

# Mass Customization, Plastic Injection Molding Style

by Denny Scher

**B**efore the Industrial Revolution of the 19th century, skilled workers made custom, one-of-a-kind products that we'd call "designer" today. Then of course came mass production - new manufacturing methods that standardized products and made them faster and more efficiently than making them by hand.

In the 20th century, we began to see a new revolution – the Customer Revolution. Ironically, despite Henry Ford's defiance of customer choice ("You can have any color you want, as long as it's black"), *mass customization* actually began in the automotive industry. If you didn't find the exact color and options you wanted in a showroom model, you could order a vehicle with the options you wanted.

Consumers became aware of choice in reference to products like cars, and demanded that this level of choice trickle down into other products. Also, competition among manufacturers and retailers led to companies creating niche products to fill the gaps left by large, mass-produced products. Lastly, advances in manufacturing technology and order-taking interfaces like the Internet made customization economically viable.

Mass customization brought the best of both worlds together – the personalized products of customization, and the efficient manufacturing practices of mass production. It created a win-win scenario for both buyer and seller.

So how did mass customization find its way into the plastic injection molding business? After all, of all the various plastic manufacturing processes, injection molding has long been the tried-and-true method of *mass production*. Huge molding machines cranked out millions of parts, all exactly the same, with high repeatability.

The answer is that the large plastic injection molding behemoths are going the way of smaller, more agile companies that are very adept at low-volume manufacturing. Of course, this is a B2B scenario where the "consumer" is a business in need of fast, custom plastic parts, but the same concept applies here as it would to an individual ordering a personalized shirt with his initials on the cuff.

In fact, B2C and B2B have a lot more in common when it comes to mass customization. One commonality is the ordering mechanism – both rely on the Internet and technology to facilitate the order process. To order a personalized shirt, one simply goes onto a website, fills in all the options, and places the order. Similarly, there are custom injection molders like Toledo-based [ICOMold](#) with sophisticated online ordering systems that allow for many custom options to be specified.

The entire online quotation and ordering system is automated. The customer simply uploads 3D CAD models of the plastic parts they want to order, and chooses options like quantity, material, color and shipping method. Then, additional "secondary" processes can also be specified right in the same ordering process. The secondary processes include painting, pad printing, chrome plating and adding threaded inserts, among others.

Special options can be specified, and the customer is no longer bound by a single, large order of identical parts. It is now possible to make changes *within* production runs. For example, by utilizing exchangeable inserts in the molds, it's possible to run a certain quantity of "blank" parts, then run another quantity with the customer's logo on them.

A discussion of custom plastic parts wouldn't be complete without mention of 3D printing, which allows complete customization of one-off parts. It has its advantages for the right circumstances, but the best method for producing a plastic part by 3D printing versus injection molding depends on quantity, quality and cost (see [Will 3D Printing Be the Demise of Plastic Injection Molding?](#)). So for the mass customization case, we're assuming these variables point to injection molding as the preferred production method.

In conclusion, just as Henry Ford's mass production model evolved into custom, online vehicle ordering, so too has plastic injection molding evolved from large volumes of identical parts, to smaller batches of customized parts, with special options specified in the ordering process.

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