

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Engine Subsystem

with type designation(s)
Dual Fuel ME-GI System

Issued to

**MAN DIESEL & TURBO, BRANCH OF MAN DIESEL & TURBO
SE, GERMANY
København SV, Denmark**

is found to comply with
DNV GL rules for classification – Ships Pt.4 Ch.3 Sec.1 Reciprocating internal combustion engines

Application :

The Electronic Controlled Gas Injection System is approved for use on MAN Diesel & Turbo ME/ME-C engines.

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Issued at **Høvik** on **2018-04-09**

This Certificate is valid until **2022-06-30**.

DNV GL local station: **Copenhagen**

for **DNV GL**

Approval Engineer: **Dag Harald Williksen**

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Oddvar Deinboll
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.



Product description

Electronically controlled high pressure gas injection system for MAN Diesel & Turbo SE's dual fuel diesel engines (ME-GI/ME-GI-C). Common rail gas supply system with gas pressure 250 – 300 bar. Separate valves for gas injection and pilot fuel supplied by a standard fuel valve. Integrated sealing oil system for separation of control oil and gas at gas injection valves. Double wall gas piping system with ventilation and system purging with inert gas. A hydraulic supply unit and fast acting hydraulic/electric valves serve the purpose of creating and controlling the oil pressure for opening and closing of the gas valves. The hydraulic/electric valves are controlled by a separate computerised GI-ECS control system which is connected to the ME-ECS engine control system. By the control system, the engine can be operated in the modes: normal "dual fuel mode" with minimum pilot oil amount, "specified gas mode" with limited amount of gas available and "fuel oil-only mode".

Application/Limitation

The ME-GI system is approved for use on DNVGL Type Approved series of the electronic controlled ME/ME-C engines.

Type Approval documentation

Tests carried out

Type Approval test of the ME-GI system on a 8S70ME-GI-C8.2 engine carried out at HHI, Ulsan, Korea 2012.11.27-29.

Marking of product

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

Periodical Assessment

For retention of the Type Approval, a DNV GL surveyor shall perform an assessment after 2 years and after 3.5 years to verify that the conditions of the type approval are complied with. A renewal assessment will be performed at renewal of the certificate.

Other conditions

The ME-ECS (for engine) & GI-ECS (for gas injection system) control and monitoring systems, including sensors are not covered by this type approval certificate. Documentation for safety, control and monitoring systems shall be submitted for approval according to DNVGL Rules for Ships Pt.4 Ch.9 Sec.1 Table 5 and/or as listed in relevant type approval certificates.

For installations onboard DNV vessels, documentation covering the ship's gas system arrangement according to DNVGL Rules for Ships Pt.6 Ch.2 Sec.5 Table 2 shall be submitted for approval.

END OF CERTIFICATE