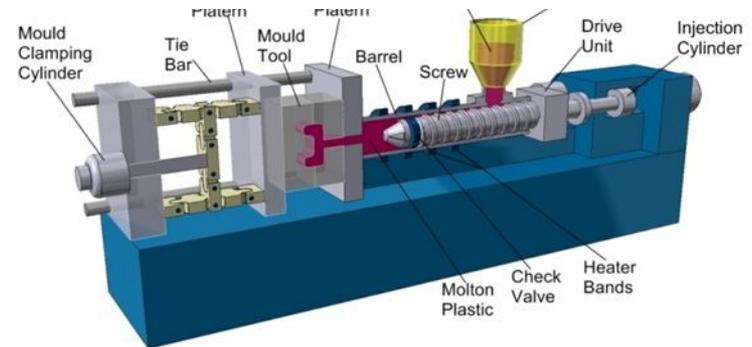


INJECTION MOULDING — Reforming



This is a high automated process used to manufacture a wide range of common goods such as washing-up bowls, buckets and cases for household electrical items. Injection moulding is best suited to thermoplastics but some thermosetting plastics can be used. The injection moulding machine is made up of: A hopper unit, a screw and injector unit, a heating element and a mould.

Injection moulding is a versatile process that can be used to produce all kinds of items from pencil sharpeners to wheelie bins. It is a highly automated process that can run 24/7. It can produce very accurate identical components but it is expensive to set up but relatively cheap to run.



Advantages

- Can operate 24 hours a day
- Can be used to make different coloured plastic products
- Inserts, such as screwdriver blades, can be moulded directly into handle
- Several smaller items can be manufactured in a single mould
- Suitable for high-volume continuous production
- High levels of accuracy
- Identical components formed each time
- Little or no secondary surface finishing is required
- Unit costs are low in comparison with initial set-up costs

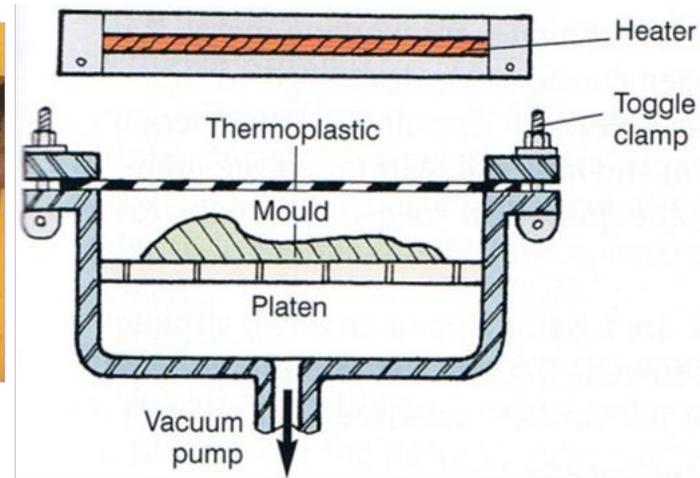
Disadvantages

- Initial machine and mould costs are high
- Some flashing may have to be removed
- Sprue pins need to be cut off



VACUUM FORMING — Deforming

Vacuum forming is a process used to make various packaging items such as Easter-egg containers, yoghurt pots, trays, dishes and masks. Generally the most suitable materials for vacuum forming are thermoplastics such as polythene, PVC, ABS and acrylic. Vacuum forming is a simple workshop process. The quality of the mould design and surface finish will determine the success of the final product. Sticking to some basic design principles will result in a more successful product



Advantages

- Lightweight, hollow products can be made
- Relatively cheap moulds can be made from MDF in the school workshop for a one off item
- Surface textures can be moulded into products

Disadvantages

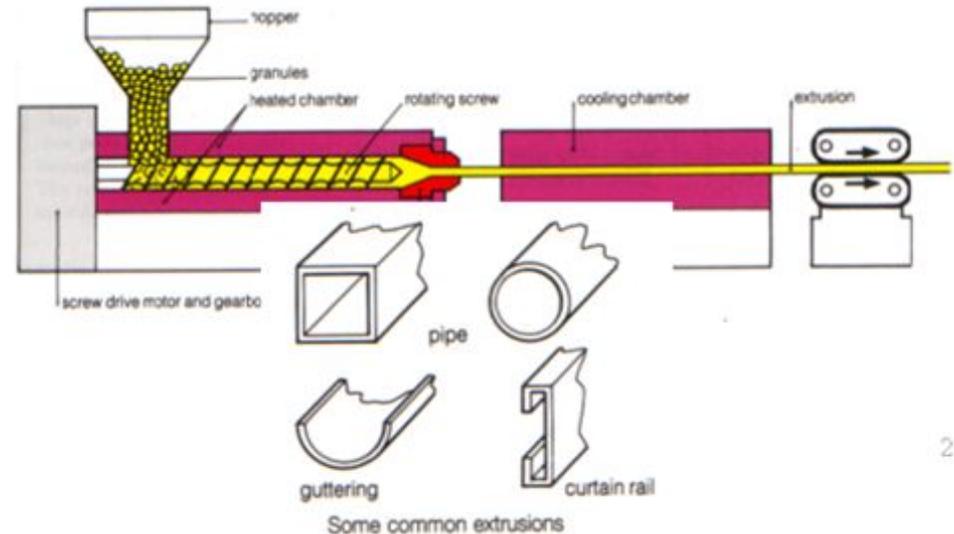
- Thermoplastic material sometimes thins too much and may burst or pop.
- Webs sometimes form between items, meaning that the formed product cannot be used.
- Products need to be trimmed and cut out.

EXTRUSION — Deforming



Extrusion is a process used to manufacture products that have a regular, fixed cross-sectional profile such as rainwater guttering or copper pipes. The material can be pushed or drawn through a die of the required cross section. Extrusion can produce continuous lengths of product, or they can be cropped to length.

Plastic Extrusion – Similar to injection moulding, plastic pellets are fed into a hopper before being fed into a heated chamber. The extrusion screw then forces the material into the desired shape.



Advantages

- Continuous lengths can be produced
- Complex profiles can be achieved
- Seamless tubes can be produced
- Small production runs can be achieved with relative ease
- Excellent surface finish on plastics
- Very high tolerances can be achieved

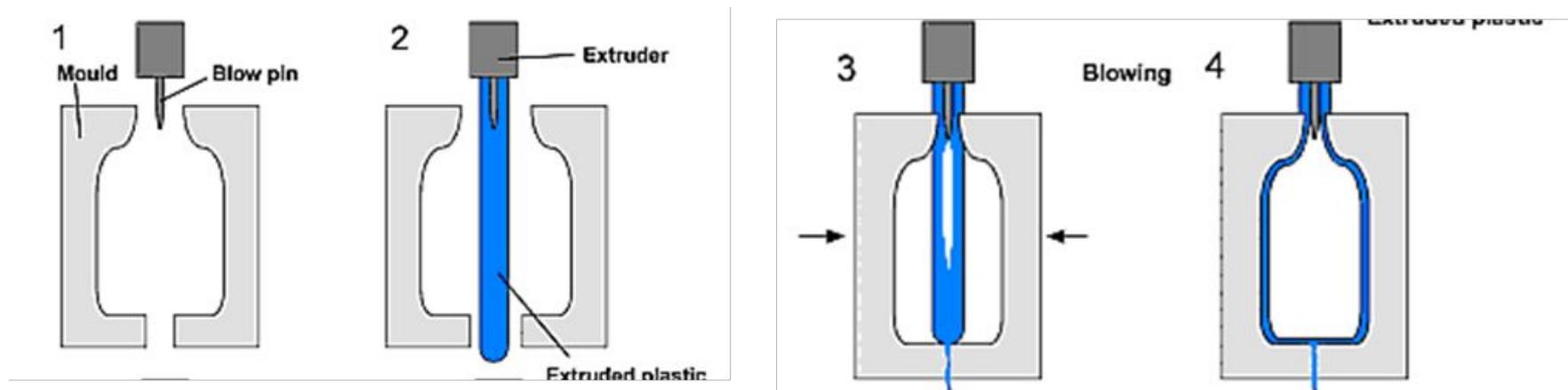
Disadvantages

- Initial set-up costs of machinery and upkeep are high
- Die costs can be very high
- Hot extrusion of metals such as steel can leave oxidised surface finish

BLOW MOULDING — Deforming



Blow moulding is a manufacturing process used to make strong, hollow plastic products such as bleach, disinfectant, fizzy drinks and shampoo bottles and water butts. The process starts with the production of a parison. The parison is a tube like piece of plastic, a bit like a hosepipe, with a hole in one end into which compressed air can pass. The mould traps the parison before air is blown in to form the shape



Advantages

- Very cheap unit costs
- Highly automated process
- Not very labour intensive
- Ideal for high volume, continuous production since it can run 24 hours a day
- Very little secondary finishing required due to nature of plastic material and mould surface finish

Disadvantages

- Initial costs of machine and tooling very high
- Not suitable for production runs
- Sometimes a seam is left around the product where mould closes
- Products sometimes need to have flashing removed