عنوان مقاله:

A Computational Study about the Effect of Turbines Pitched Blade Attack Angle on the Power Consumption of a Stirred Tank

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خلاصه مقاله:

In this study, the stirring mechanism of shear-thinning fluids benefiting from four blades in turbulent flow is considered. The fluid is studied inside a stirred cylindrical tank with a flat bottom. The height of fluid is equal to the cylinder's diameter and the impeller is positioned centrally. A CFD simulation has been carried out and three-dimensional turbulent flow is numerically analyzed using the Shear Stress Transport k-ω (k- ω SST) model. The parameters related to power consumption including attack angle and flow index were studied. The power consumed during the mixing of the shear thinning liquids under a specific Reynolds number and attack angle is less than that consumed when the fluid used is water, which is a Newtonian fluid. As the power law index decreases, the corresponding power consumption also declines. At a certain attack angle and power law index, an increase in the Reynolds number first significantly decreases power consumption; beyond a given range, the consumption plateaus. To validate the numerical simulation results, the findings derived on the basis of the power number used in this work were compared with the test results of other studies, and good agreement was observed

کلمات کلیدی:

Turbulent Flow,Power Consumption,Mixing Vessel,Shear Thinning Fluid,Blade Attack Angle,

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