Certificate No:
TAM0000013

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Diesel Engine

with type designation(s)
MTU Series 2000P

Issued to
MTU Friedrichshafen GmbH
FRIEDRICHSHAFEN, Germany

is found to comply with
Det Norske Veritas' Rules for Classification of Ships/High Speed and Light Craft
DNV's Offshore Standard DNV-OS-D101 "Marine and Machinery Systems and Equipment"

Application :

The approval is valid for auxiliary and emergency duty.

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 **2018-12-31**.
Issued at **Høvik** on **2015-07-08**
DNV GL local station: **Augsburg** for **DNV GL**

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.

© DNV GL 2014. DNV GL and the Horizon Graphic are trademarks of DNV GL AS.

Job Id: **262.1-001134-8**
Certificate No: **TAM0000013**

Product description

Four Stroke Diesel Engine

Cylinder bore: 130 mm
Piston stroke: 150 mm
No. of cylinders: 12 and 16 in V

Manufacturing plants:

MTU Friedrichshafen GmbH, Germany
MTU Detroit Diesel Inc., Graniteville, USA

Application/Limitation

The approval is valid for auxiliary and emergency duty and is based on the following main data:

Engine model 12V 2000P	Max. cont. rating (kW)	Corresponding to (RPM)	Max.cylinder pressure (bar)	Mean indicated pressure (bar)
	498	1500	120 + 10	18.7
	575	1500	135 + 10	21.6
	600	1800	115 + 10	18.7
	675	1800	125 + 10	21.0
	695	1800	130 + 10	21.7
	788	2100	140 + 10	21.2

Engine model 16V 2000P	Max. cont. rating (kW)	Corresponding to (RPM)	Max.cylinder pressure (bar)	Mean indicated pressure (bar)
	664	1500	125 + 10	18.4
	770	1500	140 + 10	21.3
	800	1800	120 + 10	18.4
	900	1800	125 + 10	20.7
	930	1800	140 + 10	21.5
	980	1800	145 + 10	22.6
	1050	2100	135 + 10	20.7

Marking of product

The product is to be marked with the 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

- 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