

**Progress in rheology of glass melts (a survey)**

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**Abstract**

The rheology of glass melts is not restricted to Newtonian viscous flow but it involves also non-Newtonian flow and viscoelasticity. The former one dominates in the steady state flow at low deformation rates, the latter ones dominate during the initial state of stress generation and during the final state of flow and fracture under extreme deformation conditions. The whole scale of rheological phenomena are demonstrated in this review article. Typical available experimental results and mathematical formulations are given briefly for single-phase glass melts. In this context the development of new equations give rise to the introduction of a series of new definitions and conceptions which characterize physically and mathematically the different rheological behaviour of glass melts under the various stress-strain procedures. The connection between flow behaviour and structural aspects is pointed out with a short reference to flow birefringence. Finally, an extension from the behaviour of single-phase to a double-phase system is developed for the case of suspended crystals with defined sizes, concentrations and shapes within an inert glass melt (model for glass-ceramic melts).