

## Hydrodynamic Study of Laminar Flow in Agitated Vessel by a Curved Blade Agitator

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**Abstract :** The mixing and agitation of fluid in stirred tank is one of the most important unit operations for many industries such as chemical, biotechnological, pharmaceutical, petrochemical, cosmetic, and food processing. Therefore, determining the level of mixing and overall behaviour and performance of the mixing tanks are crucial from the product quality and process economics point of views. The most fundamental needs for the analysis of these processes from both a theoretical and industrial perspective is the knowledge of the hydrodynamic behaviour and the flow structure in such tanks. Depending on the purpose of the operation carried out in mixer, the best choice for geometry of the tank and agitator type can vary widely. Initially, a local and global study namely the velocity and power number on a typical agitation system agitated by a mobile-type two-blade straight ( $d/D=0.5$ ) allowed us to test the reliability of the CFD, the result were compared with those of experimental literature, a very good concordance was observed. The stream function, the velocity profile, the velocity fields and power number are analyzed. It was shown that the hydrodynamics is modified by the curvature of the mobile which plays a key role.

**Keywords :** agitated tanks, curved blade agitator, laminar flow, CFD modelling

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