

MARINE DIVISION67/71 Boulevard du Château
92200 Neuilly-sur-Seine - FranceTel. 33 1 55 24 70 00
Fax. 33 1 55 24 70 45
www.veristar.com

Certificate number: 12894/B0 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***TYPE APPROVAL CERTIFICATE***This certificate is issued to***BELMAN PRODUCTION A/S**

Esbjerg - DENMARK

*for the type of product***METALLIC EXPANSION JOINTS / BELLOWS**

AX, AN, LA and UN

Regulations and standards:

BUREAU VERITAS Rules for the Classification of Steel Ships

*This certificate is issued to attest that BUREAU VERITAS did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements of the Regulations and standards mentioned above.***This certificate is valid until: 11 Mar 2014**

At Neuilly, on: 11 Mar 2009

**For BUREAU VERITAS,
By order of the Secretary**

Approval office

Local office: BV FREDERICIA
Surveyor: V. Simonsen

L.COURREGELONGUE



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. 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 Division. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against BUREAU VERITAS 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.

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION :

Axial, Angular, Lateral and Universal Belman compensators

1.1 Type

AxialAXn / AngularAN / LateralLA / UniversalUN

1.2 Rating

Size and Pressure

DN 40 to DN 400

PN 40/25/16/10/6/2.5/1 up to DN 100

PN 25/16/10/6/2.5/1 up to DN 400

Temperature range

-55°C to +550°C

Ends

Weld-end, fixed flange and loose flange

Axial, lateral and/or angular movements as per drawings

1.3 Materials and/or components

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)

Welding ends and Flanges : 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≤0.023%) / ASTM A 105 / 1.0432 (C≤0.023%)

Alternative materials are possible.

2. DOCUMENTS AND DRAWINGS :

- BELMAN's catalogue
- Bellows calculation of pressure strength and cyclic life according to EJMA

3. TEST REPORTS :

Type tests performed in the Manufacturer's Laboratory under supervision of a Classification Society's Surveyor:

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

4. APPLICATION / LIMITATION :

4.1 The expansion joints may be 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

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 expansion joints are to be installed according to manufacturer's instructions and Bureau Veritas Rules.

4.7 The expansion joints must only be fitted in areas where they are always accessible.

5. PRODUCTION SURVEY REQUIREMENTS :

5.1 The products are to be manufactured, examined and tested by the manufacturer in accordance with the type described in this certificate and Bureau Veritas Rules for the Classification of Steel Ships. Arrangements shall be made for a Society's Surveyor to attend the relevant tests and examinations at manufacturer's works or to perform the relevant audits when an alternative survey scheme (BV Mode I) has been agreed. Relevant Bureau Veritas certificate will be issued after satisfactory completion of the procedure.

5.2 The manufacturer has declared to Bureau Veritas that the products detailed in this certificate are manufactured at the production site stated on the front page of this certificate.

5.3 Each 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.

6. MARKING OF PRODUCT :

Each expansion joint is to be marked clearly to avoid any wrong utilization with:

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

7. OTHERS :

7.1 This approval is given with the understanding that the manufacturer will accept full responsibility for informing shipbuilders or their sub-contractors of the proper methods of fitting and general maintenance of the products and of the conditions of this approval.

7.2 This certificate supersedes the Type Approval Certificate N° 12894/A0 BV issued on 28/10/2003 by the Society.

*** END OF CERTIFICATE ***