

Power Consumption for Viscoplastic Fluid in a Rotating Vessel with an Anchor Impeller

Authors : Draoui Belkacem, Rahmani Lakhdar, Benachour Elhadj, Seghier Oussama

Abstract : Rheology is known to have a strong impact on the flow behavior and the power consumption of mechanically agitated vessels. The laminar 2D agitation flow and power consumption of viscoplastic fluids with an anchor impeller in a stirring tank is studied by using computational fluid dynamics (CFD). In this work the objective of this paper is: to evaluate the power consumption for yield stress fluids in standard mixing system. The power consumption is calculated for the different types of anchor impeller configurations and an optimum configuration is proposed. The hydrodynamic fields of incompressible yield stress fluid with model of Bingham in a cylindrical vessel not chicaned equipped with anchor stirrer was undertaken by means of numerical simulation. The flow structures, and especially the effect of inertia, the plasticity and the yield stress, are discussed.

Keywords : rheology, 2D, numerical, anchor, rotating vessel, non-Newtonian fluid

Conference Title : ICMAE 2015 : International Conference on Mechanical and Aerospace Engineering

Conference Location : Jeddah, Saudi Arabia

Conference Dates : January 26-27, 2015