

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Turbocharger

with type designation(s)
METxxMB

Issued to

HSD Engine Co., Ltd.

Changwon-si, Gyeongsangnam-do, 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 :

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

Issued at **Høvik** on **2019-03-07**

This Certificate is valid until **2024-03-06**.

for **DNV GL**

DNV GL local station: **Gimhae Station**

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.



Product description

Exhaust driven turbochargers served by cylinder groups with combined power in the range of 6250 – 21 000 kW

Application/Limitation

Type	MET60MB	
Impeller type	V (W,T)	U, T
		H
	3	3
Max rated speed (RPM)	14550	15450
Max temperature (°C)	580	
Max compressor ratio	4.2	5.0

Type	MET66MB	
Impeller type	V (W,T)	U, T
		H
	3	3
Max rated speed (RPM)	13000	13790
Max temperature (°C)	580	
Max compressor ratio	4.2	5.0

Type	MET71MB		
Impeller type	V (W,T)	U, T	
		H	
	2	2	3
Max rated speed (RPM)	12750	12750	12750
Max temperature (°C)	580		
Max compressor ratio	4.2	5.0	

Type	MET83MB			
Impeller type	V (W,T)		U, T	
			H	
	2	3	2	3
Max rated speed (RPM)	10900	10270	10900	10900
Max temperature (°C)	580			
Max compressor ratio	4.2		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

Job Id: **262.1-030580-1**
Certificate No: **TAM000011Z**

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 makers specifications for MET-MB turbochargers (ref. Tz-E002-3925).

Tests carried out

Type Approval test of MET66MB August 2011.

Type Approval test report MET66MB (no.GU3L23DCD4J0), dated 2010-11-25

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, both referring to the issue date of the type approval certificate 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