

Impacts on the Modification of a Two-Blade Mobile on the Agitation of Newtonian Fluids

Authors : Abderrahim Sidi Mohammed Nekrouf, Sarra Youcefi

Abstract : Fluid mixing plays a crucial role in numerous industries as it has a significant impact on the final product quality and performance. In certain cases, the circulation of viscous fluids presents challenges, leading to the formation of stagnant zones. To overcome this issue, stirring devices are employed for fluid mixing. This study focuses on a numerical analysis aimed at understanding the behavior of Newtonian fluids when agitated by a two-blade agitator in a cylindrical vessel. We investigate the influence of the agitator shape on fluid motion. Bi-blade agitators of this type are commonly used in the food, cosmetic, and chemical industries to agitate both viscous and non-viscous liquids. Numerical simulations were conducted using Computational Fluid Dynamics (CFD) software to obtain velocity profiles, streamlines, velocity contours, and the associated power number. The obtained results were compared with experimental data available in the literature, validating the accuracy of our numerical approach. The results clearly demonstrate that modifying the agitator shape has a significant impact on fluid motion. This modification generates an axial flow that enhances the efficiency of the fluid flow. The various velocity results convincingly reveal that the fluid is more uniformly agitated with this modification, resulting in improved circulation and a substantial reduction in stagnant zones.

Keywords : Newtonian fluids, numerical modeling, two blade., CFD

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