

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Metallic Expansion Joints

with type designation(s)

**As per GB/T12522-2009, As per CB1153-2008, As per GB/T12777-2008 and GB/T12522-2009,
As per GB/T12777-2008 and CB1153-2008**

Issued to

Jiangsu Yangzijiang Pipe Co., Ltd.
Taizhou City, Jiangsu, 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:
As per GB/T12522-2009	Up to 550°C	0.1 MPa	DN 65 - DN 4000
As per CB1153-2008	Up to 200°C	Up to 1.6 MPa	DN 65 - DN 1000
As per GB/T12777-2008 and GB/T12522-2009	Up to 550°C	0.5 MPa	DN 65 - DN 1200
As per GB/T12777-2008 and CB1153-2008	Up to 550°C	0.5 MPa	DN 200 - DN 1200

Issued at **Hamburg** on **2020-03-19**

This Certificate is valid until **2025-03-18**.

DNV GL local station: **Nantong**

for **DNV GL**

Approval Engineer: **Andrii Pishchanskyi**

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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.



Product description

Bellow type expansion joints with U-shaped convolutions with slip-on or loose flanges as follows:

Standard	Type	Flange type	Size	Design pressure [MPa]	Design temperature [°C]
GB/T12522-2009	Single expansion joint	A	DN 65 - DN 500	0.1	550
		AS	DN 65 - DN 4000	0.1	550
		AJ	DN 65 - DN 4000	0.1	550
		BS	DN 1000 - DN 4000	0.05	550
	Double expansion joint	BS	DN 1000 - DN 3200	0.05	550
		BJ	DN 1100 - DN 2600	0.05	550
CB1153-2008	Single expansion joint	A	DN 65 - DN 500	0.6, 1.0, 1.6	200
		AS	DN 65 - DN 600	0.6, 1.0, 1.6	200
		B	DN 65 - DN 500	0.6, 1.0, 1.6	200
		BS	DN 65 - DN 1000	0.6	200
		BS	DN 65 - DN 600	1.0, 1.6	200
GB/T12777-2008, GB/T12522-2009	Single expansion joint	AST	DN 65 - DN 1200	0.5	550
GB/T12777-2008, CB1153-2008	In-line pressure balanced joint	ZPT	DN 200 - DN 1200	0.5	550

The main components and their material are as follows:

- Bellow type expansion joints as per CB/T12522-2009

Component \ Type	Single expansion joint	Double expansion joint
Flange	Q235B	Q235B
Bellow, liner	06Cr18Ni11Ti ¹⁾ 06Cr19Ni10 ¹⁾ 022Cr23Ni5Mo3N A 240 S31254	06Cr18Ni11Ti ¹⁾ 06Cr19Ni10 ¹⁾ 022Cr23Ni5Mo3N
Tubes	N/A	Q235B

- Bellow type expansion joints as per CB1153-2008

Component \ Flange type	A and AS	B and BS
Welded flange	06Cr18Ni11Ti ¹⁾ 06Cr19Ni10 ¹⁾ 022Cr17Ni12Mo2 ²⁾	Q235B
Loose flange	Q235B	N/A
Bellow	06Cr18Ni11Ti ¹⁾ 06Cr19Ni10 ¹⁾ 022Cr17Ni12Mo2 ²⁾	06Cr18Ni11Ti ¹⁾ 06Cr19Ni10 ¹⁾ 022Cr17Ni12Mo2 ¹⁾
Collar	06Cr18Ni11Ti ¹⁾ 06Cr19Ni10 ¹⁾ 022Cr17Ni12Mo2 ²⁾	Q235B 20#

- Bellow type expansion joints as per GB/T12777-2008 and GB/T12522-2009

Component \ Type	Single expansion joint
Flange	Q235B
Bellow, liner	06Cr18Ni11Ti ¹⁾ 06Cr19Ni10 ¹⁾ 022Cr23Ni5Mo3N A 240 S31254

- Bellow type expansion joints as per GB/T12777-2008 and CB1153-2008

Component \ Type	In-line pressure balanced joint
Flange, tube	06Cr18Ni11Ti ¹⁾ 06Cr19Ni10 ¹⁾ 022Cr17Ni12Mo2 ²⁾
Bellow, liner	06Cr18Ni11Ti ¹⁾ 06Cr19Ni10 ¹⁾ 022Cr23Ni5Mo3N A 240 S31254

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;
- 2) The stainless steel grade is not considered suitable for use in 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.

Application scope

- Expansion joints according to standard CB/T1153-2008 are type approved for application in class II and III piping systems for fuel oil, lubricating oil, auxiliary steam, fresh water and sea water systems as per DNVGL-RU-SHIP Pt.4, Ch.6, Sec.9, 5.3;
- Moreover, expansion joints according to standard GB/T12522-2009 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.

Loose flange connections

Approval of expansion joints type as per Standard CB1153-2008 with loose flange connections (type A and AS) is limited to:

- Class II piping systems for other media with design temperature up to +250°C as per DNVGL-RU-SHIP Pt.4, Ch.6, Table 7, Type F;
- Class III piping systems, e.g. exhaust gas systems. The temperature range is limited according to the values specified in this type approval certificate.
Refer to DNVGL-RU-SHIP Pt.4, Ch.6, Table 1, Footnote No.2.

Expansion bellow design

This type approval is based on EJMA bellow design calculation (Edition 9, 2008).

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

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 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 considered. Refer to DNVGL-RU-SHIP Pt.4, Ch.6, Sec.2.

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 joints shall be installed 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, seawater, fresh water and auxiliary steam systems shall be pressure tested with 1.5 times M.A.W.P.

Type Approval documentation

Job Id: **262.1-031258-1**
Certificate No: **TAP00001VB**

Tests carried out

- 1) Pressure and tightness test;
- 2) Fatigue life test.

Marking of product

For traceability to this type approval, each product are to be marked with at least:

Marking scope	Example
Manufacturer's name	JiangSu Yang Zi Jiang pipe Co.Ltd
Type code	AS100-6
Nominal diameter	DN 100
Max. working pressure	0.1 MPa
Max. working temperature	200°C
Compensation	12 mm
Manufacturing standard	CB1153-2008
Product number	YZJ20190316- 001
Factory date	2019.04.10

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 the Class Programme DNVGL-CP-0338, Sec.4.