DNV·GL

Certificate No:
TAP00001T3

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Metallic Expansion Joints

with type designation(s)
ZC 2.5, ZC 6

Issued to
Shanghai Yongxin Corrugate Pipe Co., Ltd.
Shanghai, China

is found to comply with
DNV GL 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 GL.

Type:	Temperature range:	Max. working press.:	Sizes:
ZC 2.5	-55°C up to 550°C	2.5 bar	DN 25 - DN 1500
ZC 6	-55°C up to 550°C	6 bar	DN 25 - DN 1000

Issued at **Hamburg** on **2020-04-09**
This Certificate is valid until **2025-04-08**.
DNV GL local station: **Shanghai**

Approval Engineer: **Andrii Pishchanskyi**

for **DNV GL**

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.

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Job Id: **262.1-029881-1**
Certificate No: **TAP00001T3**

Product description

Bellow type expansion joints with U-shape convolutions with slip-on flange. The main components and their material are as follows:

Component	Material
Flange	Q235B (non alloy steel)
Bellow	SUS304[1)] (stainless steel) SUS321[1)] (stainless steel)
Liner	
Collar	

Footnote

1) The stainless steel grade is not considered suitable for use in:
   a. Piping systems (e.g. seawater cooling or wet exhaust gas) with flowing and stagnant seawater;
   b. Seawater atmosphere, i.e. unprotected area subject to seawater spray or green water, e.g. open deck.

Manufacturing locations

A following manufacturing location is approved:

Manufacturer's name	Changshu Yongxin Corrugate Pipe Co.,Ltd
Address	Sicun Road, Zhaoshi Village, Meili Town, Changshu City, Jiangsu Province, China

Application/Limitation

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

Application scope

- Expansion joints of types ZC 2.5 and ZC 6 are type approved for application in class II and III piping systems for fuel oil, lubricating oil, fresh water cooling, compressed air and auxiliary steam piping systems as per DNVGL-RU-SHIP Pt.4, Ch.6, Sec.9, 5.3;
- Moreover, expansion joints of types ZC 2.5 and ZC 6 are type approved for application in exhaust gas piping systems. Vibration influence is not assessed. A piping system design shall insure that vibration loads will not be detrimental to function of a bellow as per EJMA Sec.4, 9 (Edition 10);
- The application of expansion joints in thermal-oil piping systems is subject to case by case approval. Refer to DNVGL-RU-SHIP Pt.4, Ch.6, Sec. 5.

Expansion bellow design

The type approval is based on EJMA Standard, 9th Edition with specific service parameters and life expectations of 1000 cycles.

The life time of expansion bellows depends on service condition such as working pressures, axial stroke, bending angle, lateral displacement. Accordingly, for each application bellows design shall be based on the applicable service condition and expected life time which is to be specified in the bellows design drawing.

Selection of materials

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

A combination of a stainless steel bellow with a flange made of carbon steel is not approved for seawater systems.

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

Material certificate
An appropriate material certificate of the bellow and flange materials depending on class of piping system is to be provided. Refer to:

- DNVGL-RU-SHIP Pt.4, Ch.6, Sec.1 – Table 1 Pipe classes
- DNVGL-RU-SHIP Pt.4, Ch.6, Sec.2 – Table 3 Material certificates
- DNVGL-RU-SHIP Pt.2, Ch.1, Sec.2 - Approval of manufacturers (AoM)

Installation
Expansion joint installation shall be as per DNVGL-RU-SHIP Pt.4, Ch.6, Sec.9, 5.3. In addition, expansion bellows shall be installled in places where they are always accessible. Possible exceptions to be considered in each case.

Production testing
Each batch of expansion joints for fuel oil, lubricating oil, fresh water cooling, compressed air and auxiliary steam piping systems shall be pressure tested as per Production Test Plan No. No. YBJ-PTP-2019 and delivered with a corresponding test report.

Type Approval documentation

Tests carried out

1. Pressure and tightness test;
2. Burst pressure test;
3. Endurance test.

Marking of product

For traceability of products, marking shall be legible and indelible. Products are to be marked at least as follows:

Marking content	Example
Manufacturer's logo	
DNVGL certificate No.	TAP00001T3
Nominal diameter	DN 350
Nominal pressure	PN6
Contract No. & serial number	2014-560-2-1/6
Manufacture date	201404

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days) to verify that the conditions for the Type Approval are complied with. Refer to DNVGL-CP-0338, Sec.4.