

Injection Molding FAQ's

Why should I use injection molding to mfg. a part?

Injection Molding is one of the most popular forms of processing plastics as it enables us to mold fairly complex shapes at high production rates and hold fairly tight tolerances while maintaining good dimensional stability. Thermoplastic resin used in the injection molding process can be reground and reprocessed however some physical properties of the plastic may be lost through each generation of regrinding. With the amount of engineered plastic resins available today, many cost saving opportunities exist utilizing plastic in place of metal when manufacturing large volumes.

How much does an injection molded part cost?

Typically an injection molded part can cost anywhere from a fraction of a cent to a few dollars. The cost of an injection molded part is dependent on many factors such as size and complexity of the part which will affect production rates, the plastic resin being molded, the number of cavities in the mold just to name a few.

How long does it take to mold a plastic part?

Typically the cycle time for an injection molded part can be anywhere from a few seconds to a few minutes. Many factors determine this such as the size of the part, the material being molded, the mold design as well as the part design. Set up time for a mold can range anywhere from a few minutes to a few hours. Regardless, once a setup is established and the process is stable, injection molding machines usually run around the clock so that the set up and start up time can be absorbed into the cost of the part.

How much does an injection mold cost?

Typically an injection mold can cost anywhere from a few thousand dollars to a few hundred thousand dollars. Many things contribute to this cost with the biggest factor probably being the complexity of the part as well as the size of the part. This can be deceiving because a very simple looking part could be very difficult to build a mold for because it has an undercut that will require moving parts in the mold to move out of the way allowing the part to be ejected freely when the mold opens.

Who owns the injection mold?

In most cases the injection mold is owned by the customer who designed and is purchasing the parts. Unless specific contract terms are agreed upon, the customer usually will have the right to take their mold anywhere to have parts molded, however there is some risk involved in making sure the right equipment is available and that an acceptable process can be established in the new environment.

How long does it take to build an injection mold?

Typically an injection mold can take anywhere from a few weeks to a few months to build. Many factors can contribute to this time such as a supplier's backlog or amount of resources available as well as the complexity of the part or the complexity of the mold design and the number of cavities needed.

What if I want to change my part design? Can the original injection mold be modified?

In some cases yes depending how the injection mold was designed. A good injection mold will be built using steel inserts that make different features of the part and assembled all together in a mold base. This makes it easier to change one feature of the part when all you have to do is modify or re-build a small steel insert. When

the whole part design is cut into one piece of steel, some design changes can be more challenging and may require building the entire mold over again to incorporate the design change.

What is the typical life expectancy of an injection mold?

Most mold makers build molds to industry standards such as SPI Class 101 which should guarantee a mold life of 1M Shots. This means if your mold has 4 cavities you should get 4M parts from you mold with out any problem. Depending on the complexity of the part and the plastic resin used, this amount may vary. It is not unlikely for you r mold to last for well over 1M shots. If your part is complex and the mold has small intricate steel inserts or you are using an abrasive plastic resin such as a glass filled polycarbonate, mold wear will be more progressive shortening the life of your mold.

What is a mold cavity?

The cavity is the part of the injection mold that forms the part. An injection mold could have one single cavity or multiple cavities of the same part or a family of different parts. Multiple cavities will increase that injection mold cost however lower the cost for the injection molded parts since multiple parts could be made during one molding cycle.

What is a parting Line?

Where the two halves of an injection mold come together is known as the parting line. A witness line of where the mold was parted can usually be seen on the molded part. Sometimes the parting line may be stepped rather than flat all the way around the part.

What is the difference between the “A” half and the “B” half of an injection mold?

The half of the injection mold that sits stationary in the machine and has plastic injected into it is known as the “A” half. The other half that moves back and forth to open and close the mold is known as the “B” half. When the mold is open, the part is ejected from the “B” half.

What is an ejector pin?

These pins actually push the part off of the “B” half of the Mold. Holes are made on the “B” half of the mold and steel pins are ground flush with the mold cavity surface on the “B” half. The other ends of the pins are connected to a plate (known as the “Knock Out Plate”) behind the mold. When the injection mold is open, the molding machine is programmed to push a steel rod (known as the “Knock Out Bar”) forward. This pushes the knock out plate forward moving all of the ejector pins forward simultaneously to eject the part.

What is a gate?

A gate is the opening where the plastics flows into the injection mold cavity.

What kind of tolerances can you hold on an injection molded part?

To hold a tolerance of plus or minus .001 of an inch on a plastic part is not unheard of. Some plastic materials are easier to control variation then others. Injection molding machines today are sophisticated and advanced enough to produce relatively accurate and repeatable results. If you are looking to maintain six sigma quality with a tolerance window of .002 of an inch, you may be starting to push the limit as there may be variations in gauge measurements and other areas that throw off your statistics. Some plastic resins of course are more predictable and shrinkage is consistent and easier to control from part to part.

What does Steel Safe Mean?

When a mold maker builds an injection mold, he has to take into account the plastic shrink rate. So if he were to build an injection mold for a part that was molded from a plastic with a shrink rate of .003 in./in. and needed to have a 1 inch inside diameter then the mold builder would have to build a mold core 1.003 in. in diameter to allow for shrinkage. In order to leave room for error (whether it is in measurement or shrinkage) he would build the core slightly over size because he could always remove steel to make the core smaller if needed after the part is molded. If the part ends up too small it would not be possible to add steel to the mold core to make it bigger so it would require a lot more work to fix the problem by building the mold core over. Please note that if we were trying to control an outside diameter, steel safe would mean making the mold cavity on the small side. If the O.D. of the part was too small, steel could be removed from the mold cavity allowing the part to be molded with a bigger O.D.