TYPE APPROVAL CERTIFICATE

Certificate no.:
TAP0000204
Revision No:
1

This is to certify:

that the Pipe Couplings

with type designation(s)
GR-S, GR-L

issued to
Young Nam Metal Co.,Ltd.
Gimhae-si, Gyeongsangnam-do, Korea, Republic of

is found to comply with
DNV-OS-D101 – Marine and machinery systems and equipment, Edition July 2021
DNV rules for classification – Ships Pt.4 Ch.6 Piping systems
DNV class programme DNV-CP-0185 – Type approval – Mechanical joints

Application:

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

Type:	Temperature range:	Max. working press.:	Sizes:
GR-S	-50°C to +220°C (see page 2)	5 to 20 bar (see page 2)	15A to 350A
GR-L	-50°C to +220°C (see page 2)	5 to 20 bar (see page 2)	15A to 300A

Issued at **Høvik** on **2024-12-11**

This Certificate is valid until **2029-08-12**.
DNV local unit: **Gimhae Station**

Approval Engineer: **Sarah Miller**

for **DNV**

Digitally Signed By:
Bosman van der Merwe
Location: DNV Høvik, Norway

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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.

Product description

Grip type Slip-on joints mechanical joints in two standard Grip type slip-on mechanical joints have two standards for each type designations(GR-S and GR-L) as fire resistant type with fire protection cover(FPC) and non-fire resistant type without FPC.

Material of construction:
Case : SUS304,316L
Rubber : EPDM, NBR, SILICONE, VITON
Bolt : SUS304,316L
Ring : SUS301/304
FPC : SUS304

Application/Limitation

The slip-on joints (Grip type) are approved as fire resistant couplings and are allowed for Class II and III below piping systems:

Systems	***Classification of Piping system***	***Non-fire resistant type***	***Fire resistant type***
Flammable fluids (flash point ≤ 60 °C)			
1. Cargo oil lines	dry	NP	NP
2. Crude oil washing lines	dry	NP	NP
3. Vent lines	dry	NP	NP
Inert gas			
4. Water seal effluent lines	wet	+	+
5. Scrubber effluent lines	wet	+	+
6. Main lines	dry	NP	NP
7. Distribution lines	dry	NP	NP
Flammable fluids (flash point > 60 °C)			
8. Cargo oil lines	dry	NP	NP
9. Fuel oil lines	wet	NP	+[2) 3)]
10. Lubricating oil lines	wet	NP	+[2) 3)]
11. Hydraulic oil	wet	NP	+[2) 3)]
12. Thermal oil	wet	NP	+[2) 3)]
Fresh water			
13. Cooling water system	wet	NP	+[4)]
14. Condensate return	wet	NP	+[4)]
15. Non-essential systems	dry, dry/wet, wet	+	+
Sanitary/drains/scuppers			
16. Deck drains (internal)	dry	+[5)]	+[5)]
17. Sanitary drains	dry	+	+
18. Scuppers and discharge (overboard)	dry	NP	NP
Sounding/vent			
19. Water tanks/dry spaces	dry/wet	+	+
20. Oil tanks (f.p > 60 °C)	dry	+[2) 3)]	+[2) 3)]
Miscellaneous			
21. Starting/control air	dry	NP	NP
22. Service air (non-essential)	dry	+	+
23. Brine	wet	+	+
24. CO_2 system (outside protected space)	dry	NP	NP
25. CO_2 system (inside protected space)	dry	NP	NP
26. Steam	wet	+[6)]	+[6)]

Abbreviations
+ Application permitted (with limitations, if any, as in the footnotes below)
NP Application not permitted

Footnotes
1) Not permitted when mechanical joints are installed in pump rooms and open decks.
2) Not permitted 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) Not permitted 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.

Systems	***Classification of Piping system***	***Non-fire resistant type***	***Fire resistant type***

4) Not permitted when mechanical joints are installed in machinery spaces of category A.
5) Permitted only above bulkhead deck of passenger ships and freeboard deck of cargo ships.
6) Permitted to be used for pipes on deck with a design pressure of 10 bar or less.
7) Pipe couplings made of austenitic stainless steel material grades covered by this certificate are not permitted to use in sea-water applications except for sus 316L using for flowing seawater.
8) Only pipe coupling using EPDM and NBR sealings with fire protection covers(FPC) as fire resistant types in 'wet' conditions.

Sizes	Maximum working Pressure	
	GR-S	GR-L
15A, 20A, 25A, 32A, 40A	20 bar	20 bar
50A, 65A	18 bar	18 bar
80A, 100A	16 bar	16 bar
125A, 150A	12 bar	12 bar
200A, 250A	7 bar	7 bar
300A	5 bar	5 bar
350A	5 bar	-

Design temperature range dependent on gasket material:

NBR:	-30°C to +100°C
EPDM:	-40°C to +100°C, not to be used for hydrocarbon applications.
SILICONE:	-50°C to +190°C
VITON:	-30°C to +220°C

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

Materials and material protection chosen for the specific system shall be suitable for the intended medium and environmental conditions.

For elevated temperatures, pressure reduction factors as specified in DNV-CP-0185 Sec.2 shall be followed.

Type Approval documentation

Drawing numbers: YG-0002-0, YG-0002-1, and YG-0002-2 dated 2019-05-21
Report numbers: YNQ-19TGL015, YNQ-19TGL150, YNQ-19TGL300, YNQ-19TGS015, YNQ-19TGS200, YNQ-19TGS350 dated 2019-10-11; GNTP-V19-023, GNTP-V19-024, GNTP-V19-025 and GNTP-V19-026 dated 2019-09-24
Test reports KOMERI-07T179,180,181,182,183,184
Pull-out test report SE-080220-001 dated 2002-02-20
Gasket datasheets:

- General purpose Silicone elastomer dated April 20, 2020
- Document no. 2003250001 - Data sheet for NBR dated 2020.03.25
- Data sheet – Black Viton Rubber
- Document no. 2004130001 - Data sheet for EPDM dated 2020.04.13

Tests carried out

Burst pressure test, Vibration/Impulse test, Fire test, Vacuum test, Pull-out test, Tightness test, Repeated assembly test

Marking of product

For traceability to this Type Approval each joint is to be marked with:

- Manufacturer's name or trademark
- Type designation
- Size
- Max. working pressure or pressure class

Periodical assessment

For retention of the Type Approval, a DNV Surveyor shall perform periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days) to verify that the conditions for the approval are complied with. Reference is made to DNV-CP-0338.

To check the validity of this certificate, please look it up in https://approvalfinder.dnv.com.

TYPE APPROVAL CERTIFICATE

Certificate no.:
TAP0000205
Revision No:
1

This is to certify:

that the Pipe Couplings

with type designation(s)
MF-RS & MF-RL, RCH-S & RCH-L, RCH-E & RCD-E

issued to
Young Nam Metal Co.,Ltd.
Gimhae-si, Gyeongsangnam-do, Korea, Republic of

is found to comply with
DNV rules for classification – Ships Pt.4 Ch.6 Piping systems
DNV-OS-D101 – Marine and machinery systems and equipment, Edition July 2021
DNV class programme DNV-CP-0185 – Type approval – Mechanical joints

Application:

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

Type:	Temperature range:	Max. working press.:	Sizes:
MF-RS & MF-RL	-50°C to +220°C (see page 2)	4 to 20 bar (see page 2)	15A to 500A (see page 2)
RCH-S & RCH-L	-50°C to +220°C (see page 2)	3 to 14 bar (see page 2)	15A to 500A (see page 2)
RCH-E & RCD-E	-50°C to +220°C (see page 2)	3 to 11 bar (see page 2)	15A to 500A (see page 2)

Issued at **Høvik** on **2024-12-11**

This Certificate is valid until **2029-08-12**.
DNV local unit: **Gimhae Station**

Approval Engineer: **Sarah Miller**

for **DNV**

Digitally Signed By:
Bosman van der Merwe
Location: DNV Høvik, Norway

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Product description

Six types of Slip-on joints - Slip type:

- Multi Flex Round Standard type (MF-RS) – approved fire-resistant type
- Multi Flex Round Long type (MF-RL) – approved fire-resistant type
- Repair Clamp Hinge Standard type (RCH-S)
- Repair Clamp Hinge Long type (RCH-L)
- Repair Clamp Hinge Elbow type (RCH-E)
- Repair Clamp Double Elbow type (RCD-E)

Material of construction:

FPC : SUS304
Case : SUS 304, 316L,
Rubber : EPDM, NBR, SILICONE, VITON
Bolt : SUS 304, 316L
Bar : SUS 304, 316L

Application/Limitation

Sizes	Maximum working Pressure (bar)			
	MF-RS and MF-RL	RCH-S and RCH-L	RCH-E	RCD-E
15A	20	14	11	-
20A	20	14	8	-
25A	20	14	8	-
32A	20	12	8	-
40A	20	12	8	-
50A	18	10	7	-
65A	18	10	7	-
80A	16	8	7	-
100A	16	8	7	-
125A	14	8	7	-
150A	14	8	7	-
200A	10	7	-	6
250A	10	7	-	6
300A	8	6	-	5
350A	8	6	-	5
400A	5	4	-	5
450A	5	4	-	4
500A	4	3	-	3

Design temperature range dependent on gasket material:

NBR: -30°C to +100°C
EPDM: -40°C to +100°C, not to be used for hydrocarbon applications.
SILICONE: -50°C to +190°C
VITON: -30°C to +220°C

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

The coupling types MF-RS & MF-RL are considered as approved fire-resistant types whereas the types RCH-S, RCH-L, RCH-E & RCD-E are not fire tested and therefor shall not be used in applications where fire resistance is required.

Materials and material protection chosen for the specific system shall be suitable for the intended medium and environmental conditions.

For elevated temperatures, pressure reduction factors as specified in DNV-CP-0185 Sec.2 shall be followed.

The slip-on joints (Slip type) covered by this certificate are approved to be used in below Class II and III piping systems:

Systems		***Classification of Piping system***	***Approved fire resistant type[6)]***	***Non-fire resistant type***
Flammable fluids (flash point ≤ 60 °C)				
1.	Cargo oil lines	dry	NP	NP
2.	Crude oil washing lines	dry	NP	NP
3.	Vent lines	dry	NP	NP
Inert gas				
4.	Water seal effluent lines	wet	+	NP
5.	Scrubber effluent lines	wet	+	NP
6.	Main lines	dry	NP	NP
7.	Distribution lines	dry	NP	NP
Flammable fluids (flash point > 60 °C)				
8.	Cargo oil lines	dry	NP	NP
9.	Fuel oil lines	wet	+[6)]	NP
10.	Lubricating oil lines	wet	+[6)]	NP
11.	Hydraulic oil	wet	+[6)]	NP
12.	Thermal oil	wet	+[6)]	NP
Fresh water				
13.	Cooling water system	wet	+	NP
14.	Condensate return	wet	+	NP
15.	Non-essential systems	dry, dry/wet, wet	+	+
Sanitary/drains/scuppers				
16.	Deck drains (internal)	dry	+[4)]	+[4)]
17.	Sanitary drains	dry	+	+
Sounding/vent				
18.	Water tanks/dry spaces	dry/wet	+	+
19.	Oil tanks (f.p > 60 °C)	dry	+[2) 6)]	+[2) 6)]
Miscellaneous				
20.	Service air (non-essential)	dry	+	+
21.	Brine	wet	+	+
22.	CO_2 system (outside protected space)	dry	NP	NP
23.	CO_2 system (inside protected space)	dry	NP	NP
24.	Steam	wet	+[7)]	+[7)]

Abbreviations

+ Application permitted (with limitations, if any, as in the footnotes below)
NP Application not permitted

Footnotes

1) Not permitted when mechanical joints are installed in pump rooms and open decks.
2) Not permitted 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.
3) Not permitted when mechanical joints are installed in machinery spaces of category A.
4) Permitted only above bulkhead deck of passenger ships and freeboard deck of cargo ships.
5) 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.
6) 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.
7) May be used for pipes on deck with a design pressure of 10 bar or less.
8) Only pipe coupling using EPDM and NBR sealings with fire protection covers(FPC) as fire resistant types in 'wet' conditions.

Type Approval documentation

Test report numbers: YNQ-19TML015, YNQ-19TML300, YNQ-19TML500, YNQ-19TMS015, YNQ-19TMS300 and YNQ-19TMS500 dated 2019-10-11
Drawing numbers: YM-0001-0, YM-0001-1 and YM-0001-2 dated 2019-05-21
Test reports KOMERI-07T185,186,187,188,189,190
Gasket datasheets:

- General purpose Silicone elastomer dated April 20, 2020
- Document no. 2003250001 - Data sheet for NBR dated 2020.03.25

- Data sheet – Black Viton Rubber
- Document no. 2004130001 - Data sheet for EPDM dated 2020.04.13

Drawing numbers YR-0003-0, YR-0003-1, YR-0003-2, YR-0004-0, YR-0004-1 and YR-0004-2 dated 2019.05.21
Test report numbers: YNQ-19THL015, YNQ-19THL0250 and YNQ-19THL500 witnessed by DNV dated 21-Oct-2019
Test report numbers: YNQ-19THS015, YNQ-19THS0250 and YNQ-19THS500 witnessed by DNV dated 21-Oct-2019
Test report numbers: YNQ-19THE015, YNQ-19TDE250 and YNQ-19TDE500 witnessed by DNV dated 21-Oct-2019

Tests carried out

Burst pressure test, Fire test (only for MF-RS and RL types), Vacuum test, Tightness test

Marking of product

For traceability to this Type Approval each joint is to be marked with:

- Manufacturer's name or trademark
- Type designation
- Size
- Max. working pressure or pressure class

Periodical assessment

For retention of the Type Approval, a DNV Surveyor shall perform periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days) to verify that the conditions for the approval are complied with. Reference is made to DNV-CP-0338.

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