



New filter removes 93% of dangerous particles from ships

A new filter for ships can more or less eliminate harmful particle pollution from ships in coastal areas.

The filter has been developed by the manufacturing company Dinex A/S. The project was conducted in collaboration with the Danish Technological Institute and the ferry company Ærøfærgerne, with support from the Danish Environmental Protection Agency (Danish EPA) under the Ministry of Environment.

The technology breaks new ground because near-coast shipping is responsible for much of the particle emissions in coastal areas. In 2012, WHO confirmed that the exhaust from diesel engines is carcinogenic for humans and that exposure to diesel exhaust is linked to a higher risk of lung cancer.

Therefore a giant leap forwards has now been made in successfully completing work to develop an effective particle filter for ships, that could reduce particle emissions by up to 93% on the test ferry M/F Ærøskøbing.

Inspiration from transport on land

Development of new solutions to remove harmful particles from shipping has not followed in line with developments within transport on land, where it has been possible to limit pollution with effective ceramic filters. The objective of the "Development of particle filters for ships" project was to adapt the technology to the special conditions on ships.

The search to develop a new solution encountered many challenges underway. One of the most important was to find a method of regenerating the filter, as it was difficult to get the high temperatures on a ship required for daily cleaning. Moreover, the manufacturer of the engine required a low back pressure and it was hard to find enough space in the engine room.

The space problem was solved by fitting the filter in the stack housing. The researchers doubled the number of filter elements in order to ensure that the filter never gets blocked and forms excessive back pressure. Finally, the high temperatures needed to clean the filters were achieved by installing electric heating elements in the filter box.

Fact box

The project is part of the Danish EPA's efforts to promote eco-efficient technology. It is one of the initiatives in the action plan for cleaner shipping which was drawn up in connection with the Partnership for Cleaner Shipping between the Danish EPA, the Danish Maritime Authority and the Dan-

Cleaner shipping with new filter

According to Lars Christian Larsen, Chief Technology Officer at Dinex A/S, the trial on M/F Ærøskøbing is the first stepping stone on the way to developing a filter which can be used to limit particle emissions from shipping on a much larger scale:

"Now we're going to evaluate the commercial potential which, in addition to the purely technical opportunities and limitations, is also determined by legislation.

Personally, I am convinced that there are good opportunities for spin-off business from technical emissions solutions for the maritime sector. The emissions limit values for shipping are extremely high compared with what is permitted for land transport," said the CTO, who expects to complete a combined solution with both a particle filter and an SCR catalytic converter during 2013.

However, the commercial potentials are closely linked to new statutory requirements for the area, as he stressed; "The commercial potential depends entirely on having the courage to adopt the planned international environmental requirements, as it is expensive to retrofit particle filters on ships. However, we have the basic solution ready to remove particles and nitrogen oxides, as well as an informed estimate of what costs will be when the legislation comes".

The Ministry of the Environment has provided support for the project and is also responsible for regulating air pollution from ships. "In recent years, the requirements for emissions of nitrogen oxides (NOx) from shipping and the sulphur content in ship fuels have been made tougher and we expect that they will become even more restrictive in the future," said Dorte Kubel, special consultant from the Danish EPA, and she continued: "When, in the future, Denmark is to work in an international context for tougher requirements for air pollution from ships, it is important that we can document that it is actually possible to meet these requirements in practice. In this context, this type of project plays an important role".

ish Shipowners' Association. The project was conducted as a collaboration between Dinex A/S, the Ærøfærgerne ferry company and the Danish Technological Institute, and it was completed on 6 November 2012. Read more at www.ecoinnovation.dk and www.dinex.dk.