Design & Manufacture

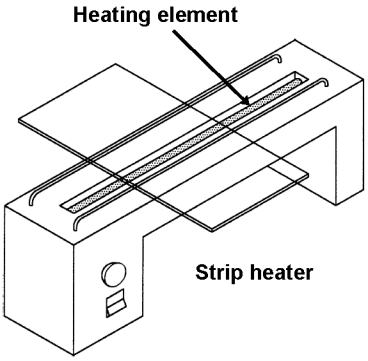
Homework 32

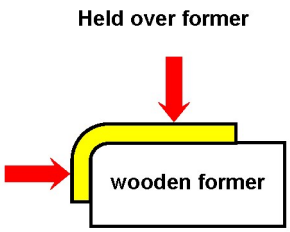
Shaping Plastic– Forming

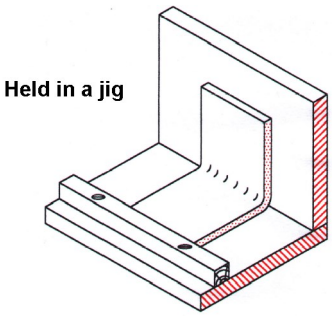
Bending

Thermoplastics in sheet form can be heated gently to between 160°C and 180°C and then bent into shape. If the sheet is held in position while it cools it will remain in its new shape while it is at room temperature or below. If the plastic sheet is re-heated then it will try to return to its original shape of a flat sheet. This property is known as **plastic memory**.

To bend a straight line use a **strip heater**. A heating element will heat the plastic only along the area held above it. When the plastic in the heated area becomes soft it can be removed and held over a former, or in a jig, to hold it in shape until it cools.

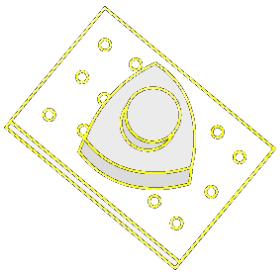






Vacuum Forming

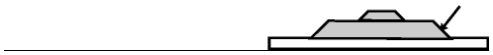
Most thermoplastics are suitable for vacuum forming. This process is useful for making shaped packaging trays, such as those that hold a layer of chocolates in a box. Other items made by this process are face masks, the shelving on the inside of refrigerator doors and plastic baths.



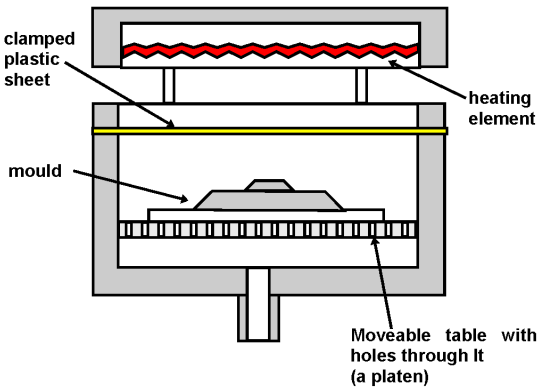
The mould can be made from MDF and is attached to a baseboard made from drilled hardboard or thin plywood.

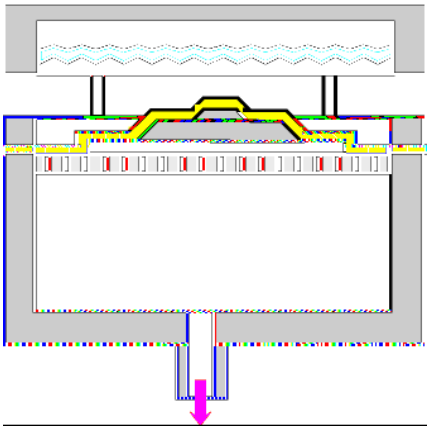
The sides should be tapered (draft), to make it easier for the plastic and mould to separate at the end.

Draft



Vacuum forming machine

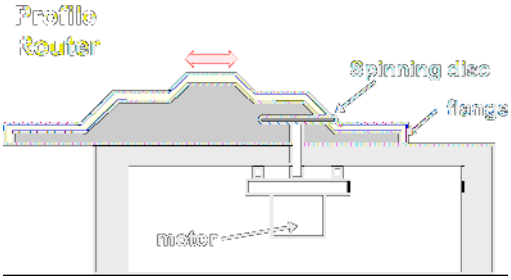




The table with the mould is raised into the plastic and the vacuum pump is switched on. The plastic sheet is then sucked tightly over the mould. The mould can be removed from the plastic moulding when the plastic has cooled.

Air sucked out by vacuum pump

The waste can be trimmed from the base of the moulding by using a profile router. This machine uses a spinning abrasive disc, that can be set at different heights, to cut away the waste flange.



Question

1. Explain the term ‘plastic memory’.

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2. Illustrate how a straight line, 90° bend, can be made in a 3mm thick sheet of PVC.

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5. Why are vacuum forming moulds made with drafted edges?

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6. Illustrate the vacuum forming process.