

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Turbocharger

with type designation(s)
METxxSR/SRII/SRC

Issued to

**Mitsubishi Heavy Industries Marine Machinery & Engine Co.,
Ltd.
Nagasaki City Nagasaki Pref., Japan**

is found to comply with
DNV GL rules for classification – Ships

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.

This Certificate is valid until **2020-12-31**.

Issued at **Høvik** on **2016-03-14**

DNV GL local station: **Hiroshima**

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.

Product description

Exhaust driven turbochargers served by cylinder groups with combined power in the range up to 4400 kW

Application/Limitation

Type	MET18SRC			MET22SRC	
Impeller size	1	2	3	2	3
Max rated speed (RPM)	54360 ¹⁾ 60360 ²⁾	49360 ¹⁾ 54730 ²⁾	46550 ¹⁾ 51730 ²⁾	41730 ¹⁾ 46450 ²⁾	39450 ¹⁾ 43820 ²⁾
Max temperature (°C)	580 ¹⁾ 610 ²⁾			580 ¹⁾ 610 ²⁾	

Type	MET26SRC		MET30SRC	
Impeller size	2	3	2	3
Max rated speed (RPM)	34360 ¹⁾ 38180 ²⁾	32450 ¹⁾ 36000 ²⁾	28270 ¹⁾ 31360 ²⁾	26730 ¹⁾ 29640 ²⁾
Max temperature (°C)	580 ¹⁾ 610 ²⁾		580 ¹⁾ 610 ²⁾	

Type	MET37SRC	
Impeller size	2	3
Max rated speed (RPM)	23090 ¹⁾ 25550 ²⁾	21730 ¹⁾ 24090 ²⁾
Max temperature (°C)	580 ¹⁾ 610 ²⁾	

- 1) Standard type
2) High pressure ratio type

Type	MET22SR / SRII		MET26SR / SRII	
Impeller size	2	3	2	3
Max rated speed (RPM)	41730	39450	34360	32450
Max temperature (°C)	580			

Type	MET30SR/SRII	
Impeller size	2	3
Max rated speed (RPM)	28270	26730
Max temperature (°C)	580	

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 turbochargers:

Static: ± 15°

Dynamic (momentary): ± 22.5°

Engine induced vibrations to be within the specified limits given in instruction manuals for METxxSR/SRII/SRC turbochargers.

Job Id: **262.1-002367-4**
Certificate No: **TAM000006S**

Tests carried out

Doc.No	Title
NA343135	Type Test of MET-30SR Type Exhaust Gas Turbocharger
IRE2-07589	Inspection Report Mitsubishi Exhaust Gas Turbo Charger MET-26SR-II
NA808037	Type Test for MET-18SRC Type Exhaust Gas Turbocharger
98-087	Inspection report of Mitsubishi exhaust gas turbocharger MET26SR type

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 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.

END OF CERTIFICATE