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Sposób oczyszczania gazów odlotowych emitowanych przez silniki Diesla w szczególności zamontowane na jednostkach transportu morskiego

A method of cleaning exhaust gases emitted by diesel engines, in particular, installed at sea transport vessels

Patent Application PL: No.435454
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An innovation of the invention is the use of spraying of part or whole of the process water from the scrubber circuit in the flue gas irradiation reactor, resulting of increasing the overall efficiency of the flue gas cleaning process.

Fig. 1

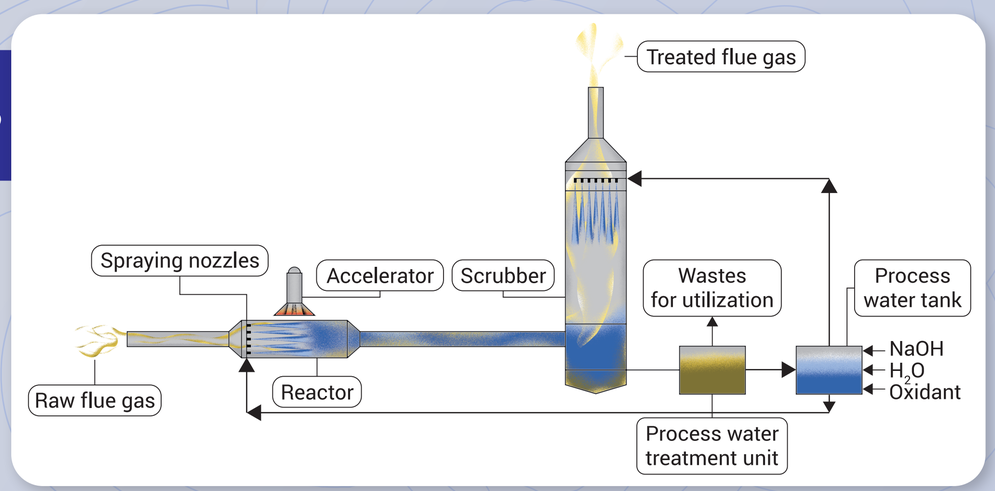
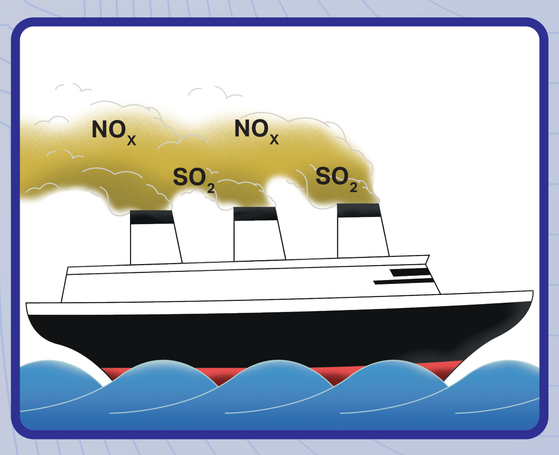
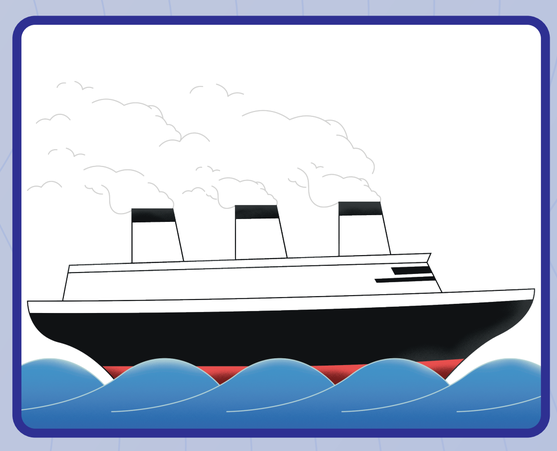


Figure 1. Flue gas treatment installation scheme according to the invention

Currently, maritime transport accounts for a significant share of global emissions. As pollution of the marine environment increases, the scope of activities aimed at preventing this phenomenon gradually expands. According to the actual regulations of the International Maritime Organization (IMO), an 80-90% reduction in NO_X emission and a 97% reduction in SO_2 emission from marine engines powered by heavy fuel oil are required. Electron beam flue gas treatment technology allows for the simultaneous reduction of SO_2 and NO_X emissions, with the possibility of its applicationfor treatment of exhaust gases from marine Diesel engines. In this case, the flue gases irradiated in the reactor are directed to the scrubber, where they are absorbed in sea water.



The method of treatment of flue gases according to the invention consists in irradiating of the flue gases introduced into the reactor with an electron beam from the accelerators while simultaneously spraying the process water from the scrubber circuit at the gas inlet to the reactor, and the process is carried out in a known manner. The process water used in the process is seawater containing an oxidant and an alkaline solution to keep it alkaline and neutralize the absorbed acidic contaminants. The addition of an oxidant in the process water supports the oxidation of SO_2 and NO, thus increasing the efficiency of the entire process.



By the use of spraying of part or whole amount of the process water from the scrubber system in the reactor, where the irradiation of flue gases with an electron beam from accelerators causes oxidation of SO_2 and NO to higher oxides, the invention allows for about 5 - 10% more effective flue gas treatment in comparison to the case where process water spraying was not used.

Fig. 2

NO_X removal

Dose	Scrubber	Scrubber with spray
4,4	91,2	96,4
10,9	90,3	97,0
21,8	95,5	97,7

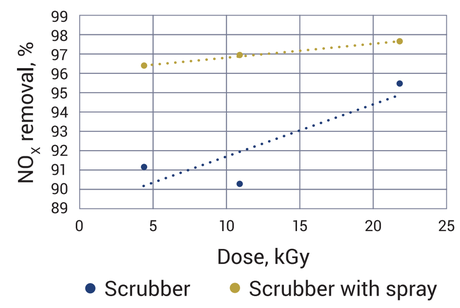


Figure 2. Comparison of NOX removal efficiency for scrubber with water spraying to the reactor and sole scrubber

Due to the fact that in the case of Diesel exhaust gases the concentrations of nitrogen oxides are very high, the icreased efficiency of exhaust gas treatment allows to meet stringent international emission standards.