



Certificate No:
TAP00002CF

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Metallic Expansion Joints

with type designation(s)
ZCPD, ZCFL

Issued to

Wuxi CSI Bellows Co., Ltd.
Wuxi, China

is found to comply with

DNV rules for classification – Ships Pt.4 Ch.6 Piping systems

Application :

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

Type:	Temperature range:	Max. working press.:	Sizes:
ZCPD	up to 525 °C	0.6 MPa	DN 65 - DN 1200
ZCFL	up to 525 °C	0.6 MPa	DN 400 - DN 1200

Issued at **Hamburg** on **2022-06-29**

This Certificate is valid until **2027-06-28**.

DNV local station: **Jiangyin NB & CMC**

Approval Engineer: **Andrii Pishchanskyi**

for **DNV**

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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.

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.



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Product description

Type ZCPD is a single and ZCFL is a double bellows expansion joint with U-shape convolutions and fitted with a welded slip-on flange on both sides. It falls into flange type E as per DNV-RU-SHIP Pt.4 Ch.6 Sec.9 §5.1.2.

The main components and their material are as follows:

Component \ Type	ZCPD	ZCFL
Bellows	316Ti ²⁾	316Ti ²⁾
Flange	316L ²⁾	316L ²⁾
	316Ti ²⁾	316Ti ²⁾
Liner ¹⁾	316L ²⁾	316L ²⁾
	316Ti ²⁾	316Ti ²⁾
Intermediate pipe	N/A	316L ²⁾
		316Ti ²⁾
Ring	N/A	316L ²⁾
		316Ti ²⁾

Notes

- 1) Type ZCPD DN 65 up DN 300 are not fitted with liner;
- 2) The stainless steel grade is not considered suitable for use in wet exhaust gas and exhaust gas scrubber piping systems with stagnant seawater.

Application/Limitation

The expansion joints are designed for the absorption of axial and lateral movement. Refer to manufacturer's instruction for exact values.

The expansion joints of types ZCPD and ZCFL are type approved for application in exhaust gas piping systems. Vibration influence is not assessed. Hence, piping system design shall ensure that vibration loads are not be detrimental to function of bellows as per EJMA Sec.4 §9 (Edition 10).

The expansion joints are designed for the absorption of axial and lateral displacement. Refer to manufacturer's instruction for exact values.

Expansion bellow design

This type approval is based on EJMA bellows design calculation (ninth Edition) and minimum of 5000 life cycles.

The lifetime of expansion bellows depends on service condition such as working pressures, bending angle, axial and lateral displacement. Hence, bellow design for each application shall be based on the applicable service conditions and expected lifetime. This is to be documented for each delivery.

Selection of materials

The selection of the materials shall always consider the applicable service condition with respect to type of media, flow velocity, media temperature, installation area of the piping system, etc. In particular, the resistance to corrosion, erosion, oxidation and other deterioration during projected service life are to be considered. Refer to DNV-RU-SHIP Pt.4 Ch.6 Sec.2.

It is the manufacturer's responsibility to ensure that the materials applied in specific piping systems are suitable for the intended service conditions.

Installation

- Expansion bellows are not to compensate for misalignment of pipework;
- The installation of expansion bellows shall be carefully pre-planned. Thorough analysis of size and all movement direction shall be performed. The estimated total movement of the pipeline to be absorbed by the bellows shall include not only the elongation/contraction of piping but also the movement of the ship, movement of attached equipment, anchors as applicable;
- If there are possibility that the flowing medium may separate solids, provision shall be made to prevent that the solids are entrapped in the bellow.

Type Approval documentation

Tests carried out

Marking of product

For traceability to the type approval, each expansion joint is to be marked with at least:

Marking scope	Example
Manufacturer Name	WUXI CSI BELLOWS CO.,LTD.
Type	ZCFL
Nominal diameter DN	DN600
Nominal pressure PN	PN5
Serial number	202206031A1

Periodical assessment

For retention of the Type Approval, a DNV surveyor shall perform periodical assessment as per DNV-CP-0338 Sec.4 to verify that the conditions for the Type Approval are complied with.

To check the validity of this certificate, please look it up in <https://approvalfinder.dnv.com>.