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Hydraulic Presses and Molding Processes

Making the Optimal Choice for Your Molding Application

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Hydraulic Presses and Molding Processes – Making the optimal choice for your molding application

Depending on the material, volume, size and shape of your molded parts, using the optimal molding process can reduce your operating costs and improve your part quality.

Here are some of the most commonly used hydraulic press molding processes:

Compression Molding
This is the most widely used production method for molding rubber products. It is ideal for low to medium volumes and can be used for a large variety of part sizes and materials, including high cost materials and applications that demand extreme hardness. It is a very useful molding process for forming bulky parts, gaskets, seals and O-rings. It is also a very efficient, low waste method that offers the simplest process, lowest investment and greatest flexibility. Compression molding generally results in lower amounts of scrap. It does not consume excess rubber in the runner of an injection mold, or in the pot of a transfer mold.

The most commonly viewed drawbacks to compression molding are longer cycle times and costly labor costs. However, both of these can be addressed to equal or surpass the injection molding process. Cycle times for compression molded parts using preheated preforms can be less than for injection molded parts. Automated preform, loading/unloading, and post handling equipment can be integrated with a compression press to nearly equal the labor cost of injection.

Compression molding is best suited for:

- Low to medium production volumes
- Medium to large sized parts
- Thick cross-sectional parts
- Low to high durometer materials including very high hardness – Ideal durometers 60A-90A
- More expensive rubber formations and other high cost materials
- Molders who require quick tooling changeover

Compression molding advantages over other methods:

- Lowest investment for tooling and machinery
- Shortest mold setup times make a perfect match for short production runs
- Internal stress is minimized, producing less warping
- Ability to process very stiff, high durometer materials
- Generates less waste than other production methods
- Ability to process thin to large thick parts
- Greatest flexibility in molding various part sizes and materials
- Less shrinkage of material leads to greater accuracy of parts
- More cavities per mold are possible as lower molding pressure is required

Compression molding disadvantages:

- Requires a preform (a pre-measured slug of material)
- Can produce a higher rate of dimensional inconsistency
- Generally produces the largest parting line
- Flash removal requires a secondary operation
- Typically the most labor intensive, but can be automated to nearly equal injection molding.

Other Compression Molding Applications

Compression molding presses are used in virtually every molding application from various thermoset to thermoplastics, including laminates and composites. There are many others processes that can use compression presses in a stand only condition, or in combination with auxiliary material dispensing systems.

Transfer Molding

In concept, transfer molding is a simplified version of injection molding. It provides many of the benefits of both injection and compression molding. Transfer molding allows the molding of intricate parts while providing highly accurate dimensional control for low to medium production volume requirements. The cycle times are generally longer than injection molding, however they can be very cost competitive.

Transfer molding can also reduce the cure time by heating the material before it reaches the mold. The material is forced into a closed mold by means of a hydraulically operated plunger or by using the compressive force of the hydraulic press in combination with a tooling with an internal transfer pot.

Transfer molding was developed to facilitate the molding of intricate products with small deep holes or numerous metal inserts. It is ideal for insert molding because the tool is closed prior to the material being transfer, which limits the amount of shift with the insert parts.

Transfer molding is best suited for:

- Mid range dimensional tolerances
- Low to medium volume production
- Small to medium sized parts
- Delicately shaped parts
- Low to medium durometer materials
- Insert molding
- Colored and translucent compounds

Transfer molding advantages:

- Shorter production cycles than compression molding
- Ability to maintain closer dimensional tolerances than compression molding
- Excellent uniformity from mold cavity to mold cavity
- Rapid mold setups
- Typically less flash than compression molding because the cavity plates are closed
- For multi-cavity tools, labor cost is lower than compression since only a single pre-form is necessary.

Transfer molding applications:

- Low to medium durometer materials
- Low to medium production volumes – flexibility with part sizes
- Small delicate parts

Transfer molding disadvantages:

- Higher Investment Cost than compression molding (press, tooling and auxiliary equipment)
- Requires a preform (a pre-measured slug of material)
- Not well suited for filled materials
- Generates some amount of material degradation
- Cannot process high durometer materials
- Tool maintenance costs are typically higher than compression molding
- Wear of cavities is less than injection molding, but gates and runners erode
- Labor content typically higher than injection
- Flash Pad or Pot Pad is excess scrap material

Compaction Molding
In compaction molding, plastic molding powder is mixed with materials or fillers such as wood flour and cellulose to strengthen or give other added qualities to the finished product. This mixed material is put directly into the open mold cavity. The mold is then closed, pressing down on the plastic and causing it to flow throughout the mold. The pressing and compaction rate can be critical to the process. Entrapped gases can create voids, defect and poor material properties that result in high scrap rates.

Typical materials for compaction molding:
Phenolics
Polyamides
Melamines
PTFE

About TMP, A Division of French

TMP, A Division of French engineers and manufactures technologically advanced hydraulic presses from 5 to 3,000 tons for compression, lamination, transfer and vacuum molding. In addition to the extensive line of hydraulic presses and mixing machinery, TMP services machines and offers machine rebuilding, which invariably includes upgrades, higher automation, improved product quality and process control.

Now owned by The French Oil Mill Machinery Company, TMP is internationally recognized for building high performance machinery. Leading rubber industry companies in more than 1,500 locations in over 16 countries rely on TMP molding and mixing systems to meet their objectives for product quality and process efficiency with lower life cycle costs.

French is a 3rd generation family-owned company that custom designs, manufactures and supports process equipment for the molding, oilseed and synthetic rubber industries to customers in over 80 countries. Their 225,000 square foot corporate office and manufacturing facility are located in Piqua, Ohio.

Questions? Call (937) 773-3420

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