DNV·GL

Certificate No:
TAM000007E

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Dual Fuel Engine

with type designations(s)
M46DF

Issued to
Caterpillar Motoren GmbH & Co. KG
Kiel, Germany

is found to comply with
DNV GL Rules for classification, Ships - DNVGL-RU-SHIP-Pt.4 Ch.3 Sec.1, Reciprocating Internal Combustion Engines

Application:

propulsion / auxiliary

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

This Certificate is valid until **1st June, 2021**
Issued at **Hamburg** on **2nd June, 2016**

DNV GL local station: Hamburg

for **DNV GL**

Approval Engineer: Jan Sell

Frank Lutz
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

four stroke, in-line engine, non-reversible, trunk-piston, with supercharging, with charge air cooling, constant-pressure charging system, direct injection, injection operation by cams, injection operation electronically controlled, valve operation by cams, liquid fuel, dual fuel

Cylinder bore: 460 mm
Piston stroke: 610 mm

Additional place of production

Caterpillar Motoren Rostock GmbH, Rostock, Germany

Application / Limitation

Rated power [kW/cyl.]	915	915
Rated speed [rpm]	514	500
Mean effective pressure [bar]	21.07	21.66
Max. firing pressure [bar]	186	186

Definition

Type Approval documentation

10-125799, 11-014122, 12-134140, 13-094044, 13-097667, 13-101845, 13-106904, 13-117139, 14-015316, 14-019844, 14-027313, 14-034567, 15-030665, 15-073279, 16-007973, 16-008330, 16-008423, 262.1-013150-1, 262.1-021144-1

Tests carried out

Documentation:

Test report titel	Test Report M46DF Inline Engine Type Approval Test
Test report reference	16-007973, 2016-04-07
Place of test	Rostock
Date of test	2016-01-25 until 2016-01-29

Test engine:

Model	8M46DF
Serial no.	71007
No. of cylinders	8
Power [kW/cyl.]	915
Speed [rpm]	500

Marking of product

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

Periodical assessment

For retention of the Type Approval, DNV GL shall perform a Periodical Assessment every second year and before the expiry date of this certificate.

The objective of the Periodical Assessment is to verify that the conditions for the Type Approval are not altered since the Type Approval certificate was issued.

In case where the Type Approved product is manufactured at other companies, the Periodical Assessment shall verify that the Type Approval applicant has a quality control system for consistent production at their licensees/subcontractors. Furthermore Periodical Assessment shall be carried out randomly at these companies.

Other conditions

1. For installation, operation, and service of the engine, the relevant instructions of the engine manufacturer are to be observed.
2. Flexible hose assemblies shall be type approved by DNV GL; DNV GL Rules Pt.4 Ch.6 Sec.9 [4].
3. Connections of pipes carrying lube oil or fuel oil shall be properly screened to prevent oil spray in case of leakage; DNV GL Rules Pt.4 Ch.3 Sec.1 [2.6.2].
4. Signboards shall be fitted according to the DNV GL Rules Pt.4 Ch.3 Sec.1 [2.3.6].
5. Gas fuel pipes shall be colour marked; DNV GL Rules Pt.6 Ch.2 Sec.5 [5.1.3.17].
6. At type approval test of the engine, the following electronic systems/components for engine control were used and tested during integration test: Caterpillar MACS and Caterpillar ADEM V A5E4v2. However, engine safety, control and monitoring systems, including sensors and actuators, are not covered by this Type Approval certificate. Documentation for engine safety, control (including speed governing), and monitoring systems shall be submitted for approval according to DNV GL Rules Pt.4 Ch.9 Sec.1 Table 5 and/or as listed in relevant Type Approval certificates.
7. Electric cables and cabling are not covered by this Type Approval certificate and shall be verified to comply with DNV GL Rules Pt.4 Ch.8.
8. Individual product certification is required for each engine; DNV GL Rules Pt.4 Ch.3 Sec.1 [1.1.14].
9. Gas Valve Unit is not covered by this Type Approval certificate.
10. For single main propulsion application a suitable fuel rack actuator with mechanical back-up speed governor is to be used; DNV GL Rules Pt.4 Ch.3 Sec.1 [5.2.3.2].

END OF CERTIFICATE