

CFD Mixing Design in Large Petroleum Storage Vessels

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Abstract

In petroleum storage vessels mixing is important for preventing sludge settling on the tank floor. Settled and hardened sludge can not be remixed. Improper mixing has far reaching economical and environmental consequences.

Sizing of mixers for petroleum storage vessels is based on set of experimental rules established over years of experience. New applications and larger vessels are presenting new challenges. The tool of choice for mixing study is CFD. This is the only method to visualize the mixing process in vessels up to 95 m (300') in diameter. With hundreds of installations the CFD modeling can be validated and use for optimum mixing design

The paper reports numerous results of mixing CFD experiments and validation for different vessel sizes, multiple mixers and configurations. Results are validated with experimental findings. The paper also discusses simulation results for two impeller types with different flow characteristics.