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In application to rotational molding of thin polymer films, the rimming flow of a thin layer of fluid is studied using theoretical models. Non-Newtonian shear-thinning and visco-elastic memory effects characteristic to many polymers are taken into account with various quasi-linear constitutive models. For each type of fluid, the stability of the films to small perturbations is studied analytically using linear theory. Explicit results are obtained in each case and validated against numerical solutions of the fully nonlinear disturbances relation. Shear-thinning films are shown to be neutrally stable. Visco-elasticity is shown to stabilize thin films. (Received September 08, 2013)