

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Metallic Expansion Joints**

with type designation(s)

Single Bellow, Universal Bellow

Issued to

Belman A/S**Esbjerg N, Denmark**

is found to comply with

DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems**Application :****Product(s) approved by this certificate is/are accepted for installation on vessels classed by DNV GL.**

Type:	Temperature range:	Max. working press.:	Sizes:
Single Bellow	See page 2	See page 2	DN 80/200/400/900
Universal Bellow	See page 2	See page 2	DN 65/150/250/300/900

Issued at **Høvik** on **2020-12-09**This Certificate is valid until **2025-12-08**.for **DNV GL**DNV GL local station: **Denmark CMC**Approval Engineer: **Thomas Wilhelm Juell**

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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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Product description

Four metallic expansion joints (single type) designed according to EJMA 9th Edition, with or without internal sleeve and permanently fitted flanges.

Type	Size	Design Temp. (°C)	Design Pressure (bar)
AX1HU-40-0080-030-1	DN80	20/510	40
UN1BRU-03-0200-006-0	DN200	20/200	2.5
UN1BRU-09-0400-052-0	DN400	-1/70	9
US1BRU-03-0900-035-0	DN900	20/500	2.5

Seven metallic expansion joints (universal type) designed according to EJMA 9th Edition & EN 13445-3, with permanently fitted flanges.

Type	Size	Design Temp. (°C)	Design Pressure (bar)
AX2BRU-10-0150-050-0	DN150	20	10
AX2BRU-10-0250-050-0	DN250	20	10
AX2BRU-10-0300-060-0	DN300	20	10
AX2BRU-01-0900-065-0	DN900	20/400	0.5
UN3BRU-03-0250-010-0	DN250	20/350	2.5
US3BRU-03-0900-046-0	DN900	20/500	2.5
UN2FU-01-0065-030-0	DN65	20/510	1

Material:

- Bellow & internal sleeve: INCONEL 625 (ASTM B443); 1.4541 (EN10028-7); 1.4547 (EN 10028-7); 1.4571 (EN 10028-7)
- Pipe material: INCONEL 625 (ASTM B443); 1.4571 (EN 10028-7)
- Flanges according to DIN 86044; EN 1092

Application/Limitation

Expansion bellows covered by this certificate are found to be in compliance with the given design standard and may be installed in exhaust gas & water systems.

- All dimensional data, movements and weld details shall be in accordance with approved dimensional tables/drawings.
- All expansion bellows covered by this certificate are approved for 1000 load cycles.
- Maximum velocity for bellows without sleeves shall be in accordance with EJMA 9th edition table 4.10-1.
- Minimum thickness of internal sleeve: in accordance with EJMA 9th edition Table 4.10.3
- Minimum thickness of pipe (in universal bellows) shall fulfil requirements in DNV GL Ship Rules Pt.4 Ch.6 Sec.9 Table 3 & Table 4.

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

- Bellows covered by this certificate shall be delivered with a reference to this type approval certificate (see 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 bellow shall have material certificates in accordance with DNVGL-RU-SHIP Pt.4 Ch.6 Sec.2 Table 3. All materials delivered with VL or works certificate shall be made at works approved by DNV GL manufacturers.
- This type approval covers the design of the product with respect to internal pressure. External loading/pipeline loads have not been considered.
- The installation shall be done according to type approval holder's procedures.

Materials and material protection chosen for the specific system shall be suitable for the intended medium and environmental conditions.

Type Approval documentation

Production testing

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

Marking of product

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

- Manufacturer's trademark
- 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.