

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Metallic Expansion Joints**with type designation(s)
UN1F.0250.10.023

Issued to

EagleBurgmann KE A/S
Ringkøbing, Denmark

is found to comply with

DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems**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 vessels classed by DNV GL.****Temperature range: -52°C to 150°C****Max. working press.: 10 bar****Sizes: DN250**Issued at **Høvik** on **2020-01-31**This Certificate is valid until **2024-06-30**.DNV GL local station: **Fredericia**for **DNV GL**Approval Engineer: **Adel Samiei**

Zeinab Sharifi
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

Single Metallic expansion Bellows designed according to EJMA 9th Edition made of three plies (thickness of each ply: 0.4 mm). All dimensional data according to the drawings listed in "Type approval documentation". Material of Bellow and Flange: EN 1.4404 (AISI 316L)

Application/Limitation

Expansion bellows covered by this certificate are found to be in compliance with the given design standard and may be installed in LPG carrier or Nitrogen Systems in design condition as:

Axial Movement:	-5 mm/0 mm
Lateral Movement:	1 mm
Angular Movement:	0°
Design Life:	10000 cycles

The pipeline in which expansion bellows are to be fitted shall not be subject to ship deformation loads.

Maximum flow velocity (without using an internal sleeve):

- For Gases : 12.8 m/s
- For Liquid : 5.2 m/s

The installation shall be done according to type approval holder's procedures.

Production testing

Each expansion bellow shall be subjected to hydrostatic pressure test upon completion to at least 1.5 times the design pressure.

Certification

Whenever the piping system is subject to approval by the society, the below limitations shall be considered:

- Cargo expansion Bellows intended for LPG systems shall be delivered with DNV GL product certificate (refer to DNVGL-RU-SHIP Pt.5Ch.7 Sec.1 Table 7). Other Bellows shall be delivered with test report with reference to this type approval certificate (refer to DNVGL-RU-SHIP Pt.4 Ch.6 Sec.1 Table 4).
 - Welding shall fulfill requirements in DNVGL-RU-SHIP Pt.2 Ch.4.
 - Material of cargo expansion Bellows shall have material certificate according to DNVGL-RU-SHIP Pt.5Ch.7 Sec.1 Table 8. Other Bellows covered by classification shall have material certificates in accordance with DNVGL-RU-SHIP Pt.4 Ch.6 Sec.2 Table 3.
- Approval of manufacturer is required for VL or W material certificates.

Type Approval documentation

Tests carried out

Burst Test, Pressure Test, Cyclic Test

Marking of product

For traceability to this type approval, the compensators are to be marked with:

- Manufacturer's trade mark
- Type designation (as stated in the submitted drawings)
- Size
- Maximum working pressure
- Temperature range
- The flow direction, if applicable

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days) to verify that the conditions for the approval are complied with. Reference is made to DNVGL-CP-0338.