

Agitation and mixing by helical impellers in highly viscous and non-Newtonian liquids.

University of Salford - [PDF] Experimental and CFD studies of power consumption in the agitation of highly viscous shear thinning fluids



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THE FUNDAMENTALS OF HIGH VISCOSITY MIXING

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Mixing in food processing

Whilst viscoelastic fluids have been the subject of much investigation over the years, beginning with Weissenberg's observation of rod-climbing phenomena Weissenberg, 1947 , there has been little in the way of investigation into their effect on processes, although stirred tank geometries are the most well developed area. A variant of this type of turbine is the paddle type, which is used in large basins in flocculation processes or in those processes in which very low shear is required.

Agitaion and mixing

As shear is held constant in a non-Newtonian system, the viscosity of rheoplectic and thixotropic materials is directly related to time. Impeller torque T as a function of rotational impeller speed N was measured utilizing rheometers from BROOKFIELD Eng. These are typically selected when a shear force must be transferred to the process or when a radial flow direction is required for a given tank geometry.

Mixing of Newtonian and viscoelastic fluids using “butterfly” impellers

The circulating flow in a vessel induced by rotating impellers has drawn a lot of interests in industries for mixing different fluids. However, with non-Newtonian fluids, limited published literature is available on the hydrodynamic behaviour of the mixing process in stirred vessels. The complexity of the mixing operation is driven primarily by the highly nonlinear constitutive viscoelastic behaviour of the fluid products, which is a function of the polymeric liquids and multiple phases particles, bubbles, drops present Paul et al.

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