MeltFlipper® MAX™ Case Study

Case Study: Altering Filling Patterns with MeltFlipper® MAX™ technology

This case study focuses on a disk with uniform wall thickness produced in a single cavity/single gated mold. A molder would anticipate a radial filling pattern in this type of part as observed in Figure 1. But as seen in Figure 2, the material is race tracking around the perimeter of the cavity, even though the part has uniform wall thickness and only one gate. The race tracking flow front advancement is created by the highly sheared laminates around the perimeter of the runner system. The higher sheared laminates have a lower viscosity, which in turn creates the racetrack effect. As the melt front advances, a gas trap and/or void is formed near the end of the part, creating a defective part (Figure 3). This can be particularly troublesome in injection molding parts such as lenses and electrical connectors.

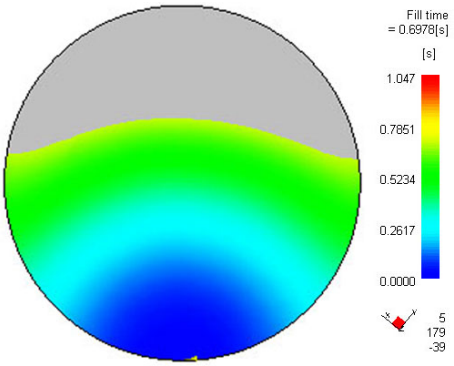

Figure 1: Radial flow predicted in mold simulation software.

Figure 2: Filling pattern in a single cavity disk without MeltFlipper MAX.

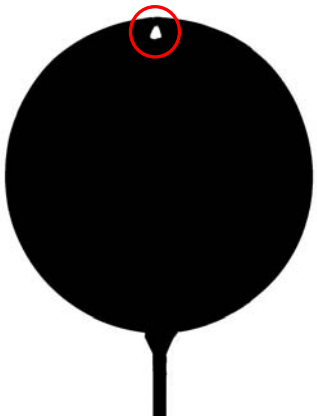

Figure 3: Formation of gas trap due to race tracking fill pattern.

1524 East 10th Street * Erie PA 16511 * Tel: 814.899.6390 * Fax: 814.899.7117
www.beaumontinc.com * e-mail: info@beaumontinc.com

In order to solve this filling problem in the past, the mold or part design would have to be modified by changing part wall thickness, adding special venting in the tool, or machining additional gates. However by taking control of the viscosity variations in the melt and using them to the molder's advantage, MeltFlipper® MAX™ is able to change the advancing flow front profile and the resulting part quality as shown in Figure 4. This figure is the same single cavity disk mold after MeltFlipper MAX was strategically positioned in the mold. The material, gates, and process settings were unaltered throughout the entire experiment.

The rotation was designed to ensure that the high sheared laminates from the outside of the runner's cross-section would be located in the center of the melt stream as the plastic enters the cavity. The new melt front profile through the part will eliminate the filling problems seen in Figures 2 and 3. And depending on the location of MeltFlipper MAX, the flow front can be further managed to a desired profile, including offsetting the high sheared laminates to one side of the part to provide filling solutions for warp and dimensional stability (Figure 5).

Figure 4: Filling pattern in a single cavity disk achieved with MeltFlipper MAX.

Figure 5: Offset filling pattern in a single cavity disk achieved with MeltFlipper MAX.