



TYPE APPROVAL CERTIFICATE

Certificate No:
TAP00000MS
Revision No:
2

This is to certify:

That the Metallic Expansion Joints

with type designation(s)
Exhaust gas bellows

Issued to

Teddington Engineered Solutions Ltd
Llanelli, United Kingdom

is found to comply with

DNV rules for classification – Ships Pt.4 Ch.6 Piping systems
DNV-OS-D101 – Marine and machinery systems and equipment, Edition July 2021

Application :

Product(s) approved by this certificate is/are accepted for installation on vessels classed by DNV.

Temperature range: 20° to 550°
Max. working press.: 1 barg
Sizes: DN50 to DN 2000

Issued at **Høvik** on **2023-01-17**

for **DNV**

This Certificate is valid until **2027-07-02**.

DNV local unit: **Southampton**

Approval Engineer: **Sarah Miller**

Bosman van der Merwe
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 AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") 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

Metallic expansion bellows (Single & Multi Ply) designed according to EJMA 10th Edition:

- Single Bellow: DN50 to DN2000
- Universal Bellow: DN100 to DN1000

Dimensional data: according to document "50NB to 2000NB bellow Range Revision 5".

With or without internal sleeve (minimum thickness of sleeves in accordance with EJMA 10th Edition – Table 4.10-3)

Material of bellow:

- SA240 – 316 (1.4401) , 316L (1.4404), 316Ti (1.4571), 321 (1.4541)
- 1.4547 (SMO 254), 1.4462 (Duplex) & 1.4501 (Super Duplex)
- 1.4876 & 2.4858 (Incoloy 800 & 825) / 2.4816 & 2.4856 (Inconel 600 & 625)

Flange: PN6/10 – JIS 5k/10K – DIN86044 (Other standard flanges complying with pressure-temperature range according to other international standard may be used) - may be delivered with pipe-end.

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 systems. (Fatigue life for each bellow is in-line with the independent and combination movements shown in document "50NB to 2000NB bellow Range Revision 5".

When vibrations are present in the piping system, care shall be taken that the natural frequency of the expansion bellows does not coincide with the system frequency. (According to clause 4.9 of EJMA 10th edition) Also, the maximum velocity of gas in expansion bellows without sleeves shall be limited according to EJMA 10th edition table 4.10-1.

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 DNV-RU-SHIP Pt.4 Ch.6 Sec.1 Table 4).
- Welding shall fulfill requirements in DNV-RU-SHIP Pt.2 Ch.4.
- Material of bellow shall have material certificates in accordance with DNV-RU-SHIP Pt.4 Ch.6 Sec.2 Table 3. All materials delivered with NV or works certificate shall be made at works approved by DNV manufacturers
- The installation shall be done according to type approval holder's procedures.

Production test:

Each expansion bellow shall be subjected to minimum hydrostatic test pressure equal to 1.5 times internal design pressure.

Type Approval documentation

50NB to 2000NB bellow Range Revision 5

Drawing numbers: M51597 Rev.2/M51597_F1/M51597_F2/M58629 Rev.3 & calculation reports

Marking of product

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

- Manufacturer's trade Mark
- Type designation (as stated in the submitted drawings)
- Size
- Maximum working Pressure

Periodical assessment

For retention of the Type Approval, a DNV 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 DNV-CP-0338.