



Creep Experiment (Step Stress test).

Creep experiments are a valuable method for studying the viscoelastic properties of polymer melts. The zero shear viscosity can be calculated at many temperatures and plotted as a function of temperature.

Many Engineering textbooks use the zero shear viscosity for extrusion and die design. The viscosity is calculated from the slope of the compliance versus time or strain versus time curves. Viscosity is 1 / slope of the curve in the steady state (linear). The following creep is a typical example for low-density polyethylene.

Zone - This term is the zone during which the calculations were made. If data from all zones is selected, the zone is zero.

Stress - Stress is calculated as the average of all stresses for all selected data points. At each data point, stress is calculated as the product of torque and the stress constant.

Viscosity - Viscosity (η) in the steady state region is calculated as stress divided by strain rate.

Rate - Rate is the stress head angular velocity in the region of constant strain rate.

J_0 - The line resulting from the least squares fit in the steady state window is extrapolated to the y-axis, where time = zero. The y-intercept of the fit line is J_0 (below).

The extrapolation of the fit is not displayed on the plot, but the fit is displayed in the steady state region.

Creep is an important linear viscoelastic property, which calculates the zero shear viscosity. The zero shear viscosity is influenced by the molecular structure of the polymer (branching, and the Mw).

