



Certificate No:
TAP00002DV

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Metallic Expansion Joints

with type designation(s)

A, AS, BS, AST (GB/T12522-2009, GB/T12777-2008 and EJMA9th,10th Edition)

Issued to

Jiangsu Kuize Machinery Industry Co., Ltd.
Nantong, Jiangsu, 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.

Temperature range: Refer to certificate

Max. working press.: 0.05 up to 0.6MPa

Sizes: DN65 up to DN4000

Issued at **Hamburg** on **2022-01-11**

This Certificate is valid until **2025-05-13**.

DNV local station: **Nantong**

Approval Engineer: **Hagen Markus**

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.



Form code: TA 251

Revision: 2021-03

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Page 1 of 5

Product description

Metallic expansion joint consisting of corrugated bellows with flanges ready for installation.
Designed according to EJMA 9th and 10th Edition as well as GB/T12522-2009 and GB/T12777-2008.

Material

Exhaust gas systems

Type	Bellows materials	Flange materials
A, AS, BS	SUS304/304L, SUS316/316L, SUS321, 316Ti, Monel400, 310S	SUS304/304L, SUS316/316L, SUS321, 316Ti, 310S, Q235A/B, SS400, Monel400
AST	SUS304/304L, SUS316/316L, SUS321, 2205, 254SMO, 310S, 316Ti, Monel400	SUS304/304L, SUS316/316L, SUS321, 2205, 254SMO, SS400, 310S, 316Ti, SS400, Q235A/B, Monel400

Exhaust gas scrubber systems (EGC-SOX)

Type	Bellows	Flanges
AS, BS, AST – Exhaust gas scrubber	SMO254, 2205	SMO254, 2205, 316L

Selection of materials

The materials SUS 304/304L, SUS 316/316L, SUS 321, 310S, SUS 316Ti and Monel 400 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 Monel400 may be used in marine atmospheric environment and flowing sea water but is considered not suitable in piping systems with long durations of 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 DNV Rules Pt.4, Ch.6 – Section 2 – Materials.

Types A (GB/T12522-2009) – Exhaust gas lines

Design pressure 0.1 MPa, Temperature range up to 550°C

DN	Ply	Convolution	
	Thickness*n	Pitch / Height	Quantity
65~80	0.5	15/18	6 and 8
100~125	0.5	22/23	4 and 6
150~175	0.5	28/30	4 and 6
200~300	0.8	50/48	3 and 5
350~500		50/55	3 and 5

Note

Ply and convolution design acc. to KZ 100800001

Types AS (GB/T12522-2009) – Exhaust gas lines, Exhaust gas scrubber systems (EGC-SOX)

Design pressure 0.1 MPa, Temperature range up to 550°C

DN	Ply	Convolution	
	Thickness*n	Pitch / Height	Quantity
65, 80	0.5*1	15/18	6, 8
100, 125		22/23	4, 6
150, 175	0.6*1	28/30	
200	0.8*1	28/30	3, 5, 6
250, 300		50/48	3, 5, 6
350, 400, 450, 500, 600	0.8*1	50/60	3, 5, 6
700, 800, 900	1.0*1	50/50	3, 5, 6
1000, 1100, 1200	1.0*1	65/58	3, 5
1300	1.0*1	65/60	3, 5
1400, 1500	0.8*2	65/60	3, 5
1600, 1700, 1800	0.8*2	75/65	3, 5
1900, 2000	1.0*2	75/80	3, 5
2100, 2200, 2300	1.2*2	75/80	3, 5
2400	1.2*2	75/80	5
2500, 2600, 2700, 2800, 2900, 3000, 3100, 3200	1.2*2	75/80	3, 5
3300, 3400, 3500, 3600, 3700, 3800, 3900, 4000	1.5*2	75/80	

Note

Ply and convolution design acc. to KZ 190420-1

Types AS (GB/T12522-2009) – Exhaust gas lines

Design pressure 0.1 MPa, Temperature range up to 559°C

DN	Ply	Convolution	
	Thickness*n	Pitch / Height	Quantity
300	0.8*1	50/48	6
350		50/50	3 to 5
400	1*1	50/50	6
450		50/55	3 to 5
500	0.6*2	50/55	6
			3 to 5
			6
600			2 to 5

Note

Ply and convolution design acc. to KZ-20210510-1

Types AST (GB/T12777-2008) – Exhaust gas lines

Design pressure 0.6 MPa, Temperature range up to 550°C

DN	Ply	Convolution	
	Thickness*n	Pitch / Height	Quantity
65, 80	1*1	15/18	6, 8
100, 125	1.2*1	22/23	4, 6
150	1.5*1	28/28	
200		28/28	3, 5, 6
250, 300	1.5*2	50/44	
350, 400, 450, 500, 600		50/44	
700, 800, 900		50/43	
1000, 1100, 1200	1.5*3	65/54	

Note

Ply thickness and quantity according to KZ 20201105

Types BS (GB/T12522-2009) – Exhaust gas lines, Exhaust gas scrubber systems (EGC-SOX)

Design pressure 0.05 MPa, Temperature range up to 550°C

DN	Ply	Convolution	
	Thickness*n	Pitch / Height	Quantity
1000, 1100, 1200, 1300, 1400, 1500	1.0*1	65/60	3, 5
1600, 1700, 1800		75/65	
1900, 2000	0.8*2	75/65	
2100, 2200, 2300, 2400, 2500, 2600, 2800, 3000, 3200, 3400, 3600		75/80	
4000		75/90	

Note

Ply thickness and quantity according to KZ190420-1

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 Pt.4 Ch.6, Sec.1 - Table 1 Pipe classes
DNV Pt.4 Ch.6, Sec.2 - Table 3 Material certificates

Range of Application/Limitation

Type	Flange design	Type ¹	Design pressure (MPa)	Service Temp.	Media	Pipe Class	Assembly Drawing
A	Welded flange	E	0.1	≤ 550°C	Exhaust gas lines ²	III	KZ100800001
AS	Welded flange	E	0.1	≤ 550°C	Exhaust gas scrubber, Exhaust gas lines ²	III	KZ190420-1
BS	Welded flange		0.05	≤ 550°C			
AS	Welded flange	E	0.1	≤ 559°C	Exhaust gas lines ²	III	KZ20210510-1
AST	Welded flange		0.6	≤ 550°C	Exhaust gas lines ²		KZ20201105

Notes

¹ Reference DNV 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 EMA 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 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 – 30th June 2021”

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 Surveyor shall perform periodical assessment.

Refer to the Class Programme DNV-CP-0338, Sec.4.

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

End of certificate