



DNV

TYPE APPROVAL CERTIFICATE

Certificate No:
TAM00001AE

This is to certify:

That the LFL Engine

with type designation(s)
DI16 MD97

Issued to

Enmar Engines AB
414 51 Göteborg, Sweden

is found to comply with

DNV Rules for classification, Ships - DNV-RU-SHIP-Pt4 Ch3 Sec1, Reciprocating Internal Combustion Engines

Application :

propulsion, multi engine plant / auxiliary

Product approved by this certificate is accepted for installation on all vessels classed by DNV.

Issued at **Høvik** on **30th Mars, 2023**

This Certificate is valid until **29th Mars, 2028**.

DNV local station: **Gothenburg**

for **DNV**

Approval Engineer: **Dag Harald Williksen**

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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 AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") 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

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

Cylinder bore [mm]	130
Piston stroke [mm]	154
No. of cylinders	8

Application/Limitation

Rated power [kW]	330	370	415
Rated speed [rpm]	1500	1800	2100
Mean effective pressure [bar]	16.3	14.6	14.5
Max. firing pressure [bar]	187	184	200

Type Approval documentation

Tests carried out

Documentation:

Test report title	Type approval test report DI16 MD97
Place of test	Nordhavn Power Solutions, Nikkelvej 17, 8940 Randers, Denmark
Date of test	2023-03-16 until 2023-03-16

Test engine:

Model	DI16 MD97	
Serial no.	SNEID00010	
No. of cylinders	8	
Power [kW/cyl.]	330 kW	415 kW
Speed [rpm]	1500 rpm	2100 rpm

Marking of product

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

Periodical assessment

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.

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

Flexible hoses 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 the Rules Pt.4 Ch.9 Sec.1 Table 5 and/or as listed in relevant type approval certificates.

Electric cables and installation of this is not covered by this approval and must be verified to comply with the requirement of the Rules Pt.4 Ch.8 - Electrical Installation.

The second barrier of the return pipes for methanol built on the engine are not in compliance with the requirements given in the IMO Interim Guideline Circ. 1621, paragraph 5.6.2 and 9.4. However, the applied measures, documented in the existing safety concept and demonstrated by testing, confirms that the design is suitable for the intended use. The project-specific application requires the approval of the flag state.

END OF CERTIFICATE