DNV·GL

Certificate No:
TAP00001XU

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Metallic Expansion Joints

with type designation(s)
A, B, AS, BS (CB/T1153), AS, BS (GB/T12522)

Issued to
Jiangsu Kuize Machinery Industry Co., Ltd.
Nantong, 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:
A, B, AS, BS (CB/T1153)	0°C up to 200°C	0.4, 0.6, 1.0, 1.6MPa	DN50 up to DN1000
AS, BS (GB/T12522)	0°C up to 550°C	0.1, 0.05MPa	DN2500 up to DN4000

Issued at **Hamburg** on **2020-05-14**
This Certificate is valid until **2025-05-13**.
DNV GL local station: **Nantong**

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 to EJMA 9th and 10th Edition as well as CB/T1153-12522, GB/T12522 and flanges ready for installation.

Materials

Bellows: SUS304/304L, SUS316/316L, SUS321
Flanges: Q235-A/B
SUS304/304L, SUS316/316L, SUS321

Technical data

Types A, AS (CB/T1153-2008)

DN	PN	Ply	Convolution		Length overall	
	MPa	Thickness*n	Pitch / Height	Quantity	Type A	Type AS
300	0.4	0.6*1	30/28	4	230	240
350	0.4					
400	0.4				240	250
450	0.4					
500	0.4				250	260
600	0.6	0.8*2	30/30	4/6	--	345/405
	1.0	1.0*2	30/30	4/6	--	365/425
	1.6	1.0*3	30/32	4/6	--	400/460

Types A, B, AS, BS (CB/T1153-2008)

Nominal pressure PN: 6 bar – dimensions in mm

DN	Ply	Convolution		Length overall			
	Thicknes*n	Pitch /Height	Quantity	Type A	Type B	Type AS	Type BS
50	0.4*1	15/4	6	230/160	210/180	235/160	210/180
65	0.5*1	16/16		240/160	215/200	235/180	210/190
80						250/190	220/200
100							
125	0.6*1	25/23	4	200/225	225/200	240/220	210/225
150							
175							
200	0.8*1	30/28		260/220	235/205	285/220	250/205
250				260/230		285/230	
300				270/240	245/210	285/240	250/210
350						300/240	260/210
400				280/250	245/210	300/250	
450	0.6*1					305/220	265/220
500					245/220		
600	0.8*2	30/30	4/6	--	--	345/405	300/360
700	1.0*2	35/40		--	--	--	
800	1.0*2	35/40		--	--	--	310/380
900	1.0*2	35/40		--	--	--	
1000	1.2*2	50/54		--	--	--	355/455

Types A, B, AS, BS (CB/T1153-2008)

Nominal pressure PN: 10bar - all sizes single ply, except sizes >350 double-ply – dimensions in mm

DN	Ply	Convolution		Length overall			
	Thickness*n	Pitch / Height	Quantity	Type A	Type B	Type AS	Type BS
50	0.6*1	15/13	6/7	230/185	210/180	250/185	180
65			6	240/200	215/200	265/200	200
80		20/17					
100				240/210		265/210	
125			4/6	220/235	225/200	260/235	225
150		20/18		220/250		260/250	
175					230/200		230
200	1*1	30/28	4/6	270/235	225/260	305	260
250				270/315			
300				275/370		305/315	
350				275/390	225/270		270
400	0.8*2			285/390	250/280	305/335	280
450					250/290	330/335	290
500					250/300	330/350	300
600	1.0*2	30/30	4/6	--	--	365/425	--

Types A, B, AS, BS (CB/T1153-2008)

Nominal pressure PN: 16bar – dimensions in mm

DN	Ply	Convolution		Length overall			
	Thickness*n	Pitch / Height	Quantity	Type A	Type B	Type AS	Type BS
50	0.5*2	15/14	6/7	230/210	210/180	250/185	180
65			6	250/235	225/200	265/200	200
80				250		265/210	
100							
125		20/17	4/6	235/300	210/225	260/235	225
150	0.6*2			235/320		260/250	
175				235/340	210/230		230
200	0.8*2	30/28	4/6	285/340	250/260	315/300	265
250				285/360		315/320	270
300				285/370		315/340	280
350				285/390	265/270		290
400	1*2			310/390	265/280	335/360	310
450				335/390	280/290	360/370	
500					280/300	360/390	330
600	1.0*3	30/32	4/6	--	--	400/460	--

Types AS (GB/T12522-2009)

Design pressure 0.1 MPa

DN	Ply	Convolution	
	Thickness*n	Pitch / Height	Quantity
2500, 2600, 2700, 2800, 2900,3000	1.2*2	75/80	3/5
3100, 3200, 3300, 3400, 3500, 3600, 3700	1,5*2		
3800, 3900, 4000			

Types BS (GB/T12522-2009)

Design pressure 0.05 MPa

DN	Ply	Convolution	
	Thickness*n	Pitch / Height	Quantity
2600, 2600, 2800, 3000, 3200	1.0*2	75/80	3/5
3400, 3600, 3800, 4000	1.2*2		

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 materials SUS304/304L, SUS316, SUS321 are considered not corrosion resistance to sea water and sea water atmosphere and therefore considered not suitable for application in unprotected installation areas subject to sea water spray or green sea, e.g. open deck or in wet exhaust gas respectively exhaust gas scrubber systems and similar application with high corrosive media.
This is also applicable to combination of carbon steel flanges with any bellows material.

Material SUS316L (1.4404) may be used in marine atmospheric environment and flowing sea water but is considered not suitable if stagnant sea water.

In addition to the above it shall be noted that 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 taken into account.

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
AS	0.6, 1.0, 1.6	Welded flange ring with loose flange	E	<200°C	Fresh water, sea water, oil, steam	II, III	A/AS-00000-1
BS	0.6, 1.0, 1.6	Welded flange	E		Fresh water, sea water, oil, steam, exhaust gas	II, III	B/BS-00000-1
BS	0.6	Welded flange	E	<200°C	Fresh water, sea water, oil, steam, exhaust gas	III	BS-00001-1
AS BS	0.1 0.05	Welded flange	E	≤ 550°C	Exhaust gas[2]	III	AS-1000-1 BS-1000-1

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 bellows design calculation shall include prove acc. to EJMA 9th Ed., Sec. 4.9- Vibration for each individual application.

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

Loose flange connections
Expansion joints with loose flanges are not approved for application in steam, cargo oil, lubricating and fuel oil systems and pipe class I piping systems.

For "Other medias" and piping systems included in pipe class II this type of flange connection is approved for service temperatures up to + 250°C.
For pipe class III applications the temperature range is limited according to the values specified in this type approval certificate.

Refer to DNV GL Rules Pt.4, Ch. 6, Section 9 – 5 Detachable pipe connections, Table 9 – Type F.

Expansion bellows design
This type approval is based on bellows design calculations acc. to EJMA, Edition 9th and 10th, minimum life cycle of 1000 and minimum safety factor of 1.

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.

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 joint 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.

Production testing
Each batch of metallic expansion joints are subject to final inspection according test plan "Production testing of stainless steel bellows expansion joints"
Appropriate works certificate to be issued and enclosed to each delivery.

Type Approval documentation

Marking of product

For traceability to this type approval certificate, the final product is marked with a name plate with following data:

Name plate	
Scope	**Example**
Manufacturer's name or trade mark	Jiangsu Kuize Machinery Industry Limited Company
Expansion joint type	AS
Design Pressure / Temperature	0.1Mpa / 550°C
Fabrication number or batch number	20D01001-003

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform periodical assessment.
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