

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Pipe Couplings

with type designation(s)

Straub - FLEX 1, FLEX 2

Issued to

Straub Werke AG Rohrverbindungen
Wangs, SG, Switzerland

is found to comply with

DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems

DNV GL class programme DNVGL-CP-0185 – Type approval – Mechanical joints

Application :

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

Temperature range: Refer to certificate.

Max. working press.: PN16. Refer to certificate.

Sizes: Pipe O.D. 48.3 up to O.D. 1219.2

Issued at **Hamburg** on **2018-10-02**

This Certificate is valid until **2023-10-01**.

DNV GL local station: **Augsburg**

for **DNV GL**

Approval Engineer: **Hagen Markus**

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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.



Product description

Slip-on joint slip type coupling with NBR and EPDM gaskets, **non - fire resistant type**.

Materials

Standard material combination according to Straub "TECHNICAL MANUAL, 05-2018".
Equivalent material qualities, released by the manufacturer, are included.

Material combination	W1 FLEX 2	W2 FLEX 1 / FLEX2	W5 FLEX 1 / FLEX 2
Casing	S355MC, hot-dip galv.	AISI 316	AISI 316L
Bolts	AISI 4135	AISI 4135	A4-80
Bars	AISI 12 L 14, galv.	AISI 12L 14, galv.	AISI 316L
Strip insert (option)	AISI 316L or similar / HDPE		
Sealing sleeve	NBR, EPDM		

Temperature range¹

NBR	-20°C up to +80°C	All sizes and coupling types
EPDM	-30°C up to +100°C	

Note

¹ According to "TECHNICAL MANUAL, 05-2018".

Overview size and pressure range

Flex - 1		Flex - 2				
Pipe O.D. ¹	PN	Pipe O.D. ¹	PN	PN	PN	PN
48.3	16	180	2.5	6	10	16
54		200.0				
57		219.1				
60.3		250				
63.5		267				
76.1		273				
84		304				
88.9		323.9				
104		355.6				
108		406.4				
114.3		457.2				
129		508				
133		558.8				
139.7		609.6				
154		711.2				
159		762				
168.3		812.8				
219.1		914.4				
	1016					
	1117.6					
	1219.2					
Note ¹ Clamping range of coupling refer to Straub “TECHNICAL MANUAL, 05-2018”.						

Application/Limitation

The slip-on joint flex type coupling of type FLEX is type approved for pipe class II and III piping systems as listed in table below. In addition, the limitations as specified on page 4 of this certificate and in the "Notes" column of the table below are to be observed.

The selection of the pipe couplings for the corresponding application and the right installation are to be in accordance with the fitting instructions of the manufacturer.

Table - Approved applications

Piping systems	Notes
Flammable fluids (flash point ≤ 60 °C)	
Cargo oil lines	4)
Crude oil washing lines	4)
Vent lines	3)
Inert gas	
Water seal effluent lines	5)
Scrubber effluent lines	5)
Main lines	2), 4)
Distribution lines	4)
Flammable fluids (flash point > 60 °C)	
Cargo oil lines	4)
Fuel oil lines	2), 3)
Lubricating oil lines	2), 3)
Hydraulic oil lines	2), 3)
Thermal oil lines	2), 3)
Sea water	
Bilge lines	1)
Water filled fire extinguishing systems (e.g. sprinkler)	3)
Non-water filled fire extinguishing systems (e.g. foam, drencher systems)	3)
Fire main (not permanently filled)	3)
Ballast systems	1)
Cooling water systems	1)
Tank cleaning services	5)
Non-essential systems	5)
Fresh water	
Cooling water systems	1)
Condensate return systems	1)
Non-essential piping systems	5)
Sanitary/drains/scuppers	
Deck drains (internal)	6)
Sanitary drains	5)
Sounding/vent	
Water tanks/dry spaces	5)
Oil tanks (flash point > 60 °C)	2), 3)
Miscellaneous	
Service air piping systems (non-essential)	5)

Notes - Fire resistance

For applications where "fire resistance types" are required, the pipe coupling of type FLEX is not approved.

- 1) Inside machinery spaces of category A - only approved fire resistant types.
- 2) Not inside machinery spaces of category A or accommodation spaces. May be accepted in other machinery spaces provided the joints are in easily visible and accessible positions.
- 3) Approved fire resistant types except in cases where such mechanical joints are installed on exposed open decks, as defined in SOLAS II-2/Reg. 9.2.3.3.2.2(10) and not used for fuel oil lines.
- 4) In pump rooms and open decks - only approved fire resistant types.
- 5) Non-fire resistance types are approved.

Notes - General

- 6) Only above bulkhead deck of passenger ships and freeboard deck of cargo ships.

Limitations

Job Id: **262.1-012465-2**
Certificate No: **TAP00001JD**

Slip-on joints are in general not approved for the following applications:

- bilge lines inside ballast and fuel tanks.
- seawater and ballast lines including air and overflow pipes inside cargo holds and fuel tanks.
- fuel and oil lines including overflow pipes inside cargo holds and ballast tanks.
- scuppers and discharge (overboard)
- starting, control air and CO2 systems.
- piping sections directly connected to sea openings or tanks containing flammable liquids which in the event of damage could cause fire or flooding.
- systems containing oxygen (more than 25% by volume).
- in piping systems with impulse pressure load other than water hammer, e.g. pressure lines of hydraulic piping systems

Installation inside tanks is permitted only if the pipes and tanks contain a medium of the same nature.

Type Approval documentation

Tests carried out

Marking of product

Pipe coupling / Fire sleeve

Each pipe coupling shall bear legible and durable marking on the body or on a plate fixed securely to the body. Scope of marking shall be at least as follows:

	Example
Manufacturer's mark	STRAUB
Type	FLEX 1
Size in mm / inch	114,3 / 4
PN	16
Gasket material	NBR
Casing material	W5

Periodical assessment

For retention of the type approval certificate periodical assessments shall be carried out at production places by DNVGL surveyor.

The objective of the periodical assessment is to verify that the design and production conditions for the type approval have not been altered.

Main scope of the assessment:

- verification of the production and quality control system
- review of quality control documentation of recent deliveries
- review of drawings in production to verify any design changes which may have an impact on data specified in the type approval certificate, performance and range of application
- verification of the product marking

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

End of certificate