FRP Mold Design

General Information

It now is well understood that a good matched metal chrome-plated steel mold is required for optimum production conditions when one is molding bulk molding compound (BMC) or sheet molding compound (SMC) parts.

We will discuss the various details that must be covered in designing fiberglass reinforced plastic (FRP) matched metal steel molds. They have been presented in such a manner that they can be easily converted into a mold specification by the molder.

The actual design of the mold can be done either by the molder or by the moldmaker. Larger molders maintain their own engineering staffs to design molds, secondary fixtures, and to follow the mold during its progress through the moldmaker’s shop. Smaller molders take advantage of the moldmaker’s engineering staff for the development of working mold drawings. Either way it is necessary for the molder to develop a satisfactory mold specification sheet for the designer to follow.

The mold specification will automatically standardize such items as handling bolts, mounting means, heating channels, etc., so that most molds can be mounted in a press and made ready for production with a minimum of maintenance time.

When the moldmaker is expected to design the mold, the molder must furnish the following minimum information:
1. Part print
2. Master model
3. Size of press to be used with the mold, including mounting hole patterns, etc.
4. Expected molding pressure
5. Type of molding compound to be used
6. Molding material shrinkage
7. Ejector cylinder line pressure
8. Operating temperature ranges for both core and cavity
9. Type of steel to be used.

Figure 3.1 consists of a sketch of a typical small mold and includes the terminology used throughout this chapter.

**Mold Steel**

Preliminary mold drawings should have been completed by the responsible design group and approved by the molder before ordering steel.

The anticipated production quantities expected from the mold or the product end use or both should dictate the choice of mold steel, as shown in Table 3.1.

When steel forgings are used, a certification of the steel composition, vacuum degassing, and hardness should be supplied by the steel company to the moldmaker.

Stress relieving of both the core and the cavity are necessary after rough duplicating. The steel company should provide the time and temperature requirements for the proper stress relieving.

**Master Models**

Male master models of mahogany or laminated hardwood should be constructed to the outside surface of the part. Those master models should be finished with a protective coating to prevent moisture pickup or loss that might cause distortion.