



NO_x Reduction Package for M/F GEISNES MAN L23/30 engine retrofitted to Tier II limits

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Retrofit solution: 30% NO_x reduction achieved in connection with general main overhaul onboard a Norwegian pendulum ferry.

The MAN 6L23/30 main engine installed in M/F GEISNES was built in Frederikshavn, Denmark, in 1988 - and after the delivery of the ferry in 1989, it has served the vessel for 96,842 operating hours. In connection with a recent major overhaul of the main engine, it was decided by the Norwegian owner, Namsos Trafikselskab, to retrofit an upgrade package with Tier II engine components.

The Tier II main engine upgrade package for M/F GEISNES included:

- New cylinder heads with improved flow properties
- New camshaft for optimised timing
- New fuel equipment (injection pumps and injection valves)
- New gas sealing for increased compression ratio (from 12.6:1 to 13.1:1)
- Readjustment of cam drive gear wheels for retarded injection
- New pistons with improved drains and optimised piston ring configuration
- New cylinder liners with flame ring

Before and after – measurements and documentation

For engines put into service before January 2000, there are no requirements for a technical file. In this case, however, where a shipping company wants to convert and modify the engine for NO_x reduction, the Norwegian authorities and the classification society DNV demand a measuring of the emission level before and after the conversion. Consequently, ISO corrected figures according to the IMO cycle E2 for propulsion plants with CP propellers are calculated. For M/F GEISNES, the emission registration and the related IMO cycle calculations were carried out in close co-operation with DNV in Oslo, who also performed the certified measurements onboard.

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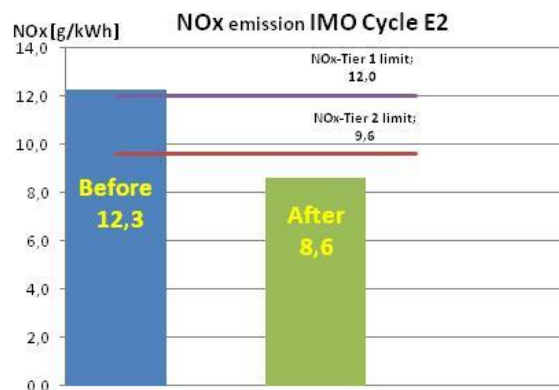
M/F GEISNES particulars:

- Vessel type: 46 metre pendulum ferry for passengers and cars
- Owner: Namsos Trafikselskab, Norway
- Main engine: MAN 6L23/30 (810 kW nominal – rated to 566 kW at 740 r/min)
- Reduction gear: MAN Alpha
- CP Propeller: MAN Alpha type VB
- Classification: DNV (Det Norske Veritas)

Car deck of the Norwegian pendulum ferry M/F GEISNES operating for the Namsos Trafikselskab.



A 30% reduction of NO_x has lowered M/F GEISNES' exhaust gas emissions with a good margin below the IMO Tier II limit – 8.6 g/kWh against 9.6 g/kWh. The fuel consumption is mainly affected (reduced) at the 50% load range.



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About MAN Diesel & Turbo

MAN Diesel & Turbo SE, based in Augsburg, Germany, is the world's leading provider of large-bore diesel engines and turbomachinery for marine and stationary applications. It designs two-stroke and four-stroke engines that are manufactured both by the company and by its licensees. The engines have power outputs ranging from 450 kW to 87 MW. MAN Diesel & Turbo also designs and manufactures gas turbines of up to 50 MW, steam turbines of up to 150 MW and compressors with volume flows of up to 1.5 million m³/h and pressures of up to 1,000 bar. The product range is rounded off by turbochargers, CP propellers, gas engines and chemical reactors. MAN Diesel & Turbo's range of goods includes complete marine propulsion systems, turbomachinery units for the oil & gas as well as the process industries and turnkey power plants. Customers receive worldwide after-sales services marketed under the MAN PrimeServ brand. The company employs around 12,700 staff at more than 100 international sites, primarily in Germany, Denmark, France, Switzerland, the Czech Republic, Italy, India and China. MAN Diesel & Turbo is a company of the Power Engineering business area of MAN SE, which is listed on the DAX share index of the 30 leading companies in Germany.

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