

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Axial Restraining Pipe Couplings**with type designation(s)
GR-S, GR-L

Issued to

Youngnam Metal Co.,Ltd.
Gimhae-si Gyeongsangnam-do, Republic of Korea

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:** -20°C to 200°C, see certificate
Max. working press.: 12 - 20 bar, see certificate
Sizes: 40A - 200A, see certificateThis Certificate is valid until **2021-06-30**.Issued at **Høvik** on **2016-08-08**DNV GL local station: **Changwon**Approval Engineer: **Zeinab Sharifi**for **DNV GL**

Marianne Spæren Marveng
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

Axial grip type slip on-joints. Grip ring standard type (GR-S) and Grip ring long type (GR-L)

Sizes:

(GR-S): 40A, 50A, 65A, 80A, 100A, 125A, 150A and 200A

(GR-L): 40A, 50A, 65A, 80A, 100A, 125A, 150A and 200A

Materials:

Casing :	Stainless Steel, SUS304 or SUS316
Grip ring:	Stainless Steel, SUS301
Internal components:	Stainless Steel, SUS304
Rubber sleeve:	EPDM/ NBR/SILICON/VITON

Application/Limitation

The joints can be used in class II and III piping systems for the following pipelines according to DNV GL Ship Rules Pt. 4, Ch. 6, Sec. 9 Table 12:

Fittings are approved to be used in below applications:

Systems	note	Systems	note
Flammable fluids (Flash point ≤ 60 °C)		Fresh water	
1	Cargo oil lines	5	
2	Crude oil washing lines	5	
3	Vent lines	3	
Inert gas		Sanitary/Drains/Scuppers	
4	Water seal effluent lines		
5	Scrubber effluent lines		
6	Main lines	2, 5	
7	Distribution lines	5	
Flammable fluids (Flash point > 60 °C)		Sounding/ vent	
8	Cargo oil lines	5	
9	Fuel oil lines	3, 2	
10	Lubrication oil lines	2, 3	
11	Hydraulic oil	2,3	
12	Thermal oil	2,3	
21	Cooling water system		1
22	Condensate return		1
23	Non-essential system		
24	Deck drains (internal)		4
25	Sanitary drains		
26	Water tanks/Dry spaces		
27	Oil tanks (flash point > 60 °C)		2, 3
		Miscellaneous	
28	Service air (non-essential)		
30	Brine		
31	Steam		6

Limitations/notes:

- 1) Inside machinery spaces of category A - only approved fire resistant types (both types and all sizes)
- 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.
- 4) Above free board deck only.
- 5) In pump rooms and open decks – only approved fire resistant types.
- 6) May be used for pipes on deck with a design pressure of 10 bar or less.

EPDM is not to be used for fuel oil and cargo oil. NBR is not to be used for couplings intended for fire systems.

The joints made of austenitic stainless steel materials are not permitted in seawater systems.

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

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

The couplings are to be assembled and mounted according to the manufacturer's written instructions.

Working pressure-temperature limitations:

Max. working pressures depending on size		Working temperature range depending on sleeve material
GR-S/GR-L 40A	20 bar	EPDM: -20/120°C
GR-S/GR-L 50A	18 bar	NBR: -20/90°C
GR-S/GR-L 65A	18 bar	SILICON: -20/150°C
GR-S/GR-L 80A	16 bar	VITON: -20/200°C
GR-S/GR-L 100A	16 bar	
GR-S/GR-L 125A	14 bar	
GR-S/GR-L 150A	14 bar	
GR-S/GR-L 200A	12 bar	

Type Approval documentation

KOMERI test report no. 07T179 ~ 07T184, dated Sep 3, 2007 ~ Feb 15, 2008

SMBA test report no. 08-2007-01129/01148/01183/01223 dated Dec 24, 2007 ~ Jan 7, 2008

DNV witnessed test reports from Young Nam dated 2008-02-15, 2008-02-20, 2007-11-20, 2007-12-04, 2007-11-13.

Lloyd's witnessed test reports from Youngnam dated 2007-12-07, 2007-11-30, 2007-11-15, 2007-11-22
Safety Economy Eng. test report no. SE-080220-001 dated 20 Feb, 2008

Test reports dated 2007-09-03 to 2008-02-20

Drawing nos. YG-5001-1 dated 2002-07-24, YG-S-5001 dated 2002-08-16, YG-S-5001-W dated 2007-08-17,

YG-L-5001 dated 2002-08-17, YG-L-5001-W dated 2007-08-17

New drawings: dwg no. YG-5001-2, dated 2016-06-01.

Hydrostatic test report for the axial restraining pipe couplings, dated 2016-06-21.

Tests carried out

Burst, Fire, Pull-out, Vibration, Pressure Pulsation, Repeated assembly, Hydrostatic Tightness and Vacuum test.

Marking of product

For traceability to this Type Approval, each coupling is at least to be marked with:

- Manufacturer's name or trade mark
- Type designation
- Material combination
- Size
- Maximum working pressure

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform a survey – every second year and before the expiry date of this certificate – to verify that the conditions for the type approval are complied with. The Surveyor shall perform the following tasks on samples selected at random from stock or from the running production:

- Verify that the dimensions of the joints comply with Type Approved documentation
- Verify that the material composition complies with Type Approved documentation
- Witness burst testing