



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. **P-14723**

This is to certify that the
Pipe Couplings, Bite and Compression Type

with type designation(s)
S-LOK Type Tube Fittings

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

is found to comply with
Offshore Standard DNV-OS-D101, Marine and Machinery Systems and Equipment
Det Norske Veritas' Standards for Certification 2.9 No. 5-792.20
Det Norske Veritas' Rules for Classification of Ships

Application

The couplings may be used in the following systems: Hydraulic, compressed air, fuel oil (not high pressure injection systems), lubrication oil, fresh water cooling and sanitary.

Temperature range: -60°C to +600°C (see cert.)
Max. working press.: 1500 psi to 10,900 psi (see cert.)
Sizes: For tubes 1/8" to 1 1/2"

This Certificate is valid until **2018-06-30**.

Issued at **Høvik** on **2014-03-12**

DNV local station: **Pusan**

for **Det Norske Veritas AS**

Approval Engineer: **Tom Berg-Nielsen**

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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.

If any person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In this provision "Det Norske Veritas" shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.

Product description

Bite and compression type tube fittings for S-LOK

Materials:

		Bar Stock	Forging	Tubing
Fitting materials	Carbon Steel	JIS G4051 S20C-S48C	JIS G4051 S20C-S48C	ASTM A161, ASTM A179 DIN 2391
	Brass	ASTM B16 Alloy360 ASTM B435 Alloy345 JIS H3250 Alloy C3604	ASTM B124 Alloy 377 JIS H3250 Alloy C3771	ASTM B68, ASTM B75 ASTM B88, DIN 1786
	Stainless Steel	ASTM A276, ASTM A479 JIS G4303	ASTM A182 F316, JIS G3214	ASTM A213, ASTM A249, ASTM A269
	Alloy 400	ASTM B164	ASTM B164	ASTM B165

Types and design:

Type description	Fitting designation
Tube to Tube Union	SU, SL, SUR, ST, SX, SUB
Tube to Male Pipe	SMC-N/R/G, SMCT, SOM, SMCB, SLBM, SLM, STRM, STBM
Tube to Female Pipe	SCF, SCG, SCBF, SLF, STRF, STBF
Stub Tube Connector	SR, SAB, SAM, SAF, SCP, SCRP
Tube to AN Tube	SUA, SUBA, SAA
Tube to SAE O-ring Seal	SMCS, SLS, SLBS, STRS, STBS, SCOS, SCOP
Tube to Weld End	SCW, SLW, SCSW, SLSW
Plug and Cap	SP, SC
Tube Insert	SI
Nut	SN
Front Ferrule	SFF
Back Ferrule	SFB
Ferrule Set	SFS

Application/Limitation

Max working pressure and sizes:

Sizes (inch)	Allowable Working pressure (psi)		
	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

Max working temperature for couplings of the following materials:

Carbon Steel	-40°C to +120°C
Brass	-54°C to +204°C
Stainless Steel	-60°C to +600°C

At elevated temperatures the pressure will have to be derated according to the below table.

Temperature, °C	Carbon Steel	Stainless Steel	Brass
20	1,00	1,00	1,00
50	1,00	0,95	0,90
100	1,00	0,85	0,80
120	0,94	0,77	0,75
175	N/A	0,71	0,65
250	N/A	0,67	N/A
300	N/A	0,63	N/A
350	N/A	0,60	N/A
400	N/A	0,58	N/A
450	N/A	0,57	N/A
500	N/A	0,56	N/A
550	N/A	0,55	N/A
600	N/A	0,50	N/A

Carbon steel couplings are not allowed for seawater.

Couplings made of mild steel may only be used at temperatures below -10 °C when the materials are normalised.

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

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

The wall thickness and material of the tubes to be in accordance with the current Rules of Det Norske Veritas.

Type Approval documentation

Manufacturer's product catalogues: Hansun Tube Fitting for S-LOK (HanSun Engineering Co., Ltd Catalogue_S_LOK_201207)

Manufacturer's test reports Nos:

- Tightness and leakage test: HSET-DNV-1304-001, HSET-DNV-1305-001, HSET-DNV-1306-001
- Repeated Assembly test: HSET-DNV-1304-004, HSET-DNV-1305-004, HSET-DNV-1306-004
- Bursting Pressure Test: HSET-DNV-1304-007, HSET-DNV-1305-007, HSET-DNV-1306-007
- Vibration&Pressure Pulsation Test: HSET-DNV-1304-010, HSET-DNV-1305-010, HSET-DNV-1306-010
- Pull-out Test: HSET-DNV-1304-013, HSET-DNV-1305-013, HSET-DNV-1306-013

DNV retention survey report dated 2013-03-20

Tests carried out

Leakage test, repeated assembly test, burst pressure test, vibration 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 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. The Surveyor shall witness burst testing of samples of couplings selected at random from stock or from the running production as a part of this survey.

END OF CERTIFICATE



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. **P-14721**

This is to certify that the
Pipe Couplings, Bite and Compression Type

with type designation(s)
Bite - JIS B 2351 Type Tube Fittings

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

is found to comply with
Det Norske Veritas' Rules for Classification of Ships
Offshore Standard DNV-OS-D101, Marine and Machinery Systems and Equipment
Det Norske Veritas' Standards for Certification 2.9 No. 5-792.20

Application

The couplings may be used in the following systems: Hydraulic, compressed air, fuel oil (not high pressure injection systems), lubrication oil, fresh water cooling and sanitary.

Temperature range: -60°C to +600 °C (see cert.)
Max. working press.: 147 - 500 bar (See cert.)
Sizes: For tubes 4 mm to 50 mm

This Certificate is valid until **2018-06-30**.

Issued at **Høvik** on **2014-03-12**

DNV local station: **Pusan**

for **Det Norske Veritas AS**

Approval Engineer: **Tom Berg-Nielsen**

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Marianne Spæren Marveng
Head of Section

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If any person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In this provision "Det Norske Veritas" shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.

Product description

Bite and compression type tube fitting for JIS B2351

Materials:

		Carbon Steel	Stainless Steel	Brass
Fitting material	Forged bodies	S20C-S48C	SUS316/L	C3771
	Bar stock Bodies	S20C-S48C	SUS316/L	C3604
	Cold Formed Nuts	S10C-S20C	-	-
	Barstock Nuts	S20C-S48C	SUS304/L, SUS316/L	C3604
	Sleeves	S10C	SUS304/L, SUS316/L	C3604

Types and design:

Type Description	Fitting Designation	Type Description	Fitting Designation
Straight Union	BU	Plug	BP
Union Elbow	BL	Nut	BN
Union Tee	BT	Sleeve	BS
Straight Bulkhead Union	BBU	Hose Male Union	BHUM
Bulkhead Elbow	BBL	Hose Female Union	BHUF
Long Male Connector	BLMC	Hose Bulkhead Male Union	BHBM
Male Connector	BMC-R/G, BOM	Hose Bulkhead Female Elbow	BHBF
Male Elbow	BLM	Hose Male Elbow	BHLM
Long Male Elbow	BLLM	Hose Female Elbow	BHLF
O-Seal Male Elbow	BOLM	Hose Bulkhead Male Elbow	BHBLM
Banjo Elbow	BSLM	Hose Bulkhead Female Elbow	BHBLF
Male Branch Tee	BBTM	Welding Connector	BCW
Male Run Tee	BRTM	Welding Bulkhead Union	BBUW
Bulkhead Female Connector	BBFC	Adapter	BA-R
Female Connector	BFC	Adapter (for Copper Gasket)	BA-G
Gauge Connector	BGC	Reducer	BR
Female Elbow	BLF	Positionable Elbow	BLA
Female Branch Tee	BBTF	Positionable Branch Tee	BBTA
Female Run Tee	BRTF	Positionable Run Tee	BRTA
Jig	BJ	Air Purge Valve (tube end)	BAP-1
Cap	BC	Air Purge Valve (thread end)	BAP-2

Application/Limitation

Max working pressures and sizes :

Sizes, inches	Allowable Working Pressure, bar		
	Carbon Steel	Stainless Steel	Brass
4 – 15	500	500	350
16 – 22	400	400	280
25 - 28	350	350	245
30 - 38	250	250	178
40 - 50	210	210	147

Max working temperature for couplings of the following materials:

Carbon Steel	-40°C to +120°C
Brass	-54°C to +204°C
Stainless Steel	-60°C to + 600°C

At elevated temperatures the pressure will have to be derated according to the below table.

Temperature, °C	Carbon Steel	Stainless Steel	Brass
20	1,00	1,00	1,00
50	1,00	0,95	0,90
100	1,00	0,85	0,80
120	0,94	0,77	0,75
175	N/A	0,71	0,65
250	N/A	0,67	N/A
300	N/A	0,63	N/A
350	N/A	0,60	N/A
400	N/A	0,58	N/A
450	N/A	0,57	N/A
500	N/A	0,56	N/A
550	N/A	0,55	N/A
600	N/A	0,50	N/A

Carbon steel couplings are not allowed for seawater.

Couplings made of mild steel may only be used at temperatures below -10°C when the materials are normalised.

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

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

The wall thickness and material of the tubes to be in accordance with the current Rules of Det Norske Veritas.

Type Approval documentation

Manufacturer's product catalogues: Hansun Tube Fittings for BITE JIS B2351
(Hansun Engineering Co., Ltd. Catalogue_JIS_201207)

Manufacturer's test reports Nos:

- Tightness and leakage test: HSET-DNV-1304-002, HSET-DNV-1305-002, HSET-DNV-1306-002
- Repeated Assembly test: HSET-DNV-1304-005, HSET-DNV-1305-005, HSET-DNV-1306-005
- Bursting Pressure Test: HSET-DNV-1304-008, HSET-DNV-1305-008, HSET-DNV-1306-008
- Vibration&Pressure Pulsation Test: HSET-DNV-1304-011, HSET-DNV-1305-011, HSET-DNV-1306-011
- Pull-out Test: HSET-DNV-1304-014, HSET-DNV-1305-014, HSET-DNV-1306-014

DNV retention survey report dated 2013-03-12

Tests carried out

Tightness & Leakage test, repeated assembly test, bursting pressure test, vibration test and pressure pulsation test, Pull-out 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 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. The Surveyor shall witness burst testing of samples of couplings selected at random from stock or from the running production as a part of this survey.

END OF CERTIFICATE



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. **P-14722**

This is to certify that the
Pipe Couplings, Bite and Compression Type

with type designation(s)
Bite - DIN 2353 Type tube fitting

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

is found to comply with
Det Norske Veritas' Rules for Classification of Ships
Offshore Standard DNV-OS-D101, Marine and Machinery Systems and Equipment
Det Norske Veritas' Standards for Certification 2.9 No. 5-792.20

Application

The couplings may be used in the following systems: Hydraulic, compressed air, fuel oil (not high pressure injection systems), lubrication oil, fresh water cooling and sanitary.

Temperature range: -60°C to +600°C (see cert.)
Max. working press.: 70 to 630 bar
Sizes: For tubes 4 to 42 mm (see cert.)

This Certificate is valid until **2018-06-30**.

Issued at **Høvik** on **2014-03-12**

DNV local station: **Pusan**

Approval Engineer: **Tom Berg-Nielsen**

for **Det Norske Veritas AS**

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Marianne Spæren Marveng
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Product description

Bite and compression type tube fitting according to DIN2353 LL, L and S series

Materials:

Fitting materials	Carbon steel	DIN 3859
	Brass	CuZn35Ni2 according to DIN17660/17672
	Stainless steel	X6CrNiMoTo 17122 according to DIN 17122/17440, ASTM A479 TP316

Types and design:

Type Description	Fitting designation
Tube to Tube	DDU, DDL, DDUR, DDT, DDC, DDTR, DDBU, DDBUW, DDBL
Tube to Female Port	DDOM-U/M, DDMC-R, DDMC-G, DDMC-M, DDMC-GED, DDMC-MED, DDMC-N, DDLM-R/M
Tube to Male Thread	DDFC-G/M
Tube to Tube Port (Adjustable fitting)	DDLA, DDBTA, DDRTA, DDEW, DDET, DDEL, DDKOR, DDR, DDRED
Tube Port to Female Port	DDA-GED/MED, DDEGE-G/M
Tube Port to Tube Port	DDUE
Banjo Fittings	DDSWVE-G/M, DDWH-G/M, DDTH-G/M
Gauge Connector & Test Couplings	DDGC-G, DDGE-G, DDGA-G, DDGMA, DDEMA3
Weld Fitting	DDAS, DDASK, DDAK, DDAKR
Adaptor	DMFAD, DMFAE, DMFAD-ED, DMFAE-ED
Plug and Caps	DDVSTI-GED/MED, DDVSTI, DDVKA, DDCA
Cutting ring	DDS
Nut	DDN

Application/Limitation

Max. working pressure and sizes:

Series	Tube O.D (mm)	Max. Working Pressure (bar)		
		Stainless Steel	Carbon steel	Brass
Very light (LL)	4 – 8	100	100	70
Light (L)	6 – 15	250	315	221
	18 – 22	160	-	-
	28 - 42	100	160	112
Heavy (S)	6 – 14	630	630	441
	16 – 30	400	400	280
	30 - 38	315	315	221

Max working temperature for couplings of the following materials:

Carbon Steel	-40°C to +120°C
Brass	-54°C to +204°C
Stainless Steel	-60°C to + 600°C

At elevated temperatures the pressure will have to be derated according to the below table.

Temperature, °C	Carbon Steel	Stainless Steel	Brass
20	1,00	1,00	1,00
50	1,00	0,95	0,90
100	1,00	0,85	0,80
120	0,94	0,77	0,75
175	N/A	0,71	0,65
250	N/A	0,67	N/A
300	N/A	0,63	N/A
350	N/A	0,60	N/A
400	N/A	0,58	N/A
450	N/A	0,57	N/A
500	N/A	0,56	N/A
550	N/A	0,55	N/A
600	N/A	0,50	N/A

Carbon steel couplings are not allowed for seawater.

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The wall thickness and material of the tubes to be in accordance with the current Rules of Det Norske Veritas.

Type Approval documentation

Manufacturer's product catalogue: Hansun Tube Fittings for BITE DIN 2353
(Hansun Engineering Co., Ltd. Catalogue_DIN201207)

Manufacturer's test reports:

- Tightness and leakage test: HSET-DNV-1304-003, HSET-DNV-1305-003, HSET-DNV-1306-003
- Repeated Assembly test: HSET-DNV-1304-006, HSET-DNV-1305-006, HSET-DNV-1306-006
- Bursting Pressure Test: HSET-DNV-1304-009, HSET-DNV-1305-009, HSET-DNV-1306-009
- Vibration&Pressure Pulsation Test: HSET-DNV-1304-012, HSET-DNV-1305-012, HSET-DNV-1306-012
- Pull-out Test: HSET-DNV-1304-015, HSET-DNV-1305-015, HSET-DNV-1306-015

DNV retention survey report dated 2013-03-20

Tests carried out

Tightness & Leakage test, repeated assembly test, bursting pressure test, vibration test and pressure pulsation test, pull-out test.

Marking of product

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

- Manufacturer's name:
- Type designation
- Size

Periodical assessment

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END OF CERTIFICATE