

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Pipe Couplings, Bite and Compression Type**with type designation(s)
S-LOK

Issued to

Hansun Engineering Co., Ltd.
Busan, Republic of Korea

is found to comply with

DNV GL class programme DNVGL-CP-0185 – Type approval – Mechanical joints**DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems****DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition January 2018****Application :****Products approved by this certificate are accepted for installation on vessels classed by DNV GL.****Temperature range:** -60°C to +550°C**Max. working press.:** 1500 psi to 10,900 psi**Sizes:** 1/8" to 1 1/2"Issued at **Høvik** on **2020-08-31**This Certificate is valid until **2023-06-30**.DNV GL local station: **Gimhae Station**for **DNV GL**Approval Engineer: **Adel Samiei**

Zeinab Sharifi
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: **262.1-016384-3**
Certificate No: **TAP00001JO**

Product description

Bite and compression type tube fittings of type S-LOK. O-ring on ends of some types.

Materials:

Part	Carbon Steel	Stainless Steel	Brass
Bar stock Bodies	S20C-S48C	ASTM A276 ASTM A479 JIS G4303	ASTM B16 Alloy360 ASTM B435 Alloy345 JIS H3250 Alloy C3604
Forging	S20C-S48C	ASTM A182 F316 JIS G3214	ASTM B124 Alloy 377 JIS H3250 Alloy C3771
Tubing	ASTM A161 ASTM A179 DIN 2391	ASTM A213 ASTM A249 ASTM A269	ASTM B68 ASTM B75 ASTM B88 DIN 1786
Sealing	FKM, PTFE (Teflon), NBR		

Application/Limitation

Couplings covered by this certificate are only to be used in piping classes I, II and III in below applications: (couplings without non-metallic sealings shall be considered fire resistant type)

1) Flammable fluids (flash point $\leq 60^{\circ}\text{C}$) - Cargo oil lines ⁽³⁾ - Crude oil washing lines ⁽³⁾ - Vent lines ⁽²⁾ 2) Inert gas - Water seal effluent lines - Scrubber effluent lines - Main lines ⁽³⁾ - Distributions lines ⁽³⁾ 3) Flammable fluids (flash point $> 60^{\circ}\text{C}$) - Cargo oil lines ⁽³⁾ - Fuel oil lines ⁽²⁾ - Lubricating oil lines ⁽²⁾ - Hydraulic oil ⁽²⁾ - Thermal oil ⁽²⁾ 4) Fresh water - Cooling water system ⁽¹⁾ - Condensate return ⁽¹⁾ - Non-essential system 5) Sanitary/drains/scuppers - Deck drains (internal) ⁽⁴⁾ - Sanitary drains	6) Sea water ⁽⁵⁾ - Bilge lines ⁽¹⁾ - Water filled fire extinguishing systems, e.g. sprinkler systems ⁽²⁾ - Non water filled fire extinguishing systems, e.g. foam, drencher systems ⁽²⁾ - Fire main (not permanently filled) ⁽²⁾ - Ballast system ⁽¹⁾ - Cooling water system ⁽¹⁾ - Tank cleaning services - Non-essential systems 7) Sounding/vent - Water tanks/dry spaces - Oil tanks (f.p. $> 60^{\circ}\text{C}$) ⁽²⁾ 8) Miscellaneous - Starting/control air ⁽¹⁾ - Service air (non-essential) - Brine - CO₂ system ⁽¹⁾ - Steam
(1) Inside machinery spaces of category A - only approved fire-resistant types. (2) 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. (3) Only in pump rooms and open decks - only approved fire-resistant types. (4) Only above bulkhead deck of passenger ships and freeboard deck of cargo ships. (5) Only brass couplings are allowed to be used in seawater applications	

Temperature range is dependent to the used material as below:

Material	Temperature Range	Material	Temperature range
Carbon Steel	-40°C to +120°C	FKM	-20°C up to +180°C
Brass	-54°C to +204°C	NBR	-23°C up to +120°C
Stainless Steel	-60°C to +550°C	PTFE	-60°C up to +240°C

Sizes	Maximum Working pressure (psi)
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(inch)	Carbon Steel	Stainless Steel	Brass
1/8	10,900	10,900	3,400
3/16	10,200	10,200	3,400
1/4	10,200	10,200	3,500
5/16	8,000	8,000	2,700
3/8	6,500	6,500	2,200
1/2	6,700	6,700	2,200
5/8	6,000	6,000	1,900
3/4	5,800	5,800	1,800
7/8	4,800	4,800	1,500
1	4,700	4,700	1,500
1 1/4	4,900	4,900	1,500
1 1/2	4,900	4,900	1,500

For couplings at elevated temperatures, the maximum working pressure shall be reduced with the following factors:

Temperature °C	≤20	50	100	120	150	200	250	300	350	400	450	500	550
Carbon Steel	1	1	1	0.94	-	-	-	-	-	-	-	-	-
Stainless Steel	1	0.95	0.85	-	0.77	0.71	0.67	0.63	0.60	0.58	0.57	0.56	0.55
Brass	1	0.90	0.80	-	0.75	0.65	-	-	-	-	-	-	-

Threaded connections where pressure-tight joints are made on the threads with parallel or tapered threads shall not be used for piping systems conveying toxic or flammable media or services where fatigue, severe erosion or crevice corrosion is expected to occur. For other applications threaded connections with pressure-tight joints on threads may be used for outside diameters:

- In CO2 systems shall be allowed only inside protected spaces and in CO2 cylinder rooms
- Threaded joints with tapered thread shall be allowed for:
 - o class I, outside diameter not more than 33.7 mm
 - o class II and class III, outside diameter not more than 60.3 mm
- Threaded joints with parallel thread shall be allowed for 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. These couplings should not be used on tubes in cold fabricated (hard temper) conditions.

Couplings covered by this certificate shall not be used in systems subject to pressure below atmospheric or vacuum conditions.

Type Approval documentation

Tests carried out

Tightness test, repeated assembly test, burst pressure test, pull-out test, vibration endurance test, and pressure pulsation test.

Marking of product

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

- Manufacturer's name:
- 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



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