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The Effect of Elasticityon the Extrudate Swell of Molten Polymers. SAVVAS HATZIKIRIAKOS, VINOD KUMAR KONAGANTI, The University of British Columbia, UBC TEAM — The extrudate swell of an industrial grade high molecular weight high-density polyethylene (HDPE) in capillary dies is studied using the integral K-BKZ constitutive model. The non-linear viscoelastic flow properties of the polymer resin are studied for a broad range of large step shear strains and high shear rates using the cone partitioned plate (CPP) geometry of the stress/strain controlled rotational rheometer. This allowed the determination of the rheological parameters accurately, in particular the damping function, which is proven to be the most important in simulating transient flows such as extrudate swell. A series of simulations performed using the integral K-BKZ Wagner model with different values of the Wagner exponent n, ranging from n =0.15 to 0.5, demonstrates that the extrudate swell predictions are extremely sensitive to the Wagner damping function exponent. Using the correct $n-$value resulted in extrudate swell predictions that are in excellent agreement with experimental measurements. .

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