moulding compound, and the toner of laser printers	Viscous, pale-colored liquids consisting of a solution of polyester in a monomer which is usually styrene	No
Urea-Formaldehyde (UF)	Hard, stiff, excellent thermal insulation		Electrical fittings, toilet seats. It can be used to create Urea-formaldehyde foam insulation (UFFI)	Nontransparent thermosetting resin or polymer	No

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VERSION INFORMATION

Date	Arthur	Comment
13-Mar-2021	Andrew Seaford	Initial release.