

Comparison of extrusion and injection blow molding

Extrusion blow molding

- It is best suited for bottle over 200g in weight, shorter runs and quick tool changeover
- Machine costs are comparable to injection blow molding
- Tooling costs are 50% to 75% less than injection machine
- It requires sprue and head trimming
- Total cycle is shorter than injection (since the parison and blowing can be done using the same machine)
- Wider choice of resin
- Final part design flexibility

Injection blow molding

- Best suited for long runs and smaller bottles
- No trim scrap
- Higher accuracy in final part
- Uniform wall thickness
- Better transparencies with injection blow molding, because crystallization can be better controlled
- Can lead to improve mechanical properties from improved parison design.

Common plastics for blow molding

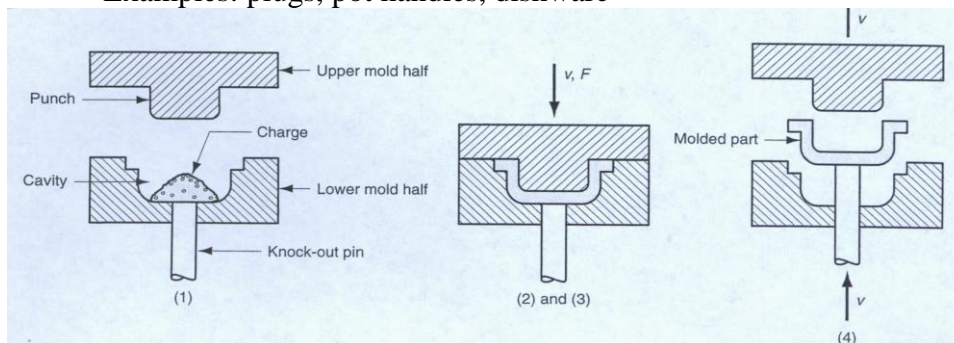
- HDPE (stiff bottle, toys, cases, drum)
- LDPE (flexible bottle)
- PP (higher temperature bottle)
- PVC (clear bottle, oil resistant containers)
- PET (soda pop bottle)
- Nylon (automotive coolant bottle, power steering reservoir)

Compression Molding

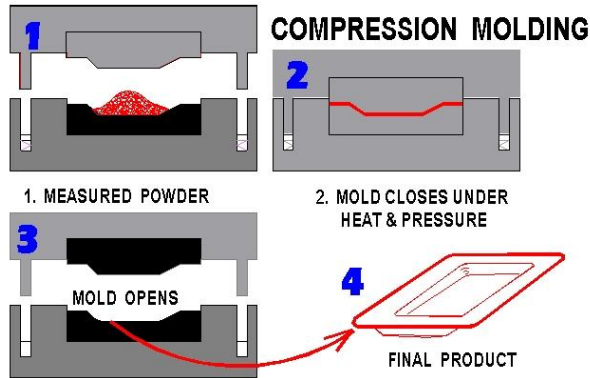
- The process of molding a material in a confined shape by applying pressure and usually heat.
- Almost exclusively for thermoset materials
- Used to produce mainly electrical products

Thermoset granules are “compressed” in a heated mold to shape required.

Examples: plugs, pot handles, dishware



Process



Transfer Molding

- A process of forming articles by fusing a plastic material in a chamber then forcing the whole mass into a hot mold to solidify.
- Used to make products such as electrical wall receptacles and circuit breakers
- Similar to compression molding except thermosetting charge is forced into a heated mold cavity using a ram or plunger.

Examples: electrical switchgear, structural parts

Process Variables

- Amount of charge
- Molding pressure
- Closing speed
- Mold temperature
- Charge temperature
- Cycle time

Advantages

- Little waste (no gates, sprues, or runners in many molds)
- Lower tooling cost than injection molding
- Good surface finish
- Less damage to fibers
- Process may be automated or hand-operated
- Material flow is short, less chance of disturbing inserts, causing product stress, and/or eroding molds.

Disadvantages

- High initial capital investment
- Labor intensive
- Secondary operations maybe required
- Long molding cycles may be needed.

Cold Molding

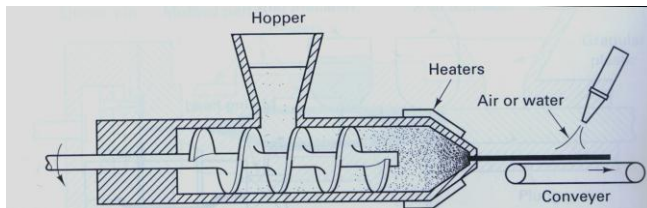
Charge is pressed into shape while cold then cured in an oven. Economical but usually poor surface finish

Extrusion

Extrusion is the process of squeezing metal in a closed cavity through a tool, known as a die using either a mechanical or hydraulic press.

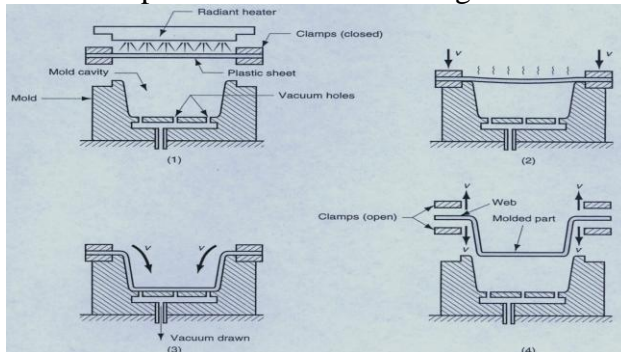
Similar to injection molding except long uniform sections are produced –e.g. pipes, rods, profiles.

Extrusion often minimizes the need for secondary machining, and as a result could result in financial savings. However extruded objects are not of the same dimensional accuracy or surface finish as machined parts.



Thermoforming

Sheet material heated to working temperature then formed into desired shape by vacuum suction or pressure. Suitable for large items such as bath tubs



Rotational Molding

Used to form hollow seamless products such as bins. Molten charge is rotated in a mold in two perpendicular axes simultaneously, or rotated while tilting.

Foam Molding

Foaming agent is combined with the charge to release gas, or air is blown into mixture while forming.

Used to make foams. Amount of gas determines the density

Calendaring:

Molten plastic forced between two counter-rotating rolls to produce very thin sheets e.g. polyethylene sheets

Spinning

Modified form of extrusion in which very thin fibers or yarns are produced

Machining

Material removal process such as drilling, turning, thread cutting. E.g. nylon fasteners. In general thermoplastics have poor machinability.

Pressure Forming

It is nothing more than Vacuum Forming with pressure assist to the forming process to enable crisper detail and sharper features. Pressure Forming utilizes pressurized air to push the heated sheet into the cavity. Pressure formed parts can resemble the detail of injection molded parts at a fraction of the tooling cost.

Vacuum Forming

It is accomplished by heating the plastic sheet until it is pliable enough to be vacuumed either into a female mold or over a male mold.

Source : <http://nprcet.org/e%20content/mech/MT.pdf>