



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. P-10808
This Certificate consists of 5 pages

This is to certify that the
Expansion Joint for Pipe, Slide Type and Flexible Type

with type designation(s)
WAGA 500

Manufactured by
Rasmussen GmbH
Maintal (Hochstadt), Germany

is found to comply with
Det Norske Veritas' Rules for Classification of High Speed and Light Craft.
Det Norske Veritas' Rules for Classification of Ships and Mobile Offshore Units
Det Norske Veritas' Rules for Classification of Fixed Offshore Installations.
Det Norske Veritas' Standards for Certification 2.9 No. 102

Application
The couplings may be used in the systems mentioned in the certificate.

Temperature range: dep. sealing, see cert.
Max. working press.: 16 bar (see cert.)
Sizes: 26,9 to 168.3 mm (see cert.)


Place and date
Høvik, 2001-06-06
for DET NORSKE VERITAS AS


for Kjell Folge
Head of Section



Local Office
DNV Essen

This Certificate is valid until
2004-12-31


Kristian Lindelof
Surveyor

Notice: This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.

If any person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In this provision "Det Norske Veritas" shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.



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File No.: 792.40

Product description

Materials:

Material combination	W2		W4		W5	
	DIN	AISI	DIN	AISI	DIN	AISI
Housing	1.4301	304	1.4301	304	1.4571	316 Ti
Bolts	1.7220 / 1.4404	4140H / 316L	1.4404	316 L	1.4404	316 L
Massive trunnion	1.0737	12 L 14	1.4301	304	1.4401	316
Hollow trunnion	-	-	1.4571	316 Ti	1.4571	316 Ti
Steel stip inlay and Protection ring	1.4571	316 Ti	1.4571	316 Ti	1.4571	316 Ti

Application/Limitation

The joints can be used for the following pipelines:

- Sea and fresh water cooling of systems not necessary to perform the ship main functions.
- Ballast lines (see remarks).
- Bilge lines (see remarks).
- Sanitary service
- Cargo oil lines (see remarks).
- Hydrocarbon and hydrocarbon vent lines within cargo tanks and on open deck.
- Fuel oil transfer lines on open deck (see remarks)
- Compressed air lines
- Fire main and foam lines.
- Water spray, deluge and sprinkler systems.
- Deck wash lines.
- Sanitary scupper, - drain and supply pipe lines.
- Tank air, - filling and sounding pipes (see remark).
- Inert gas lines.
- Sea water, but not cooling water for ship main functions
- Fresh and domestic freshwater
- Hydraulically driven cargo pump systems.
- Bulk cement and baryte
- Steam condensate returns outside machinery spaces

The couplings can not be used for inflammable fluids within machinery spaces of category A.

Temperature range depending upon size and sealing material:

Sealing	Temperature
EPDM (<=168,3)	-30 to 125 °C
EPDM (>180)	-20 to 80 °C
NBR	-20 to 80 °C



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When used for systems where vacuum may occur, such as bilge and ballast systems, due measures shall be taken to avoid that packing element is sucked through the gap between pipe ends.

Each pipe length is to be fixed clamped and the joints are to be mounted according to the manufacturer's written instructions.

For use in sea and fresh water cooling systems, the couplings must at any time be accessible. Possible exceptions to be considered in each case.

The couplings can be used on bilge lines provided the joints are accessible at any time, i.e. they cannot be used for bilge lines carried through tanks.

The couplings can be used on ballast lines in engine room, and outside engine room where the ballast lines are carried through pipe tunnels or ballast tanks.

The couplings can be used for air pipes from tanks in engine room not containing fuel oil or other inflammable liquids.

The materials used in the gaskets must be resistant to the fluid carried in the pipe and also to the surrounding fluid if the coupling is mounted in a tank. EPDM is not to be used for fuel oil and cargo oil.

Rubber elements and other parts subject to wearing are to be replaced by new parts in case of repeated use of the coupling.

Each joint is to be hydraulic pressure tested to 1.5 times the working pressure.

No product certificate will be required.

Type Approval documentation

- Test reports on tests performed from 13th to 15th November 1996 witnessed by DNV.
- Test reports: 61/99, 54/99 65/99, 57/99 58/99, 60/99 dated February 17, 1999.
- Drawings received with letter dated 1999-03-23 and 1999-09-01

Tests carried out

Visual inspection, Oil resistance test, Fatigue test, Hydrostatic pressure test using angular pipe ends, Burst test, Pneumatic leakage test under vacuum using angular pipe ends.



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Maximum allowable working pressure:

Size	WAGA 500/ 500E
Ø 26,9mm - 168,3mm	16 bar

Size	WAGA 500 type			
	500A2/ 500A2E	500B2/ 500B2E	500C2/ 500C2E	500D2/ 500D2E
Ø 180 - 219,1 mm	9,2 bar	13,7 bar	16 bar	16 bar
Ø 273,0 mm	7,0 bar	12,0 bar	13,5 bar	16 bar
Ø 323,9 mm	5,0 bar	9,0 bar	10,5 bar	15,0 bar
Ø 355,6 mm	5,2 bar	9,0 bar	10,5 bar	13,2 bar
Ø 406,4 mm	5,2 bar	7,5 bar	10,2 bar	12,3 bar
Ø 508,0 mm	3,2 bar	5,5 bar	6,5 bar	7,5 bar
Ø 609,6 mm	4,5 bar	5,5 bar	6,2 bar	-
Ø 711,2 mm	4,0 bar	4,5 bar	5,0 bar	-
Ø 812,2 mm	3,2 bar	3,5 bar	4,5 bar	-
Ø 1200 mm	2,0 bar	2,3 bar	3,3 bar	-

Installed couplings are to be applied with a minimum applied stud torque:

Size	Torque, WAGA 500 type				
	500E/500	500A2E/ 500A2	500B2E/ 500B2	500C2E/ 500C2	500D2E/ 500D2
Ø 26,9 - 33,7 mm	3 Nm	-	-	-	-
Ø 35,0 - 76,1 mm	5 Nm	-	-	-	-
Ø 84 - 88,9 mm	7,5 Nm	-	-	-	-
Ø 104 - 108 mm	10 Nm	-	-	-	-
Ø 114,3 mm	12,5 Nm	-	-	-	-
Ø 129 - 133 mm	17,5 Nm	-	-	-	-
Ø 139,7 mm	22,5 Nm	-	-	-	-
Ø 154 - 168,3 mm	30 Nm	-	-	-	-
Ø 177,8 - 355,6 mm	-	15 Nm	25 Nm	30 Nm	35 Nm
Ø 356 - 406,4 mm	-	15 Nm	25 Nm	22,5 Nm	35 Nm
Ø 407 - 508mm	-	30 Nm	40 Nm	40 Nm	40 Nm
Ø 509 - 609,6 mm	-	35 Nm	40 Nm	40 Nm	-
Ø 610 - 711mm	-	35 Nm	40 Nm	45 Nm	-
Ø 711,2 - 812,8 mm	-	50 Nm	45 Nm	45 Nm	-
Ø 813 - 1220 mm	-	50 Nm	50 Nm	50 Nm	-

Couplings in cargo holds are to be adequately protected from damage from the cargo.



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Marking of product

For traceability with this type approval the couplings are at least to be marked with:

- Manufacturer's name or trade mark
- Type designation: WAGA 500 (Georg Fischer WAGA N.V.)

Certificate retention survey

For retention of the Type Approval, a DNV Surveyor shall perform a survey before the expiry date, to verify that the conditions for the type approval are complied with.

END OF CERTIFICATE