

Composites are made from two or more different materials combined together to create a new material with improved properties and functionality. Examples of fibre-based composites include [glass reinforced plastic](#) (GRP) and [carbonfibre reinforced plastic](#) (CRP). They are both materials made up of fibres set within a resin base.

### The manufacturing process

Built up in layers, a sheet of glass or carbon fibres is placed into a mould and impregnated with resin. Once cured, another sheet is placed on top and the process repeated until the required thickness is achieved. The process can be time-consuming due to curing. [Resin transfer moulding](#) can be used for medium production volumes and can be automated.

### Properties

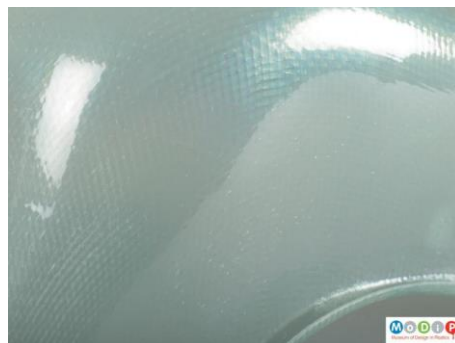
GRP and CRP are thermoset materials: once moulded they are set permanently and cannot be re-melted and re-formed. The resin makes the product lightweight while the fibres give the material strength and rigidity.

### Common uses

Being strong, lightweight and stiff, these composites are ideal for protection, sport and transport applications eg. [tennis rackets](#), [helmets](#), [bikes](#), [racing cars](#) and [boats](#).



[GRP karting seat](#)



Close-up of glass fibre sheet



[CRP motocross helmet](#)



Close-up of carbon fibre sheet

### Recyclability

Many composites are not considered to be environmentally friendly at the end of life because they cannot easily be recycled: it is hard to separate them out into their original materials. However, glass reinforced plastic has started to be recycled in Germany to make cement. The glass elements are made of sand which is a major component of cement and the resin (often polyester) is used as an energy source. With carbonfibre reinforced plastic, the resin is burnt off and the fibres reused but they do lose their strength when they are recycled.