DNV·GL

Certificate No:
TAA00000VN

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Electronic fuel injection system

with type designation(s)
ADEM IV (A4E4 v2) - Engine Control Module (ECM)

Issued to
Caterpillar Inc.
Lafayette IN, United States

is found to comply with
DNV GL rules for classification – Ships, offshore units, and high speed and light craft

Application :

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

Temperature	**D**
Humidity	**B**
Vibration	**B**
EMC	**A**
Enclosure	**C**

This Certificate is valid until **2021-11-06**.

Issued at **Hamburg** on **2017-04-27**
DNV GL local station: **New York** for **DNV GL**

Approval Engineer: **Andrea Grün**

Joannis Papanuskas
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.

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Job Id:
Certificate No: **TAA00000VN**

Product description
ADEM IV - Electronic Control Module (ECM) for electronic control of fuel injection, speed governing and extra I/O modules for engine management.

Approval conditions
The following documentation of the actual application is to be submitted for approval in each case:
- Reference to this Type Approval Certificate
- Functional description
- System block diagram (showing overall system layout and ECM)
- List of control & monitored points (including alarms, shutdowns, setpoints)
- Power supply arrangement (may be part of the System block diagram)
- Test program for certification

The Type Approval covers hardware listed under Product description.

Product certificate
When the ADEM IV Engine Control Module is used in control, safety and monitoring systems for diesel engines onboard vessels classed by DNV GL, product certificate will be required for the application software according to DNV GL Rules Pt.4 Ch.9 Sec.1 A 202. The certification test shall be performed at the manufacturer of the application system before the system is shipped to the yard. After the certification the clause for application software control will be put into force.

Clause for application software control
All changes in software are to be recorded as long as the system is in use on board. The records of all changes are to be forwarded to DNV GL for evaluation and approval. Major changes in the software are to be approved before being installed in the computer.

Type Approval documentation

Test Report:
Documentation:

Tests carried out
Applicable tests according to class guideline DNVGL-CG-0339, November 2016.

Periodical assessment
The scope of the periodical assessment is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, software versions, components and/or materials.

The main elements of the assessment are:
- Ensure that type approved documentation is available
- Inspection of factory samples, selected at random from the production line (where practicable)
- Review of production and inspection routines, including test records from product sample tests and control routines
- Ensuring that systems, software versions, components and/or materials used comply with type approved documents and/or referenced system, software, component and material specifications
- Review of possible changes in design of systems, software versions, components, materials and/or performance, and make sure that such changes do not affect the type approval given
- Ensuring traceability between manufacturer's product type marking and the type approval certificate.

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE