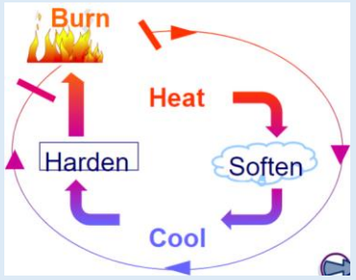
Thermosetting plastics

- Thermosetting plastics are those which are set with heat and have little **elasticity**. Once set, they cannot be reheated and reformed.
- They are heated and moulded during manufacture.
- Once cooled, they will not soften again when heated. This breaks the potentially unending cycle that thermoplastic plastics are capable of.
- If heated too much, they burn.



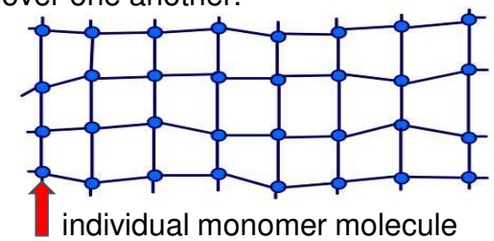
Thermosetting Plastic Advantages:

- More resistant to high temperatures
- Highly flexible design
- Thick to thin wall capabilities
- High levels of dimensional stability
- Cost-effective

Thermosetting Plastics Disadvantages:

- Can't be recycled
- More difficult to surface finish
- Can't be remolded or reshaped

Thermosetting plastics also have lots of long chain molecules, but there are links between them. These cross links prevent the molecules from moving over one another.



individual monomer molecule

PR (polyester resin)
resistance to water and variety of chemicals. Resistance to weathering and ageing. withstand temperature up to 80 °C. It can take several forms, including liquid, gel, and film, and has different properties that make it a useful material in many industries. Architects, builders, engineers, and designers all take advantage of the light weight, weatherproof strength of polyester resin in a variety of applications.

ER (epoxy resin)
High strength. Low Shrinkage. Adhesion to various substrates. Electrical insulation. Chemical and solvent resistance, Low cost and low toxicity. They are commonly used as **laminating resins**, are valued for their strong adhesive properties and water resistance, are applied on aircraft and boats.

Thermoset plastics offer enhanced high-performance combination of thermal stability, chemical resistance, and structural integrity. Thermoset components are used extensively in a wide range of industries – and are used for applications in the automotive, appliance, electrical, lighting, and energy markets due to excellent chemical and thermal stability along with superior strength, hardness, and moldability.

Polymers can be made from both natural and synthetic resources

Natural
Plants - cellulose is extracted
Trees - latex, amber and some resins
Animals - horns and milk can be used to make glues
Insects - shellac (yes the polish used on nails!)

Synthetic
Plastics can be manufactured from Crude Oil, Coal and Natural Gas

UF (urea formaldehyde)
high tensile strength, good heat fire heat resistance, low water absorption, mould shrinkage, high surface hardness, elongation at break, and volume resistance.

MF (melamine formaldehyde)
Hard, very durable, versatile, good fire and heat resistance. Often used for plastic laminate and overlay materials such as laminate floors and kitchen surfaces. Melamine resin is often used in kitchen utensils and plates

Properties of Polymers
-weight
-hardness
-elasticity
-conductivity/ insulation
-toughness
-strength.
-UF (urea formaldehyde)
-PR (polyester resin)
-ER (epoxy resin)
-MF (melamine formaldehyde)
-Synthetic
-Natural
-Polymerisation

A thermosetting polymer, resin, or plastic, often called a thermoset, is a polymer that is irreversibly hardened by curing from a soft solid or viscous liquid prepolymer or resin. Curing is induced by heat or suitable radiation.

Design and Technology

Polymers- Thermosetting plastic

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