Preheat Compression Molding Startup Procedure for Granular Polyester Molding Compounds

Prior to setting a mold into a press, it is necessary to determine first if the mold will fit in between the tie bars of the intended press. Once this is determined and before installation begins, the minimum clamp tonnage for the mold must be calculated. A couple reasons for the need to determine proper clamp tonnage are:

- Insufficient clamping force may lead to parts having unacceptable dimensions such as being too thick because the press may not have sufficient clamp force to force the material throughout the cavity(s)
- Potential mold damage from installing a mold that is too small for a press. Example: A mold that requires only 75T of clamp force is installed into a 400T press with non-adjustable clamp force may be damaged from too high of clamp pressure.

To determine the correct tonnage, multiply the projected area of the part at the parting line by 4,000 psi ($2T/in^2$) - 6,000 psi ($3T/in^2$).

Example: A part having a 12" diameter requires a minimum clamp pressure of 226T ($2T/in^2$)

This can be calculated from the following formula:

Clamp tonnage required = $r^2 * \pi * T/in^2$

$6"^2 * 3.1416 * 2(T/in^2)$ = 226 tons of clamp pressure

Once a mold has been matched with a press and is installed in that press, a standard procedure should be followed to begin molding parts. Following a written procedure each time a mold is installed makes it easier for the press operators by helping to minimize the omission of any procedural steps. After the mold is installed, the following startup procedure can be implemented.

1. Turn on the heat and frequently check the temperature of the molding surfaces with a calibrated pyrometer and surface probe. Typically, start with a mold temperature of 310°F - 350°F (154°C - 182°C). It is desirable to have as little temperature variance (typically within 10F) across the mold surface as possible.

2. Obtain the molding process information if this job has been molded before.

3. If this job has not been run previously, review process information from similar molds.

4. Obtain blank process set up sheets to record press settings and information.

5. Setup / enter press settings **BEFORE** waxing the mold.

6. Breathing PLENCO granular polyester molding materials when compression is typically not suggested.

7. If you are using a **pre-plasticizer** to preheat the material, the screw RPM in most cases should be 60 or less. A faster RPM may not allow the material to feed evenly and the result will be the same as running at a slower RPM. In addition, running at a slower screw speed usually produces a uniform stock temperature and a more consistent shot weight.

8. When using a **reciprocating screw pre-plasticizer**, a typical backpressure to start with is 0.3MPa (50 psi).

9. Check the **preheat temperature** of the material being loaded into the mold. It should be 200°F - 210°F (93°C - 99°C). It is to be measured by taking an extruded slug or preheated perform and probing it 2 or 3 times using the needle probe of a calibrated pyrometer. The preheat temperature should always be rechecked after any changes are made to the process.

NOTE: Preforming PLENCO colored polyester materials can increase the risk of contamination due to potential scuffmarks from the preforming dies. An alternative to preform-preheat molding is utilizing a pre-plasticizer. Typically, the cosmetic appearance of a part molded with preheated preforms will not be as good as that of a part molded with a pre-plasticized slug.

10. Just prior to charging the cavities with material for the first shot, the mold should be **completely waxed**. Carnauba wax works well for this purpose. To wax a mold, melt the wax on the molding surface and with the aid of a small natural bristle paintbrush, spread it over the entire molding surface, getting it into every pocket and corner. Remove any excess wax from the mold surface as quickly as possible to avoid wax burning onto the mold surface.

11. Run first shot to evaluate results.

12. The molding parameters should be adjusted to produce good parts from all cavities, each shot.

13. After an acceptable molding process is established, it should be capable of continuing without change for many hours.