

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Tube Fittings**

with type designation(s)
EMB-FS (form and seal)

Issued to

Eifeler Maschinenbau GmbH
Euskirchen Nordrhein-Westfalen, Germany

is found to comply with

DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
DNV GL class programme DNVGL-CP-0185 – Type approval – Mechanical joints

Application :

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

Temperature range: -35°C to +200°C / material dependant

Max. working press.: 250 bar to 800 bar /size dependant

Sizes: 6 mm to 42 mm

Issued at **Hamburg** on **2017-02-06**

This Certificate is valid until **2022-02-05**.

DNV GL local station: **Essen**

for **DNV GL**

Approval Engineer: **Christian Kaemmer**

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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.



Product description

Design:

The EMB FS system is a tube reshaping system that consists of the components nut, fitting, function-ring and tube. The mechanically reshaped tube end is connected by a fitting-body and a nut. The leakage path is sealed by the function ring with elastomer sealing and by a metallic seal (integral 24° cone of the tube). DIN 2353, ISO 8434-1/-4.

Tube reshaping machine:

EMB FS90, FS92 and FS93

Materials:

Tubes:

Seamless steel tube

Carbon steel E235N (St37.4) acc. to DIN EN 10305-4

Stainless steel 1.4571/ X6CrNiMoTi 17122, cold-drawn, heat-treated to DIN EN 10216-5.

Tolerances of tube outside and inside diameter to DIN EN 10305-4/DIN2391-1-C

Fitting-body, Nut, function ring FSR, FSSR:

Carbon steel EN235N (St37.4)

- DIN EN 10305-4

Stainless steel

1.4571/X6CrNiMoTi 17122

- DIN EN 10216-5

Rubber sealing

NBR, FPM

Sizes: 6 mm to 42 mm.

Application/Limitation

The EMB-FS-system is type approved for application in pipe class I, II and III-piping systems, fire resistant type, as listed in DNV GL Ship Rules Pt. 4, Ch. 6, Sec. 9 Table 12 & 13, Bite-type. Regarding limitations refer to page 3.

Size [mm]	Nominal pressure PN	Nominal pressure PN
	L-Series	S-Series
6	500	800
8	500	800
10	500	800
12	400	630
15	400	
16		630
18	400	
20		400
22	250	
25		400
28	250	
30		400
35	250	
38		400
42	250	

Temperature range:

Metallic material	Temperature range
Carbon steel	-20°C to +120°C (-40°C ambient)
Stainless steel	-60°C to +400°C
Sealing material	
NBR	-35°C to +100°C
FPM	-25°C to +200°C

For application of carbon steel fittings below -10°C the pre- material is to be normalized.

The maximum service temperature (M.A.W.T.) arise out of the tube fitting and sealing material combination.

Example M.A.W.T.:

Carbon steel fitting (normalized) with NBR sealing, -20°C up to +120°C.
Stainless steel in combination with FPM sealing, -25°C up to +200°C.

Pressure reduction factors:

Stainless steel

For service temperatures above 50 °C the pressure is to be reduced in accordance with the manufacturer's pressure reduction factors:

20°C - 50°C	-4%
50°C - 100°C	-11%
100°C - 200°C	-20%

Tube fittings with parallel thread are not approved for pipe class I and II.

Pipe couplings with tapered or parallel thread are not approved for toxic or flammable media or services where fatigue, severe erosion or crevice corrosion is expected to occur.

Tube fittings made of stainless steel 1.4571 are not permitted in seawater systems.

A tube material grade suitable for cold bending and flaring is to be used.

For the assembly and the installation of the joints manufacturer's instructions are to be observed.

The wall thickness of the tubes is to be in accordance with current DNVGL Rules.

Bulkhead connections of type K, L, are not approved through tank walls , fire divisions, watertight deck and bulkheads.

Type Approval documentation

Tests carried out

Repeated assembly, Leakage, Burst, Impulse, Vibration and Fire Test
Tightness test & Burst-pressure test

Marking of product

For traceability to this Type Approval, the tube fittings are to be marked with:

- Manufacturer's name or trade mark
- Type designation
- Size

Job Id: **262.1-007069-6**
Certificate No: **TAP00000TV**

Periodical assessment

For retention of the type approval certificate periodical assessments shall be carried out at production places by local DNVGL Surveyor.
Prior to the expiry date of this certificate a renewal assessment is to be carried out to verify that the conditions for the type approval are complied with and to witness burst pressure testing on select sizes.

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 drawings in production to verify any design changes which may have an impact on data specified in the type approval certificate, performance and range of application
- verification of the product marking.

End of certificate