

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Tube Fittings

with type designation(s)
Tube fittings with cold formed tubes

Issued to

Marinetec development(Shanghai) Limited
Shanghai, China

is found to comply with
DNV GL rules for classification – Ships
DNV GL rules for classification – Yachts
DNV GL rules for classification – Offshore units

Application :

Mineral oil, lubricating oil, water-glycol and phosphate ester, sea water, compressed air
Products approved by this certificate are accepted for installation on all vessels classed by DNV GL

Temperature range: -45 °C to +200 °C (see cert.)
Max. working press.: 250 to 800 bar (dep. size and type, see cert.)
Sizes: OD.: 8 to 42mm (dep. type, see cert.)

This Certificate is valid until **2021-07-31**.

Issued at **Hamburg** on **2016-08-01**

for **DNV GL**

DNV GL local station: **Shanghai**

Approval Engineer: **Hagen Markus**

Olaf Drews
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: **262.1-012333-2**
Certificate No: **TAP00000FD**

Product description

The tube fittings are designed according to ISO8434-1/DIN2353, L and S series and consist of nuts, seals and fitting bodies.

Fitting types

G: Union, E: Elbow, T: Union Tee, K: Union Cross, TR: Tee Reducer, VKA: Cap, VST: Hex Cap, ESV: Welded Bulkhead Fittings, GE: Male connector, EGEV: Swivel Connector, SV: Bulkhead Union, GR: Straight Reduced, WSV: Bulkhead Union Elbow, Re: Reducing nipple, RED: Tube End Reducer, EW: Swivel Nut Elbow Fittings, SKA Weld Nipple, ASK: Weld Straight Union, MDOZ: Seal, M: Nut.

Size range

L series - Tube O.D. 08-42 mm

S series - Tube O.D. 08-38 mm

Material designation: 45# carbon steel and 316L stainless steel
Sealing material: NBR for steel connectors, FKM for stainless steel connectors

Application

Temperature range

Type of rubber	Minimum temperature [°C]	Maximum temperature [°C]		
		Dry air	Freshwater, steam	Hydrocarbons
NBR	-10 to -30	Up to 100	Up to 90	Up to 90
FKM	-20 to -45	Up to 200	Up to 150	Up to 170

Working pressures

Serials	Type Carbon steel	Type Stainless steel	Tube O.D. [mm]	Max. Working Pressure [bar]
L	MD-F/G08L	MD-F/G08Lss	8	500
	MD-F/G10L	MD-F/G10Lss	10	500
	MD-F/G12L	MD-F/G12Lss	12	400
	MD-F/G15L	MD-F/G15Lss	15	400
	MD-F/G18L	MD-F/G18Lss	18	400
	MD-F/G22L	MD-F/G22Lss	22	250
	MD-F/G28L	MD-F/G28Lss	28	250
	MD-F/G35L	MD-F/G35Lss	35	250
	MD-F/G42L	MD-F/G42Lss	42	250
S	MD-F/G08S	MD-F/G08Sss	8	800
	MD-F/G10S	MD-F/G10Sss	12	800
	MD-F/G12S	MD-F/G12Sss	10	630
	MD-F/G14S	MD-F/G14Sss	14	630
	MD-F/G16S	MD-F/G16Sss	16	630
	MD-F/G20S	MD-F/G20Sss	20	420
	MD-F/G25S	MD-F/G25Sss	25	420
	MD-F/G30S	MD-F/G30Sss	30	420
	MD-F/G38S	MD-F/G38Sss	38	420

F: Tube fitting, forming, MD: Manufacturer's Marking, Tube O.D. : Tube outer diameter

For selection of the tubes the following is to be observed:

- The wall thickness and material are to be in accordance with the current Rules of DNVGL
- The pipe tolerances shall be in compliance with manufacturer specification

Limitation

The pipe couplings are not approved for:

- on tubes in cold fabricated (hard temper) conditions
- piping for high pressure fuel injection systems

Application in sea water systems

For application in sea water systems austenitic stainless steels qualities shall be used which are proven in respect to intercrystalline corrosion. Material certificate shall include appropriate confirmation tests according to ASTM A262, Practice E, Copper - Copper Sulphate - Sulphuric Acid Test, or to another recognised standard. Refer to DNVGL Rules Part 2 Section 3 – Corrosion testing.

Type Approval documentation

Drawings (Union)

G06L, G08L, G10L, G12L, G15L, G18L, G22L, G28L, G35L, G42L, G06S, G08S, G10S, G12S, G14S, G16S, G20S, G22S, G30S, G38L.

Other type drawings

Fitting type: G: Union, E: Elbow, T: Union Tee, K: Union Cross, TR: Tee Reducer, VKA: Cap, VST: Hex Cap, ESV: Welded Bulkhead Fittings, GE: Male connector, EGEV: Swivel Connector, SV: Bulkhead Union, GR: Straight Reduced, WSV: Bulkhead Union Elbow, Re: Reducing nipple, RED: Tube End Reducer, EW: Swivel Nut Elbow Fittings, SKA Weld Nipple, ASK: Weld Straight Union, MDOZ: Seal, M: Nut.

Test reports

- Test reports according to DNV Type Approval Programme No. 5-792.20, dated 2011.09.15
- Application for type approval certificate from DNV Shanghai, China, dated 2011.09.22
- Initial survey report from DNV Shanghai, China, dated 2011.09.22
- Assessment report dated 2016-06-21

Tests carried out

Following tests according to DNV Type Approval Programme No. 5-792.20, dated 2011.09.15

- Burst pressure test, witnessed by Dalian DNV Surveyor
- Leakage test
- Repeated assembly test
- Pull-out test
- Vibration test
- Pressure pulsation test
- Fire test

Marking of product

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

- Manufacturer's name or trade mark
- Type designation

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Periodical assessment

For retention of the type approval certificate periodical assessments shall be carried out at production place(s).

The objective of the periodical assessment is to verify that the design and production conditions for the type approval have not been altered.

Main scope of the assessment:

- verification of the production and quality control system
- review of quality control documentation of recent deliveries
- review of the type approval documentation and that this is still the basis for the production
- review of design changes , pre- material and performance of the product
- verification of the product marking