



Confirmation of Product Type Approval

Company Name: YOUNGNAM METAL CO.,LTD

Address: 12-3, JILLYE-RO 74BEON-GILJILLYE-MYEONGIMHAE-SI GYEONGSANGNAM-DO Korea, Republic of

Product: Pipe Coupling

Model(s): MF-RS, MF-RL, GR-S, GR-L, RCH-S, RCH-L, RCH-E & RCD-E

Endorsements:

Certificate Type	Certificate Number	Issue Date	Expiry Date
Product Design Assessment (PDA)	24-0023453-PDA	07-JUN-2024	06-JUN-2029
Manufacturing Assessment (MA)	24-6245605	02-FEB-2024	19-FEB-2029
Product Quality Assurance (PQA)	NA	NA	NA

Tier

3 - Type Approved, unit certification not required

Intended Service

Classes II and III piping systems as per 4-6-2/Table 10 (Slip-on Joints) of Marine Vessels Rules. Refer to the attachment.

Description

Slip-on mechanical joints

1. Model Name

- 1.1. MF-RS (Slip Type): Multi-Flex Round Standard Type
- 1.2. MF-RL (Slip Type): Multi-Flex Round Long Type
- 1.3. GR-S (Grip Type): Grip Ring Standard Type
- 1.4. GR-L (Grip Type): Grip Ring Long Type
- 1.5. RCH-S (Slip Type): Repair Clamp Hinge Standard Type
- 1.6. RCH-L (Slip Type): Repair Clamp Hinge Long Type
- 1.7. RCH-E (Slip Type): Repair Clamp Hinge Elbow Type
- 1.8. RCD-E (Slip Type): Repair Clamp Double Elbow Type

2. Size

- 2.1. MF-RS/RS(FPC)/RL/RL(FPC):15A ~ 500A

2.2. GR-S/S(FPC): 15A ~ 350A

2.3. GR-L/L(FPC): 15A ~ 300A

2.4. RCH-S/L: 15A ~ 500A

2.5. RCH-E: 15A ~ 150A

2.6. RCD-E: 200A ~ 500A

3. Material

3.1. Case/ Bolt/ Bar Washer/ Bar Nut/ Slide Plate: SUS304/316L

3.2. Packing: EPDM, NBR, Silicon, Viton

3.3. Washer: SUS301

3.4. Grip Ring (GR-S/L only): SUS301

3.5. Insert Ring/ Wire Ring (GR-S/L only): SUS304

3.6. Fire Protection Cover (MF-RS/RL, GR-S/L only): SUS304

3.7. Hinge Pin (RCH-S/L/E only): SUS304

3.8. Hinge Plate (RCH-S/L/E only): SUS304/316L

Ratings

1. Design pressure

1.1. MF-RS/RL: 20 bar (15A ~ 40A), 18 bar (50A & 65A), 16 bar (80A & 100A), 14 bar (125A & 150A), 10 bar (200A & 250A), 8 bar (300A & 350A), 5 bar (400A & 450A), 4 bar (500A)

1.2. GR-S: 20 bar (15A ~ 40A), 18 bar (50A & 65A), 16 bar (80A & 100A), 12 bar (125A & 150A), 7 bar (200A & 250A), 5 bar (300A & 350A)

1.3. GR-L: 20 bar (15A ~ 40A), 18 bar (50A & 65A), 16 bar (80A & 100A), 12 bar (125A & 150A), 7 bar (200A & 250A), 5 bar (300A)

1.4. RCH-L/S: 14 bar (15A ~ 25A), 12 bar (32A & 40A), 10 bar (50A & 65A), 8 bar (80A ~ 150A), 7 bar (200A & 250A), 6 bar (300A & 350A), 4 bar (400A & 450A), 3 bar (500A)

1.5. RCH-E: 11 bar (15A), 8 bar (20A ~ 40A), 7 bar (50A ~ 150A)

1.6. RCD-E: 6 bar (200A ~ 250A), 5 bar (300A ~ 400A), 4 bar (450A), 3 bar (500A)

2. Design temperature

2.1. EPDM: -18 to +90 deg.C

2.2. NBR: -18 to +70 deg.C

2.3. Silicon: -18 to +250 deg.C

2.4. Viton: -18 to +230 deg.C

Service Restrictions

1. Unit Certification is not required for this product. If the manufacturer or purchaser requests an ABS Certificate for compliance with a specification or standard, the specification or standard, including inspection standards and tolerances, must be clearly defined.

2. Materials are to be suitable for intended service at the pressure-temperature ratings.
3. Application of this product and the use of each service is to comply with 4-6-2/Table 10 (Slip-on Joints) & 4-6-2/Table 11 (Grip Type & Slip Type) of Marine Vessels Rules.
4. For sea water piping systems in which sea water may be retained within the piping system in a stagnant or low flow condition (i.e., less than 1 m/sec), the following materials are not to be used for this product:
 - 4.1. 304 stainless steel
 - 4.2. 316L stainless steels with a molybdenum content of less than 2.5%
5. This product is not to be used in pipelines in cargo holds, tanks and other spaces that are not easily accessible, unless approved by ABS.
6. Application of this product inside tanks may be permitted only for the same media that is in the tanks.
7. Usage of this product as the main means of pipe connection is not permitted except for cases where compensation of axial pipe deformation is necessary.
8. This product, which in the event of damage could cause fire or flooding, is not to be used in piping sections directly connected to the vessel's side below the freeboard deck of cargo vessels or tanks containing flammable fluids.
9. This product is not to be used in areas where 8 minutes dry + 22 minutes wet and 30 minutes dry fire endurance test is required.
10. MF-RS/RL & GR-S/L may be used where approved fire resistant types are required, subject to the following
 - 10.1 Fire protection cover is fitted;
 - 10.2 Packing material is of EPDM

Comments

1. The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product.
2. Where this product is used in piping containing fluids having flash point of 60 degree C or less and piping that is routed through hazardous areas, the same is to be electrically earthed (grounded) to ensure that the resistance from any point along the subject coupling does not exceed 1 Mega ohm. Refer to 4-6-2/7.5 of the Marine Vessels Rules.
3. Slip-on joints are to be accessible for inspection.
4. Fire Endurance tests were carried out for the following models:
 - 4.1 MF-RS/RL fitted with fire protection cover (Packing: EPDM): 15A, 40A, 100A, 200A, 300A
 - 4.2 GR-S/L fitted with fire protection cover (Packing: EPDM): 15A, 40A, 100A, 200A

Notes, Drawings and Documentation

1. Drawing List
 - 1.1 YM-0001-1/1/2 (Rev.1), "Multi Flex Type Pipe Coupling" dated 21 May 2019
 - 1.2 YG-0002-0/1/2 (Rev.1), "Grip Ring Type Pipe Coupling" dated 21 May 2019
 - 1.3 YR-0003-0/1/2 (Rev.1), "Repair Clamp Type Pipe Coupling" dated 21 May 2019

1.4 YR-0004-0/1/2 (Rev.1), "Repair Clamp Type Pipe Coupling" dated 21 May 2019

1.5 YG-0005-0/1/2 (Rev.1), "Grip Ring Type Coupling (Fire Protection Cover)" dated 22 October 2019

1.6 YM-0006-0/1/2 (Rev.1), "Multi Flex Round Type Coupling (Fire Protection Cover)" dated 22 October 2019

2. Type Test Reports

2.1 Report No. "YNQ-19T-ABS" witnessed by ABS Surveyor dated 16 October 2019

2.2 Report No. "KOMERI-07T179/80/81/82/83/84/85/86/87/88/89/90 issued by Korea Marine Equipment Research Institute (KOMERI) dated 3 March 2008

2.3 Report No. " YNF-0805-04/0" witnessed by ABS Surveyor dated 20 February 2008

2.4 Report No. "08-2007-01223" issued by Chungbuk Regional Small and Medium Business Administration dated 7 January 2008

2.5 Report No. "08-2007-01183" issued by Chungbuk Regional Small and Medium Business Administration dated 4 January 2008

2.6 Report No. "08-2007-01129" issued by Chungbuk Regional Small and Medium Business Administration dated 24 December 2007

2.7 Report No. "08-2007-01148" issued by Chungbuk Regional Small and Medium Business Administration dated 28 December 2007

Term of Validity

This Product Design Assessment (PDA) Certificate remains valid until 06/Jun/2029 or until the Rules and/or Standards used in the assessment are revised or until there is a design modification warranting design reassessment (whichever occurs first).

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or previous to the effective date of the ABS Rules and standards applied at the time of PDA issuance. Use of the Product for non-ABS units is subject to agreement between the manufacturer and intended client.

ABS Rules

2024 ABS Rules for Condition of Classification 1-1-4/7.7, 1-1-A3, 1-1-A4, which covers the following:

2024 Marine Vessels Rules: 4-6-2/5.9 & 4-6-2/Table 12

International Standards

ISO 19921: 2005(E), ISO 19922: 2005(E)

EU-MED Standards

NA

National Standards

NA

Government Standards

NA

Other Standards

NA



A handwritten signature in dark ink, appearing to read "Joseph W. H.", is positioned above the corporate information.

Corporate ABS Programs
American Bureau of Shipping
Print Date and Time: 07-Jun-2024 3:03

ABS has used due diligence in the preparation of this certificate, and it represents the information on the product in the ABS Records as of the date and time the certificate is printed.

If the Rules and/or standards used in the PDA evaluation are revised or if there is a design modification (whichever occurs first), a PDA revalidation may be necessary.

The continued validity of the MA is dependent on completion of satisfactory audits as required by the ABS Rules. The validity of both PDA and MA entitles the product to receive a **Confirmation of Product Type Approval**.

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or prior to the effective date of the ABS Rules and standards applied at the time of PDA issuance. ABS makes no representations regarding Type Approval of the Product for use on vessels, MODUs or facilities built after the date of the ABS Rules used for this evaluation.

Type Approval requires Drawing Assessment, Prototype Testing and assessment of the manufacturer's quality assurance and quality control arrangements. The manufacturer is responsible to maintain compliance with all specifications applicable to the product design assessment. Unless specifically indicated in the description of the product, certification under type approval does not waive requirements for witnessed inspection or additional survey for product use on a vessel, MODU or facility intended to be ABS classed or that is presently in class with ABS.

Due to wide variety of specifications used in the products ABS has evaluated for Type Approval, it is part of our contract that; whether the standard is an ABS Rule or a non-ABS Rule, the Client has full responsibility for continued compliance with the standard.

Questions regarding the validity of ABS Rules or the need for supplemental testing or inspection of such products should, in all cases, be addressed to ABS.



Marine & Offshore

Certificate number: 09738/E0 BV

File number: ACM 135/2504/002

Product code: 2106H

This certificate is not valid when presented without the full attached schedule composed of 7 sections

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TYPE APPROVAL CERTIFICATE

This certificate is issued to

YOUNGNAM METAL CO., LTD.

Gimhae (Gyeongnam) - KOREA (REPUBLIC OF)

for the type of product

MECHANICAL JOINTS - SLIP-ON JOINTS - GRIP TYPE

GR-S (Grip Ring Type Standard)

GR-L (Grip Ring Type Long Size)

Requirements:

- BUREAU VERITAS Rules for the Classification of Steel Ships
- BUREAU VERITAS Rules for the Classification of Offshore Units

This certificate is issued to attest that Bureau Veritas Marine & Offshore did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 16 Apr 2025

For Bureau Veritas Marine & Offshore,

At BV PUSAN, on 16 Apr 2020,

Chang-Uk HONG



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with Bureau Veritas Marine & Offshore. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of Bureau Veritas Marine & Offshore available on the Internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against Bureau Veritas Marine & Offshore for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

The electronic version is available at: <http://www.veristarm.com/veristamb/jsp/viewPublicPdfTypepec.jsp?id=zqjrhakqr3>
BV Mod. Ad.E 530 June 2017

This certificate consists of 3 page(s)

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION

GR-S (Grip Ring Type Standard) ,GR-L (Grip Ring Type Long Size)

1.1 Rating

Type	Dimension (mm)	Max. Working Pressure (bar)
GR-S	DN 15 to DN 40	20
GR-L	DN 15 to DN 40	20
GR-S, GR-L	DN 50 & DN 65	18
GR-S, GR-L	DN 80 & DN 100	16
GR-S, GR-L	DN 125 & DN 150	12
GR-S, GR-L	DN 200	7
GR-S, GR-L	DN 250	7
GR-S, GR-L	DN 300	5
GR-S	DN 350	5

Temperature range : -20°C to +100°C EPDM / -20°C to +80°C NBR / -20°C to 200°C VITON / -60°C to 200°C SILICON

Nota: The maximum working pressure is not to exceed one quarter of the burst pressure at the service temperature

1.2 Materials and/or components

Body: SUS 304 / SUS 316L

Seal: EPDM , NBR, SILICONE or VITON

When other choices of materials are used per manufacturer's recommendations, the BV agreement is to be obtained.

2. DOCUMENTS AND DRAWINGS

- Dimension Sheet "GR-S and GR-L types" N°YG-0002-0 dated 21/05/2019

- Drawing "Grip Ring Standard Type - Sizes 15A to 350A" N°YG-0002-1 Rev.0 dated 21/05/2019

- Drawing "Grip Ring Long Type - Sizes 15A to 300A" N°YG-0002-2 Rev.0 dated 21/05/2019

No departure from the above documents shall be made without the prior consent of the Society. The manufacturer must inform the Society of any modification or changes to these documents and drawings.

3. TEST REPORTS

3.1 Initial test reports:

- Repeated assembly test, tightening test, burst test, vacuum test, pull-out test N° SE 08-0220-001 dated 20/02/2008 and N°YNF0805-04/0 dated 15/02/2008, vibration test dated 07/12/2007 and N° 08-2007-01223/01129/01148 dated 28/12/2008, pressure pulsation test dated 07/12/2007

- KOMERI Test report N°07T179/80/81/82/83/84 dated 03/03/2008: Tightness test, pressure pulsation test, burst pressure test, fire endurance test, vacuum test and repeated assembly test

3.2 2014 test reports:

- Tightness test, pressure pulsation test, burst test, pull-out test, fire endurance test, vacuum test and repeated assembly test report N° YNT-14T001 to N° YNT-14T006 dated 08/04/2014.

- Vibration test report N° 2014-V-003 to N° 2014-V-008 dated 03/05/2014 & 04/05/2014.

- Specimens tested: GR-L DN 40, DN 100, DN 200 & GR-S DN 40, DN 100, DN 200.

3.3 Type Approval Inspection and Test Plan 17/10/2019

3.4 2019 test reports:

- Tightness test, vibration test, pressure pulsation test, burst test, pull-out test, fire endurance test, vacuum test and repeated assembly test reports N° YNQ-19TGS015, N° YNQ-19TGS350, N° YNQ-19TGL015 and N° YNQ-19TGL300 dated 11/10/2019

Specimens tested: GR-S DN 15, GR-S DN 350, GR-L DN 015 and GR-L DN 300

4. APPLICATION / LIMITATION

4.1 May be used on board for services of class II and class III piping systems:

- **Flammable fluids (flash point ≤ 60°C)** - cargo oil (2), crude oil washing (2), vent lines

- **Inert gas** - water seal/scrubber effluent, main lines (1+2), distributions lines (2)

- **Flammable fluids (flash point > 60°C)** - cargo oil (2), fuel oil (1), lubricating oil (1), hydraulic oil (1), thermal oil lines (1)

- **Sea water** - bilge/ballast/cooling water, water/non-water filled fire extinguishing systems, fire main, tank cleaning/non-essential lines

- **Fresh water** - cooling water, condensate return, non-essential lines
- **Deck drains (internal)** (4), sanitary drains
- **Sounding and venting** - water tanks/dry spaces, oil tanks (flash point > 60°C) (1)
- **Miscellaneous** - service air (non-essential), brine, steam (3)
- (1)- *Not inside machinery spaces of category A or accommodation spaces. May be accepted in other machinery space provided the joints are located in easily visible and accessible positions.*
- (2)- *Only in pump rooms and open decks*
- (3)- *May be used for pipes on deck with a design pressure of 10 bar or less.*
- (4)- *Only above bulkhead deck of passenger ships and freeboard deck of cargo ships.*
- 4.2 Not to be used for scuppers and discharge (overboard), starting/control air and CO2 system.
- 4.3 In all cases the pipes are to be suitably supported and anchored. The joints are to be at any time accessible, excepting inside tanks where permitted by the Bureau Veritas rules.
- 4.4 The couplings can not be used on sea water or fresh water pipes passing through fuel oil or cargo tanks.
- 4.5 The material of the internal sealing sleeve is to be suitable for the proposed medium. EPDM is not to be used for hydrocarbons applications.

5. PRODUCTION SURVEY REQUIREMENTS

- 5.1 - The products are to be supplied by **YOUNGNAM METAL CO., LTD.** in compliance with the type described in this certificate.
- 5.2 - This type of product is within the category HBV of Bureau Veritas Rule Note NR320 and as such does not require a BV product certificate.
- 5.3 - **YOUNGNAM METAL CO., LTD.** has to make the necessary arrangements to have its works recognised by Bureau Veritas in compliance with the requirements of NR320 for HBV products.
- 5.4 - For information, **YOUNGNAM METAL CO., LTD.** has declared to Bureau Veritas the following production site:

YOUNGNAM METAL CO., LTD.
12-3, Jillye-ro, 74 Beon-gil, Jillye,
Gimhae (Gyeongnam),
KOREA (REPUBLIC OF)

6. MARKING OF PRODUCT

The couplings shall be marked with at least:

- Manufacturer's name
- Type designation
- Size

7. OTHERS

It is **YOUNGNAM METAL CO., LTD.**'s responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

This certificate supersedes the Type Approval Certificate N° 09738/D0 BV issued by the Society.

*** END OF CERTIFICATE ***



Marine & Offshore

Certificate number: 05755/G0 BV

File number: ACM 135/2504/001

Product code: 2107H

This certificate is not valid when presented without the full attached schedule composed of 7 sections

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TYPE APPROVAL CERTIFICATE

This certificate is issued to

YOUNGNAM METAL CO., LTD.

Gimhae (Gyeongnam) - KOREA (REPUBLIC OF)

for the type of product

MECHANICAL JOINTS - SLIP-ON JOINTS - SLIP TYPE

MF-RS, MF-RL (Multi Flex Round types)

RCH-S, RCH-L, RCH-E, RCD-E (Repair Clamps types)

Requirements:

- BUREAU VERITAS Rules for the Classification of Steel Ships
- BUREAU VERITAS Rules for the Classification of Offshore Units

This certificate is issued to attest that Bureau Veritas Marine & Offshore did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 16 Apr 2025

For Bureau Veritas Marine & Offshore,

At BV PUSAN, on 16 Apr 2020,

Chang-Uk HONG



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are compiled with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with Bureau Veritas Marine & Offshore. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of Bureau Veritas Marine & Offshore available on the Internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against Bureau Veritas Marine & Offshore for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

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BV Mod. Ad.E 530 June 2017

This certificate consists of 4 page(s)

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION

Series MF-RS (Multi Flex Round Standard Type) and MF-RL (Multi Flex Round Long Type)

Series RCH-S (Repair Clamp Hinge Standard Type), RCH-L (Repair Clamp Hinge Long Type), RCH-E (Repair Clamp Hinge Elbow Type), RCD-E (Repair Clamp Double Lock Elbow Type)

1.1 Rating

Type	Pipe OD (mm)	Max. working pressure (bar)	Type	Pipe OD (mm)	Max. working pressure (bar)
MF- RS / MF-RL	21.7	20	RCH-S / RCH-L	21.7 / 27.2 / 34.0	14
MF- RS / MF-RL	27.2	20	RCH-S / RCH-L	42.7 / 48.6	12
MF- RS / MF-RL	34.0	20	RCH-S / RCH-L	60.5 / 76.3	10
MF- RS / MF-RL	42.7	20	RCH-S / RCH-L	89.1 / 114.3 / 139.8 / 165.2	8
MF- RS / MF-RL	48.6	20	RCH-S / RCH-L	216.3 / 267.4	7
MF- RS / MF-RL	60.5	18	RCH-S / RCH-L	318.5 / 355.6	6
MF- RS / MF-RL	76.3	18	RCH-S / RCH-L	406.4 / 457.2	4
MF- RS / MF-RL	89.1	16	RCH-S / RCH-L	508.0	3
MF- RS / MF-RL	114.3	16			
MF- RS / MF-RL	139.8	14			
MF- RS / MF-RL	165.2	14	RCH-E	21.7	11
MF- RS / MF-RL	216.3	10	RCH-E	27.2 / 34.0 / 42.7 / 48.6	8
MF- RS / MF-RL	267.4	10	RCH-E	60.5 / 76.3 / 89.1 / 114.3 / 139.8 / 165.2	7
MF- RS / MF-RL	318.5	8			
MF- RS / MF-RL	355.6	8	RCD-E	216.3 / 267.4	6
MF- RS / MF-RL	406.4	5	RCD-E	318.5 / 355.6 / 406.4	5
MF- RS / MF-RL	457.2	5	RCD-E	457.2	4
MF- RS / MF-RL	508.0	4	RCD-E	508.0	3

Temperature range: -20°C to +100°C EPDM / -20°C to +80°C NBR / -20°C to 200°C VITON / -60°C to 200°C SILICON

1.2 Materials

Body: SUS 304 / SUS 316L

Seal: EPDM / NBR / VITON / SILICON

When other choices of materials are used per manufacturer's recommendations, the BV agreement is to be obtained.

2. DOCUMENTS AND DRAWINGS

- Drawing N° YM-5002-2 2013/08/19 & Drawing N° YM-S-5002-3 2013/08/19
- Drawing N° YM-S-5002-W 2002/8/16 & Drawing N° YM-L-5002-4 2013/08/19
- Drawing N° YM-L-5001-W 2002/08/16
- Dimension Sheet "RCH-S and RCH-L types" N°YR-0003-0 dated 21/05/2019
- Drawing "Repair Clamp Standard Type" N°YR-0003-1 dated 21/05/2019
- Drawing "Repair Clamp Long Type" N°YR-0003-2 dated 21/05/2019
- Dimension Sheet "RCH-E and RCD-E types" N°YR-0004-0 dated 21/05/2019
- Drawing "Repair Clamp Hinge Elbow Type" N°YR-0004-1 dated 21/05/2019
- Drawing "Repair Clamp Double Lock Elbow Type" N°YR-0004-2 dated 21/05/2019

No departure from the above documents shall be made without the prior consent of the Society. The manufacturer must inform the Society of any modification or changes to these documents and drawings.

3. TEST REPORTS

3.1 Initial test reports:

- Repeated assembly test N° YNF 0805-04/0 dated 15/02/2008 / Tightening test N° YNF 0805-04/0 dated 15/02/2008
- Burst test N° YNF 0805-04/0 dated 15/02/2008 / Vacuum test N° YNF 0805-04/0 dated 15/02/2008
- Pull-out test N° YNF 0805-04/0 dated 15/02/2008 / Vibration test dated 07/12/2007
- Pressure pulsation test dated 07/12/2007 / Vibration test N° 08-2007-01223/01129/01148 dated 28/12/2008
- Pull Out test N° SE 08-0220-001 dated 20/02/2008
- KOMERI Test report N° 07T185/86/87/88/89/90 dated 03/03/2008: Tightness test, pressure pulsation test, burst pressure test, fire endurance test: vacuum test and repeated assembly test

3.2 2014 test reports:

- Tightness test, burst test, fire endurance test and vacuum test report N° YNT-14T007 to N° YNT-14T012 dated 08/04/2014.
- Specimens tested: MF-RS DN 40, DN 100, DN 200 & MF-RL DN 40, DN 100, DN 200.

3.3 Type Approval Inspection and Test Plan 17/10/2019

3.4 2019 test reports:

- Tightness test, Burst test, Vacuum test report N° YNQ-19THS015, N° YNQ-19THS100 and N° YNQ-19THS500 dated 11/10/2019

Specimens tested: RCH-S DN 15, RCH-S DN 100, RCH-S DN 500

- Tightness test, Burst test, Vacuum test report N° YNQ-19THL015, N° YNQ-19THL100 and N° YNQ-19THL500 dated 11/10/2019

Specimens tested: RCH-L DN 15, RCH-L DN 100, RCH-L DN 500

- Tightness test, Burst test, Vacuum test report N° YNQ-19THE015 and N° YNQ-19THE100 dated 11/10/2019

Specimens tested: RCH-E DN 15 and RCH-E DN 100

- Tightness test, Burst test, Vacuum test report N° YNQ-19TDE500

Specimen tested: RCD-E DN 500

3.5 Types RCH-S, RCH-L, RCH-E and RCD-E have not been tested for fire resistance.

4. APPLICATION / LIMITATION

4.1 May be used on board for services of class II and class III piping systems:

- **Flammable fluids (flash point $\leq 60^{\circ}\text{C}$)** - cargo oil (4), crude oil washing (4), vent lines (3)
- **Inert gas** - water seal/scrubber effluent, main lines (2+4), distributions lines (4)
- **Flammable fluids (flash point $> 60^{\circ}\text{C}$)** - cargo oil (4), fuel oil (2+3), lubricating oil (2+3), hydraulic oil (2+3), thermal oil lines (2+3)
- **Sea water** - bilge/ballast/cooling water (1), water/non-water filled fire extinguishing systems (3), fire main, tank cleaning/non-essential lines
- **Fresh water** - cooling water (1), condensate return (1), non-essential lines
- **Deck drains (internal)** (6), sanitary drains
- **Sounding and venting** - water tanks/dry spaces, oil tanks (flash point $> 60^{\circ}\text{C}$) (2+3)
- **Miscellaneous** - service air (non-essential), brine, steam (5)

(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 space 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.

4.2 Not to be used for scuppers and discharge (overboard), starting/control air and CO2 system.

4.3 In all cases the pipes are to be suitably supported and anchored. The joints are to be at any time accessible, excepting inside tanks where permitted by the Bureau Veritas rules.

4.4 The couplings can not be used on sea water or fresh water pipes passing through fuel oil or cargo tanks.

4.5 The packing material must be compatible with the fluid to be conveyed and the maximum working temperature, according to the manufacturer's recommendation.

5. PRODUCTION SURVEY REQUIREMENTS

5.1 - The products are to be supplied by **YOUNGNAM METAL CO., LTD.** in compliance with the type described in this certificate.

5.2 - This type of product is within the category HBV of Bureau Veritas Rule Note NR320 and as such does not require a BV product certificate.

5.3 - **YOUNGNAM METAL CO., LTD.** has to make the necessary arrangements to have its works recognised by Bureau Veritas in compliance with the requirements of NR320 for HBV products.

5.4 - For information, **YOUNGNAM METAL CO., LTD.** has declared to Bureau Veritas the following production site:

YOUNGNAM METAL CO., LTD.
12-3, Jillye-ro, 74 Beon-gil, Jillye
Gimhae (Gyeongnam)
KOREA (REPUBLIC OF)

6. MARKING OF PRODUCT

The couplings shall be marked with:

- Manufacturer 's name
- Type designation
- Size

7. OTHERS

It is **YOUNGNAM METAL CO., LTD.**'s responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

This certificate supersedes the Type Approval Certificate N° 05755/F0 BV issued by the Society.

*** END OF CERTIFICATE ***

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**

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

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.

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



EUROPEAN UNION RECOGNISED ORGANISATION (EU RO) MUTUAL RECOGNITION TYPE APPROVAL CERTIFICATE

Certificate No:
MRP0000008

In accordance with Article 10.1 of EU Regulation 391/2009

This Certificate is issued to

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

for

Mechanical Joints

with type designation(s)

GR-S, FPC-GR-S

The product is found to comply with

EU RO Mutual Recognition Technical Requirements for Mechanical Joints

Intended service

See page 2

Type	Temperature range	Max. working press.	Sizes
GR-S	-50°C to 220°C (see page 3)	see page 3	DN15 to DN300 (see page 3)
FPC-GR-S	-30°C to 100°C (see page 3)	see page 3	DN15 to DN300 (see page 3)

This is to certify:

that the Product referred to herein has been inspected for the Manufacturer, pursuant to the relevant requirements of the European Union Recognised Organisation Mutual Recognition procedure, required by Article 10.1 of EU Regulation 391/2009, and has been found in accordance with those requirements.

This Certificate is valid until **2029-01-28**.

Issued at **Høvik** on **2024-01-29**

for **DNV**

DNV local unit: **Gimhae Station**

Approval Engineer: **Maheshraja Venkatesan**

.....
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.

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.



Form code: MRTA 201

Revision: 2022-12

www.dnv.com

Page 1 of 5

Product description

Grip type slip-on mechanical joints of two designations of same design:

- GR-S (without fire protection cover)
- FPC-GR-S (with fire protection cover)

Material of construction:

Part	Material grade
Casing	SUS 304/316L
Grip ring	SUS 301
Insert ring and wire ring	SUS 304
Slide plate	SUS 304/316L
Rubber sealing	EPDM/ NBR/ SILICONE/ VITON
Bolting	SUS 304/316L
Fire protection cover	SUS 304

Manufactured by

YOUNG NAM METAL CO., LTD.,
Gimhae-si, Gyeongsangnam-do, Republic of Korea

Application/Limitation

Couplings covered by this certificate are approved to be used in class II and III piping systems according to the latest requirements of governing rules in following applications:

Systems	Classification of Piping system	GR-S (non-fire-resistant type)	FPC-GR-S (fire resistant type) ⁸⁾
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	+	+

Systems		Classification of Piping system	GR-S (non-fire-resistant type)	FPC-GR-S (fire resistant type) ⁸⁾
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. 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. ⁸⁾ Only the FPC-GR-S type with EPDM and NBR sealings are considered as fire resistant types in 'wet' conditions.				

Pressure ratings:

Size	Type GR-S		Type FPC-GR-S	
	Model	design pressure (bar)	Model	design pressure (bar)
1/2"	GR-S 15A	20	FPC-GR-S 15A	20
3/4"	GR-S 20A	20	FPC-GR-S 20A	20
1"	GR-S 25A	20	FPC-GR-S 25A	20
1 1/4"	GR-S 32A	20	FPC-GR-S 32A	20
1 1/2"	GR-S 40A	20	FPC-GR-S 40A	20
2"	GR-S 50A	18	FPC-GR-S 50A	18
2 1/2"	GR-S 65A	18	FPC-GR-S 65A	18
3"	GR-S 80A	16	FPC-GR-S 80A	16
4"	GR-S 100A	16	FPC-GR-S 100A	16
5"	GR-S 125A	16	FPC-GR-S 125A	16
6"	GR-S 150A	16	FPC-GR-S 150A	16
8"	GR-S 200A	15	FPC-GR-S 200A	15
10"	GR-S 250A	11	FPC-GR-S 250A	11
12"	GR-S 300A	8	FPC-GR-S 300A	8

Temperature ratings:

Seal material	Design temperature range
EPDM	-30°C to +100°C
NBR	-20°C to +80°C
VITON	-30°C to +220°C
SILICONE	-50°C to +190°C

Materials chosen for the specific system shall be suitable for the intended medium and environmental conditions. Couplings with EPDM sealings shall not be used in hydrocarbon applications.

At elevated temperatures, the maximum working pressure should be reduced with the following factors:

Temperature (°C)	20	50	100	120	150	200	220
Stainless Steel	1	0.95	0.85	0.81	0.77	0.71	0.69

The approval is only valid when the couplings are assembled with tubing of correct temperature and tolerances as recommended by the manufacturer.

Type Approval documentation

Name	Number	Date
FPC (Fire protection cover) GR-S (Grip ring standard): part list (FPC-GR-S)	YG-0007-2 Rev.0	2022.11.22
FPC (Fire protection cover) - out drawings & dimension sheet	YG-0007-3 Rev.0	2022.11.22
Grip ring type standard type coupling - out drawings & dimension sheet (GR-S)	YG-0007-0 Rev. 1	2022.08.18
GR-S (Grip ring standard): part list	YG-0007-1 Rev. 2	2023.05.11
GR-S Type Fire Protection Cover – out drawing & Dimension sheet	YG-2023-11-21-0 Rev. 1	2023.11.21
Youngnam Metal Co., Ltd. EU RO MR Type approval test reports	YNQ-22TGS150	Test date: 27-SEP-2022 to 18-NOV-2022
	YNQ-22TGS150-1	
	YNQ-22TGS300	
	YNQ-22TGS300-1	
Youngnam Metal Co., Ltd. Type approval test reports from DNV certificate TAP0000204	YNQ-19TGS015	11-Oct-2019
Vibration test report GR-s 150A	GNTP-RVT22-009	2022-11-25
Vibration test report GR-S 300A	GNTP-RVT22-010	2022-11-25
Type test reports for GR-S (40A) – Fire endurance test	YNT-14T001	April 08, 2014
Type test reports for GR-S (100A) – Fire endurance test	YNT-14T003	April 08, 2014
Datasheet: General purpose Silicone elastomer	-	April 20, 2020
Data sheet for NBR	2003250001	2020.03.25
Data sheet – Black Viton Rubber	-	-
Data sheet for EPDM	2004130001	2020.04.13

Tests carried out

Burst pressure test, Vibration test, Pressure pulsation test, Fire test in 'wet' conditions, Vacuum test, Pull-out test, Tightness test, Repeated assembly test

Marking of product

For traceability to this Type Approval each mechanical joint is to be marked at least with the following particulars:

- 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 every year to verify that the conditions for the approval are complied with. Reference is made to DNV-CP-0338.