

Optimization and design of a squared scrubber for desulfurization of the marine diesel engine exhaust

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The International Marine Organization (IMO) established regulations on SO<sub>2</sub> emissions in the MARPOL Annex VI. Since 1<sup>st</sup> January 2015 equivalent Sulphur emissions have to be lower (0.1% in weight) in some coastal regions named “Sulphur Emission Control Areas”, SECAs while from 1<sup>st</sup> January 2020, sulphur emissions for oceangoing vessels must be equivalent to sulphur content in fuel lower than 0.5% in weight worldwide. For enabling the installation of closed-loop flue gas desulfurization (FGD) in limited spaces of a shipment, a systematic methodology for the square-shaped FGD design was proposed, experiments to treat the flue gas released from a marine diesel engine (720kW) 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. A liquid-to-gas mass ratio of approximately 4.32kg.kg<sup>-1</sup> provided SO<sub>2</sub> removal efficiency higher than 95 %.