

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Turbocharger

with type designation(s)
METxxMB

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 Pt.4 Ch.3 Sec.1 Reciprocating internal combustion engines

Application :

The turbochargers are approved for use on diesel engines with application data as given in the certificate

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

Issued at **Høvik** on **2017-09-20**

This Certificate is valid until **2022-06-30**.

for **DNV GL**

DNV GL local station: **Ulsan**

Approval Engineer: **Tage Olav Alexander Strøm**

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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: **262.1-014684-2**
Certificate No: **TAM00000NY**

Product description

Exhaust driven turbochargers served by cylinder groups with combined power in the range of 6900 - 20100 kW

Types: **MET66MB, MET71MB, MET83MB**

The turbochargers are manufactured based on licence agreement with Mitsubishi Heavy Industries Ltd.

Application/Limitation

Type	MET66MB		MET71MB		MET83MB	
Impeller type	V	U	V	U	V	U
Max rated speed (RPM)	13000	13790	12010	12750	10270	10900
Max exhaust gas temperature before turbine (°C)	580		580		580	

Maximum allowable compressor ratio:

Impeller type **V** : 4.2

Impeller type **U** : 5.0

ALARM LEVELS:

Overspeed, maximum alarm level: 105% of maximum rated speed

High exhaust temperature at turbine entry, maximum alarm level: 550 °C.

Low lubrication oil pressure at turbocharger inlet, minimum alarm level: 0.6 bar (gauge pressure)

Maximum lubrication oil outlet temperature (alarm level): 85 °C

Application constraints:

Maximum allowed inclinations for MET-MB turbochargers:

Static: $\pm 15^\circ$

Dynamic (momentary): $\pm 22.5^\circ$

Engine and rotor vibrations to be within Mitsubishi's specifications for MET-MB turbochargers (ref. Tz-E002-3925).

Tests carried out

Type Approval test of MET66MB August 2011 by Mitsubishi Heavy Industries Ltd.

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 GL surveyor shall perform an assessment after 2 years and after 3.5 years to verify that the conditions of the type approval are complied with. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE