

TYPE APPROVAL CERTIFICATE

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

with type designation(s)
BTLxx, GTAx, GTBxx

Issued to

Honeywell Productos Automotrices
Mexicali BC, Mexico

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 **2018-02-07**

This Certificate is valid until **2023-02-06**.

DNV GL local station: **Long Beach**

for **DNV GL**

Approval Engineer: **Andreas Wolf**

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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.



Job Id: **262.1-025859-1**
Certificate No: **TAM00000M6**

Application/Limitation

Max. operation speed and exhaust gas temperatures acc. application at diesel engines:

Type	Compressor wheel diameter (mm)	Max. speed (rpm)	Max. temperature (C°)	Max. allowable compressor ratio	Engine output (kW)	Used in Engine Type
BTL55	102	102,100	760	3.9	671	C3508
GTA60	141	74,200	760	4	629	C3512
GTB47	102	99,500	760	4.4	820	C3508
GTB57	133	76,295	760	4.8	634	C3512
GTB60	151	67,100	760	4.9	675	C3516
GTB62	151	72,000	760	4.9	820	C3516
GTB65	161	68,500	760	5.0	951	C3516
GTB 67	172.03	64,900	760	5.0	1050	3516 / C175
GTB70	182.99	61,100	760	5.0	1270	3516 / C175

Alarm Levels

Alarm level for overspeed : $n_{\max}$
Alarm level for exhaust gas temperature before turbine : $T_{\max}$
Minimum lubrication oil inlet pressure and alarm level : 2.07 bar
Maximum lubrication oil outlet temperature and alarm level : 150°C

Application constraints

Maximum allowable vibration level (both self- and externally generated): 60 mm/s

Type Approval documentation

Tests carried out

Recognition of turbocharger field experience proven by the following documents:

1. Caterpillar Marine Turbo Field History
2. HTT Marine Cert Tracking Caterpillar 3500 series (failure vs. population)
3. HTT Marine Cert Tracking Caterpillar C175 series (failure vs. population)

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.

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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

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 a certificate is not mandatory.

Welding on rotating parts such as turbine wheel/shaft assembly, may only be carried out by companies which have a welding workshop approval by DNVGL.

END OF CERTIFICATE