



Transfer Molding

To improve on the compression molding process and mold parts with geometries that compression molding is unable to produce, a second method of processing thermoset molding materials was developed - Transfer Molding. The mold consists of a chamber called a **transfer pot (also known as a transfer or shooting cylinder)**. It is separated from, but connected to the cavities by way of **runners** and **gates**. There are two methods of transfer molding; top transfer and bottom transfer.

In “**Top Transfer Molding**” the mold is closed and fully clamped; then the material shot placed into the transfer pot. In “**Bottom Transfer Molding**” the mold is fully open and the shot of material is placed into the transfer 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 transfer pot as a log. Lastly, the transfer cylinder pushes the material out of the transfer 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. Typical pressure on the transfer cylinder is about 800 - 1,000 psi (5.5 - 6.9 MPa) and the transfer time should be from 3 - 8 seconds. This 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 330°F - 360°F (165°C - 182°C) for phenolic molding compounds, 300°F - 350°F (150°C - 177°C) for melamine-phenolic molding compounds, 310°F - 350°F (154°C - 182°C) for PLENCO granular polyester molding compounds or 290°F - 340°F (143°C - 171°C) for PLENCO BMC polyester molding compounds. The temperature of the preheated material is usually 220°F - 240°F (104°C - 116°C) for the phenolic and melamine-phenolic molding compounds, 200°F - 210°F (93°C - 99°C) for PLENCO granular polyester compounds and 90°F - 160°F (32°C - 71°C) for PLENCO BMC polyester molding compounds.

What are the advantages of Transfer Molding?

- Parts with geometries that compression molding was unable to produce are now producible.
- 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, knit lines opposite the gate and at each core pin are likely to occur.
- 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. Thus a higher tonnage press is required.

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This information is suggested as a guide to those interested in processing Plenco Thermoset molding materials. The information presented is for your evaluation and may or may not be compatible for all mold designs, runner systems, press configurations, and material rheology. Please feel free to call Plenco with any questions about PLENCO molding materials or processing and a Technical Service Representative will assist you.