CASE STUDY, NO.

RHEOLOGICAL CONTROL SYSTEMS™

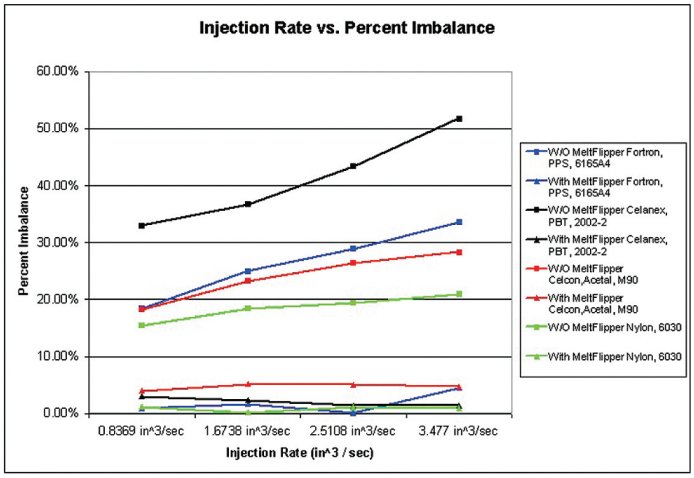
Beaumont

Revolutionizing Injection Molding

Study shows wider processing window with MeltFlipper®

As a world-leading supplier of engineering resins, Ticona approached Beaumont Technologies to conduct a R&D analysis using Beaumont's MeltFlipper® Technology and Ticona's materials. Four different materials (Forton PPS, Celanex PBT, Celcon Acetal, and Celanese Nylon) and four different injection rates were chosen for the study. The purpose was to study the effect of material variations and injection rates on process windows with and without MeltFlipper® technology in the runner system.

To understand the process window study, consider molding PBT without MeltFlipper® at an injection rate of 1.67 in^3/s. The imbalance in this mold is 37 percent, which would create short shots on the outer cavities. As a result, the processor would increase the injection rate to 2.5 in^2/s in an effort to eliminate short shots. But, at the faster injection rate, the imbalance increased to 43 percent; thus, creating flash on the inside cavities. The molder would need to find the delicate process setting to where the inside cavities do not flash and the outside cavities are not short.



PROJECT DESCRIPTION:

- Determine if MeltFlipper® technology can increase process windows

METHODS:

- 8-cavity mold
- Four materials (PPS, PBT, POM, Nylon)
- Four Injection Rates
- MeltFlipper® insert installed
- 5 Step Process™ applied

RESULTS:

- Conventional runner
  - a. Imbalace is sensitive to material and process
  - b. Imbalance ranged from 16-52%
- MeltFlipper® Runner
  - a. Imbalace is relatively stable for all materials
  - b. Imbalance reduced to 5% or less for all conditions

CONCLUSIONS:

- Mold is less sensitive to material and process changes
- provides a wider processing window

With MeltFlipper® in the runner system, the imbalance is only 2 to 3 percent between both injection rates. This indicates that all parts are seeing identical molding conditions; therefore, changes in the overall process affect all cavities in the same manner, and the process can be optimized without adversely affecting the part quality. The study also shows that MeltFlipper® provides a wider window in regard to material variations since the imbalance with MeltFlipper® is 5 percent or less for all material versus 16 to 52 percent without MeltFlipper®.

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