DNV·GL

Certificate No:
TAP00001YH

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Metallic Expansion Joints

with type designation(s)
GB/T12522-96 - AS, CB1153-93 - AS(A), BS (B)

Issued to
Taizhou Bellows Factory
Taizhou, 100, 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:
GB/T12522-96 - AS	up to +550°C	0.1MPa	DN65 to DN3000
CB1153-93 - AS(A), BS (B)	up to +200°C	0.6, 1.0, 1.6MPa	DN65 to DN500

Issued at **Hamburg** on **2020-06-23**
This Certificate is valid until **2025-06-22**.
DNV GL local station: **Jiangyin**

Approval Engineer: **Hagen Markus**

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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Product description

Metallic expansion joint consisting of corrugated bellows, designed according GB/T12522-96, CB 1153-93, and flanges ready for installation

Technical data

Nominal pressure PN 0.1 MPa

Type	Nominal size	PN (MPa)	Number of convolutions	Plies x thickness (mm)
GB/T12522-96-AS	DN100, DN125	0.1	100-6, 125-6	3x0.3
	DN150, DN200, DN250		150-4, 200-3/5, 250-3/5	3x0.4
	DN300, DN350		300-3/5, 350-3	
	DN350, DN400, DN450		350-5, 400-3/5, 450-3	2×0.5
	DN450		450-5	2×0.6
	DN500		500-3	3×0.5
	DN500		500-5	2×0.5
	DN600		600-3	4×0.5
	DN600, DN700, DN800		600-5, 700-3/5, 800-3/5	3x0.5
	DN900, DN1000, DN1100		900-3/5, 1000-3/5, 1100-3/5	
	DN1200, DN1400, DN1600		1200-3/5, 1400-3/5, 1600-3	
	DN1600, DN1800, DN2000		1600-5, 1800-3/5, 2000-3/5	4×0.5
	DN2400, DN2800		2400-3/5, 2800-3/5	
	DN3000		3000-3/5	5x0.6

Nominal pressure PN 0.6, 1.0, 1.6 MPa

Type	Nominal size	PN (MPa)	Number of convolutions	Plies x thickness (mm)
CB 1153-93 AS (A) CB 1153-93 BS (B)	DN 65, DN80, DN100	0.6	65-6, 80-6, 100-6	1×0.6
	DN125, DN150, DN200, DN250		125-6, 150-6, 200-4. 250-4	2×0.5
	DN300, DN350		300-4, 350-4	2×0.6
	DN400, DN450		400-4, 450-4	
CB 1153-93 AS (A)	DN500		500-4	3x0.6
CB 1153-93 BS (B)				2x0.6
CB1153-93 AS (A) CB1153-93 BS (B)	DN65, DN80, DN100, DN125	1.0	65-6, 80-6, 100-6, 125-6	2×0.5
	DN150, DN200		150-6, 200-6	2×0.6
	DN250, DN300, DN350		250-6, 300-6, 350-6	2×0.8
	DN400, DN450, DN500		400-6, 450-6, 500-6	2×1.0
CB1153-93 AS (A) CB1153-93 BS (B)	DN65, DN80, DN100	1.6	65-6, 80-6, 100-6	2×0.6
	DN125, DN150		125-6, 150-6	
	DN200, DN250, DN300, DN350		200-6, 250-6, 300-6, 350-6	3×0.8
	DN400, DN450, DN500		400-6, 450-6, 500-6	3×1.0

Materials

Type	Bellows	Flanges
GB/T12522-96-AS	SUS304 – X5CrNi1810(1.4301)-A 403	Q235-A
CB 1153-93 BS (B)	SUS304 – X5CrNi1810(1.4301)-A 403	Q235-A
CB 1153-93- AS (A)	SUS316L-X2CrNiMo17132 (1.4404)-A 403	SUS316L

Requirements according to pipe classes

Depending on pipe class appropriate material certificates for the bellows sheet material and flanges are to be provided.
Refer to:

DNV GL Rule Pt.4, Ch.6, Sec.1 – Table 1 Pipe classes
DNV GL Rule Pt.4, Ch.6, Sec.2 – Table 3 Material certificates
DNV GL Rule Pt.2, Ch.1, Sec.2 - Approval of manufacturers (AoM)

Selection of materials

The material grade SUS304 is considered not corrosion resistance to sea water and sea water atmosphere. Accordingly, the application in sea water systems, wet exhaust gas and exhaust gas scrubber systems and similar application with high corrosive media is not approved.
Furthermore, installation in unprotected areas subject to sea water spray or green sea, e.g. open deck.
Combination of stainless-steel bellows with flanges made of carbon steel is also not approved for the said applications.
The material grade SUS316L may be used in marine atmospheric environment and flowing sea water but is considered not suitable in piping systems with stagnant sea water. Combination of stainless-steel bellows with flanges made of carbon steel in direct contact with the media is also not approved for sea water systems.

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.
Reference is made to DNVGL Rules Pt.4, Ch.6 – Section 2 – Materials.

Range of Application / Limitation

Type	Design pressure (MPa)	Flange design	Type[1]	Service Temp.	Media	Pipe Class	Assembly. Drawing reference
CB 1153-93 AS (A)	0.6, 1.0, 1.6	Welded flange ring with loose flange	E	<200°C	Fresh water, sea water[3]	III	AS(A) 6500 AS(A) 10500 AS(A) 16500
CB 1153-93 BS (B)	0.6, 1.0, 1.6	Welded Flange	E	<200°C	Fresh water, sea water[3], oil, steam	II, III	BS(B) 6500 BS(B) 10500 BS(B) 16500
GB/T12522-96-AS	0.1			≤ 550°C	Exhaust gas[2]	III	AS3000-3 AS3000-5

Notes
[1] Reference DNVGL Pt.4, Ch.6, Sec. 9 – Table 7 Type of flange connection
[2] For installation in exhaust gas lines on diesel engines, e.g. on cylinder head or in exhaust gas manifold, the bellow design calculation shall include prove acc. to EJMA 9th Ed., Sec. 4.9- Vibration for each individual application.
[3] Refer to "Selection of materials"

The application in of expansion joints thermal-oil piping systems is subject to case by case approval. Refer to Rules Pt.4, Ch. 6 – Sec. 5.

Expansion bellows design

This type approval is based on bellows design calculations acc. to standard GB/T12522-96, CB 1153-93 based on common lifetimes for expansion bellows, minimum life cycle of 3000 and safety factor of 10.

The lifetime of expansion bellows depends on the service conditions, such as working pressure, axial and lateral stroke and bending angle. Accordingly, for each application the bellows design shall be based on the applicable service condition and lifetime. This is to be documented in the bellows design drawing for each delivery.

Production testing

Each batch of metallic expansion joints are to be hydraulically pressure tested up to 1.5 times the design pressure: Reference quality plan "Production Test Plan DNV GL".

Regarding non-destructive testing of welding's Pt.4, Ch.6 Section 10 – 1.5 is to be observed.

Works certificate to be issued by manufacturer and to be enclosed to each delivery.

Installation

The bellows must only be fitted in places where they are always accessible. Possible exceptions to be considered in each case.

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

The expansion joint is only to compensate for thermal movements and relative movement in ship and machinery, not to compensate for misalignment during installation of the pipework.

Tests carried out

Cyclic testing, Pressure and Burst testing.

Type Approval documentation

Marking of product

Each expansion joint to be provided with name plate as follows

Scope	Example
Manufacturer	
Nominal diameter DN	
Serial number / Date	
Design pressure / Temperature	
Movement	
Flowing direction (if applicable)	

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.

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

END OF CERTIFICATE