



STUDY ON INFLUENCING FACTORS IN MICRO THERMOFORMING AND MICRO BLOW MOLDING

M. Heilig*, M. Schneider, H. Dinglreiter, M. Worgull

*Karlsruhe Institute of Technology, Institute for Microstructure Technology, and Hermann-von-Helmholtz-Platz 1, 76344
Eggenstein-Leopoldshafen, Germany*

*Corresponding author: markus.heilig@kit.edu

Influencing Factors in large scale Thermoforming and Blow Molding are well known due to the long time experience in these replication technologies. Micro Thermoforming and Micro Blow Molding are emerging technologies which were introduced at the Karlsruhe Institute of Technology (KIT) for the fabrication of film microchips for capillary electrophoresis (CE) and for three-dimensional cell cultivation devices. Thermoforming parts with micro-scale design features require use of thin polymer films. Difference in size between film thickness and width of cavities gets smaller, resulting in a high pressure Thermoforming process with large aspect ratios. Influencing Factors are discussed based on a new replication machine for Micro Thermoforming and Micro Blow Molding. Parameter variations with precise and reproducible variations in clamping force (100 N up to 200 kN), form pressure application (+/- 0.3 bar up to 100 bar), duration of pressure application and temperatures up to 350°C are possible with the newly designed control. An experimental design is used to check the weighting of the influencing factors in Micro Thermoforming. This results in an improved process description of the Micro Thermoforming and Micro Blow Molding Process.