

Exhaust gas scrubbers

Lloyd's Register



The future international regulations regarding sulphur emissions from ships imply that low sulphur fuel should be used in the future; however, exhaust gas scrubbers are allowed as an alternative to actually lowering the fuel sulphur content.

Scrubbers can be used for washing the exhaust gas from the main engine and can, in principle, be compared to a large shower cabinet placed in the funnel of the ship. With Aalborg Industries' newly developed scrubbing system, it is possible to reduce the sulphur emissions to a level as low as if low sulphur fuel oil was used. But because low sulphur fuel oil has a significantly higher cost price, it makes good financial sense to use scrubbers to clean off the exhaust gas and thereby continue using heavy fuel oil.

The method

The major environmental benefit from the scrubbing system developed by Aalborg Industries is that both seawater and freshwater mixed with caustic soda can be used for the scrubbing. This makes the scrubbing process more environmentally safe than using chemicals to clean the exhaust gas of emissions.

Project facts

Category: **Machinery**

Emission reductions:

CO ₂	3 % (compared to converting HFO to MGO in refineries)
SO _x	98 %
PM	80 %

Partners:

Aalborg Industries A/S
MAN Diesel
DFDS

The scrubbing process in the Aalborg Industries system consists of three stages: At the first stage, the exhaust gas is cooled from approximately 350°C to 160-180°C in a conventional exhaust gas economizer that uses the extra heat in other parts of the system instead of just wasting it. At the second stage, the exhaust gas is treated with a special ejector. Here the exhaust gas is further cooled by injection of water removing the majority of the soot particles. Finally, the exhaust gas is led through an absorption duct where the exhaust gas is sprayed with water and thus cleaned of the remaining sulphur dioxide. To prevent visible condensation and corrosion, the exhaust gas is subsequently reheated before being discharged through the funnel of the ship.

Extensive testing

The scrubbing system has undergone extensive testing with good results.



Olav Knudsen from Aalborg Industries explains, 'During the winter of 2008/09, a comprehensive range of tests was carried out together with MAN Diesel in their test facility in Holeby, Denmark. The test proved that we are able to remove almost 100% of the sulphur from the exhaust gas and up to 80% of the particles. In June 2009, our first scrubber installation was supplied and installed on a DFDS Ro-Ro cargo vessel and in late 2009, we expect to complete the installation and make the commissioning on board the ship.'

