



COMPANY
EMERSON INNOVATION CENTER

LOCATION
Pune, Maharashtra, India

SOFTWARE
AUTODESK® Moldflow®

World-Leading Industrial Automation & Commercial & Residential Solutions Manufacturer Leverages Autodesk® Moldflow® to Advance Product Quality

Emerson, headquartered in St. Louis, Missouri (USA), is one of the world's leading diversified manufacturers of industrial, commercial and residential solutions. Emerson Automation Solutions' business helps the process, hybrid, and discrete manufacturers maximize production, protect personnel, and the environment while optimizing their energy and operating costs. Emerson's commercial & residential solutions business help ensure human comfort and health, protect food quality and safety, advance energy efficiency, and create sustainable infrastructure.

The company is dedicated to improving the quality of life around the world. In order to fulfill this mission, Emerson places innovation at the core of its strategy. In recent years, Emerson's commercial & residential solutions business have grown at a speed and scale that is unmatched in the world, leading to a corresponding increase in customer expectations about the technology.

Challenges

Emerson has been on the forefront of incorporating technologies into its commercial & residential solutions business so they can better serve their customers. Outstanding customer service is a pillar of Emerson's success. All divisions of the organization constantly strive to fulfill ever-escalating customer expectations. Customers today demand components and systems that not only provide high quality and performance, but also improved energy efficiency.



With over seven decades of experience in inventing household food waste disposers, Emerson's InSinkEerator has also recently seen its relationships with long-term customers evolve, the appetite to address food waste is growing across the world.

For every new product developed, Emerson's design team always collaborate with the services and marketing team to define product specifications and follow up on product development from the design to the validation phases. The requests come to the Analysis Center of Excellence (EICP) in Pune, India from various internal departments that face immediate issues during product development and production. Fast and efficient troubleshooting is required to ensure excellence in customer support.

Recently, InSinkEerator standard series developed the new plastic housing & the design is submitted for Moldflow analysis to understand any manufacturing issues like filling of part, sink marks & warpage. Exterior parts for household appliances require high dimensional precision and fine surface finish. Therefore, effective control of part parameters becomes a vital factor in the production process. In order to effectively control issues in plastic parts, Autodesk® Moldflow® analysis has been an indispensable element in the entire product development cycle.

Initial Design

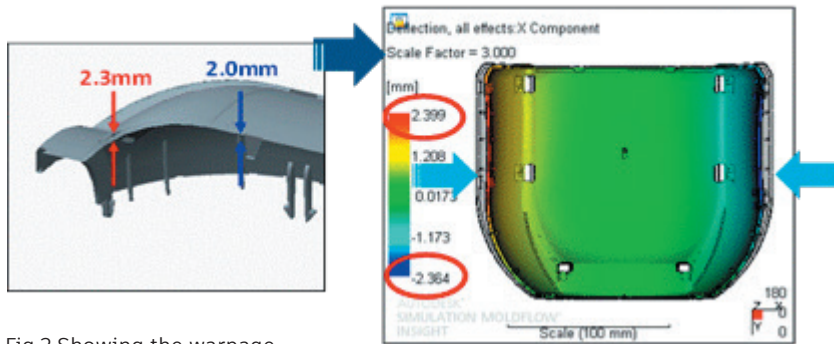


Fig.2 Showing the warpage predictions in the X-direction during the initial design stage

The InSinkEerator cylindrical shell part A and part B as shown in fig 1. Holds rotating motor and other electrical, electronic systems inside. To have maximum internal space for internal parts to be packed in a product, the external shell was designed accordingly by the design team. The production technique of plastic injection molding of a part with a thin shell leads to the defects of parts, such as warpage, shrinkage. When the issue was reported to analysis engineer, through Autodesk® Moldflow® potential molding scenarios were simulated on the original design for both the parts. Emerson's analysis engineer was able to detect uneven product shrinkage that ultimately leads to the warpage. Fig. 2 shows the warpage predictions in the X direction, the warpage was severe enough to imperil the success of part assembly in the production stage.

Solution

Next, the Autodesk® Moldflow® software was utilized to investigate the issue of the warpage, through the analysis results, and looking at the part geometry, based on previous experience lead engineer was able to understand the real cause of the issue and suggested changes in part thickness which thickness needs to be more uniform. The part warpage was reduced from 3mm to 0.6mm. as shown in Fig. 3. Also, the design suggestions were able to fulfill the product aesthetic requirement.

Proposed Design

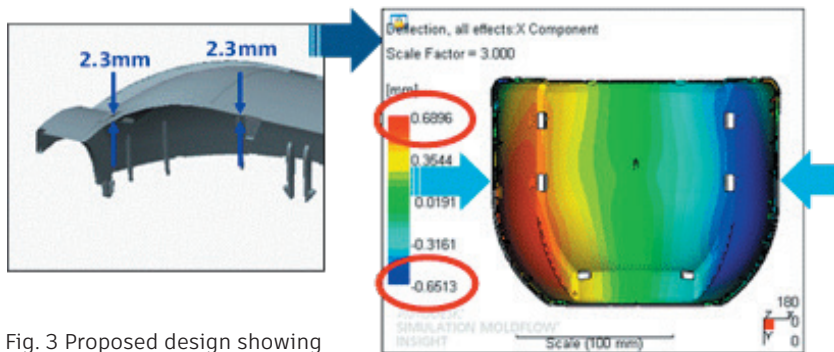


Fig. 3 Proposed design showing warpage values after suggested changes in part thickness.

"If we did not have Autodesk® Moldflow®, we wouldn't have as much confidence in the manufacturability of a design. It helps us avoid going back and forth with the design and manufacturing team, which saves time and reduces costs. Autodesk® Moldflow® simulation has allowed us to move to another level." Explains Mr. Balasubramanyam Padarthi, Lead Engineer, Emerson.

Here, Emerson was able to optimize the product design and processing parameters effectively to achieve the most optimal results. With the validation of Autodesk® Moldflow® simulation, Emerson could make a confident decision and concluded that the revised design was the most ideal for improving the part warpage issue. As a result, the real molded part successfully met the specification for structural strength and deformation.

Results

With the help of Autodesk® Moldflow® analyses, Emerson was able to make effective design changes and optimize processing parameters successfully to achieve an outstanding result of more than 90% improvement on part warpage. The product is already launched in the market and performing great.

“Emerson develops, markets through outstanding products, wins customers through high quality, and drives the future through innovation. Autodesk® Moldflow® enables us to make the leap and achieve a level of analysis that really enhanced our problem solving and decision-making ability. With the strong support of Autodesk, we will certainly deliver the best results & solution.” Concludes Mr. Balasubramanyam Padarthi.