

EXHAUST AFTERTREATMENT SYSTEM

The Lürssen Think Tank
Technical Whitepaper

THE LÜRSSSEN THINK TANK

New environmental legislation is changing the way that superyachts are being built, and Lürssen is paving the way with a pioneering exhaust aftertreatment system that achieves significant reductions in Nitrogen Oxide emissions as well as added benefits for its clients. Daniela Backhaus, head of mechanical engineering at Lürssen, reveals the details behind this state-of-the-art system.



EXHAUST AFTERTREATMENT SYSTEM



Compliance with IMO Tier III regulations, in terms of its strict limits on Nitrogen Oxide (NOx) emissions for vessels operating in Nitrogen Emission Control Areas (NECAs), is a major challenge for the superyacht industry. Diesel-propulsion engines cannot be modified to deliver the required reduction in emissions and, as such, these limits can only be achieved by incorporating cumbersome selective catalytic reduction (SCR) systems for exhaust aftertreatment – adding considerable volume and weight to the engine room.

At Lürssen, we wanted to develop our own exhaust aftertreatment system that would significantly reduce NOx emissions while also reducing space, weight, noise and vibration. The fundamental idea was to incorporate the silencer as part of the SCR structure – a solution that wasn't available elsewhere on the market – and create an extremely compact exhaust aftertreatment system.

Starting in 2014, the research and development process spanned nearly three years. It required a lot of manpower and

collaboration between the shipyard, our two engineering partners and the classification society. The challenge was that, due to the newness of the IMO regulations, we did not have any prior experience of designing such a solution to draw from, so extensive testing was undertaken to achieve the optimal results and final certification.

The end result, however, is an innovative and extremely compact exhaust aftertreatment system that filters out 97 per cent of the NOx emissions, as well as reducing space and weight by 30 per cent, cost by 20 per cent and minimising noise and vibration. This means Lürssen clients can have more interior volume for themselves, while also being able to enjoy their yachts in a more comfortable and healthier environment.

Different combinations of the exhaust aftertreatment system have also been developed, so that we are always able to offer the best solution for each individual client and project's needs, independent of the engine manufacturer and engine room design. Due to its variability and compactness, the system is also an ideal solution for refit projects.

The exhaust aftertreatment system is now being fitted on all Lürssen yachts with keels laid after 1 January, 2016 and the 142m Nord is one of Lürssen's first projects to feature it on board. The yacht has been built with a diesel-propulsion system with two main shafts – each main shaft has a diesel engine, a gear box, propeller system, a diesel particulate filter and an external exhaust aftertreatment system.

With our unique exhaust aftertreatment system, Lürssen is able to build yachts that are as innovative on the inside as they are on the outside and deliver the best solution for both the owner and the planet.


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