



TYPE APPROVAL CERTIFICATE

Certificate No:
TAP00001J0
Revision No:
1

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, 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 :

Products approved by this certificate are accepted for installation on vessels classed by DNV.

Temperature range: -55°C to +550°C (see page 3)
Max. working press.: 1500 PSI up to 10900 PSI (size dependant, see page 3)
Sizes: 1/8" to 1-1/2" (see page 3)

Issued at **Høvik** on **2023-12-07**

for **DNV**

This Certificate is valid until **2028-06-30**.

DNV local unit: **Gimhae Station**

Approval Engineer: **Maheshraja Venkatesan**

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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.

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

Bite and compression type tube fittings of type S-LOK (with or without O-ring sealings) comprising of following material of construction:

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 approved to be used in class I, II, and III piping systems according to the latest requirements of governing rules in following applications:

Systems	Classification of Piping system	Without O-ring (Approved fire-resistant type)	With O-ring
Flammable fluids (flash point ≤ 60 °C)			
1. Cargo oil lines	dry	+	+1)
2. Crude oil washing lines	dry	+	+1)
3. Vent lines	dry	+	+2)
Inert gas			
4. Water seal effluent lines	wet	+	NP
5. Scrubber effluent lines	wet	+	NP
6. Main lines	dry	+	+1)
7. Distribution lines	dry	+	+1)
Flammable fluids (flash point > 60 °C)			
8. Cargo oil lines	dry	+	+1)
9. Fuel oil lines	wet	+	NP
10. Lubricating oil lines	wet	+	+2)
11. Hydraulic oil	wet	+	+2)
12. Thermal oil	wet	+	+2)
Sea water 5)			
13. Bilge lines	dry/wet	+	+3)
14. Water filled fire extinguishing systems, e.g. sprinkler systems	wet	+	+2)
15. Non water filled fire extinguishing systems, e.g. foam, drencher systems	dry/wet	+	+2)
16. Fire main (not permanently filled)	dry/wet	+	+2)
17. Ballast system	wet	+	+3)
18. Cooling water system	wet	+	+3)
19. Tank cleaning services	dry	+	+
20. Non-essential systems	dry, dry/wet, wet	+	+
Fresh water			
21. Cooling water system	wet	+	+3)
22. Condensate return	wet	+	+3)
23. Non-essential systems	dry, dry/wet, wet	+	+
Sanitary/drains/scuppers			
24. Deck drains (internal)	dry	+	+4)
25. Sanitary drains	dry	+	+
26. Scuppers and discharge (overboard)	dry	+	+
Sounding/vent			
27. Water tanks/dry spaces	dry/wet	+	+

Systems		Classification of Piping system	Without O-ring (Approved fire-resistant type)	With O-ring
28.	Oil tanks (f.p > 60 °C)	dry	+	+2)
Miscellaneous				
29.	Starting/control air	dry	+	+3)
30.	Service air (non essential)	dry	+	+
31.	Brine	wet	+	+
32.	CO ₂ system (outside protected space)	dry	+	NP
33.	CO ₂ system (inside protected space)	dry	+	NP
34.	Steam	wet	+	+
Abbreviations				
+ Application permitted				
NP Application not permitted				
Footnotes				
1) Not permitted 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 in machinery spaces of category A.				
4) Permitted 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
Carbon Steel	-40°C to +120°C
Brass	-54°C to +204°C
Stainless Steel	-55°C to +550°C

Material	Temperature range
FKM	-20°C up to +180°C
NBR	-23°C up to +120°C
PTFE	-55°C up to +240°C

Sizes and maximum working pressure values:

Sizes (inch)	Maximum Working pressure (PSI)		
	Carbon Steel	Stainless Steel	Brass
1/8	10900	10900	3400
3/16	10200	10200	3400
1/4	10200	10200	3500
5/16	8000	8000	2700
3/8	6500	6500	2200
1/2	6700	6700	2200
5/8	6000	6000	1900
3/4	5800	5800	1800
7/8	4800	4800	1500
1	4700	4700	1500
1 1/4	4900	4900	1500
1 1/2	4900	4900	1500

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	0.87	0.72	-	0.65	0.59	0.55	0.51	0.48	0.46	0.45	0.44	0.43
Brass	1	0.90	0.80	-	0.75	0.65	-	-	-	-	-	-	-

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

Materials chosen for the specific system shall be suitable for the intended medium and environmental conditions.

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 class I systems only when the outside diameter is not more than 33.7 mm
- Threaded joints with parallel thread shall be allowed only for class III systems.

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.

Type Approval documentation

Manufacturer's product catalogues HanSun Engineering Co., Ltd Catalogue_S_LOK_201207

Manufacturer's test reports Nos:

Tightness test: HSET-DNV-1304-001, HSET-DNV-1305-001, HSET-DNV-1306-001, HSET-DNV-1911-001, HSET-DNV-1912-001, HSET-DNV-1912-010

Repeated assembly test: HSET-DNV-1304-004, HSET-DNV-1305-004, HSET-DNV-1306-004, HSET-DNV-1911-004, HSET-DNV-1912-004, HSET-DNV-1912-013

Burst pressure test: HSET-DNV-1304-007, HSET-DNV-1305-007, HSET-DNV-1306-007, HSET-DNV-1911-007, HSET-DNV-1912-007, HSET-DNV-1912-016

Pull-out Test: HSET-DNV-1304-013, HSET-DNV-1305-013, HSET-DNV-1306-013, HSET-DNV-2001-001, HSET-DNV-2001-004, HSET-DNV-2001-007

Vibration endurance & pressure pulsation test: HSET-DNV-1304-010, HSET-DNV-1305-010, HSET-DNV-1306-010, HSET-DNV-2001-010, HSET-DNV-2001-012, HSET-DNV-2002-001

Renewal burst pressure test report nos. HSET-DNV-2309-001, HSET-DNV-2309-002 and HSET-DNV-2309-003 witnessed by DNV dated 10/12/2023

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 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.