

Beaumont

Revolutionizing Injection Molding



RCS™ improves concentricity and material properties

"We utilized Beaumont's MeltFlipper® technology and redesigned a 4-cavity conventional runner system. The end result was a gear with 50% improvement in concentricity." -Harry Soling

Molding gears is more than a job for Winzeler Gear. It's a passion driven by the desire for continuous improvement. It's this desire that prompted the engineers at Winzeler Gear to find new technologies to improve gear concentricity.



During a molding process using a conventional runner system, it was noticed that one half of a gear was filling faster than the other. This caused different packing conditions within the part. Also, by installing two "effective melt temperature sensors" from RJG, Inc., it was verified that the melt temperatures on opposite ends of the part were different on average by 38.3° F. Understanding the temperature influence on crystallinity, this posed an immediate concern on part quality and concentricity.



Fig 1: Conventional Asymmetrical Fill Pattern

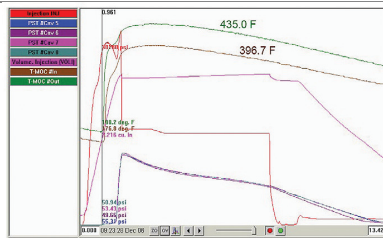


Fig 2: 38.3 °F 'Effective Melt Temperature' Variation

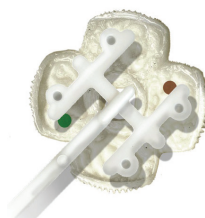


Fig 3: MeltFlipper® Symmetrical Fill Pattern

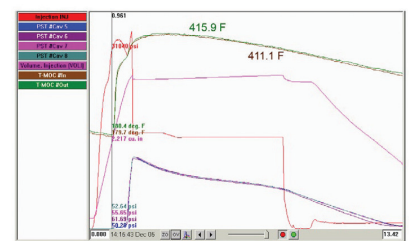


Fig 4: 4.8 °F now results in an effective melt temperature variation

PROJECT DESCRIPTION:

- 4-cavity production mold, four gates per part
- POM material
- "Effective" melt temperature sensors installed

PROBLEMS :

- Imbalanced filling within the cavities
- Concentricity issues
- Material property variations

SOLUTION:

- Install MeltFlipper® technology

RESULTS:

- 50% improvement in concentricity
- 73% improvement to intra-cavity crystallinity uniformity
- Intra-cavity Delta T dropped from 38 °F to 4.8 °F

Winzeler worked with Beaumont to design and install a MeltFlipper® runner system. Immediate improvements were noticed in the filling pattern and the intra-cavity melt temperature readings. The melt temperature variation dropped down to 4.8° F, which was an indication that crystallinity should be more uniform and, in turn, provide improvements to concentricity.

Upon completion of testing, a 50 percent improvement on concentricity was measured. The parts were also sent for testing using Differential Scanning Calorimetry (DSC), where a 73 percent reduction in crystallinity differences from side-to-side within the part were verified in the parts molded with MeltFlipper® technology.

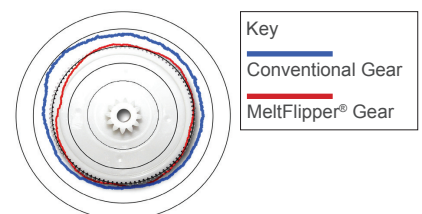


Figure 5: Concentricity vs. MeltFlipper®