

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Exhaust gas cleaning systems for the reduction of NOx

with type designation(s)
MAN 175D SCR System

Issued to

MAN Energy Solutions SE
Augsburg, Germany

is found to comply with

DNV GL rules for classification – Ships Pt.6 Ch.7 Environmental protection and pollution control

DNV GL class programme DNVGL-CP-0353 – Type Approval - Selective catalytic reduction systems

Application :

Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.

Design pressure: 9,0 bar (urea solution)

Pressure drop: 200 mbar

Design temperature: 580 °C

Issued at **Hamburg** on **2021-02-12**

This Certificate is valid until **2026-02-11**.

for **DNV GL**

DNV GL local station: **Augsburg**

Approval Engineer: **Wolfgang Schütz**

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Olaf Drews
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Product description

The MAN Energy Solutions SE marine exhaust aftertreatment system is designed for reduction of NOx emissions, applicable for engine models MAN 175D (12V, 16V and 20V). It is intended for the use as main propulsion and auxiliary engines.

The SCR system includes the following components:

- Urea mixing unit (including thermal insulation)
- Urea dosing device (urea filter, urea pump module, distributor block. Urea injector, 1 m flexible hoses to connect each injector to the distributor block, wire harness)
- SCR reactor (including thermal insulation)
- SCR control unit with all sensors (not covered by this certificate)
- IMO Tier III certification (not covered by this certificate)

Not included in MAN Energy Solution SE standard scope of delivery are:

- Urea storage tank incl urea level detection
- Urea piping, shut-off valves, drain tray below pump module and filter (dip trays)
- Thermomechanical compensation

For reduction a 32.5% or 40% aqueous urea solution is used.

UREA Pressure (max. working pressure) : 9.0 bar
Exhaust mass flow (max.) : 0.28 kg/s per cylinder
Working temperature (max.) : 580° C
Exhaust back pressure (max.) : 250 mbar

Place of production

MAN Energy Solutions SE
Niels Juels Vel 15
9900 Frederikshavn
Denmark

Application/Limitation

- Pipe dimensions and standard to be according to RU-Ships Pt.4 Ch.6 Sec.9.
- The system is not approved for use with HFO. RU-Ships Pt.6 Ch.7 Sec.7 [3.1.5].
- Hose assemblies and compensators are only to be used at locations where they are required for compensation of relative movements. They are to be kept as short as possible under consideration of the installation instructions of the hose manufacturer. The number of hose assemblies and compensators is to be kept to minimum.
- Bypass is not required RU-Ships Pt.6 Ch.7 Sec.7 [4.1.2].

Below is not scope of this approval

- Control & monitoring system
- Urea storage arrangements, including tank instrumentation, filling, ventilation and sounding arrangements. These shall be submitted for approval for each actual installation.
- Drainage arrangements for urea tank/pump assembly spill tray.

NOx Emission reduction capacity assessment according to Appendix A1 – A4 in DNVGL-CP-0353

- The selection of the SCR system type shall be based on the observance of acceptable exhaust back pressure to the engine and on the maximum allowable space velocity to enable the required NOx reduction rate.
- This additional assessment does not replace the Engine International Air Pollution Prevention Certificate (EIAPP) and cannot be converted into an EIAPP certificate.
- The deterioration rate of the catalyst material is not scope of this additional assessment.

Type Approval documentation

Tests carried out

Type Approval Test, witnessed Frederikshavn, dd 2018-11-29

Marking of product

The products to be marked with manufacturer's name or trademark and type number identification.

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days) to verify that the conditions for the Type Approval are complied with. Refer to the Class Programme DNVGL-CP-0338, Sec.4.

Other conditions

1. Where this SCR system is to be included within the EIAPP certification, it must be considered as a component of the engine, and its presence shall be reported in the engine's Technical File.
2. SCR control and monitoring system, sensors, control of exhaust dampers, etc., is not covered by this certificate. Documentation for the control and monitoring system shall be submitted for approval according to DNV GL Rules Ships Pt.6 Ch.7 Sec.7 Tab.3 and Pt.4 Ch.9 Sec.1 Tab.5 and/or as listed in relevant Type Approval certificates.
3. The following documentation of each actual installation shall be submitted in each case:
 - Reference to this Type Approval Certificate.
 - Information about engine type and intended use (propulsion, auxiliary, etc.).
 - Information of all pipes and hoses to be delivered by the yard as referenced in the installation manual and PID.
 - Pressure drop calculation for the complete exhaust line.
 - Urea storage arrangements, including tank instrumentation, filling, ventilation and sounding arrangements. These shall be submitted for approval for each installation.
 - Drainage arrangements for urea tank/pump assembly spill tray.

END OF CERTIFICATE