

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Torsional Vibration Dampers

with type designation(s)
Vdamp VB,VD

Issued to

Geislinger GmbH
Hallwang Salzburg, Austria

is found to comply with
DNV GL rules for classification – Ships
Det Norske Veritas' Rules for Classification of High Speed and Light Craft

Application :

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

This Certificate is valid until **2022-06-21**.

Issued at **Hamburg** on **2017-06-22**

DNV GL local station: **Augsburg**

for **DNV GL**

Approval Engineer: **Stanislav Avanesov**

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.

Certificate No: **TAM00000K9**
File No: **718.30**
Job Id: **262.1-005507-5**

Product description

Viscous torsional vibration dampers/Visco-Dampers (Vdamp®):

VB xxx/yy/zz/vv
VD xxx/yy/zz/vv

where:

xxx – housing outer diameter [cm]
yy – housing outer width [cm]
zz – version number

Viscous damper definition:

A ring in a housing where the ring is connected to the housing by means of bearings and silicone oil only.

Alternative places of production

Geislinger Corporation, Battle Greek, Michigan, USA
Geislinger K.K. Kobe, Japan
Geislinger Ltd., Busan, Republic of Korea
Geislinger (Suzhou) Co.,Ltd., Suzhou, P.R.China

Application/Limitation

The approval is valid for dampers to be used in propulsion and auxiliary engines and is based on the following main data:

Damper data given in "DNVGL - Verification - list" dated 29.05.2008 and corresponding CD-(Stiffness/Damping)-diagrams (received with e-mail from Geislinger dated 05.06.2008).

Sizes not mentioned in the above mentioned list are also covered by this type approval, provided that the following data is submitted on individual basis:

Damper data:

DNV shall be provided with the following data:

- Damper type and Geislinger Summary Drawing No.
- Engine manufacturer and type
- Diameter and width [mm]
- Ring inertia [kgm²]
- Housing inertia [kgm²]
- Ring surface area [m²]
- Damper housing form coefficient [-]
- Type of bearing
- Welded or bolted design
- Sample plug for viscous oil testing: yes/no
- CD-diagram (stiffness and damping values as a function of vibration frequency and temperature)
- Permissible damping power [kW] or [kW/m²] as a function of engine speed¹⁾

Geislinger is to keep DNVGL updated on any changes in the above data.

Unless otherwise stated, the viscosity tolerance ranges are:

max. -7.5 % to + 7.5 % of nominal value

(referred to measurement conditions: 25°C, rotary mode, shear rate ramp from 0.1 to 10 1/s,

Certificate No: **TAM00000K9**
File No: **718.30**
Job Id: **262.1-005507-5**

plate/plate or plate/cone device).

Higher viscosity loss may be accepted on a case-by-case approval basis (by Geislinger and DNVGL) for applications with non-critical behaviour after verification.

For engines in DNVGL classed vessels:

The above mentioned data (stated by Geislinger) are to be conveyed to DNVGL by Geislinger. Geislinger is to inform the engine manufacturer about this commitment.

Viscous dampers are developed for a specific engine in a specific configuration (e.g. 4 stroke engine directly connected with a single bearing generator or 2 stroke engine with direct coupled shaft line). Type approval is only valid for those engine/engine configuration(s) that have been calculated/measured by Geislinger and for which the corresponding data are conveyed to DNVGL.

- For series engines/engine configurations using a series damper (typically 4 stroke) this specification is stated once per engine series/ engine system only.
- For machinery arrangements (typically direct coupled 2 stroke plants with specific propeller & shafting) using tailor-made dampers this specification is stated for each first application. Only exact rebuildings (sister ships) of machinery arrangement are included in that statement.

The suitability of a certain damper for slightly modified machinery (mass-elastic system) is to be verified by Geislinger with a new torsional vibration calculation and submitted to DNVGL for approval.

Verification of damping

For series engines/engine configurations using standard dampers the damping properties are to be verified once per engine series by measuring front end displacement amplitudes (using encoder technique) and damper temperature (surface or inside) in a relevant speed range. In this context engine series are e.g. in-line engines (5-9 cylinders) or V-engines (≥ 12 cylinders). This should preferably be made during an engine workshop testing, but may also be done onboard. Measurements made prior to this type approval may also be accepted.

For dampers used for shaftline protection (direct coupled 2 stroke plants) the damping is to be verified for the first ship in a series of exact rebuildings (sister ships) by measuring intermediate shaft strain and/or front end displacement amplitudes (encoder) together with damper temperature (surface or inside) under steady state condition. Exclusion of the propeller damping may be made by calculations after having determined the phase angle between shaft torque and propeller displacement.

Type Approval documentation

Marking of product

The dampers are to be marked with manufacturer's name or trademark and a serial number (Geislinger work number).

Periodical Assessment

For retention of the Type Approval, a DNVGL surveyor shall perform a survey every second and half 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



Certificate No: **TAM00000K9**
File No: **718.30**
Job Id: **262.1-005507-5**

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.

Other conditions

Damper data for dampers not mentioned in the above mentioned Table of Visco-Damper Types have to be submitted to DNV Høvik att. MCANO-373 either direct from Geislinger GmbH or via DNV Essen. This certificate replaced the certificate M-12728.



Certificate No: **TAM00000K9**
File No: **718.30**
Job Id: **262.1-005507-5**