



*Custom Injection Molding*

**molding dynamics, inc.**

## **INJECTION MOLDING EXPLAINED**

**Injection Molding** is a standard method for manufacturing plastic products and is used to make a variety of parts in automotive, medical, consumer and industrial applications. Reasons that injection molding is a popular technique include:

- Capable of high production rates
- Simple to Complicated shapes are possible
- High tolerances can be maintained
- A wide range of materials may be used
- Extremely cost efficient with low labor rates

Injection molding is accomplished using an injection molding machine, plastic resin and a mold. The machine consists of two segments:

- Clamping Unit – holds the mold closed under pressure
- Injection Unit – melts the plastic resin and rams the molten plastic into the mold

Machines come in many sizes, optimized to produce various sizes of part, and are characterized by the clamping force the machine can produce.

A mold is most commonly constructed out of aluminum or steel, but other materials are possible. It is constructed in two halves with the shape of the part precision machined into the metal. Molds may be extremely simple and inexpensive or highly complicated and expensive. The complexity is proportional to the part configuration and the number of parts per mold.

Thermoplastic resins come in the form of granules, and are the most popular type of material used in injection molding. There are many thermoplastic resin types with a wide range of material properties suitable for a great number of product applications. Polypropylene, Polycarbonate, and Polystyrene are examples of commonly used resins. In addition to the vast material options which thermoplastics offer, they are also recyclable, versatile and easily melted for processing.

The molding process, which occurs in the molding machine, has six basic steps:

1. Clamping – The clamping unit of the machine presses the two halves of the mold together
2. Injection – Melted plastic from the injection unit of the machine is rammed into the mold
3. Dwelling – Molten plastic which has been injected into the mold is held under pressure to ensure all areas of the part are filled with plastic
4. Cooling – The hot plastic is allowed to cool into the final part shape while still in the mold
5. Mold Opening – The clamping unit of the machine disengages and separates the mold into two halves
6. Ejection – the finished part is ejected out of the mold

Injection molding is a great technology for finished production on a massive scale; however, it is also useful for prototypes that are used in initial product design or for consumer and/or product testing. The possibilities and applications for utilizing injection molding to produce plastic parts are seemingly infinite and offer manufacturers a cost effective method for producing reliable components.