



Marine & Offshore

Certificate number: 12894/D0 BV

File number: ACM 188/2511/001

Product code: 21011

This certificate is not valid when presented without the full attached schedule composed of 7 sections

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TYPE APPROVAL CERTIFICATE

This certificate is issued to

BELMAN A/S

Esbjerg - DENMARK

for the type of product

METALLIC EXPANSION JOINTS / BELLOWS

AX, AN, LA, UN and US

Requirements:

- BUREAU VERITAS Rules for the Classification of Steel Ships
- BUREAU VERITAS Rules for the Classification of Offshore Units
- IGC Code as amended by IMO Resolution MSC.370(93)

This certificate is issued to attest that Bureau Veritas Marine & Offshore did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 06 Dec 2023

For Bureau Veritas Marine & Offshore,

At BV FREDERICIA, on 06 Dec 2018,

Jesper Jensen



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with Bureau Veritas Marine & Offshore. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of Bureau Veritas Marine & Offshore available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against Bureau Veritas Marine & Offshore for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

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BV Mod. Ad.E 530 June 2017

This certificate consists of 3 page(s)

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION

Metallic Expansion Bellows

1.1 Design (metallic bellows with or without inner sleeves)

AX	Axial bellows
AN	Angular bellows
LA	Lateral bellows
UN	Universal bellows
US	Exhaust bellows

- Axial, lateral and/or angular movements as per drawings

1.2 Rating (depending on type)

Nominal size (DN)	DN 25 to DN 3000 DN 40 to DN 400 for IGC cargo and process piping
Nominal pressure (PN)	PN 40 / PN 25 / PN 16 / PN 10 / PN 6 / PN 2.5
Pressure range *	PN 40 (DN 40 to DN 100) PN 25 / PN 16 / PN 2.5 (DN 125 to DN 400) PN 2.5 Exhaust (up to and including DN 3000)
Temperature range (°C)	-55 / 550 -165 / 125 for IGC cargo and process piping

* For IGC cargo, the design pressure is not to be less than 10 bar except for open-ended lines where it is to be not less than 5 bar.

1.3 Ends

S	Welding ends	U	No fittings
F	Slip on flanges	T	Tie rods
B	Loose flanges	H	Hinges
H	Welding neck flanges		

1.4 Materials

Items	General use	IGC cargo use
Bellows	1.4301/AISI 304, 1.4306/AISI 304L, 1.4541/AISI 321, 1.4401/AISI 316, 1.4404/AISI 316L, 1.4571/AISI 316 Ti, 1.4539/AISI 904L / 1.4547 (254SMO) / 1.4835 (253 MA) 1.4410 (SAF 2507 / 1.4462 (Duplex 2205) / AISI 321H	1.4301/AISI 304, 1.4306/AISI 304L, 1.4401/AISI 316, 1.4404/AISI 316L, 1.4541/AISI 321, 1.4550/AISI 347
Ends	1.4301/AISI 304, 1.4306/AISI 304L, 1.4541/AISI 321, 1.4401/AISI 316, 1.4404/AISI 316L, 1.4571/AISI 316 Ti, 1.4539/AISI 904L, St 37-2, 1.0305/St 35.8, 1.0345/Hi, 1.0425/HII, 1.0460/C22.8, 1.0473/St 52-3 / ASTM A 106 Grade B (C≤0.23%) / ASTM A 105 / 1.0432 (C≤0.23%) 1.4501 (Super Duplex) / 1.4462 (Duplex 2305)	1.4301/AISI 304, 1.4306/AISI 304L, 1.4401/AISI 316, 1.4404/AISI 316L, 1.4541/AISI 321, 1.4550/AISI 347

When other choices of materials are used per manufacturer's recommendations, the BV agreement is to be obtained.

2. DOCUMENTS AND DRAWINGS

- Manufacturer's drawings and catalogue as provided on 28/10/2003 & 23/11/2018
- Bellows calculation of pressure strength and cyclic life according to EJMA as provided on 28/10/2003 & 23/11/2018
- Mounting and maintenance instructions as reviewed on 20/07/2010

No departure from the above documentation shall be made without the prior consent of the Society. The manufacturer must inform the Society of any modification or changes to these documents and drawings.

3. TEST REPORTS

Type tests performed in the manufacturer's laboratory, witnessed by a Society's Surveyor as reviewed on 28/10/2003 & 18/01/2011:

- Hydraulic test at twice the maximum service pressure
- Burst test at 4/5 times the maximum service pressure
- Cyclic expansion test

4. APPLICATION / LIMITATION

4.1 The bellow expansion joints are used for the following services on board: Bilge and ballast / Steam and condensate / Compressed air / Fresh water and sea water / Fuel oil and lubricating oil and hydraulic oil / Thermal oil / Exhaust gas lines (US type).

4.2 The maximum working pressure is to be reduced corresponding to the reduction in material strength when the operating temperature exceeds 120°C according to manufacturer's instructions specified in the catalogue.

4.3 The use of stainless steel is to be restricted as per the requirements of the BUREAU VERITAS Rules.

4.4 In case of high level of vibrations in the piping systems where fitted to engines, pumps, compressors and other sources of high vibrations, care shall be taken in order to avoid that the natural frequency of compensator doesn't coincide with the system frequency.

4.5 The use of loose flanges is only permitted for Class III water pipes and open-ended lines.

4.6 The joints are to be fitted in areas where they are always accessible. The associated pipeline is to be adequately adjusted, aligned and supported.

4.7 The bellow expansion joints (except US type) are also used on cargo and process piping on board liquefied gas carriers having to comply with IGC Code. In all cases, the associated pipelines are to be suitably aligned, supported and anchored. The joints are to be at any time accessible, well visible and protected against over extension and compression and against mechanical damage. Inner sleeves are not allowed to influence structural integrity of the metallic expansion bellows. Pipe ends and flanges to be according to a recognized standard.

4.8 The joints assemblies are to be installed according to manufacturer's instructions and Society's Rules requirements.

5. PRODUCTION SURVEY REQUIREMENTS

5.1 The products are to be supplied by **Belman A/S** in compliance with the type and the requirements described in this certificate.

5.2 This type of product is within the category IBV of BUREAU VERITAS Rule Note NR320.

5.3 BV product certificate is required.

5.4 Each bellow expansion joint is to be hydraulic pressure tested to twice the maximum working pressure under witnessing of a Society's Surveyor when required by the Rules.

For information, **Belman A/S** has declared to Bureau Veritas the following production site:

Belman A/S: Malervej 4, Esbjerg V, 6710 Esbjerg DENMARK

6. MARKING OF PRODUCT

Each bellow expansion joint is to be marked with:

- Manufacturer's name or logo
- Type designation
- Date of manufacture
- Society's brand as relevant

7. OTHERS

It is **Belman A/S**'s responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

This certificate supersedes the Type Approval Certificate N° 12894/C0 BV issued by the Society.

*** END OF CERTIFICATE ***