

TYPE APPROVAL CERTIFICATE

Certificate No:
TAM00000TC**This is to certify:****That the Dual Fuel Engine**with type designation
H22CDF

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 - DNVGL-RU-SHIP-Pt4 Ch3 Sec1,
Reciprocating Internal Combustion Engines****Application :**

Multi engine plant: Propulsion, auxiliary

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

This Certificate is valid until **21st January, 2023**.Issued at **Høvik** on **22nd January, 2018**DNV GL local station: **Ulsan**for **DNV GL**Approval Engineer: **Tage Olav Alexander Strøm**

**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.

Job Id: **262.1-026019-1**
Certificate No: **TAM00000TC**

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, valve operation by cams, pilot fuel injection and gas admission system controlled electronically, dual fuel

Cylinder bore : 220
Piston stroke : 330
No. of cylinders : 5,6,7,8,9

Place of production

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

Application/Limitation

Rated power [kW/cyl.]	215	220
Rated speed [rpm]	900	1000
Break mean effective pressure [bar]	22.9	21
Max. firing pressure at MCR [bar]	220	220

Type Approval documentation

Tests carried out

Documentation:

Test report title	Type Approval Test Report H22CDF
Place of test	Hyundai Heavy Industries Co. Ltd Ulsan, Korea
Date of test	2017-12-12 until 2017-12-15

Test engine:

Model	H22CDF
Serial no.	KYE001011
No. of cylinders	7
Power [kW/cyl.]	1505
Speed [rpm]	900

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

Integration testing to be witnessed and approved when done on the engine with the control system as delivered before the first delivery of an engine.

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



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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 explosion protection of the gas admission valves does not comply with the hazardous area zone definition of the IGF Code, paragraph 12.5.1 and -2. For installation of engines on ships subject to that Code, proof of suitability for the intended use, either by (a) explosion protection certification, or (b) any other suitable measures in addition to the existing explosion protection level of the valve, shall be documented in the safety concept and approved accordingly. Additional measures (b) are subject to final acceptance by the relevant flag state administration for ships subject to the IGF Code.

END OF CERTIFICATE