

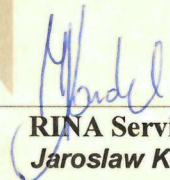


**TYPE APPROVAL CERTIFICATE**  
No. MAC068724XP

This is to certify that the product identified below is in compliance with the regulations herewith specified.

<i>Description</i>	<b>Metallic Expansion Joint</b>
<i>Type</i>	<b>AX, AN, LA, UN and US</b>
<i>Applicant</i>	<b>BELMAN A/S ODDESUNDVEJ 18 6715 Esbjerg DENMARK</b>
<i>Manufacturer</i>	<b>BELMAN A/S</b>
<i>Place of manufacture</i>	<b>ODDESUNDVEJ 18 6715 Esbjerg DENMARK</b>
<i>Reference standards</i>	<b>Part C, Chapter 1, Section 10 of RINA Rules</b>

Issued in RINA Poland Plan Approval Centre on June 12, 2024. This Certificate is valid until June 11, 2029

  
RINA Services S.p.A.  
Jaroslaw Kondracki

This certificate consists of this page and 1 enclosure.





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### Reference documents:

Belman Steel Expansion Joint Catalogue; Edition B022016-1.

Belman Inspection Certificate according to EN10204/3.1; Order No. 4523-02013-010-2.

Belman Inspection Certificate according to EN10204/3.1; Order No. 4523-02013-020-2.

RINA Test Certificate; No. 23/XD/01/260/1.

RINA Test Certificate; No. 24/XD/01/220/1 filed for info under RINA dwg PLMC-11116.

Design Drawing of Expansion Bellow DN900 PN5 along with EJMA10 Calculation approved under RINA dwg PLMC-11117.

### Technical characteristics:

- Design (metallic bellows with or without inner sleeves):

<b>AX</b>	Axial bellows
<b>AN</b>	Angular bellows
<b>LA</b>	Lateral bellows
<b>UN</b>	Universal bellows
<b>US</b>	Exhaust bellows

( geometries for exhaust bellows include the above-mentioned types )

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

- 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 5 / 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 5 (DN 400 to DN 900) 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.

- Ends:

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

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## TYPE APPROVAL CERTIFICATE

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**AX, AN, LA, UN and US**

- 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, 1.4307/304L, 2.4605/Alloy59	1.4301/AISI 304, 1.4306/AISI 304L, 1.4401/AISI 316, 1.4404/AISI 316L, 1.4541/AISI 321, 1.4550/AISI 347 2.4605/Alloy59
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), 1.4307/304L, 2.4605/Alloy59, 1.4410/Alloy 2507	1.4301/AISI 304, 1.4306/AISI 304L, 1.4401/AISI 316, 1.4404/AISI 316L, 1.4541/AISI 321, 1.4550/AISI 347 2.4605/Alloy 59, 1.4410/Alloy 2507

### **Fields of application:**

The bellow expansion joints are allowed to be used as components of the following piping systems: bilge & ballast, steam & condensate, compressed air, fresh water & sea water, fuel oil & lubricating oil & hydraulic oil, thermal oil, exhaust gas (US type).

The bellow expansion joints (except US type) are allowed to be used as components of cargo and process piping system on liquefied gas carriers complying 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 are to be in accordance with a recognized standard.

### **Acceptance conditions:**

The installation of this product is to be in accordance with the Manufacturer's instructions.

Expansion joints are to be limited to a length necessary to provide for relative movements between fixed and flexibly mounted items of machinery/equipment or systems.

Expansion joints are not to be installed where they may be subjected to torsion deformation (twisting) under normal operating conditions.

Expansion joints are to be protected against over-extension and over-compression.

### **Remarks:**

This product is to be permanently marked with the following details:

Manufacturer's name or trade mark, date of manufacture, designation type reference, nominal diameter, maximum design pressure, maximum and minimum design temperatures.

Each expansion joint, together with its connections, is to undergo a hydrostatic test under a pressure at least equal to 1,5 times the maximum service pressure.

This Certificate has replaced the previously issued Type Approval Certificate no. MAC019923XP.

**RINA Poland Plan Approval Centre**  
**June 12, 2024**

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