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CONSTANT FORCE SQUEEZE FLOW OF A BIOLOGYCAL FLUID

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Theory and experiments are described in which a blood solution was squeezed between two parallel glass plates of separation by a constant force F applied at time t=0. Squeeze flow results show that for a critical weissenberg number wec1 the fluid has an initial viscous region of faster squeeze rate , in which the plate separation as a function of time follows a power law fluid solution. Then for a second critic “we” number value wec2, the fluid experiments a terminal plateau constant viscosity zone. The viscoelastic surfactant solution is characterized with a simple model which couples the Upper-Convected Maxwell equation with an evolution equation representing the changes of structure due to the flow. An analytical solution was found that relates the axial force measured in one of the plates to the viscosity of the fluid. Analysis to zeroth order yield an expression for the force that predicts viscosity curve analog to simple shear flow viscosity; and at first order, an elastic contribution is found .