

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Turbocharger**

with type designation(s)
AT14

Issued to

IHI Rotating Machinery Engineering Co., Ltd.
Kamiina-gun Nagano Pref., Japan

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.

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Issued at **Høvik** on **2018-01-17**

This Certificate is valid until **2022-12-31**.

DNV GL local station: **Yokohama**

for **DNV GL**

Approval Engineer: **Dag Harald Williksen**

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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 turbocharger served by cylinder groups with combined power in the range from 400 kW up to 1000 kW.

Application/Limitation

Maximum allowed operating speed and exhaust gas temperature at turbine entry:

Turbocharger	Compressor diameter [mm]	Tmax [°C]	Nmax [s ⁻¹]	Max Compressor Ratio
AT14	136.7	650	1257	3.5
	144.2	650	1192	3.5
	136.0	650	1271	4.5
	144.2	650	1203	4.5

The stated speeds and temperatures are the highest allowed values and should not be exceeded at any time, nor at engine overload (110% MCR).

See drawing 4SE0202C for other turbocharger details.

ALARM LEVELS:

Overspeed, maximum alarm level: N_{max} .

High exhaust temperature at turbine entry, maximum alarm level: T_{max} .

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

Normal operation and full engine load: 2-5 bar

Low load operation: 1.2 bar

Alarm and idling operation ≤ 1.0 bar

Tests carried out

Containment verification: IHI Report dated 2008-03-31

Marking of product

The product to be marked with the 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.

END OF CERTIFICATE