

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Pipe Couplings**

with type designation(s)
GR-S and GRF-S

Issued to

Dalian Zhuhong Mechanical Co., Ltd.
Dalian, China

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: Up to 120°C (see certificate).

Max. working press.: Up to 16 bar (see certificate).

Sizes: Pipe outer diameter from 26.9 up to 219.1 mm.

Issued at **Hamburg** on **2019-09-24**

This Certificate is valid until **2024-09-23**.

for **DNV GL**

DNV GL local station: **Dalian**

Approval Engineer: **Andrii Pishchanskyi**

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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

Pipe coupling of types GR-S and GRF-S are grip type slip-on joints. Type GR-S is non-fire resistant type, whereas type GRF-S is protected by a fire sleeve and of fire resistant type.

Pipe coupling consists of the following components:

Component	Material	
	Type GR-S	Type GRF-S
Shell		SUS304 (stainless steel) ¹⁾
Tie rod		SUS304 (stainless steel) ¹⁾
Gear ring		SUS304 (stainless steel) ¹⁾
Bridge plate		SUS304 (stainless steel) ¹⁾
Sealing sleeve		NBR
		EPDM
Bolts		SUS304 (stainless steel) ¹⁾
Intumescent fire protection seal	N.A.	Polyethylene vinyl acetate rubber (EVM)
Protection plate	N.A.	SUS304 (stainless steel) ¹⁾

Footnote

- 1) Material is not approved for use on exposed open deck as per DNVGL-RU-SHIP Pt.4, Ch.6, Sec.2, 1.1.1.

Pipe coupling sizes and nominal pressure are as follows:

Size [mm]	Pipe outer diameter [mm] ¹⁾	Nominal pressure (PN)
26.9	26.9	16
33.7	33.7	
42.4	42.4	
48.3	48.3	
60.3	60.3	
76.1	76.1	
88.9	88.9	
114.3	114.3	
133	133	12
168.3	168.3	
219.1	219.1	10

Footnote

- 1) Carbon or stainless steel pipes. For allowable deviation refer to "Product information" edition A dated 2018-06-12

Application temperature range depends on sealing sleeve material as follows:

Material	Temperature range [°C]
NBR	-20 up to +80
EPDM	-20 up to +120

Application/Limitation

Pipe coupling of types GR-S and GRF-S are type approved for classes II and III of piping systems made of carbon or stainless steel.

They are not approved for in piping system with impulse pressure load other than water hammer, e.g. pressure line of hydraulic piping system.

For applications where "fire resistant type" is required, the pipe coupling casing shall be protected by a fire sleeve.

Pipe coupling of types GR-S and GRF-S are approved for the following piping systems:

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

Footnote

- 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 located 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) Only in pump rooms and open decks - only approved fire resistant types.
- 5) May be used for pipes on deck with a design pressure of 10 bar or less.
- 6) Only above bulkhead deck of passenger ships and freeboard deck of cargo ships.

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 cargo holds and ballast tanks;
- Scuppers and overboard discharge;
- Starting and control air;
- CO₂ systems;
- Piping sections, which directly connected to sea openings or tanks containing flammable liquids, if in the event of damage they could cause fire or flooding;

- Systems containing oxygen (more than 25% by volume).
Pipe coupling installation inside tanks is permitted in case the piping system and tank contain a medium of the same nature.

Installation shall be as per maker's manual "Product information".

Type Approval documentation

Tests carried out

1. Tightness test;
2. Repeated assembly test;
3. Burst pressure test;
4. Pull-out test;
5. Vibration (endurance) test;
6. Fire resistance test;
7. Vacuum test;
8. Non-combustibility test.

Marking of product

For traceability of products, marking shall be legible and indelible. Products are to be marked at least as follows:

Marking scope	Example
Manufacturer's name	Dalian Zhuhong Mechanical Co.,Ltd
Type	GR-S-26.9
Nominal diameter	DN 20
Nominal pressure	PN 16
Sealing type	NBR
Body material	SUS304
Torque	10 – 15 <i>N · m</i>

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