DNV·GL

Certificate No:
TAP00000MS

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Metallic Expansion Joints

with type designation(s)
Exhaust gas bellows

Issued to
Teddington Engineered Solutions Ltd.
Llanelli DY, United Kingdom

is found to comply with
DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition July 2015

Application :

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

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

This Certificate is valid until **2022-07-03**.

Issued at **Høvik** on **2017-07-04**
DNV GL local station: **Southampton** for **DNV GL**

Approval Engineer: **Adel Samiei**

Marianne Spæren Marveng
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.

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Job Id:
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Product description

Metallic expansion bellows (single ply) designed according to EJMA 10th Edition:

- Single Bellow: DN50 to DN2000 (26 sizes)
- Universal Bellow: DN100 to DN1000 (12 sizes)

Dimensional data: according to document "50NB to 2000NB bellow Range Revision 1".

With or without internal sleeve (minimum thickness of sleeves in accordance with EJMA 10th Edition – Table 4.10-3)
Material of bellow: SA240 – 321 / Incoloy 800 series (Incoloy 800/825) / Inconel 600 series (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

The installation/location of expansion joints is to be approved in each case. Piping system drawings shall be sent to DNV GL whenever expansion joints are to be installed in a ship classed by the society. The piping system design drawing(s) shall specify the location of all anchors, guides, supports, fixed points and type and location of all expansion joints.

The pipeline in which an expansion bellow is to be fitted is to be adequately adjusted, aligned and clamped.

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)

Each expansion bellow shall be subjected to pressure test equal to 1.5 times internal design pressure.
Bellows installed in piping classes I, II and III, shall be delivered with a product certificate issued by society. In this case hydrostatic test shall be witnessed by a DNV GL surveyor.
Bellows installed in non-class piping systems may be delivered with manufacturer's certificate.
Production test is not to be witnessed by DNV GL surveyor.(DNV GL ship Rules Pt.4 Ch.6 Sec.1 Table 5.)

The bellow material shall be delivered with material certificate according to DNV GL Ship Rules Pt.4 Ch.6 Sec.2 Table 3.

The maximum velocity of gas in expansion bellows without sleeves shall be limited according to EJMA 10th edition table 4.10-1.

Type Approval documentation

Marking of product

For traceability to this type approval, the final products are to be marked with:
Manufacturer's name or trade mark; Type designation; Working pressure and temperature; Direction of flow

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform a periodical assessment every second year and before the expiry date of this certificate to verify that the conditions for the type approval are complied with.
The main elements of the certificate retention survey are:

- Review of Type Approval documentation
- Review of possible changes in design, materials and performance.
- Ensure traceability between manufacturer's product type marking and Type Approval Certificate.