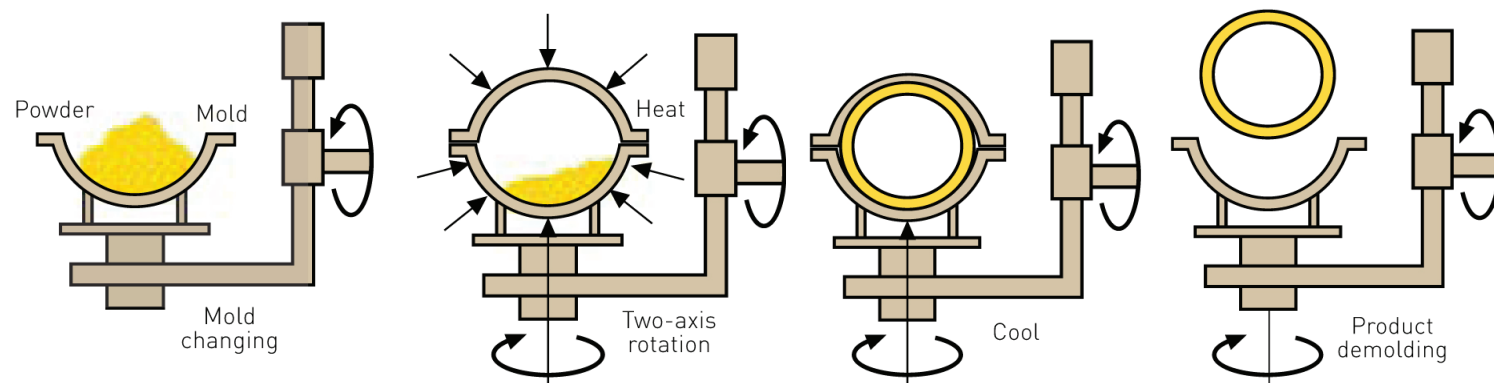


Rotational Molding

DIAGRAM



COST

Unlike other polymer moulding processes, rotational moulding does not involve pressure loading. As a result the moulding tools are made from more cost effective materials such as sheet steel and aluminium. Furthermore the tools involved do not withstand the wear that other comparative processes involve therefore the moulds last far longer. Rotational moulding costs a fraction of the price of blow or injection moulding tools, as a result new products are often firstly produced using rotational moulding as it can be brought to market cheaply and quickly.

POST PROCESSING

Rotational moulding creates almost no waste resin, as a result there is almost no need for secondary tooling other than the desired end product decoration. If there is a flash line along the parting line, it may need to be removed as part of post processing. However most flash lines created through rotational moulding are usually insignificant. Final graphics on a product are applied as part of post-processing though can be incorporated as part of the moulding process.

APPLICATION

Rotational moulding allows great design flexibility as complex geometric shapes can be achieved. Its versatility enables it to be used to make a wide variety of items such as:

- medical products
- water storage tanks
- floats, buoys and pontoons
- toys and playground equipment
- traffic cones
- manhole chamber tanks
- automotive products such as mudguards, dash boards and steering wheels

SPEED (CYCLE TIME)

Rotational moulding is often criticised due to its slower cycle times, where only one or two cycles occur per hour. Typically 15- 30 pieces can be produced in a 24-hour period which is far slower than its comparative processes such as injection or blow moulding. Multiple cavity moulds can be implemented to improve cycle times, allowing two or more parts to be produced per cycle.

PROCESS OVERVIEW

Rotational moulding is a unique bi-axial plastic casting technique that is used to produce hollow one-piece seamless components. The process itself is fairly simple and can be broken down into four main stages. It begins with filling the specialised mould with a pre-determined quality of polymer resin powder or pellets, the oven is pre-heated to around 260°C -370°C though the temperature varies due to the polymer grade used. Once the oven is sufficiently heated the polymer filled mould is locked and loaded in. Inside the oven the mould is slowly rotated. Once the component is formed, the mould is cooled using large fans, water or a combination of both. Cooling of the component is carefully monitored as rapid shrinking can cause the part to warp. Finally, once the part is sufficiently cooled the mould is opened and the part removed.

MATERIALS :

Rotational moulding exhibits the use of a wide variety of plastic polymers, the most commonly used being polyethylene (PE). However other polymers are often used when a different or unique finish is required on the final product.

polyethylene (PE): polyethylene is able to withstand prolonged periods of heightened temperatures without suffering any deterioration of quality thus it has become the most commonly used polymer for rotational moulding the process. Additionally polyethylenes low cost and light weight makes it a popular choice for manufacturers.

Other commonly used plastics are:

Polycarbonate (PC): Polycarbonate is a strong thermoplastic with high impact resistance. Similar to polyethylene it is able to withstand long periods of high heat, making it suitable for rotational moulding. Some grades of PC can also be transparent to visible light.

Ethylene vinyl acetate (EVA): Ethylene vinyl acetate (EVA) is a transparent flexible polymer with good chemical resistance, it is usually used in the production of teats, vacuum cleaner hosing and flexible tubing amongst other consumer products. Other properties of EVA include good low temperature flexibility (-70°C) and a high coefficient of friction.

Polyurethane (PU): polyurethane is a resilient durable polymer that often out-performs other conventional metals such as steel rubber and plastic in its ability to resist testing environmental factors such as abrasion, oil, heat, solvents and acid. Polyurethane is most commonly used to create water tanks, sea toppers, agricultural products and floatation devices.

Polypropylene (PP): polypropylene is a semi-rigid heat resistant polymer that presents similar properties to polyethylene but has a lower density and higher softening point. Polypropylene is most commonly used to form drums, condiment bottles, and thin walled containers.

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