DNV·GL

Certificate No:
TAP00000XN

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Metallic Expansion Joints

with type designation(s)
AX, AN, LA and UN

Issued to
Belman A/S
ESBJERG, Denmark

is found to comply with
DNV GL rules for classification – Ships Pt.5 Ch.7 Liquefied gas tankers

Application :

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

Temperature range:	**-165°C to +125°C**
Max. working press.:	**5 bar - 10 bar (see certificate)**
Sizes:	**DN50, 100, 200, 250, 350, 400**

Issued at **Høvik** on **2017-05-23**
This Certificate is valid until **2021-12-31**.
DNV GL local station: **Fredericia**

for **DNV GL**

Approval Engineer: **Adel Samiei**

Marianne Spæren Marveng
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.

© DNV GL 2014. DNV GL and the Horizon Graphic are trademarks of DNV GL AS.

Job Id: **262.1-024621-1**
Certificate No: **TAP00000XN**

Product description

Metallic expansion joint with single bellow, (AX1, AN1, LA1 and UN) or universal (AX2, AN2, LA2 and UN2) according to EJMA 9th edition. (AX: Axial Bellows – AN: Angular Bellows – LA: Lateral bellows – UN: Subject to combined movements). Dimensional data and allowable movements shall be in accordance with the type approved drawings mentioned below.
Materials of Bellows / End: 1.4301 / AISI 304, 1.4306 / AISI 304L, 1.4401 / AISI 316, 1.4404 / AISI 316L, 1.4541 / AISI 321, 1.4550 / AISI 347

Application/Limitation

For use on open deck on LNG/LPG cargo systems on LNG/LPG carriers:

Nominal size (DN)	DN50	DN100	DN200	DN250	DN350	DN400
Design pressure (bar)	10	10	10	5	10	10
Temperature range (°C)	-165 to +125°C					

Each expansion bellow has to be hydraulically tested to 1.5 times the design pressure in presence of DNV GL surveyor and delivered with a DNV GL product certificate.

Material of bellow shall have material certificates in accordance with DNV GL rules for classification of ships Pt.5 Ch.7 Sec.1 Table 8. All materials delivered with VL or works certificate shall be made at works approved by DNV GL through approval of manufacturers (AOM) scheme.

Full penetration welds (including longitudinal weld of all plies) are to be subject to 100% X-ray inspection. Bellows weld to pipe are to be subject to 100% dye Penetrant testing.

All expansion bellows covered by this approval are approved for 8000 life cycles (movements as indicated in the product description part).
This type approval covers the design of the product with respect to internal pressure. External loading/pipe loads have not been considered. The installation/location shall fulfil below coniditons:

1- The installation/location of expansion joints is to be approved in each case. Piping system drawings shall be sent to DNV GL whenever expansion joints are to be installed in a ship classed by the society. The piping system design drawing(s) shall specify the location of all anchors, guides, supports, fixed points and type and location of all expansion joints.
2- The pipeline in which an expansion bellow shall be fitted, shall be adequately adjusted, aligned and clamped. When found necessary, protection against mechanical damage of the expansion bellows may be required.
3- Ship deformation loads shall not be considered in the piping arrangement.

Type Approval documentation

Tests carried out

Burst pressure test, hydraulic test, cyclic test

Marking of product

For traceability to this type approval, the final products are to be marked with:
Manufacturer's name or trade mark / Type designation / Arrow to indicate direction of flow

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform a survey – every second year and before the expiry date of this certificate to verify that the conditions for the type approval are complied with.