

CFD calculation on amine absorber with structured-packing for CO₂ removal from natural gas

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Acid gases (H₂S and CO₂) must be removed from the crude natural gas. The process performance may be deteriorated because of ship movement on FPSO (Floating production, storage and offloading). This research aims to investigate the effects of ship movement (or ship motion) on acid gas removal performance in the amine absorber with Mellapak 250.X structured packing.

A simple cylindrical column (packed zone: 0.1m diameter x 0.245m high) was used as the domain for the calculations. A porous media CFD (computational fluid dynamics) model was developed in the framework of Eulerian two-fluid flows with user-defined functions (UDF) taking into account liquid dispersion, mass transfer at the gas-liquid interface, chemical reactions in the packed zone, the effective interfacial area, mal-distribution factor and the ship motion. CFD simulation results were validated with experimental data measured at the vertical standing column. The process performance was compared for the simulation results for two cases of vertical standing and ship motion.