DNV·GL

Certificate No:
TAP00000WU

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Metallic Expansion Joints

with type designation(s)
Fuel - Compensator M43, Fuel - Compensator VM43

Issued to
Witzenmann GmbH Metallschlauch-Fabrik
Pforzheim, Germany

is found to comply with
DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems

Application :

Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.

Type:	Temperature range:	Max. working press.:	Sizes:
Fuel - Compensator M43	**up to 150 °C**	**16 bar**	**DN 50**
Fuel - Compensator VM43	**up to 150°C**	**16 bar**	**DN 50**

Issued at **Hamburg** on **2017-07-04**
This Certificate is valid until **2022-07-03**.
DNV GL local station: **Augsburg**

Approval Engineer: **Hagen Markus**

for **DNV GL**

Olaf Drews
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.

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Product description
Fuel supply pipe with expansion bellows and connection flanges ready for installation.

Materials[1]

Component	Material designation
Pipe	1.4301, 1.4541, 1.4306 or 1.4307
Bellows	1.4571
Flanges	1.4301, 1.4541, 1.4306, 1.4307
O-Ring	FKM

Notes:
[1] Pre-material composition and mechanical properties to be confirmed by material certificate type TR (test report, 2.2 certificate acc. to EN 10204). Refer to DNV GL Rules Pt.1, Ch.3, Sec. 5.

Application/Limitation
The fuel compensator is type approved for application in fuel supply lines to fuel injection pumps of combustion engines and similar applications.

Technical data

Medium	Liquid fuel
Max. temperature	150°C
Max. service pressure	16 bar
Max. movement operation	Axial +- 3mm, lateral +-2mm
Max. compensation installation	Angular +-1°, axial +3mm / -2mm, lateral +-2mm
Approved load cycles	10 000

Type Approval documentation

Tests carried out
Visual inspection, pressure tests, load cycle test

Production testing
Each batch of fuel compensators is to be subjected to 100% pressure test with 24 bar.
In addition 10% of the batch is to be final inspected by DNV GL surveyor (visual inspection, review of material certificates and pressure test).

Marking of product
For traceability to this type approval certificate each expansion joint is provided with a name plate with the following data:

Data	Marking
Reference to pre-material batches, production tests and further quality control data	Production order number
Manufacturer's name or trade mark	" Hydra Brand "
Production place	For example " Pforzheim "

Periodical assessment
For retention of the type approval certificate periodical assessments shall be carried out at production places by DNVGL surveyor.

The objective of the periodical assessment is to verify that the design and production conditions for the type approval have not been altered.

Main scope of the assessment:
- verification of the production and quality control system
- review of quality control documentation of recent deliveries
- review of drawings in production to verify any design changes which may have an impact on data specified in the type approval certificate, performance and range of application
- verification of the product marking

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.