

# Design & Manufacture

## Homework 20

There are two main classes of plastic.

**Thermoplastics** - can be reshaped by heating. They will try and return to their original shape if re-heated.

**Thermosetting Plastics** - cannot be reshaped by heating and can withstand higher temperatures than thermoplastics.

All modern plastics are made mainly from oil, coal and extracts from plants. They are **synthetic** (not natural - man-made) and come in hundreds of types, each with their own set of properties. Many have been made to order by materials scientists, e.g. The drinks industry wanted a lightweight plastic that would not crack when dropped or when under pressure, to make bottles for fizzy drinks. Scientists produced Polyethylene teraphthalate (PET). Most property changes are made by adding additives to the basic plastic.

The following are common additives:

**Plasticisers** - make the plastic less brittle.

**Pigments** - colour the plastic

**Fillers** - powdered additives, e.g. mica reduces electrical conductivity, asbestos allows higher temperature use, etc.

**Stabilisers** - protect plastic from ultra violet light that can make it become brittle.

**Flame retardants** - make the plastic less likely to catch fire.

1. What are the two classes of plastic and what is the difference between them?

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2. Why are there many types of plastic?

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3. Give an example of how a materials chemist can change the properties of a plastics.

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4. Why would you add a stabiliser to a plastic?

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