

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Pipe Couplings, Bite and Compression Type

with type designation(s)
Twin Ferrule Compression Coupling (Brand Name : Iy-Lok)

Issued to
Ihsung Tech Co., Ltd.
Gyeonggi-do, Republic of Korea

is found to comply with
DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition January 2018
DNV GL class programme DNVGL-CP-0185 – Type approval – Mechanical joints

Application :

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

Temperature range: -20°C to +300°C
Max. working press.: 200 bar
Sizes: 1/8"to 1"

Issued at **Høvik** on **2019-02-28**

for **DNV GL**

This Certificate is valid until **2023-12-31**.

DNV GL local station: **Seoul**

Approval Engineer: **Adel Samiei**

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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.



Job Id: **262.1-000388-4**
 Certificate No: **TAP0000022**
 Revision No: **1**

Product description

Twin Ferrule Compression Coupling type Iy-lok: IUE-2, IUE-4, IUE-6, IUE-8, IUE-12 & IUE-16

Materials:

- Barstock: Stainless steel ASTM A479, ASTM A276 Type 316.
- Forging: Stainless steel ASTM A182 F316.

Configurations:

Male Connector, Thermocouple Male Connector, Male Gauge Connector, Male Connector (for Metal Gasket), Male Elbow, Male Branch Tee, Male Run Tee, Male Adaptor, 45° Male Elbow, Bulkhead Male Connector, Bulkhead Female Connector, Female Connector, Gauge Connector, Female Elbow, Female Branch Tee, Female Run Tee, Female Adaptor, Union, Reducing Union, Bulkhead Union, Union Elbow, Union Tee, Union Cross, An Union, An Bulkhead Union, An Adaptor, SAE/MS Male Connector, SAE/MS Male Elbow, SAE/MS 45 Male Elbow, SAE/MS Male Branch Tee, SAE/MSA Male Run Tee, O-Seal Straight Thread Connector, O-Seal Pipe Thread Connector, Reducer, Bulkhead Reducer, Male Pipe Weld Connector, Male Pipe Weld Elbow, Tube Socket Weld Connector, Tube Socket Weld Elbow, Port Connector, Reducing Port Connector, Cap, Plug, Tube Insert, Tube Adaptor

Size	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Pipe O.D. (mm)	3.175	6.35	9.52	12.7	19.05	25.4
Pipe Thickness (mm)	0.71	1.22	1.65	1.24	2.41	2.41

Application/Limitation

Couplings covered by this certificate may be installed on piping class system classes I,II and III and below applications:

<p>1) Flammable fluids (flash point ≤ 60°C)</p> <ul style="list-style-type: none"> - Cargo oil lines ⁽²⁾ - Crude oil washing lines ⁽²⁾ - Vent lines <p>2) Inert gas</p> <ul style="list-style-type: none"> - Water seal effluent lines - Scrubber effluent lines - Main lines ⁽²⁾ - Distributions lines ⁽²⁾ <p>3) Flammable fluids (flash point > 60°C)</p> <ul style="list-style-type: none"> - Cargo oil lines ⁽²⁾ - Fuel oil lines ⁽¹⁾ - Lubricating oil lines ⁽¹⁾ - Hydraulic oil ⁽¹⁾ - Thermal oil ⁽¹⁾ - 	<p>4) Fresh water</p> <ul style="list-style-type: none"> - Cooling water system - Condensate return - Non-essential system <p>5) Sanitary/drains/scuppers</p> <ul style="list-style-type: none"> - Deck drains (internal) ⁽³⁾ - Sanitary drains <p>6) Sounding/vent</p> <ul style="list-style-type: none"> - Water tanks/dry spaces - Oil tanks (f.p. > 60°C) ⁽¹⁾ <p>7) Miscellaneous</p> <ul style="list-style-type: none"> - Service air (non-essential) - Brine - Steam
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(1) 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.

(2) Only in pump rooms and open decks - only approved fire resistant types.

(3) Only above bulkhead deck of passenger ships and freeboard deck of cargo ships.

The maximum pressure for which the mechanical joints will be type approved is defined as maximum allowable pressure for continuous service at +20°C. For elevated temperatures the maximum allowable pressure have to be reduced according to Pressure reduction factors in the below table:

Temperature	20°C	50°C	100°C	120°C	150°C	200°C	250°C	300°C
Reduction Factor	1	0.95	0.85	0.82	0.77	0.71	0.67	0.63

Threaded joints where pressure-tight joints are made on the threads with parallel or tapered threads, are not allowed for piping systems conveying toxic or flammable media or services where fatigue, severe erosion or crevice corrosion is expected to occur.

Threaded joints in CO₂ systems are only allowed inside protected spaces and in CO₂ cylinder rooms.

For other applications, these threaded joints are only be allowed for:

- a) with tapered thread :
 - class I, outside diameter not more than 33.7 mm

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- class II and class III, outside diameter not more than 60.3 mm.
- b) with parallel thread
- only class III, outside diameter not more than 60.3 mm.

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

Type Approval documentation

Drawings enclosed with letter dated 2010-02-02 from DNV Seoul.

Manufacturer's catalogues enclosed with letter dated 2010-02-02 from DNV Seoul.

Test reports: 20091008-01, -02, -03 / 08-2009-00857/ 08-2009-00858 / 08-2009-00837 / 08-2009-00836 / 200100416-01.

Tightness test report no. 20141020-1 dated 2014-10-20 witnessed by DNV GL Seoul station

Repeated assembly test report no. 20141020-2 dated 2014-10-20 witnessed by DNV GL Seoul local station

Burst test report no. 20141020-3 dated 2014-10-20 witnessed by DNV GL Seoul local station

Pull-out report no. 20141020-4 dated 2014-10-20 witnessed by DNV GL Seoul local station

Report no. 14-056836-01-1/2/3/4 (Pull-out test) dated 2014-11-24 witnessed by DNV GL Seoul local station done by Korea Testing Laboratory (kti)

Report no. 14-053646-01-2 (Vibration & pressure pulsation test) dated 2014-11-28 witnessed by DNV GL Seoul local station done by Korea Testing Laboratory (kti)

Tests carried out

Leakage, repeated assembly, burst, vibration & pressure pulsation, pull-out

Marking of product

For traceability to this type approval, each coupling is at least to be marked with:

- Manufacturer's 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.