Desulfurization scrubbing in a squared spray column for a marine diesel engine: Design, construction, simulation, and experiment

이동영, nguyen van duc long[1], 김명진[2], 곽충용[2], 이영목[2], 강기준[3], 이문용†
영남대학교; [1]yeungnam university; [2]한발매스테크; [3]Benit M
(mynlee@ynu.ac.kr†)

The International Marine Organization(IMO)established regulations on SO_2 emissions in the MARPOL Annex VI. Since 1st January 2015 equivalent Sulphur emissions have to be lower (0.1% in weight) in some coastal regions named "Sulphur Emission Control Areas", while from 1st January 2020, sulphur emissions for oceangoing vessels must be equivalent to a sulphur content in fuel lower than 0.5% in weight worldwide.For enabling the installation of flue gas desulfurization (FGD) in a ship, a systematic methodology for the square-shaped FGD design was proposed, experiments to treat the flue gas released from a marine diesel engine (720 kW) were performed, and simulation and sensitivity analyses were conducted using Aspen Plus V10.This is aiming to reduce volume/space, weight, pressure drop, investment, and operating and maintenance costs while increasing efficiency. Good agreement was observed between experimental and simulated results. A liquid-to-gas mass ratio of approximately 4.32 $kg.kg^{-1}$provided SO_2 removal efficiency higher than 95 %. Most part of mass and heat transfers occurred in the bottom section of the scrubber and a low pressure drop was achieved.