

TYPE APPROVAL CERTIFICATE

DNV·GL

This is to certify that the undernoted product(s) has/have been tested in accordance with the relevant requirements of the DNV GL Type Approval System.

Certificate No. **13 557 - 14 HH**

Company **Hansun Engineering Co., Ltd.**
27, Noksansandan 361-ro
Busan 618-819, REPUBLIC OF KOREA

Product Description **Tube Fittings**

Type **S-LOK - Metallic Sealing**

Environmental Category **None**

Technical Data /
Range of Application **Temperature Range for Fitting Material with Metallic Seal:**
Steel: -20°C - +120°C; Brass: -60°C - +175°C; Stainless Steel: -60°C - +300°C
Working Pressure: 1.500 psi up to 10.900 psi
Size of Tube O.D.: 3 mm - 38 mm / 1/8" - 1 1/2"
Material of Fittings:
Carbon Steel: JIS G4051, S20C-S48C;
Stainless Steel: ASTM A479, ASTM A276, JIS G4303, ASTM A182 F316/316L,
JIS G3214;
Brass: ASTM B16, Alloy 360, ASTM B453, Alloy 345, JIS H3250, Alloy C3604,
Alloy 377, Alloy C3771.
For the selection of the tube fittings the service pressure specified in the
catalogue is to be observed.
Pressure reduction factors: refer to page 2

Test Standard **VI-7-8 Test Requirements for Components and Systems of Mechanical**
Engineering and Offshore Technology, Edition 2013.

Documents **GL Approval RefNo.: 13-098877, Audit Report dated 2014-03-20, ISO**
9001:2009 Certificate 122404-2012-AQ-KOR-RvA.

Remarks **refer to page 2**

Valid until **2020-01-19**
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File No. **II.C.05**
Hamburg, 2015-05-26

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Olaf Drews


Christian Kaemmer

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Pressure Reduction Factors:

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	---	0.71	0.65
250	---	0.67	---
300	---	0.63	---

S-LOK TYPE TUBE TO TUBE UNION: Union(SU), Union Elbow(SL), Reducing Union(SUR), Union Tee(ST), Union Cross(SX), Bulkhead Union(SUB). **TUBE TO MALE PIPE:** Male Connector(SMC-N,SMC-R), Thermocouple Connector(SMCT), Male Connector for Bonded Seal(SMC-G), Male Connector for Metal Gasket(SOM), Bulkhead Male Connector(SMCB), 45° Male Elbow(SLBM), Male Elbow(SLM), Male Run Tee(STRM), Male Branch Tee(STBM). **TUBE TO FEMALE PIPE:** Female Connector(SCF), Gauge Connector(SCG), Bulkhead Female Connector(SCBF), Female Elbow(SLF), Female Run Tee(STRF), Female Branch Tee(STBF). **STUB TUBE CONNECTOR:** Reducer(SR), Bulkhead Adapter(SAB), Male Adapter(SAM), Female Adapter(SAF), Female Adapter(SAG), Port Connector(SCP), Reducing Port Connector(SCRCP). **TUBE TO AN TUBE:** AN Union(SUA), AN Bulkhead Union(SUBA), AN Adapter(SAA). **TUBE TO SAE O-RING SEAL:** SAE Male Connector(SMCS), Positionable SAE Male Elbow(SLS), Positionable 45° SAE Male Elbow(SLBS), Positionable SAE Male Run Tee(STRS), Positionable SAE Male Branch Tee(STBS), O-Seal Straight Thread Connector(SCOS), O-Seal Pipe Thread Connector(SCOP). **TUBE TO WELD END:** Male Pipe Weld Connector(SCW), Male Pipe Weld Elbow(SLW), Tube Socket Weld Connector(SCSW), Tube Socket Weld Elbow(SLSW), Welding Bulkhead Union(SBUW). **PLUG and CAP:** Plug(SP), Cap(SC).

The Tube Fitting is type approved for applications in piping systems as specified in rules I-1-2, Section 11-D, see Table 11.14.

Limitation: Application of Fittings of Type SMCB, SCBF, SAB, SUBA is not approved through tank walls and watertight deck- and bulkheads. For this application Welding Bulkhead Union of type SBUW shall be used.

This certificate does not cover tube fittings with soft seals.

Scope of Tests: Tightness & Leakage Test, Bursting Pressure Test, Repeated Assembly Test, Pull-Out Test, Vibration & Pressure Pulsation Test, Vacuum Test.

Marking of Product: For Traceability to this Type Approval each product is to be marked with Manufacturer's name or trade mark, size and type designation.

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Certificate No. **13 573 - 14 HH**

Company **Hansun Engineering Co., Ltd.**
27, Noksansandan 361-ro
Busan 618-819, REPUBLIC OF KOREA

Product Description **Tube Fittings**

Type **BITE -JIS B 2351 - Metallic Sealing**

Environmental Category **None**

Technical Data /
Range of Application **Temperature Range:**
Steel: -20°C - +120°C; Brass: -60°C - +175°C; Stainless Steel: -60°C - +300°C

Size:
Tube O.D. [mm] 4~15 16~22 25~28 30~38 40~45

**Working Pressure/
PN [bar]:**
Carbon /St. Steel: 500 400 350 250 210
Brass: 350 280 245 178 147

For the selection of the tube fittings the service pressure specified in the catalogue is to be observed.

Pressure reduction factors: refer to page 2

Test Standard **VI-7-8 Test Requirements for Components and Systems of Mechanical Engineering and Offshore Technology, Edition 2013.**

Documents **GL-Approval RefNo.: 13-098877 (Test reports), Audit Report dated 2014-03-20, ISO 9001:2009 Certificate 122404-2012-AQ-KOR-RvA.**

Remarks **refer to page 2**

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Material of Fittings:

Carbon Steel: S10C - S48C / EN No: 1.0460; Stainless Steel: SUS316/316L, SUS304/304L / EN No: 1.4571; Brass C3771, C3604 / EN No: 2.0540

Pressure reduction factors:

Temperature °C	Carbon Steel	Stainless Steel	Brass
50	1,00	0,95	0,90
100	1,00	0,85	0,80
120	0,94	0,77	0,75
175	---	0,71	0,65
250	---	0,67	---
300	---	0,63	---

BITE TYPE TUBE FITTINGS for JIS B2351: Straight Union(BU), Union elbow(BL), Union Tee(BT), Straight Bulkhead Union(BBU), Bulkhead Elbow(BBL), Long Male Connector(BLMC), Male Connector(BMC-R/-G), Male Connector for O-Ring(BOM), Male Elbow(BL M), Long Male Elbow(BLLM), O-Seal Male Elbow(BOLM), Banjo Elbow(BSLM), Male Branch Tee(BBTM), Male Run Tee(BRTM), Bulkhead Female Connector(BBFC), Female Connector(BFC), Gauge Connector(BGC), Female Elbow(BLF), Female Branch Tee(BBTF), Female Run Tee (BRTF), Jig(BJ), Cap(BC), Plug(BP), Hose Male Union(BHUM), Hose Female Union(BHUF), Hose Bulkhead Male Union(BHBM), Hose Bulkhead Female Union(BHBF), Hose Male Elbow(BHLM), Hose Female Elbow(BHLF), Hose Bulkhead Male Elbow(BHBLM), Hose Bulkhead Female Elbow(BHBFLF), Welding Connector(BCW), Welding Bulkhead Union(BBUW), Adapter(BA-R / -G), Reducer(BR), Positionable Elbow(BLA), Positionable Branch Tee(BBTA), Positionable Run Tee(BRTA).

The Tube Fitting is type approved for applications in piping systems as specified in GL-rules I-1-2, Section 11-D, see Table 11.14.

Limitation: Application of Tube Fittings of Type BBU, BBFC, BHBM, BHBF, BHBLM, BHLF, is not approved through tank walls and watertight deck- and bulkheads. For this application Welding Bulkhead Union of type BBUW shall be used.

Scope of Tests:

Tightness & Leakage Test, Burst Pressure Test, Repeated Assembly Test, Pull-Out Test, Vibration & Pressure Pulsation Test.

Marking of Product: For traceability to this Type Approval each product is to be marked with Manufacture's name or trade mark, size and type designation.

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Certificate No. **13 567 - 14 HH**

Company **Hansun Engineering Co., Ltd.**
27, Noksansandan 361-ro
Busan 618-819, REPUBLIC OF KOREA

Product Description **Tube Fittings**
Type **BITE-DIN2353 - LL, L and S - Series - Metallic Sealing**

Environmental Category **None**

Technical Data /
Range of Application **Temperature Range for Fitting Materials with Metallic Seal:**
Steel: -20°C up to +120°C; Brass: -40°C up to +175°C;
316 Stainless Steel: -60°C up to +300°C

Series	Tube O.D.	Max. Working Pressure PN [bar]		
		Stainless Steel	Carbon Steel	Brass
Very Light (LL)	4-8	100	100	70
Light (L)	6-18	250	315	220
	18-22	160		
	22-42	100	160	112
Heavy (S)	6-14	630	630	441
	16-30	400	400	280
	30-38	315	315	220

For the selection of the tube fittings the service pressure specified in the catalogue is to be observed. Pressure reduction factors: refer to page 2

Test Standard **VI-7-8 Test Requirements for Components and Systems of Mechanical Engineering and Offshore Technology, Edition 2013.**

Documents **GL-Approval RefNo.: 13-098877 (Test reports), Audit Report dated 2014-03-20, ISO 9001:2009 Certificate 122404-2012-AQ-KOR-RvA. Test reports LL and S - Series dated 2015-06-11 and-17.**

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Certificate No. **13 567 - 14 HH**

Material of Fittings:

Carbon Steel: EN No: 1.0460; Stainless Steel: EN No: 1.4571; Brass: EN No: 2.0540

Reduction of Pressure [%]:

Temperature °C	Material of Fittings	
-40°C up to +120°C	Carbon Steel	- - -
-60°C up to +175°C	Brass	30 %
-60°C up to + 20°C	Stainless Steel	- - -
-60°C up to + 50°C	Stainless Steel	4 %
up to +100°C	Stainless Steel	11 %
up to +200°C	Stainless Steel	20 %
up to +300°C	Stainless Steel	29 %

Reduction of Pressure is to be observed.

APPROVED BITE TYPE TUBE FITTINGS for DIN 2353:

TUBE TO TUBE: Straight Union(DDU), Union Elbow(DDL), Reducing Union(DDUR), Union Tee(DDT), Union Cross(DDC), Reducing Tee(DDTR), Bulkhead Union(DDBU), Welding Bulkhead Union(DDBUW), Bulkhead Union Elbow(DDBL). TUBE to FEMALE PORT: Male Connector with O-Ring(DDOM-U/M), Male Connector(DDMC-R, DDMC-G, DDMC-M), Male Connector with ED-Ring(DDMC-GED, DDMC-MED), Male Connector(DDMC-N), Male Elbow(DDL-M/R/M). TUBE TO MALE THREAD: Female Connector(DDFC-G/M). TUBE TO TUBE PORT /Adjustable Fittings): Adjustable Elbow(DDLA), Adjustable Branch Tee(DDBTA), Adjustable Run Tee(DDRTA), Swivel Adjustable Elbow(DDEW)Swivel Adjustable Branch Tee(DDET), Swivel Adjustable Run Tee(DDEL), Standpipe Reducer(DDKOR), Reducer(DDR), Swivel Reducing Adaptor(DDRED). TUBE PORT to FEMALE PORT: Adaptor with ED-Ring(DDA-GED/MED), Swivel Adaptor with ED-Ring(DDEGE-G/M). TUBE PORT to TUBE PORT: Swivel Union(DDUE). BANJO FITTINGS: Banjo Fittings with DKA-Ring(DDSWVE-G/M), High Pressure Banjo Fittings with DKA-Ring(DDWH-G/M), High Pressure Banjo Fittings(DDTH-G/M). GAUGE CONNECTOR & TEST COUPLINGS: Pressure Gauge Connector(DDGC-G), Swivel Gauge Adaptor(DDGE-G), Gauge Connector(DDGA-G), Tee Test Coupling(DDGMA), Test Coupling(DDEMA3). WELD FITTINGS: Welding Connector(DDAS), Welding Connector with DAK(DDASK), Welding Nipple(DDAK), Reducing Welding Nipple(DDAKR). ADAPTORS: Male Female Adaptor(DMFAD, DMFAE), Male Female Adaptor with ED-Ring(DMFAD-ED, DMFAE-ED). PLUGS and CAPS: Blanking Plug for Port with ED-Ring(DDVSTI-GED/MED), Blanking Plug with O-Ring(DDVSTI), Blanking Plug(DDVKA), Tube Cap(DDCA).

Range of Application:

The Tube Fitting is type approved for applications in piping systems as specified in rules I-1-2, Section 11-D, see Table 11.14. Tube fittings with rubber sealing shall not be used in systems/locations where a flame resistance test acc. to table 11.14 is required.

Limitation:

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Certificate No. **13 567 - 14 HH**

Application of Tube Fittings of Type DDBU, DDBL is not approved through tank walls and watertight deck and bulkheads. For this application Welding Bulkhead Union of type DDBUW shall be used.

This certificate does not cover tube fittings with soft seals.

Scope of Tests:

Tightness & Leakage Test, Burst Pressure Test, Repeated Assembly Test, Pull-Out Test, Vibration & Pressure Pulsation Test.

Marking of Product:

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