

Numerical simulation of the injection moulding filling stage using open-source and proprietary software

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Injection moulding is one of the most important processing techniques for thermoplastic materials, and, due to the high competition and product requirements, it demands continuous optimization. In industrial practice, aiming to minimize the resources spent on the design and manufacturing activities, it is common to resort to appropriate computational modelling tools. However, mainly due to the typical high cost of proprietary software, the support of computational modelling tools in injection moulding design related tasks is not available to medium and small sized companies. This framework, and the clear perspective of the benefits brought by computational modelling, has been motivating the development of codes based on open-source codes, as happens with OpenFOAM [1] computational library. This work aims to compare the numerical results obtained by an open-source solver with the ones obtained with the proprietary software Moldex3D [2], widely employed in industry. The case of study considered is the filling stage of the injection moulding process of a rectangular cavity for a thermoplastic material modeled with a non-isothermal, inelastic and generalized Newtonian constitutive model.

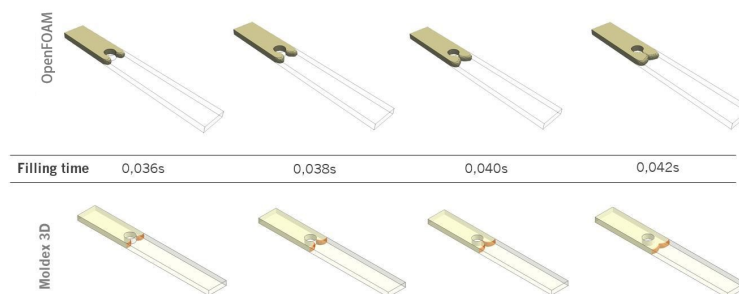


Figure 1: Evolution of the flow front at different times for both solvers

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References

- [1] <https://www.openfoam.com/>
 [2] <https://www.moldex3d.com/en/>