

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Turbocharger**with type designation(s)
VTR..4

Issued to

ABB Turbo Systems AG
Baden, AG, Switzerland

is found to comply with

DNV GL rules for classification – Ships**DNV GL rules for classification – High speed and light craft****Application :****The turbochargers are approved for use on internal combustion 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 **Hamburg** on **2018-06-12**This Certificate is valid until **2023-06-11**.for **DNV GL**DNV GL local station: **Augsburg**Approval Engineer: **Andreas Wolf**

Burkhard Lilienthal
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 500 kW to 13,000 kW.

Alternative place of production

ABB Turbo Systems Ltd
Weierstrasse 5
CH-5313 Klingnau
Switzerland

ABB Jiangjin Turbo Systems Co., Ltd.
No. 23 Dong Jiang Lu, Degan Jie Dao
Degan Industrial Zone, Jiangjin
Chongqing 402284
P.R. China

Application/Limitation

Max. operational speed and exhaust gas temperature:

Turbocharger	Compressor wheel diameter (mm)	With AI-Compressor		With Titan-Compressor	
		N _{max} (s ⁻¹)	T _{max} (°C)	N _{max} (s ⁻¹)	T _{max} (°C)
VTR184	208	772	700	820	700
VTR214	248	657	700	690	700
VTR254	294	555	700	580	700
VTR304, St 465TS	350	450 470	640 620	470	620
VTR304, St 13T	350	470	650	490	650
VTR354, St 465TS	416	380 395	640 620	395	620
VTR454, St 13T	523	395	650	412	650
VTR454, St 465TS	523	300 310	640 620	310	620
VTR454, St 13T	523	310	650	327	650
VTR564, St 465TS	659	240 244	640 620	245	620
VTR564, St 13T	659	244	620	260	650
VTR714, St 465TS	829	194	620	195	620

The stated speeds and temperatures are the highest allowed values and should not be exceeded at any time, nor at engine overload (110%). For each specific application, the ratings shall be corrected according to ABB's SiKo instructions.

ALARM LEVELS:

Overspeed

Condition:	Alarm level:
$N_{Mmax} \geq 1.02 \times N_{Bmax}$	$N_{Alarm} \geq 1.02 \times N_{Bmax}$
$1.01 \times N_{Bmax} \leq N_{Mmax} < 1.02 \times N_{Bmax}$	$N_{Alarm} = N_{Bmax}$
$N_{Bmax} \leq N_{Mmax} < 1.01 \times N_{Bmax}$	$N_{Alarm} \geq 0.99 \times N_{Bmax}$

N_{Mmax} is the turbocharger operational limit at 110% short duration engine load as stated on the rating plate.

N_{Bmax} is the turbocharger operational limit at 100% engine load, as stated on the rating plate.

N_{Alarm} is the application dependent alarm level value based on ABB's SiKo and HCF safety concept.

The overspeed alarm value shall be specified in the individual turbocharger DNV GL Product Certificate.

High exhaust temperature at turbine entry, maximum alarm level: $T_{Mmax} - 15^{\circ}\text{C}$.

T_{Mmax} is the turbocharger operational limit at engine overload (110%), as stated on the rating plate.

JOURNAL BEARINGS & EXTERNAL LUBRICATION FROM ENGINE LUBE OIL SYSTEM:

Low lubrication oil pressure at turbocharger inlet, minimum alarm level: 0.2bar (gauge pressure).

High temperature increase from oil inlet to oil outlet, maximum alarm level¹⁾: 40°C

ROLLING BEARINGS & SEPARATE INTERNAL LUBRICATION:

Lubrication oil flow: alarm if loss of flow.

High mean temperature in the lubrication oil sump, maximum alarm level¹⁾: 130°C

¹⁾ Alarm only required for turbochargers served by cylinder groups with combined power > 2500 kW

Application constraints

Engine induced vibration to be within the specified limits given in "VTR..4 Manual for the engine manufacturer – Instruction for mounting turbochargers".

Ship inclinations to be within the permissible limits given in "VTR..4 Manual for the engine manufacturer – Bearings and lubrication".

Type Approval documentation

Marking of product

The product to be marked with 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 cases where the type approved product is manufactured at other companies, periodical assessments shall be carried out randomly at these companies. All companies shall be assessed at least once in the period of validity of the TA certificate.

This will be according to Class Guideline DNVGL-CG-0338, Section 4.

Other conditions



Job Id: **262.1-002470-7**
Certificate No: **TAM00000WA**

Turbochargers are categorized in three categories depending on power served by each turbocharger:
Category A = ≤ 1000 kW, Category B = > 1000 kW and ≤ 2500 kW, Category C = >2500 kW.

Turbochargers shall be delivered with a product certificate issued by the manufacturer (category B) or by the class society (category C). For turbochargers of category A an certificate is not mandatory.

This certificate replaces DNV TAC M-12037 and GL TAC 38518-80HH.

END OF CERTIFICATE