

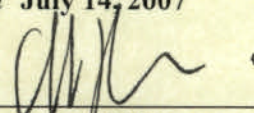
TYPE APPROVAL CERTIFICATE
No. MAC349703CS/02



This is to certify that the product identified below is in compliance with the applicable requirements of the RINA type approval system.

<i>Description</i>	pipe couplings
<i>Type</i>	Flex - Type
	NORMACONNECT F1- F2A - F2B - F2C AND F2D; +GF+/NORMA FLEX
<i>Applicant</i>	RASMUSSEN GMBH
	POSTFACH 11 49 D-63461 MAINTAL - GERMANY
	GERMANIA
<i>Manufacturer</i>	RASMUSSEN GMBH
<i>Place of manufacture</i>	POSTFACH 11 49 D-63461 MAINTAL - GERMANY
	GERMANIA
<i>Reference standards</i>	Part C, Chapter 1, Section 10 of RINA Rules
<i>Reference documents</i>	RINA Type approval system

Issued in **Genoa** on **March 11, 2004**. This Certificate is valid until **July 14, 2007**



RINA

This certificate consists of this page and 1 enclosure

This certificate annuls and replaces the previous one issued with No. MAC/48201/7/TO/02 dated 15.7.2002.



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Flex - Type

Denominations

Two denominations are used to describe the same coupling.

The first one F is used in connection with the trade name "NORMA", the second FLEX is used in connection with the trade name "+GF+/NORMA"

Reference documents

"NORMACONNECT high pressure pipe coupling - 4.11" catalogue and constructional drawings

Materials/Components

	W2		W4		W5	
	DIN	AS	DIN	AS	DIN	AS
Housing	1.4301	304	1.4301	304	1.4571	316 Ti
Bolts	1.7220 / 1.4404	4140H /316L	1.4404	316L	1.4404	316L
Trunnions	1.0737	12L14	1.4301	304	1.4401	316
Steel band inlay and protective ring	1.4571	316 Ti	1.4571	316 Ti	1.4571	316 Ti
Plastic strip insert	Polyamide with brand name Grivory HTV-4X1 natural and black					
Gasket	Synthetic rubber NBR or EPDM					

For all diameters of F1 type and for diameters from 180 mm up to 219.1 mm of F2 A-D types is foreseen to use optional plastic band insert as alternative to Stainless Steel 1.4571 band inlay.
All sizes > 219.1 with Stainless Steel 1.4571 band inlay.

Technical characteristics

Outside pipe diameter F1 / FLEX types : 26.9 mm. up to 168.3 mm.

Nominal pressure F1 / FLEX types : PN 16

Outside pipe diameter F2A / -, F2B / -, F2C / FLEX (1) types: from 180 to 1200 mm.

Outside pipe diameter F2D / FLEX types: from 180 to 600 mm

Maximum allowable working pressure for F2x / FLEX types according to the following table:

Outside pipe diameter (mm)	Maximum allowable working pressure (bar)			
	Type A	Type B	Type C	Type D
	/	/	FLEX (1)	FLEX
180 to 219.1	9.2	13.7	18.5	23.5
273	7.0	12.0	13.5	18.5
323.9	5.0	9.0	10.5	15.0
355.9	5.2	9.0	10.5	13.2
406.4	5.2	7.5	10.2	12.3
508	3.2	5.5	6.5	7.5
609.6	4.5	5.5	6.2	-
711.2	4.0	4.5	5.0	-
812.8	3.2	3.5	4.5	-
1200	2.0	2.3	3.3	-

(1) With trade name "+GF+/NORMA" are manufactured couplings having outside pipe diameter from 600 to 1200 mm



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Flex Type

Temperature range depending upon sealing material:

F1 / Flex types	: EPDM	-30°C up to 125°C
F2 / Flex types	: EPDM	-20°C up to 80°C
All types	: NBR	-20°C up to 80°C

Fields of application

The couplings are acceptable for the following applications:

- 1) bilge systems except within tanks and double bottoms;
- 2) ballast systems except within cargo tanks, fuel oil or lube oil tanks/double bottoms;
- 3) fuel oil systems on open decks and within fuel oil tanks/double bottoms;
- 4) sounding, overflow and venting systems (in engine room only from water tanks and double bottoms)
- 5) cooling water systems;
- 6) compressed air systems;
- 7) steam systems (only condensate return);
- 8) main and auxiliary boilers feed systems;
- 9) cold and hot water sanitary systems;
- 10) drinkable water systems;
- 11) cargo piping (except within ballast tanks/double bottoms) and cargo vents of oil carriers;
- 12) inert gas systems;
- 13) brine systems;
- 14) fire mains and sprinkler systems.

Acceptance conditions

The gasket material must be resistant to the fluid conveyed in the pipe and also to the surrounding fluid if the coupling is installed inside a tank.

Plastic pipes and relevant arrangement are to be in compliance with Appendix 3 of Part C, Chapter 1 of RINA Rules for the Classification of ships.

Tests carried out

Type tests carried out at the manufacturer's workshop on 12, 13 and 14 November 1996 and on 6 and 7 February 1997.

Remarks

The installation on board is to be carried out in accordance with the Manufacturer's instructions.

The acceptance of the a.m. products on board ship classed with RINA is subject to the satisfactory outcome of testing as per RINA Rules applicable.

This certificate annuls and replaces the previous one issued with No. MAC/48201/7/TO/02 dated 15.8.2002.

Genoa 11/03/ 2004

