TYPE APPROVAL CERTIFICATE

Certificate No:
TAP0000049
Revision No:
1

This is to certify:

That the Metallic Expansion Joints

with type designation(s)
SMR7742950-TA, EX12, EX16, EX06, EXBAU

Issued to
OLEODINAMICA TOSCANA S.R.L.
Serravalle Pistoiese PT, Italy

is found to comply with
DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition January 2018

Application :

Product(s) approved by this certificate is/are accepted for installation on vessels classed by DNV GL.

Type:	Temperature range:	Max. working press.:	Sizes:
SMR7742950-TA	0°C to 530°C	27 bar (@490°C) / 21 bar (@530°C)	3"
EX12	0°C to +550°C	12 bar	2", 4", 5", 6", 8", 10"
EX16	0°C to +550°C	16 bar	2 1/2", 3"
EX06	0°C to +550°C	6 bar	12", 14", 16", 18", 20", 24"
EXBAU	0°C to +550°C	30 bar	3", 4"

Issued at **Høvik** on **2020-07-10**

This Certificate is valid until **2024-10-24**.
DNV GL local station: **Italy/Malta CMC**

Approval Engineer: **Adel Samiei**

for **DNV GL**
Digitally Signed By: Ragavendhra Rao, Vishnumurthi
Location: DNV GL Høvik, Norway
on behalf of

Zeinab Sharifi
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.

Job Id: **262.1-019976-2**
Certificate No: **TAP0000049**
Revision No: **1**

Product description

Metallic expansion bellows designed according to EJMA 10th edition:

Size	Code	Diameter	Pitch	Height	Ply x thk.	Convolutions
3″	SMR7742950-TA (1)	88.6 mm	10.60 mm	8.15 mm	4x0.4 mm	2 x 6
2″	EX12050 (3)	60.8 mm	7.9 mm	6.3 mm	3x0.3 mm	19
4″	EX12100 (1)	112 mm	13.63 mm	9.0 mm	3x0.3 mm	11
5″	EX12125 (1)	140.1 mm	15 mm	9.9 mm	3x0.3 mm	10
6″	EX12150 (1)	166.9 mm	16.6 mm	11.4 mm	3x0.4 mm	9
8″	EX12200 1)	218.8 mm	16.6 mm	12.9 mm	3x0.4 mm	9
10″	EX12250 (1)	270.2 mm	18.75 mm	13 mm	4x0.4 mm	8
2 ½″	EX16065 (1)	75.8 mm	10.7 mm	6.9 mm	3x0.3 mm	14
3″	EX16080 (1)	88.2 mm	12.5 mm	8.1 mm	3x0.3 mm	12
12″	EX06300 (1)	320 mm	18.75 mm	14.3 mm	3x0.4 mm	8
14″	EX06350 (1)	354.1 mm	18.75 mm	13.3 mm	3x0.4 mm	8
16″	EX06400 (1)	401.9 mm	21.43 mm	14.9 mm	3x0.4 mm	7
18″	EX06450 (1)	453.4 mm	21.43 mm	15.9 mm	3x0.4 mm	7
20″	EX06500 (1)	501.5 mm	21.43 mm	18.5 mm	3x0.4 mm	7
24″	EX06600 (1)	600 mm	25 mm	20 mm	4x0.4 mm	6
3″	EX080BAU (2)	88.9 mm	10 mm	8.2 mm	5x0.4 mm	2 x 6
4″	EX100BAU (2)	114.3 mm	10 mm	9.8 mm	5x0.4 mm	2 x 6

(1) with collar – 2 mm thickness and 13 mm length
(2) with collar – 2 mm thickness and 17 mm length
(3) with collar – 2 mm thickness and 15 mm length

Material of bellow & pipe: AISI 316 /AISI 321
Material of Collar: AISI316

Bellows are welded directly to the piping system, except for bellows EX080BAU & EX080BAU with respectively Flanges E080FLAEX & Flanges E100FLAEX made of AISI 316L.

Application/Limitation

Expansion bellows covered by this certificate are found to be in compliance with the given design standard and may be installed in exhaust systems.

Size	Code	Movement			Lifetime	Design Pressure
		Axial	Lateral	Angular		
3″	SMR7742950-TA	0	17 mm	0	7388 cycles	21 bar & 530°C
					6999 cycles	27 bar & 490°C
2″	EX12050	+7 /-15 mm	4 mm	4°	1000 cycles	12 bar
4″	EX12100	+8 /-16 mm	4 mm	4°	1000 cycles	12 bar
5″	EX12125	+8 /-15 mm	3 mm	3°	1000 cycles	12 bar
6″	EX12150	+7 /-15 mm	3 mm	4°	1000 cycles	12 bar
8″	EX12200	+7 /-11 mm	2 mm	2°	1000 cycles	12 bar
10″	EX12250	+5 /-10 mm	3 mm	3°	1000 cycles	12 bar
2 ½″	EX16065	+7 /-15 mm	4 mm	4°	1000 cycles	16 bar
3″	EX16080	+8 /-17 mm	4 mm	4°	1000 cycles	16 bar
12″	EX06300	+8 /-19 mm	2 mm	2°	1000 cycles	6 bar
14″	EX06350	+5 /-16 mm	2 mm	2°	1000 cycles	6 bar
16″	EX06400	+6 /-14 mm	2 mm	2°	1000 cycles	6 bar
18″	EX06450	+2 /-5 mm	2 mm	2°	1000 cycles	6 bar
20″	EX06500	+2 /-5 mm	2 mm	2°	1000 cycles	6 bar
24″	EX06600	+5 /-8 mm	2 mm	2°	1000 cycles	6 bar
3″	EX080BAU	0	5 & 17 mm	0	1000 cycles	30 bar
4″	EX100BAU	0	5 & 5 mm	0	1000 cycles	30 bar

The installation shall be done according to type approval holder's procedures.

Production testing

Each expansion bellow shall be subjected to hydrostatic pressure test upon completion to at least 1.5 times the design pressure.

Certification

Whenever the piping system is subject to approval by the society, the below limitations shall be considered:

- Bellows covered by this certificate shall be delivered with test report with reference to this type approval certificate (see to DNVGL-RU-SHIP Pt.4 Ch.6 Sec.1 Table 4).
- Welding shall fulfill requirements in DNVGL-RU-SHIP Pt.2 Ch.4.
- Material of bellow shall have material certificates in accordance with DNVGL-RU-SHIP Pt.4 Ch.6 Sec.2 Table 3. Approval of manufacturer is required for VL or W material certificates.

Type Approval documentation

General drawing SMR7742950 – TA revision 0 dated 2015-07-21
Calculation report N. 0103_2015 revision 0 dated 2015-07-20
Calculation report N. 0104_2015 revision 0 dated 2015-07-20
Book DNVGL Metal flexible Bellows Rev.6 dated 2020-06-03

Marking of product

For traceability to this type approval, the compensators are to be marked with:

- Manufacturer's trademark
- Type designation (as stated in the submitted drawings)
- Size
- Maximum working pressure
- Temperature range
- The flow 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 approval are complied with. Reference is made to DNVGL-CP-0338.