

Thermal behavior of a concentric annular polymer flow

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Abstract. In injection polymer processing, cylindrical runners are usually used to achieve the polymer until the mold. In this work, we would like to study the possibility to consider a concentric annular runner instead. The main aim of this change of geometry is to facilitate the thermal instrumentation of the flow, which could be placed inside the small diameter inner channel. A numerical model is compared to a developed analytical solution to predict the velocity profile of the polymer in steady conditions. The polymer is assumed to be a pseudoplastic fluid. A sensitivity analysis according to the viscosity of polymer is performed. Then, the thermal behavior with viscous dissipation of the polymer flow is investigated and compared to the case of cylindrical runner. After concluding on results, perspectives in terms of rheometry and control of polymer processing are given.