Thermoplastic Foams Produced by CELLMOULD® Technology: Comparison of Linear and Long-Chain Branched Polypropylene

N. Loypetch, D. Nestler, T. Andhare, S. Grosch, L. Kroll
Institute of Lightweight Structures, Chemnitz University of Technology, Chemnitz, Germany

Motivation and Problem Statement

- Thermoplastic foams can reduce weight and increase mechanical properties-to-weight ratio compared to compact thermoplastics [1].
- The cell structures have an influence on the properties of the thermoplastic.
- The reduction of the cell density (cell number) and the enhancement of the cell size were observed in the foam core of the linear polypropylene (L-PP) foamed-core sandwich structures [2].
- The use of talc as the nucleation agent had no influence on the cell density and cell size of the L-PP foamed-core sandwich structure [3].

Main Objectives

- Comparison of the microstructures of L-PP, Moplen HP501H and long-chain branched polypropylene (LCB-PP), Daploy WB140 HMS, produced by foam injection moulding with CELLMOULD® technology using Supercritical liquid of N₂ as a physical blowing agent (PBA).
- Investigation of the microstructure of injected foams in two directions.

Experimental Results

- LCB-PP had higher cell density than L-PP foam.
- The large cell size, the cell agglomeration and the lack of compact layers occurred in the LCB-PP foam.
- The elongated cell structures occurred on the microstructure in X-direction (flow direction).

Future Work

- Investigations on influence of the injection parameters on the cell density and the cell size as well as the density of PP foams at production of LCB-PP foams by using CELLMOULD® technology.

References