

Effect of rheology on the performance of Maxblend™ and Superblend™ mixers

André Fontaine, Yoann Guntzburger, François Bertrand, Louis Fradette
Research Unit for Industrial Flow Processes (URPEI), Department of Chemical
Engineering, École Polytechnique de Montréal, Canada

Abstract

The reality of industrial flow processes is that rheologically complex fluids are often involved. The aim of this on-going work is to characterize the behaviour of such fluids in industrial mixing systems. In order to discriminate between non-Newtonian and elastic behaviours, different types of fluids are considered, which include power law, Boger and elastic fluids. Each time, the flow behavior and mixing performance are compared to that of a Newtonian fluid. In this work, the Maxblend™ and Superblend™ mixers are used because of their efficiency on a wide range of Reynolds numbers and their adequacy for handling complex fluids. Both our well-established discoloration technique for flow visualization and PIV are used to describe the flow field in these mixing systems. The results obtained with these experimental techniques will eventually serve to validate numerical results obtained with 3D finite element software POLY3DTM.