

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Compensator, Bellow of Rubber Material

with type designation(s)
46, 49, 50, 55, 55 SO

Issued to
Willbrandt KG
Hamburg, Germany

is found to comply with
DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
DNV GL class programme DNVGL-CP-0183 – Type approval – Flexible hoses

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:
46	up to 130°C	up to 16bar	DN20 up to DN50
49	up to 130°C	up to 25bar	DN32 up to DN500
50	up to 130°C	up to 16bar	DN20 up to DN600
55	up to 130°C	up to 16bar	DN80 up to DN300
55 SO	up to 130°C	up to 16bar	DN20 up to DN300

Issued at **Hamburg** on **2019-11-26**

This Certificate is valid until **2024-11-20**.

DNV GL local station: **Hamburg CMC**

Approval Engineer: **Hagen Markus**



for DNV GL

Digitally Signed By: Drews, Olaf
 Location: DNV GL SE Hamburg, Germany
 Signing Date: 2019-11-28

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.



Job Id: **262.1-028299-1**
 Certificate No: **TAP00001Y3**
 Revision No: **1**

Product description

Rubber expansion joints consisting of rubber bellows with fabric or steel reinforcement and end fittings made of steel / non-ferrous metal, ready for installation.

Design of bellow, flanges and expansion joint configurations according to drawing 180816.

Application/Limitation Expansion joint 46, 50

Bellow type	Bellow design			Piping systems / Media
	Liner	Reinforcement	Cover	
red	IIR	PA	EPDM	Potable water, hot water, sea water, ballast water, at pumps of fire main, fresh water-cooling water with chemical additives, low concentrated acids, lyes and salt solutions
red Sp	EPDM	PEEK	EPDM	Same as type "Red" plus Heating systems. Not for potable water
yellow	NBR	PA	CR	Fuel oil (MDO, HFO), lubricating oil, hydraulic oil, sea water, ballast water, bilge water, DIN-EN fuels with max. aromatic content of max. 50%
black EPDM	IIR		EPDM	Potable water, hot water, sea water, ballast water, at pumps of fire main, fresh water-cooling water with chemical additives, low concentrated acids, lyes and salt solutions
black CR	CR		CR	Hot water, sea water, ballast water, at pumps of fire main, fresh water-cooling water with chemical additives, low concentrated acids, lyes and salt solutions, oily compressed air
yellow steel	NBR	Steel cord	CR	Fuel oil (MDO, HFO), lubricating oil, hydraulic oil, bilge water, ballast water, DIN-EN fuels with max. aromatic content of max. 50%
yellow HNBR	HNBR			
End fitting types		Type 46 Screwed connection acc. to DIN EN 10226		Carbon steel with galvanic zinc protection, Stainless steel
		Type 50 Swivel flanges drilled according to PN 6, 10, 16, 25, ASME, JIS, BS and other standards		Carbon steel with galvanic zinc protection, hot-dip galvanized, stainless steel, bronze, gunmetal

Note

Expansion joint 46
 - vacuum resistant without additional measures
 - not approved in piping systems conveying flammable media

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Expansion joint 55³, 55SO²

Bellow type	Bellow design			Piping systems / Media
	Liner	Reinforcement	Cover	
red	IIR	PA	EPDM	Potable water, hot water, sea water, ballast water, at pumps of fire main, fresh water-cooling water with chemical additives, low concentrated acids, lyes and salt solutions
red Sp	EPDM	PEEK	EPDM	Same as type "Red" plus Heating systems. Not for potable water
yellow	NBR	PA	CR	Fuel oil (MDO, HFO), lubricating oil, hydraulic oil, bilge water, sea water, ballast water, DIN-EN fuels with max. aromatic content of max. 50%
yellow steel ¹		Steel cord		
End fitting types		Swivel flanges drilled according to PN 6, 10, 16, 25, ASME, JIS, BS and other standards		Carbon steel with galvanic zinc protection, hot-dip galvanized, stainless steel, bronze, gunmetal

Note

- ¹ Not available for type 55SO
- ² 55SO Special bellow length, bellow design same as type 50
- ³ 55 Same bellow design as type 50 but different bellow length.

Expansion joint 49

Bellow type	Bellow design			Piping systems / Media
	Liner	Reinforcement	Cover	
blue	IIR	PA	EPDM	Potable water, hot water, sea water, ballast water, at pumps of fire main, fresh water-cooling water with chemical additives, low concentrated acids, lyes and salt solutions
A-red	EPDM	PEEK	EPDM	Same as type "Blue" plus Heating systems. Not for potable water
yellow	NBR	PA	CR	Fuel oil (MDO, HFO), lubricating oil, hydraulic oil, bilge water, ballast water, DIN-EN fuels with max. aromatic content of max. 50%
black EPDM	IIR		EPDM	Potable water, hot water, sea water, ballast water, at pumps of fire main, fresh water-cooling water with chemical additives, low concentrated acids, lyes and salt solutions
End fitting types		Swivel flanges drilled according to PN 6, 10, 16, 25, ASME, JIS, BS and other standards		Carbon steel with galvanic zinc protection, hot-dip galvanized, stainless steel, bronze, gunmetal

Performance data²

Bellow Type	Temperature range	46	49	50	55	55SO
Red Sp	0°C up to 130°C	X ¹	A-red	x	x	n.a.
Red	0°C up to 100°C	x	blue	x	x	x
Yellow	0°C up to 90°C	x	x	x	x	x
Black EPDM	0°C up to 100°C	x	x	x	n.a. ¹	n.a.
Black CR	0°C up to 90°C	x	n.a.	x	n.a.	n.a.
Yellow steel	0°C up to 90°C	x	n.a.	x	x	n.a.
Yellow HNBR	0°C up to 100°C	x	n.a.	x	n.a.	n.a.

Note:

- ¹ x = Applicable bellow type, n.a.= not applicable

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Expansion joint	Bellow types	M.A.W.P ¹	BL	Sizes
46	All	16	130	20, 25, 32, 40, 50
49	All	25	100	32, 40, 50,65,80, 100, 125, 150, 200, 250, 300, 350
			110	400, 500
50	All	16	130	20, 25, 32, 40, 50,65,80, 100, 125, 150, 200, 250, 300
			200	350, 400
			10	450, 500, 600
	Black EPDM	10	130	20, 25, 32, 40, 50, 65,80, 100, 125, 150
55	All	16	125	20, 25, 32, 40, 50, 65
			150	80, 100, 125, 150,
			175	200, 250
			200	350, 400
		10	200	300
			250	450, 500, 600
55SO	All	16	160	20, 25, 32, 40, 50,65,80, 100, 125, 150, 200
		10	200	250, 300

Note:

¹ When selecting the expansion joints, the admissible M.A.W.P pressures in dependence on the media or ambient temperature as specified by Willbrandt product data sheets are to be observed.

Fire sleeve applications

Expansion joints with bellow reinforcement made of PEEK and PA, intended for application in piping systems conveying flammable media or sea water systems where failure may result in flooding shall be completely covered by a fire sleeve of type FSH 46, 49, 50, 55 (fire tested acc. to ISO 15540/41).

Production place of expansion joints

Willbrandt KG, Schnackenburgallee 180, D-22525 Hamburg

Production testing

Every expansion joint is subject to hydrostatic pressure test with 1.5 times the maximum working pressure. Appropriate works certificate (W) is to be issued.

Installation

For selection and installation of the expansion joints the Willbrandt planning and maintenance instructions are to be observed.

Rubber expansion joints shall be accessible for inspection.



Means shall be provided to isolate the expansion joint used in systems for fuel oil, lubricating oil, sea water cooling and compressed air.

Tests carried out

Burst test, Endurance test, Impulse test, Resistance against liquid, Ozone resistance, Fire resistance test acc. to ISO15540/41.

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Marking of product

Bellow	
Scope	Example
Manufacturers name or trade mark	 or WILLBRANDT
Production date	Year/Quarter plus week
Nominal pressure PN	16
Nominal diameter DN / Bellow length BL in mm	250
Bellow type	Colour code according to Willbrandt data sheets
Flanges	
Scope	Example
Manufacturers name or trade mark	WILLBRANDT
Expansion joint type	46/50/55/55SO
DN / PN / Material Charge no.	80 / 16 / xxxxxxxxxx
Test pressure (TP) (in case of final inspection witnessed by surveyor)	24bar (1.5 times of PN)
Fire sleeve	
Scope	Example
Manufacturers name or trade mark	
Fire sleeve type	FSH-50-A
DN / LW / BL	DN400 / LW 585 / BL370
Reference number	A2150630240

Type Approval documentation

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.

End of certificate