

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Metallic Expansion Joints**with type designation(s)
AS, BS

Issued to

Jiangsu Hongcheng Pipes Co., Ltd
JIANGYAN JIANGSU, Chinais found to comply with
DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems**Application :****Products approved by this certificate are accepted for installation on all vessels classed by DNV GL. The metallic expansion joints are type approved for application in pipe class I-III.****Temperature range:** -45°C up to +550°C, see page 3
Max. working press.: 6, 10 and 16 bar, size dependant
Sizes: DN65 up to DN2800Issued at **Hamburg** on **2017-03-24**This Certificate is valid until **2022-03-23**.DNV GL local station: **Nantong CMC**for **DNV GL**Approval Engineer: **Christian Kaemmer**

Olaf Drews
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.



Product description

Corrugated expansion bellow with tie bars that limit the axial movement. U-Shaped. Flanged ends with weld ends, welding neck / slip on or loose flanges. Bellow design according to EJMA.

Materials

Bellow	
	SUS304 L/ 1.4306
	SUS316L / 1.4404
	SUS 321 / 1.4541
End pipe /collar / flange	
	SUS304 L/ 1.4306
	SUS316L / 1.4404
	SUS 321 / 1.4541
	Q235,20 / Carbon Steel

Application/Limitation

The metallic expansion joints are type approved for application in the following piping systems:

- Ballast water
- Fire fighting
- Cargo oil¹
- Steam¹
- Compressed air

Size and pressure range

Type	Nominal diameter DN	Nominal pressure PN	Temperature
AS	65-800	6, 10, 16	-45°C up to 200°C
BS	65-800	6, 10, 16	-45°C up to 200°C
AS ¹	65-2800	1	-45°C up to 550°C for exhaust gas

Type AS¹ : Compensator also for exhaust gases. Design pressure 1 bar. Max temperature +550°C. For application above 300°C service temperature the applied welding procedure for bellow – flange welding shall be approved by welding procedure qualification tests (WPQT). The application in exhaust gas systems is limited to installation downstream (after) turbocharger. Installation directly on diesel engines, e.g. cylinder exhaust gas outlet is not included in this type approval and needs to be approved for each installation.

Note:

¹ Expansion joints with loose flanges in combination with flared bellows are not approved for application in steam systems and for exhaust gas.

Refer to DNVGL Rules Pt.4, Ch. 6, Section 9 – 5 Detachable pipe connections.

Temperature range

- 45 °C up to + 550 °C

- For service temperatures above 50 °C the pressure is to be reduced in accordance with the manufacturer's specifications. DNVGL Rules Pt.4,Ch.7 (Pressure equipment) respectively are to be observed.
- For application above 425°C the EJMA Requirement S3+(S4/1,25) < Sab in the creep range (T>425°C) is to be observed.
- For application of carbon steel flanges below -10°C the pre-material is to be normalized.

Bellow design depending on service conditions

This type approval is based on EJMA bellow design calculation with specific service parameters and life cycle expectations.

For each application the expansion bellow and flange connection is to be individual designed according to the applicable maximum working pressures, temperatures, media, axial/lateral movement and bending angle according to the EJMA design calculation and DNV GL Rules.

Installation on board ship

The application of metallic expansion joints is to be approved in each case by submitting of piping system drawings specifying 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. Expansion joints shall be fitted in places where they are always accessible. When vibrations are present in the piping system, care shall be taken that the natural frequency of the bellow does not coincide with the system frequency.

Requirements according to pipe classes:

Material certificates refer to:

DNVGL Rule Pt.4, Ch.6, Sec.1 – Table 1 (pipe classes)
DNVGL Rule Pt.4, Ch.6, Sec.2 – Table 3 (material certificates acc. to pipe classes)
DNVGL Rule Pt.2 Ch.1, Sec.2 (Approval of manufacturers)

Material certificates refer to:

DNVGL Rule Pt.4, Ch.6, Sec.1 – Table 1 (pipe classes)
DNVGL Rule Pt.4, Ch.6, Sec.2 – Table 3 (material certificates acc. to pipe classes)
DNVGL Rule Pt.2 Ch.1, Sec.2 (Approval of manufacturers)

Welding process refers to:

DNVGL Rule Pt.4, Ch.6, Sec.10, 1 Welding

Approved Production Place

Jiangsu Hongcheng Pipes Co., Ltd.
Shuguang Industrial Park
Jiangyan, Jiangsu Province
P.R. China

Materials of bellows included in pipe class I and II shall be delivered with works certificates (W) issued by DNV GL approved manufacturers (AoM). For application in pipe class III piping systems, e.g. exhaust gas, a test report (TR) is sufficient.

Production testing

Each batch of expansion bellow is subject in the manufacturers work shop to a hydraulic pressure test of 1.5 times the PN. The DNV GL Rules "Ships Part 4 Chapter 6 Table 5" are to be observed.

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
- Dimension and nominal pressure PN
- Additional marking necessary for identification.
- In case of one way flow bellows an arrow to indicate the direction of flow, if applicable.

Tests carried out

Pressure and tightness test, Burst pressure test, Endurance test.

Periodical assessment

For retention of the type approval certificate periodical assessments shall be carried out at production place(s).

The objective of the periodical assessment is to verify that the design and production conditions for the type approval have not been altered.

Main scope of the assessment:

- verification of the production and quality control system
- review of quality control documentation of recent deliveries
- review of the type approval documentation and that this is still the basis for the production
- review of design changes , pre- material and performance of the product
- verification of the product marking

End of Certificate