

TYPE APPROVAL CERTIFICATE

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

with type designation(s)
Convex type, Flange adapter type

Issued to

G.S. High-Techer Co., Ltd.
Miryang-si Gyeongsangnam-do, 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.

Type:	Temperature range:	Max. working press.:	Sizes:
Convex type	-25°C to +125 °C (see page 2)	16 bar and 20 bar (DN300, DN450 and DN500)	DN 65 to DN 800 (see page 2)
Flange adapter type	-25°C to +125 °C (see page 2)	16 bar	DN 65 to DN 800 (see page 2)

Issued at **Høvik** on **2017-11-27**

This Certificate is valid until **2021-12-31**.

for **DNV GL**

DNV GL local station: **Busan**

Approval Engineer: **Maheshraja Venkatesan**

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Marianne 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

Two types of Slip type Slip-on joints: Convex and Flange adapter type

Materials:

Middle ring and Follower : FCD450, SUS304, SUS316 or SC410

Gasket : NBR, Viton, TEFLON

Bolt and Nut : SS400, SUS304 or SUS316

FCD450 shall not be used for design temperatures below 0 °C.

Application/Limitation

Maximum working pressure:

Type & sizes	Maximum working pressure, in bar
Convex type: 65A, 80A, 100A, 125A, 150A, 200A, 250A, 300A, 350A, 400A, 450A, 500A, 550A, 600A, 650A, 700A, 750A & 800A	16
Convex type: 300A, 450A & 500A	20
Flange adapter type: 65A, 80A, 100A, 125A, 150A, 200A, 250A, 300A, 350A, 400A, 450A, 500A, 550A, 600A, 650A, 700A, 750A & 800A	16

Couplings covered under this certificate are approved to be used in Class II and III applications for the following systems but however, in all cases, acceptance of the joint type shall be subject to approval for the intended application, and subject to conditions of the approval and applicable rules:

- a. Flammable fluids (flash point $\leq 60^{\circ}\text{C}$)
 - Cargo oil lines⁽⁴⁾
 - Crude oil washing lines⁽⁴⁾
 - Vent lines⁽³⁾
- b. Inert gas
 - Water seal effluent lines
 - Scrubber effluent lines
 - Main lines ^{(2), (4)}
 - Distributions lines ⁽⁴⁾
- c. Flammable fluids (flash point $> 60^{\circ}\text{C}$)
 - Cargo oil lines⁽⁴⁾
 - Fuel oil lines^{(2),(3)}
 - Lubricating oil lines^{(2),(3)}
 - Hydraulic oil^{(2),(3)}
 - Thermal oil^{(2),(3)}
- d. Sea water
 - Bilge lines⁽¹⁾
 - Water filled fire extinguishing systems, e.g. sprinkler systems⁽³⁾
 - Non water filled fire extinguishing systems, e.g. foam, drencher systems⁽³⁾
 - Fire main (not permanently filled)⁽³⁾
 - Ballast system⁽¹⁾
 - Cooling water system⁽¹⁾
 - Tank cleaning services
 - Non-essential systems
- e. Sanitary/drains/scuppers
 - Deck drains (internal) ⁽⁶⁾
 - Sanitary drains
- f. Fresh water
 - Cooling water system ⁽¹⁾
 - Condensate return ⁽¹⁾
 - Non-essential system

- g. Sounding/vent
- Water tanks/Dry spaces
 - Oil tanks (f.p. > 60°C) ^{(2), (3)}
- h. 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 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*. Couplings with O-ring sealing shall not be considered as fire resistant.
- 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.
- * Convex & flange adapter type with maximum working pressure 16 bar are considered as fire resistant types

Each coupling is to be hydraulic pressure tested at 1.5 times of maximum working pressure.

Elongation of Nodular cast iron(FCD450) shall be minimum 12% as required by DNV GL-RU-SHIPS Pt.4 Ch.6 Sec.2 [1.5].

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

Slip-on joints shall not be used in pipelines in cargo holds, tanks, and other spaces which are not easily accessible. Application of these joints inside tanks may be permitted only for the same media that is in the tanks.

The use of slip type slip-on joints as a means of pipe connection is not permitted except for cases where compensation of axial pipe deformation is necessary.

Type Approval documentation

Tests carried out

Tightness, Burst pressure, Fire resistance and Vacuum test

Marking of product

For traceability to this Type Approval the products are to be marked with:

- Manufacturer's name or trade mark
- Type designation
- Size

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 approval are complied with. Reference is made to DNVGL-CP-0338.

Renewal assessment

For renewal of this certificate (as described in DNVGL-CP-0338), burst pressure tests shall be witnessed on a sample selected from stock or running production.