



Type Approval Certificate

This is to certify that the undernoted product(s) has/have been tested with satisfactory results in accordance with the relevant requirements of the Lloyd's Register Type Approval System.

Manufacturer	Belman A/S
Address	Oddersundvej 18, Esbjerg N, 6715, Denmark
Type	Expansion Bellows
Description	Metallic bellows with or without inner sleeves – axial, lateral and/or angular movements
Trade Name	Axial - AX1S, AX2S, AX1F, AX2F ,Angular - AN1S, AN2S, AN1F, AN2F ,Lateral - LA1S, LA2S, LA1F, LA2F ,Universal - UN1S,UN2S, UN1F, UN2F
Application	General use
Specified Standard	LR Rules and Regulations for the Classification of Ships, Jul 2023 EJMA 10th Edition
Ratings	Please refer to the enclosed Appendix
Additional Tests	Depending on the application, the following tests may be required prior to use of the product. Please consult with the manufacturer: (a) Extreme displacement test. Assembly to be pressurised to 2 x maximum design pressures at maximum displacement without permanent deformation. This test may require to be carried out at minimum design temperature.

71 Fenchurch Street, London, EC3M 4BS, United Kingdom

Vahid Saremi Shahab

Piping & Pressure System Lead Specialist to
Lloyd's Register EMEA
A member of the Lloyd's Register group

Lloyd's Register Group Limited, its affiliates and subsidiaries and their respective officers, employees or agents are, individually and collectively, referred to in this clause as 'Lloyd's Register'. Lloyd's Register assumes no responsibility and shall not be liable to any person for any loss, damage or expense caused by reliance on the information or advice in this document or howsoever provided, unless that person has signed a contract with the relevant Lloyd's Register entity for the provision of this information or advice and in that case any responsibility or liability is exclusively on the terms and conditions set out in that contract.



Type Approval Certificate

Other Conditions

(b) Cyclic test. For liquefied gas carriage, bellows type expansion pieces require a cyclic test to accommodate all conditions of pressure, temperature, axial movement, rotational movement, and transverse movement, as will be expected in actual service.

(a) The product is not approved for fire endurance. For application where there is a risk of fire, fire approval is advised.

This certificate is not valid for equipment, the design, ratings or operating parameters of which have been varied from the specimen tested. The manufacturer should notify Lloyd's Register EMEA of any modification or changes to the equipment in order to obtain a valid Certificate.

The Design Appraisal Document LR2451290TA and its supplementary Type Approval Terms and Conditions form part of this Certificate.





ATTACHMENT TO CERTIFICATE OF TYPE APPROVAL No. LR2451290TA

Appendix

DESIGN DATA

Rating

Nominal Size (DN)	DN 25 to DN 3000
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

Ends

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

Materials

Items	General 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
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