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RELY ON EXCELLENCE

Powerful partnerships for clean air

EagleBurgmann provides metal expansion joints for exhaust gas cleaning systems on ships

The traditional fuel used for ships is heavy fuel oil which is a byproduct from the distillation of crude oil in refineries. During combustion, Sulphur oxides (SO_x) are formed which have adverse effects on humans and the environment. New exhaust gas limits are supposed to reduce the global SO_x emissions from ships by 77 %. This is a big step to improve air quality and protect the environment but it creates a challenge for ship owners. The integration of a scrubber within the exhaust gas system poses a possibility to fulfill the requirements. EagleBurgmann supports shipbuilders, shipping companies and conversion companies globally with metal expansion joints for the flexible attachment of the systems.

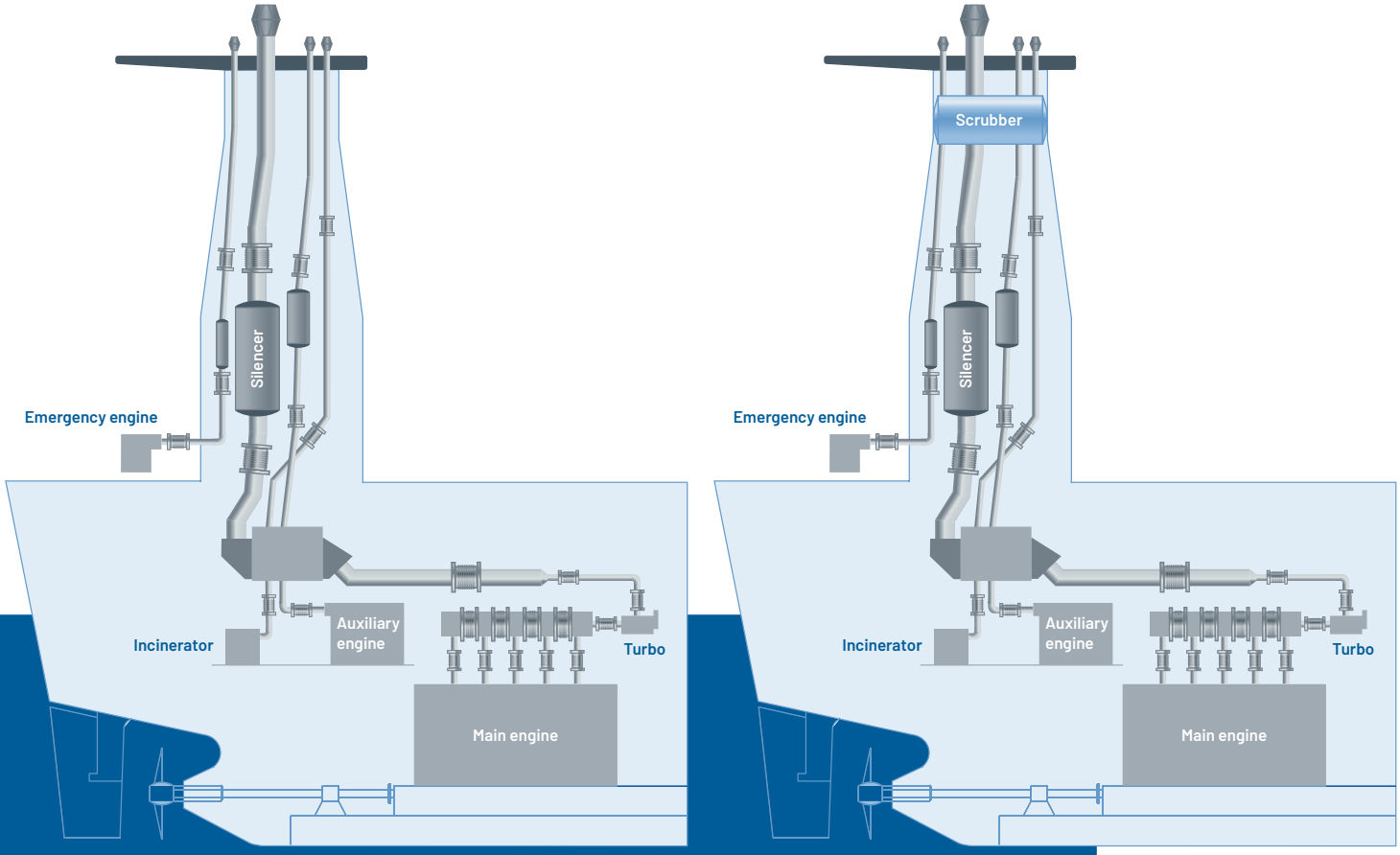
Exhaust Gas Cleaning Systems (EGCS) or scrubbers are integrated within the funnel area at the outer end of the exhaust gas system. Metal expansion joints compensate vibrations and movements which are caused by thermal extension within the pipes or at the connections. They protect the scrubber and the equipment to which it is attached.

Sulphur oxides within the ambient air cause cardiovascular and respiratory diseases as well as cancer. Furthermore, they are the main reason for the formation of acid rain. Consequently, as of January 1st, 2020, the International Maritime Organization (IMO) permits only 0.5 % instead of the previous 3.5 % Sulphur within marine fuel. Each year the emission of 8.5 million tons of Sulphur oxides shall be prevented by this limit.

An economic alternative

"There are different ways to meet the new regulations", explains Amin Alborzi, expert for expansion joints at EagleBurgmann in Denmark. "One way is the usage of low Sulphur fuel, but it's more expensive and leads to permanently high operating costs. The installation of scrubbers on the other hand is an investment which gives great flexibility."

A study of the Norwegian research organization SINTEF conducted in 2019 sees benefits for using heavy fuel oil (high Sulphur fuel oil, HSFO) in combination with scrubbers in comparison to the changeover to low-sulphur fuel (LSFO). The main reason is the overall ecologic footprint: considerably more energy is needed for the production of LSFO which consequently leads to a higher amount of greenhouse gas emissions. While there are approximately 9 to 10 grams of CO_2 equivalents emitted during the production of one MJ HSFO the amount adds up to 13 to 15 grams per MJ for LSFO.



Left: Conventional exhaust gas system. Right: The exhaust gas cleaning system (ECGS, scrubber) is implemented within the funnel area at the end of the system. All exhaust gases from the main engine, auxiliary engines or internal incinerators are cleaned by it before emission.

During longstanding reliable partnerships, EagleBurgmann has developed innovative solutions for numerous companies from the shipping sector. "The best evidence for the quality of our work is when customers decide to address us with new technical challenges like in this case", Alborzi reports. "The first project was initiated by the request of a manufacturer who wanted to supply the scrubber for a retrofit order directly with the ideal expansion joints." A rather unusual demand as usually a manufacturer just delivers the ECGS.

The entire surrounding piping and the expansion joints, the hangers, everything is done by a contractor. "The customer had already made positive experiences with EagleBurgmann in the past and thus knew he would be in good hands regarding metal expansion joints", Alborzi remembers. The collaboration with EagleBurgmann in the early state of the project turned out to be a clear competitive advantage for the customer. He was able to contrast favorably with the market by providing a complete solution package and an even more reliable product.

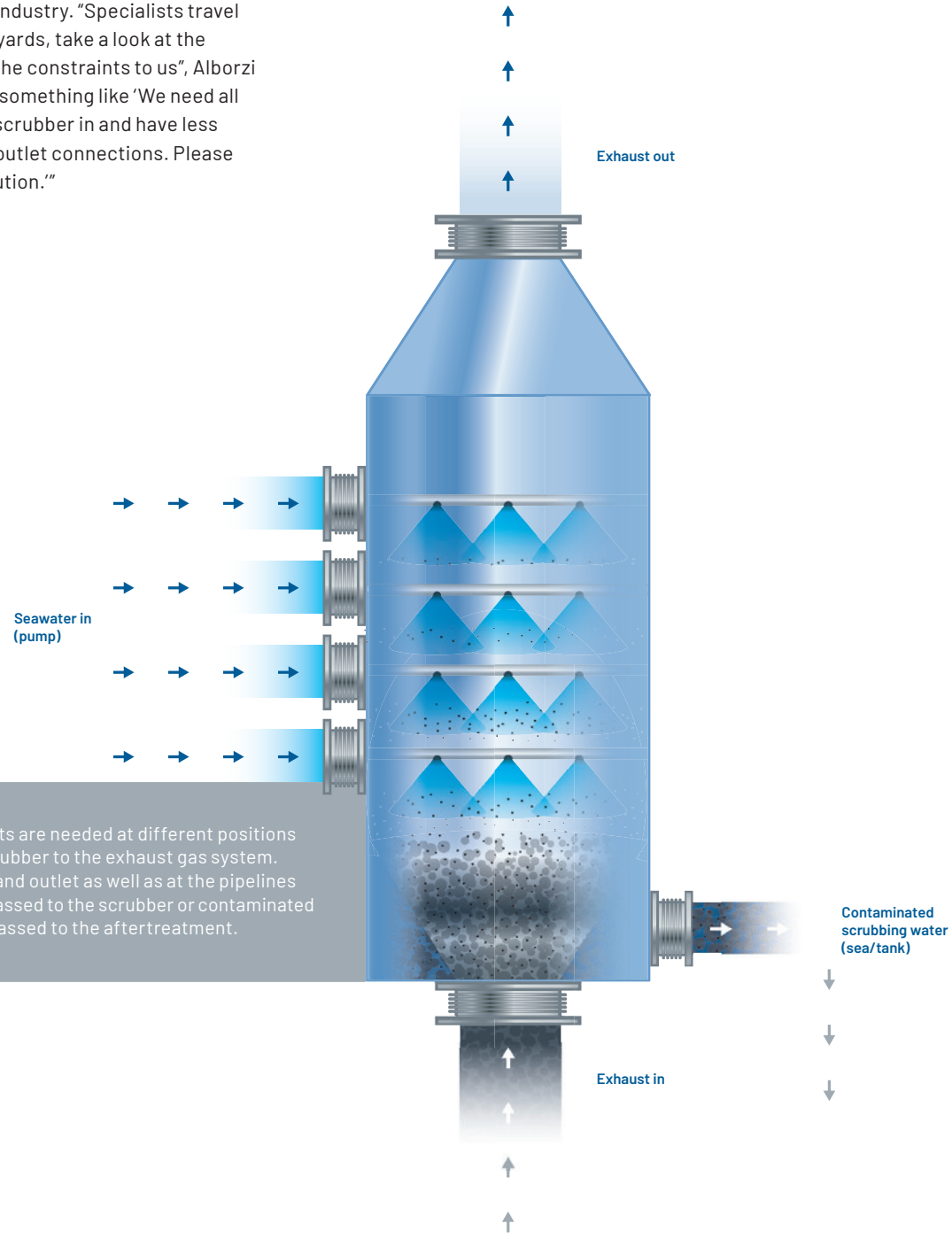
Every project is customized

Meanwhile more than 30 similar projects have been implemented and more are in the pipeline. The multitude of requirements for retrofit projects is extraordinarily challenging. From cruise liners and ferries right up to containerships all kinds of vessels have to be equipped. "Some of these ships are 20 years old and nobody was planning to install scrubbers when they were built," explains Alborzi. "There is little installation space and in many cases there is not even the complete design data available."

Existing pipelines have to be cut and modified. The manufacturer customizes the scrubber for each particular ship and engine size. Concerning the attachment to the exhaust gas system he relies on the engineering competence EagleBurgmann has built during more than 50 years in the expansion joint industry. "Specialists travel all over the globe to the shipyards, take a look at the conditions on site and pass the constraints to us", Alborzi elucidates. "Our task is then something like 'We need all room in the funnel to fit the scrubber in and have less than 50 cm for the inlet and outlet connections. Please help us to find a suitable solution.'"

Extremely short project life spans

The speed of the business requires a permanently high responsiveness and maximum customer orientation. "The market is dictating that speed", Alborzi outlines. "There is for example a free slot in a shipyard for a few weeks and several ship-owners are trying to put their vessel there. Then they need a scrubber manufacturer who can react quickly and finalize his concept within two to three days. EagleBurgmann has adapted to these very agile market requirements and is able to draw up a fitting design and submit a competitive tender within a few hours. In many cases, two to three weeks later the finished products have to be ready on site for assembly."



Metal expansion joints are needed at different positions for attaching the scrubber to the exhaust gas system. At the exhaust inlet and outlet as well as at the pipelines where sea water is passed to the scrubber or contaminated scrubbing water is passed to the aftertreatment.

Competence in materials and processing, wide product range and comprehensive certifications

A strong competence in choosing and processing a wide range of materials is a key success factor of EagleBurgmann. "We know which kinds of steel ideally meet the customers' needs. Thus, we are able to keep a stock available and start the production at notice," Alborzi illustrates. Furthermore, the longstanding experience with different installation places as well as a modular product design contribute to EagleBurgmanns' high flexibility. As almost all parts hold type approvals and are classified by the most important classification societies for shipping, the documentation effort for the tried and tested components is also minimized.

Reliable in performance and sustainability

After more than 150 metal expansion joints have been used for scrubber applications, Alborzi offers a positive summary: "Despite the challenging requirements the metal expansion joints run very reliable and there haven't been any failures up to now.
We're proud to contribute our share to more sustainability within the shipping industry with our technology and our products."

US type for exhaust outlet

UN type for wash water inlet and outlet

AX type for steam

Metal Expansion Joints for scrubbers

- Materials: 254 SMO, AISI321
- Available diameters: DN 40 ... DN 5000
- Temperature spectrum: up to 900 °C
- Movements: axial, lateral, angular
- Classifications: DNV-GL, Bureau Veritas, American Bureau of Shipping, Lloyds Register of Shipping, Russian Maritime Register of Shipping, Nippon Kaiji Kyokai

EagleBurgmann – at the leading edge of industrial sealing technology

Our products are used wherever safety and reliability count: in the industries of oil & gas, refineries, petrochemicals, chemicals, pharmaceuticals, food, power, water and many more. About 6,000 employees contribute their ideas, solutions and dedication every day to ensure that customers around the globe can rely on our seals. With our modular TotalSealCare Service, we emphasize our strong customer orientation and offer custom-tailored services for every need. **Rely on excellence.**

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