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Transfer Molding

To improve on the compression molding process, a second method of processing thermoset molding materials was developed, called Transfer Molding. The mold consists of a chamber called a **pot,** separated from but connected to the cavities by way of **runners** and **gates**. In transfer molding the mold is closed and fully clamped; then all the material for the shot of parts is loaded into the pot. The material is usually in the form of **preheated** compacted pills called preforms. In the case of BMC products, the material will be loaded into the pot as a log or in bulk. Lastly, a second cylinder pushes the material out of the pot, through the runners and gates and into the cavities. The cylinder is held in under pressure and the mold is kept closed long enough to **cure** the parts. (The pressure on the transfer cylinder should be about 5.5 - 6.9 MPa (800 - 1,000 psi) and the transfer time should be from 3 - 8 seconds.) This typically means that the parts are held in the mold until they can be removed without blistering subsequent to removal. The **length of cure** is primarily determined by the thickest cross-section in the part, the temperature of the material loaded into the transfer pot and the temperature of the mold.

The mold is heated by electric cartridge heater, steam or oil to a temperature range of 165°C - 182°C (330°F - 360°F) for phenolic molding compounds, 150°C - 177°C (300°F - 350°F) for melamine-phenolic molding compounds, 163°C - 182°C (325°F - 360°F) for PLENCO granular polyester molding compounds or 143°C – 171°C (290°F - 340°F) for PLENCO BMC polyester molding compounds. The temperature of the preheated material is usually 104°C - 116°C (220°F - 240°F) for the phenolic and melamine-phenolic molding compounds, 93°C - 100°C (200°F - 212°F) for PLENCO granular polyester compounds and 32°C - 71°C (90°F - 160°F) for PLENCO BMC polyester molding compounds.

What are the advantages of Transfer Molding?

- Loading the material for the entire shot into one location is less time consuming than loading preforms into each individual cavity.
- Longer and smaller diameter core pins may be used because they can be supported on both ends.
- With the mold being closed before any material reaches the cavity, metal inserts can be molded into the parts without flashing them.
- Across parting line dimensions are more easily held to tight tolerances.
- Parting line flash can be held to a minimal thickness if the mold is designed properly and well maintained.

What are the disadvantages of Transfer Molding?

- Warpage is more of a problem because the flow of transfer materials is softer and shrinks more than compression grade materials. In addition, the pushing of material through a runner and a gate, orients the material, which results in non-uniform shrinkage.

- Because the material flows from one location to fill the part, you will see knit lines opposite the gate at each core pin.

- The scrap rate for transfer molded parts will usually be higher than that for compression molded parts because of the added scrap from the cull and runner.

- To prevent the mold from opening slightly resulting in heavy flashing of the parts, the clamping tonnage for transfer mold parts is greater than for compression molded parts. As a result, a compression mold can have more cavities of a given part than a transfer mold for the same part in the same press.

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