Four Tips to Avoid Molding Mishaps

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Design engineers can sometimes get so caught up with the technical specifications of a molding project that they overlook the non-technical processes and miss out on an opportunity to improve production throughput. This article lays out four tips that the design engineer should follow when taking part in their next molding project so as to get the most out of the project.

Vesta operator carefully inspects a finished device to ensure compliance to product specifications.

It is a common problem, but it can mean the death of a molding program. That is, the likelihood that significant time and energy will be allocated to reviewing the technical details to ensure success, only to have a non-technical factor threaten a positive outcome. It is easy to understand how it happens, as the engineering experts are focused on the technical and functional areas. They build prints with exact requirements; identify critical and quality features; build process measurements to maintain compliance; and test for reliability with Cpk to measure performance. They remember principles of scientific injection molding, and concern themselves with polymer choices and balanced runner systems with ideal injection flow paths. They work with tooling engineers to build tools with perfect venting that maintain temperature stability. Despite all the planning and focus, these experts

may find themselves fixing problems never considered as threats to success. Fortunately, these obstacles are both predictable and avoidable.

Tip 1: Require Input From Cross Functional Teams

Molding programs are successful when all parties are involved in the program development. In addition to engineering and quality, require the organization or business partners to include their operational leads, technicians, and any other person who will be involved in the manufacturing process. Remember, the mold may require an operator to remove the molded component. Ask them for their input before steel is cut. They will view the product from the perspective of the person who is ultimately going to separate good products from bad ones. They will see risks that may be considered “unlikely” by the engineer because the same thing happened the last time the operator saw a tool with those features. They will recognize if cycle time estimates are realistic.

Tip 2: Explain What Is Not Important

Too often, the focus of product development centers on what is important. With molded products, many variables can be assumed to have value that doesn’t exist. While it’s important to consider gate and parting line locations, flash tolerance may only be critical in some parts of the design of the medical device component. If the product specification lists a universal flash tolerance or cosmetic requirement, be certain that the requirement is truly applicable to the entire part. A common example includes flash tolerances for portions of a design that are ultimately overmolded or shielded in a future manufacturing step. Designate someone to ask why and accept their challenge. They may help to avoid designing “benefits” that don’t add any benefit at all–just cost.

Tip 3: Use Molding Solutions to Reduce Work

Assembly operations can be costly and may no longer be necessary. Current molding technology has created opportunities for part sizes that have produced new options for streamlined manufacturing. Automation, tooling, and press technology have all provided possibilities for in-process molding steps that are currently supported with secondary steps. This could be a great time to review legacy products and challenge the manufacturing processes to capitalize on the benefits of technology advancements that have occurred since the product was developed. While it’s certainly more fun to design the next new widget, sustaining engineering can create significant organizational benefit by simply asking, “What new technology has been created since this part was originally designed?”

Tip 4: Walk the Floor

Molding operators will improve the process over time when permitted. Book molds will be handled with experienced movements. Cores will be removed with cautious attention. Workstations will be rearranged to facilitate workflow. All of these changes will exist in compliance with the process qualification procedures and process guides that have been established, but most will represent customization towards efficiency and improved yields. Design engineers, quality engineers, and process engineers can learn from these tendencies to design fixtures, protocols, and tools that produce better products with higher yields and lower costs.

Conclusion

Molding is an essential manufacturing process that has enabled the production of previously unimaginable life saving medical devices. Micro-presses are capable of producing components that require microscopes for inspection, and fully automated machinery is able to produce complex two-shot configurations that can baffle the brightest doctors in the industry. Despite these advancements, there are still some very simple keys to achieving program success that can get overlooked.

Come prepared to the next design review with a technical checklist of performance requirements, but don't forget to look for the non-technical issues that others have overlooked. When these are identified, the production team will not only be grateful, the reward from them will be higher yields, lower costs, and better molded medical device components.

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