

Modeling Study of Short Fiber Orientation in Simple Injection Molding Processes

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Abstract : The main objective of this paper is to develop a Computational Fluid Dynamics (CFD) model to simulate and characterize the fiber suspension in flow in rectangular cavities. The model is intended to describe the velocity profile and to predict the fiber orientation. The flow was considered to be incompressible, and behave as Newtonian fluid containing suspensions of short-fibers. The numerical model for determination of velocity profile and fiber orientation during mold-filling stage of injection molding process was solved using finite volume method. The governing equations of this problem are: the continuity, the momentum and the energy. The obtained results were compared to available experimental findings. A good agreement between the numerical results and the experimental data was achieved.

Keywords : injection, composites, short-fiber reinforced thermoplastics, fiber orientation, incompressible fluid, numerical simulation

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