

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Pipe Couplings, Bite and Compression Type**with type designation(s)
Hy-Lok Tube Fittings

Issued to

Hy-Lok Corporation (Kangseo Factory)
Busan, Republic of Korea

is found to comply with

DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
DNV GL rules for classification – Ships Pt.5 Ch.7 Liquefied gas tankers**Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.****Temperature range:** See certificate
Max. working press.: 76 to 953 bar - size dependent
Sizes: 1/8" to 1" imperial / 3 to 25 mm metric.This Certificate is valid until **2020-12-31**.Issued at **Høvik** on **2016-04-22**DNV GL local station: **Pusan**for **DNV GL**Approval Engineer: **Adel Samiei**

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

Bite and compression type tube fittings
Type designation: Hy-Lok Tube Fittings
Design: Double ferrule bite and compression type tube fittings.

Materials:

- Brass ASTM B16 or B124
- Stainless Steel ASTM A479 Type 316 or A182 F316

Application/Limitation

Fittings are approved to be used in below applications:

- Flammable fluids (flash point >60°C)
 - Cargo oil lines - Crude oil washing lines ⁽¹⁾
 - Vent lines ⁽²⁾
- Inert gas
 - Water seal effluent lines - Scrubber effluent lines
 - Main lines ^{(1) (3)}
 - Distributions lines ⁽¹⁾
- Flammable fluids (flash point >60°C)
 - Cargo oil lines ⁽¹⁾
 - Fuel oil lines - Lubricating oil lines - Hydraulic oil - Thermal oil ^{(2) (3)}
- Seawater ⁽⁴⁾
 - Bilge lines - Ballast system - Cooling water system ⁽⁵⁾
 - Fire main and water spray - Foam system - Sprinkler system ⁽²⁾
 - Tank cleaning services - Non-essential systems
- Fresh water
 - Cooling water system - Condensate return ⁽⁵⁾
 - Non-essential system
- Sanitary/drains/scuppers
 - Deck drains (internal) ⁽⁵⁾
 - Sanitary drains - Scuppers and discharge (overboard)
- Sounding/vent
 - Water tanks/Dry spaces
 - Oil tanks (flash point > 60°C) ^{(2) (3)}
- Miscellaneous
 - Starting/Control air - CO2 system ⁽⁵⁾
 - Service air (non-essential) - Brine - Steam

⁽¹⁾ In pump rooms and open decks / Just types without o-ring

⁽²⁾ Just types without o-ring

⁽³⁾ 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.

⁽⁴⁾ Just Brass couplings

⁽⁵⁾ Inside machinery spaces of category A / Just types without o-ring

Couplings used for LNG/LPG may only be used for accessory lines and instrumentation lines with external diameters of 25 mm and less. (Reference is made to DNV GL ship Rules Pt.5 Ch.7 Sec.5 [8.2.1] point 3)

Couplings covered by this type approval certificate shall not be installed in piping systems subject to pressure below atmospheric.

Temperature range:

- Brass - 54°C to + 204°C
- Stainless steel - 196°C to + 649°C
- Couplings with O-ring seal - 20°C to + 100°C

Job Id: **262.1-003931-6**
Certificate No: **TAP00000A3**

Allowable working pressure (bar)		
Sizes (inch)	Stainless Steel	Brass
1/8	886	225
1/4	820	194
-	-	-
3/8	527	153
1/2	503	123
5/8	474	119
3/4	434	103
7/8	366	87
1	352	76

Allowable working pressure (bar)		
Sizes (mm)	Stainless Steel	Brass
3	953	253
6	795	198
8	645	185
10	504	144
12	504	118
15	456	118
20	415	93
-	-	-
25	362	93

Maximum allowable working pressure of stainless steel couplings at elevated temperatures shall be reduced with a reduction factor equal to ratio of allowable stress at elevated temperature to allowable stress at room temperature. (Refernce to ASME B31.3 Table A-1)

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

These couplings shall not be used on tubes in cold fabricated (hard temper) conditions.

Used material shall be delivered with material certificate in accordance with DNV GL ship rules Pt.5 Ch.7 Sec.1 Table 8 (for LNG/LPG applications) and DNV GL ship rules Pt.4 Ch.6 Sec. 2 Table 3 (for other applications as listed in page 2).

Product certificate is not required.

Type Approval documentation

- Test reports received with DNV-Pusan's letters dated 14.Jan. 1995.
- Manufacturer's catalogue Hy-Lok Tube Fittings no. H-200TF, Jan. 2014
- Test report TR-DNV-HYLOK POT-071211, DNV witnessed 2007-12-11
- Burst pressure test, report No. TR-DNV-HYLOK-BPT-111130-1, DNV witnessed 2011-11-30

Tests carried out

Leakage, repeated assembly, burst, vibration, pressure pulsation and pull out test.

Marking of product

For traceability to this type approval the couplings are to be marked with:

- Manufacturer's name or trademark
- Type designation
- Size

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.