

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Diesel Engine

with type designation(s)
710 Series

Issued to

Electro-Motive Diesel Inc.
Mc Cook IL, United States

is found to comply with

Det Norske Veritas' Rules for Classification of Ships
DNV's Offshore Standard DNV-OS-D101 "Marine and Machinery Systems and Equipment"

Application :

The approval is valid for propulsion in multi-engine plants, auxiliary, emergency duty for ships and ship-shaped offshore units and for emergency duty for self elevating units (jack-ups), based on the following main data.

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

Rating see page 2

This Certificate is valid until **2019-12-31**.

Issued at **Høvik** on **2015-10-23**

DNV GL local station: **New York**

Approval Engineer: **Dag Harald Williksen**

for **DNV GL**

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

Two stroke diesel engine

Piston stroke: 279.4 mm
Cylinder bore: 230.12 mm
No.of cylinders: 8, 12, 16 & 20 in V

Application/Limitation

The approval is valid for propulsion in multi-engine plants, auxiliary, emergency duty for ships and ship-shaped offshore units and for emergency duty for self elevating units (jack-ups), based on the following main data:

710GC-T2 (Electronic)

	8 Cyl	12 Cyl	16 Cyl	20 Cyl
Mean indicated pressure:	10.7 bar	10.7 bar	10.7 bar	13.3
Max. cylinder pressure:	109 bar	109 bar	109 bar	121.2
Rated cont. output per cyl:	186.5 kW/cyl	186.5 kW/cyl	186.5 kW/cyl	201.4 kW/cyl
Total Rated Output:	1492 kW	2238 kW	2984 kW	4028.4 kW
Corresponding to:	900 RPM	900 RPM	900 RPM	900 RPM

710GC (Electronic)

	8 Cyl	12 Cyl	16 Cyl	20 Cyl
Mean indicated pressure:	10.7 bar	10.7 bar	10.7 bar	10.7 bar
Max. cylinder pressure:	124 bar	124 bar	124 bar	124 bar
Rated cont. output per cyl:	186.5 kW/cyl	186.5 kW/cyl	186.5 kW/cyl	186.5 kW/cyl
Total Rated Output:	1492 kW	2238 kW	2984 kW	3730 kW
Corresponding to:	900 RPM	900 RPM	900 RPM	900 RPM

710GB (Mechanical)

	8 Cyl	12 Cyl	16 Cyl	20 Cyl
Mean indicated pressure:	10.7 bar	10.7 bar	10.7 bar	10.7 bar
Max. cylinder pressure:	124 bar	124 bar	124 bar	124 bar
Rated cont. output per cyl:	186.5 kW/cyl	186.5 kW/cyl	186.5 kW/cyl	186.5 kW/cyl
Total Rated Output:	1492 kW	2238 kW	2984 kW	3730 kW
Corresponding to:	900 RPM	900 RPM	900 RPM	900 RPM

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, a DNV surveyor shall perform a survey every second year and before the expiry date of this certificate to verify that the conditions of the type approval are complied with.

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. The main scope of the Periodical Assessment will normally include:

- Verification of the Type Approval applicant's production and quality system w.r.t. ensuring continued consistent production of the Type Approved products at the Type Approval applicant's own premises and at other companies that are given the responsibility for manufacturing of the products.
- Review of the Type Approval documentation and that this is still used as basis for the production

Job Id: **262.1-002908-7**
Certificate No: **TAM0000039**

- Review of possible changes to the design, the material and the performance of the product
- Verification of the product marking.

In cases 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

Foundation arrangement to be submitted for each installation according to the Rules, Pt. 4 Ch.3 Sec.1 A500 – Documentation of arrangement.

Torsional vibration calculations to be submitted for each installation according to the Rules Pt.4, Ch.3, Sec.1, G - Vibration.

Signboards according to the Rules Pt.4, Ch.3, Sec.1, C 406

Flexible hoses with couplings to be type approved by DNV.

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 Pt.4 Ch.9 Sec.1 Table C2 and/or as listed in relevant type approval certificates.

Electric cables and cabling are not covered by this approval and must be verified to comply with the requirement of DNV Rules for Ships/ High, Speed Light Craft and Naval Surface Craft Pt.4 Ch.8 - Electrical Installation.

The approval does not include driven member.

END OF CERTIFICATE