Seven Ways to Cut Costs on Injection Molded Parts

When producing injection molded parts, a variety of factors affect a part's final cost, including part design, production time, the temperature and pressure used, and the and the type of plastic resin chosen. However, finding an injection molding company to work with you during the earliest stages of design is a critical first step to ensuring high-quality parts at the best price. Following these best practices will go a long way toward minimizing part costs without compromising your design goals.

1. Choose the right injection molding company.

The first step toward getting the best part at the best price is choosing the right injection molding partner and getting that company involved in the design process as early as possible. Often the best company for the job isn't the largest or best-known molder in the area. Your final cost involves much more than the price on an invoice. Given the increased emphasis on risk management in the new ISO 9001:2015 standard, it is important to vet the companies you are considering carefully to minimize the chance of surprises.

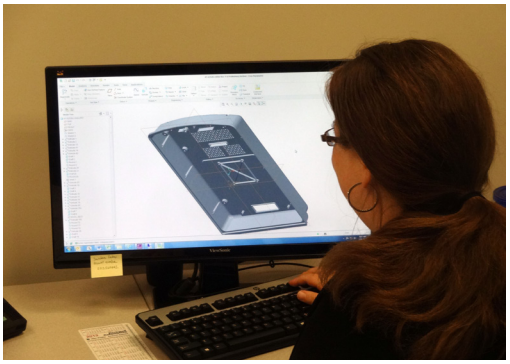
The Ferriot factory.

ISO, the global standards organization, instituted changes to this quality standard to combine "the process approach with risk-based thinking, and employing the Plan-Do-Check-Act cycle at all levels in the organization," according to a 2015 press release. The standard is key for any company looking for an injection molding manufacturer that can consistently provide products and services conforming to their requirements.

Select a company experienced in manufacturing your types of products, especially if governmental regulations and certifications are concerned. The company should have production capabilities that match your product's requirements, including machine tonnage, gas-assist, robot/automation, and integrated machine monitoring capabilities. Ideally, the injection molding company you select will also have the capability to perform any secondary

processes your product requires, such as painting, inserting, ultrasonic welding, pad printing, etc.

Also, it's important to consider minimum production quantities and lead times when launching a new product. These requirements are often negotiable, so keep digging until you find a molder with the expertise, capacity, and desire to help you with your project.


A part's design is ready for inspection.

2. Optimize your product's design.

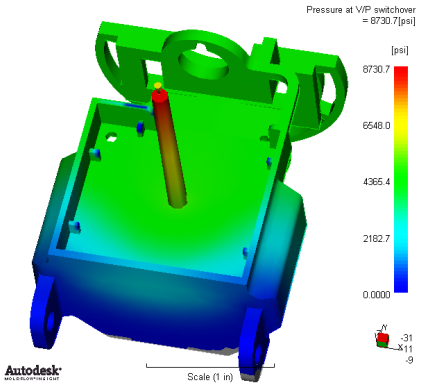
Make sure your part's design provides generous radii, where possible, to eliminate areas of high stress concentration. Uniform wall thicknesses with reinforcing ribs and gussets are critical. The result will be a more robust part that saves you money by reducing material consumption and shortening cycle times. Ferriot can provide engineering assistance and product development support to ensure the part's design allows for easy manufacturability.

3. Select the right resin for your project.

Finding the right resin for a particular part requires weighing the advantages of a variety of materials in terms of how they allow you to achieve all of your goals, including cosmetic appearance, strength, chemical or environmental resistance, and cost. Often, you'll need to make hard decisions about which of your goals is most critical to the overall success of the final product. Download our free Injection Molding Resin Selection Workbook to begin the process of resin selection. Using it to note your requirements in advance of meeting with your Ferriot representative will not only speed the selection process but help ensure that the resin chosen is the most appropriate and cost-effective one for the design of the mold and the injection molding press to be used.

4. Use mold filling simulation/analysis tools.

By running simulations like those provided in Moldflow® plastic injection molding simulation software, we can help you evaluate your part's manufacturability during the early stages of design. By simulating the mold injection process, we can identify potential issues like air pockets and knit lines, which allows us to optimize the feed system design. Tooling design can also be refined to improve part quality, shorten cycle times and eliminate the need for costly mold rework. (See inset.)



Practice Makes Perfect. *Simulation software can simulate how a mold will perform during fill, before the mold even exists. The software uses CAD models of the mold design and can be configured to simulate different types of plastic materials. The image at left, taken from a Fill + Pack + Warpage type of analysis, shows injection pressure at switchover. Ferriot engineers were particularly interested in making sure that the part would fill completely, with special attention paid to weld line location, molding parameters, and warpage.*

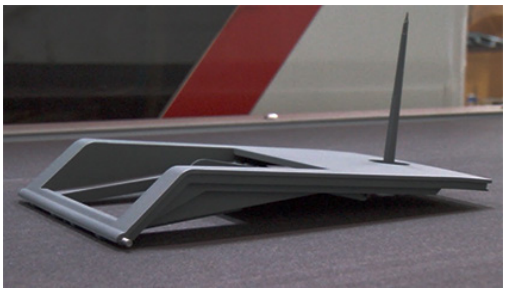
Image courtesy of Reddit.

5. Review your part tolerances.

Specifying overly tight tolerances will require additional mold manufacturing steps, increasing the mold manufacturing cost, production and molding cost, as well as residual maintenance cost. Ensure the tolerances you specify are truly necessary to meet your needs and identify where there's room for flexibility. For some manufacturers, however, tight tolerances are justifiable to ensure part consistency over the long term. For example, Lego® building blocks have tolerances as small as 10 micrometers because they must engage with every other Lego block made over the last half century, fitting firmly, yet allowing a child to disassemble them easily.

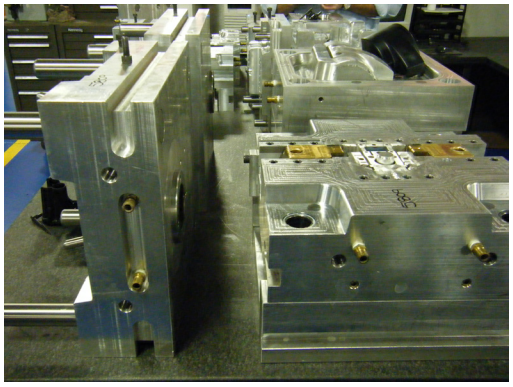
6. Consolidate your processes.

A variety of production strategies can help you minimize post-molding labor costs; many part requirements can be built right into the mold or production process, such as inserting or labelling requirements. Inserts can be molded into the plastic using robots during the molding cycle. (Watch the video of how this is done.) This insert can be made of different types of metal, including steel and aluminum and/or non-metal components. In some instances, the inserts are simple designs such as electrical leads, fasteners, pins, or sheet metal. Other times, wire meshes and plates are used as inserts, strengthening the final product of the injection molded unit. These are not the only options for injection molded inserts—more complex designs can also be molded as inserts.



An insert-molded part.

When labeling is required, any necessary labels can often be molded into the part itself to eliminate the need for this post-molding operation. Similar to in-mold labeling, the mold design process can also create decorations or finishes that would normally be added in subsequent production steps. Other cost-saving ideas include the use of multi-cavity or family molds, which can produce multiple copies of the same part simultaneously or all the different parts of a single assembly at the same time, for more efficient, less costly production.


Product molds at the Ferriot plant.

7. Consider your product lifecycle.

Producing molds and dies in general can be expensive and time-consuming because each is highly customized, and tool steels require expertise to work. Plus, they must exhibit high dimensional accuracy. However, before you begin to develop the right tooling solution it's prudent to consider the overall system cost, not just cost of the tooling or the molded part itself. Factor in your estimated annual usage, production quantities and the expected lifespan of the product. These factors influence many decisions about the part, including mold design, material choice, and finishing methods.

Typically, for larger production quantities, it will be well worth the effort needed to streamline any processes and optimize productivity early in the design phase. For products that you will continue to produce for multiple years, invest the extra money required to produce longer-lasting tooling. For smaller quantities, you may want to consider having the tooling built with softer, less expensive metals. In either case, new types of steel with unique microstructural properties, new heat-treating methods, and the potential to develop tooling alloys that are specific to your application may be avenues to explore.

Ready to Learn More? *To learn more about how to optimize your injection molded project, complete our Online Quote Form, available at* ***http://info.ferriot.com/request-a-quote****.*
Or, if you prefer, call us at ***(330) 786-3000*** *for immediate attention.*