



OP-6-162

Thursday, May 12, 2011, 05:40-06:00 pm
Room: Karam 1

**ULTRA-HIGH-MAGNIFICATION VISUALIZATION OF MELT FILLING BEHAVIORS IN LINE & SPACE
REPLICATION MOLDING USING A MICROSCOPE BUILT-IN MOLD**

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In a previous report, the authors conducted direct visualization combining the glass-insert mold, long-distance microscope and high speed video camera, and successfully clarified filling behavior of resins into grooves with fine patterns of several 10 μ m in a mold. The magnification rate of the visualization was however limited to 130 times due to the shaking of the injection molding machine. In this study, the authors developed a new experimental system with a microscope-installed which is capable of visualizing at higher magnification rates up to 360 times. By use of this system, we conducted the visualization experiments to study the melt filling behavior in a short period of time using a Line & Space cavity with micro convex and concave patterns, and investigated the effects of injection rate, gas-vent condition, and groove width on the transcription process. Especially in the filling behavior of resins into a convex-shaped L&S cavity, a unique void was confirmed to be temporarily formed at the rear of the convex portion parallel to the flow direction at the downstream, and then to disappear. During this process, two beard-like weldlines were seen to form in such various types as V-shaped, U-shaped, several separated U-shaped, etc. changing due to the deference in injection rate and gas-vent condition. Poster or Oral; Oral Presentation Desired Session; Injection Molding and Molds.