DNV·GL

Certificate No:
TAM000006M

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Diesel Engine

with type designation(s)
HIMSEN H32/40

Issued to
Hyundai Heavy Ind. Co., Ltd. Engine & Machinery Division
Ulsan, Republic of Korea

is found to comply with
DNV GL rules for classification – Ships
DNV GL offshore standards
DNV's Offshore Service Specification DNV-OSS-201 "Verification for Compliance with Norwegian Shelf Legislation".

Application :

The approval is valid for propulsion, auxliliary and emergency duty.

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

Rating 500 kW/cylinder @ 720/750 rpm

This Certificate is valid until **2020-06-30**.

Issued at **Høvik** on **2016-03-09**

for **DNV GL**

DNV GL local station: **Ulsan**

Approval Engineer: **Amir Dzaferi**

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.

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Job Id: **262.1-002350-13**
Certificate No: **TAM000006M**

Product description
Four Stroke Diesel Engine.

Cylinder bore: 320 mm
Piston stroke: 400 mm
Cylinder configuration: 6, 7, 8 and 9 in-line
12, 14, 16, 18 and 20 in-V

Application/Limitation
1. Approval according to DNV GL Rules for Classification of Ship: The approval is valid for propulsion, auxliliary and emergancy duty, and is based on the following main data:

Engine:	HIMSEN H32/40 in line and V	
Mean indicated pressure, [bar]	28,5	27,5
Max. cylinder pressure, [bar]	190	190
Rated power, [kW/cyl.]	500	500
Corresponding to, [rpm]	720	750

2. Approval according to DNV GL's Offshore Standard DNV-OS-D101 "Marine and Machinery Systems and Equipment": The approval is valid for emergency duty onboard mobile offshore units with main data as specified in above table, but is limited to the in-V configuration.

3. Approval according to DNV's Offshore Service Specification DNV-OSS-201 "Verification for Compliance with Norwegian Shelf Regulations": The approval covers compliance with DNV-OSS-201 (NMA 856/87 §11) but is limited to the in-V configuration, in combination with generator types Hyundai HSJ71203-10P , GE Power Conversion B160T10 and ABB AMG 0900 LT10 LSE, and is valid for emergency duty onboard mobile offshore units with main data as specified in above table.

The approval is only valid for the given combination of engine and generator type.

Tests carried out
- Type test of in-line version carried out acc. to the Rules 2002-10-12/25 in Ulsan, Korea.
- Type approval retention survey dated 2006-12-10.
- Type test of V-version carried out acc. to the Rules 2008-12-15/17, in Ulsan, Korea.
- Prototype test according to NMA 856/87 §11 carried out as follows:
- HiMSEN 16H32/40V, serial no BE0011, and generator Hyundai HSJ7 1203-10P carried out 2011-10-14
- HiMSEN 12H32/40V, serial no BA4985, and generator type GE Power Conversion B160T10, carried out 2013.12.17
- HiMSEN 12H32/40V, serial no BA5025-2, and generator type ABB AMG 0900 LT10 LSE, serial no 4630959, carried out 2014-01-08

Marking of product
The product is 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
- 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

- Fundation arrangement to be submitted for each installation according to the Rules Pt. Ch.3 Sec.1 [1.4] – Documentation of arrangement.

- Torsional vibration calculations to be submitted for each installation according to the Rules Pt.4 Ch.2 Sec.2 – Torsional Vibration.

- Signboards according to the Rules Pt.4 Ch.3 Sec.1 [2.3.6] – Warning Notice.

- Flexible hoses to be Type Approved by DNV GL.

- 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 approval does not include driven member. Excepted from this, is compliance with NMA 856/87 §11 for the engine and generator combination referred to under Application/Limitation, item 3. If other types of generators shall be used must either a new protptype test be carried out or generator bearing pressure calculation be submitted for approval.

END OF CERTIFICATE