

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Pipe Couplings

with type designation(s)
FFC34, FFC64, FFC74

Issued to

Tube-Mac Piping Technologies Ltd
Stoney Creek, ON, Canada

is found to comply with

DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition January 2018
DNV GL class programme DNVGL-CP-0185 – Type approval – Mechanical joints

Application :

Product(s) approved by this certificate is/are accepted for installation on vessels classed by DNV GL.

Temperature range: -20°C to +180°C (BUNA N) / -20°C to +200°C (Viton)
Max. working press.: dependent on size (see certificate)
Sizes: DN 13, 19, 25, 32, 38, 51, 64, 76

Issued at **Høvik** on **2018-08-22**

for **DNV GL**

This Certificate is valid until **2021-12-31**.

DNV GL local station: **Montreal**

Approval Engineer: **Adel Samiei**

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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.



Product description

The coupling is designed with 37 degrees flared pipe ends, loose flared flange, internal flat face and ring face with elastomeric seals.

- FFC34 - Flanges DN13-DN76 drilled to ISO 6162-1
- FFC64 - Flanges DN13-DN51 drilled to ISO 6162-2
- FFC74 - Flanges DN63-DN76 drilled to ISO 6164

Materials:

- Pipe: E235 & E355 (EN10305-4) /1.4401, 1.4404 & 1.4462 (EN10216-5)
- Flange: AISI C1045, AISI 316, S355J2 EN10025-2, 1.4401, 1.4404 & 1.4462 (10028-7)
- Cone: AISI C1045, AISI 316
- Bolt and nut: ISO898-1 Grade 10.9 min., SAE J429 Grade 8, ASTM A574
- O-ring material: Nitrile (Buna N), Fluoroelastomer (Viton)

Application/Limitation

Maximum working pressure (MWP) shall be as below table:

Part No.	Size DN	MWP (bar)	Part No.	Size DN	MWP (bar)
FFC34-050	13	350	FFC64-050	13	420
FFC34-075	19	350	FFC64-075	19	420
FFC34-100	25	350	FFC64-100	25	420
FFC34-125	32	275	FFC64-125	32	420
FFC34-150	38	210	FFC64-150	38	420
FFC34-200	51	210	FFC64-200	51	420
FFC34-250	64	175	FFC74-250	64	310
FFC34-300	76	140	FFC74-300	76	270

For couplings at elevated operating temperatures, the maximum working pressure has to be reduced with the following factors:

Temperature	20°C	50°C	100°C	150°C	200°C
Carbon Steel	1	1	1	0,89	0,81
Stainless Steel	1	0,97	0,96	0,92	0,87

Couplings covered by this certificate may be used in piping classes I, II and III in below applications:

<ul style="list-style-type: none"> • Flammable fluids (flash point ≤ 60°C) <ul style="list-style-type: none"> - Vent lines ⁽¹⁾ - Cargo oil lines - Crude oil washing lines • Inert gas <ul style="list-style-type: none"> - Water seal effluent lines - Scrubber effluent lines - Main Lines ⁽¹⁾ ⁽²⁾ - Distribution lines ⁽¹⁾ • Flammable fluids (flash point > 60°C) <ul style="list-style-type: none"> - Cargo Oil lines ⁽¹⁾ - Fuel oil lines ⁽²⁾ - Lubricating oil lines ⁽²⁾ - Hydraulic oil ⁽²⁾ - Thermal oil ⁽²⁾ • Fresh water <ul style="list-style-type: none"> - Cooling water system - Condensate return - Non-essential system • Sounding/vent <ul style="list-style-type: none"> - Water tanks/Dry spaces - Oil tanks (f.p. > 60°C) ⁽²⁾ 	<ul style="list-style-type: none"> • Sea water ⁽³⁾ <ul style="list-style-type: none"> - Bilge lines - Water filled fire extinguishing systems, e.g. sprinkler systems - Non water filled fire extinguishing systems, e.g. foam, drencher systems - Fire main (not permanently filled) - Ballast system - Cooling water system - Tank cleaning services - Non-essential systems • Sanitary/drains/scuppers <ul style="list-style-type: none"> - Deck drains (internal) ⁽⁴⁾ - Sanitary drains - Scuppers and discharge (overboard) • Miscellaneous <ul style="list-style-type: none"> - Starting/Control air - Service air (non-essential) - Brine - CO2 system - Steam
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- (1) Only in pump rooms and open decks.
- (2) Not inside machinery spaces of category A or accommodation spaces. May be accepted in other machinery spaces provided the joints are located in easily visible and accessible positions.
- (3) Please consider that Carbon Steel and Stainless steel grade 316 are not seawater resistant materials and shall not be used in seawater applications.
- (4) Only above bulkhead deck of passenger ships and freeboard deck of cargo ships.

Couplings made of carbon steel are not to be used at temperatures below -10°C unless the material is normalised.

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

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

No product certificate is required.

Type Approval documentation

Tube-mac catalogue No.0003 rev.11/04 B8 and B10

Assembly drawing No. FFC34-050-TMP52-SCH40, ½", FFC34-075-TMP52-SCH40, ¾", FFC34-100-TMP52-SCH40, 1", FFC34-125-TMP52-SCH40, 1 ¼", FFC34-150-TMP52-SCH40, 1 ½", FFC34-200-TMP52-SCH40, 2", FFC34-250-TMP52-SCH40, 2 ½", FFC34-300-TMP52-SCH40, 3", FFC64-050-TMP52-SCH80, ½", FFC64-075-TMP52-SCH80, ¾", FFC64-100-TMP52-SCH80, 1", FFC64-125-TMP52-SCH80, 1 ¼", FFC64-150-TMP52-SCH80, 1 ½", FFC64-200-TMP52-SCH80, 2", FFC74-250-TMP52-SCH80, 2 ½", FFC74-300-TMP52-SCH80, 3",

Type Approval Test Report, Burst Test, Impulse and Vibration Test, witnessed by DNV surveyor dated 2002-07-03 and 2001-09-21

Fire Test Report SwRI project No. 01.10085.01.706a, 01.10085.01.706b, 01.10085.01.706c April 14, 2004.

Pull out test report number 18.18055.18.115 dated 2018-06-25

Tests carried out

Hydraulic Proof Pressure Test, Hydraulic Burst Pressure Test, Hydraulic Impulse Test, Hydraulic Impulse and Vibration Test, Pressure pulsation, Fire tests.

Marking of product

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

- Manufacturer's name or trade mark
- Type designation and dimension

Periodical assessment

For retention of the Type Approval, a DNV GL 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 DNVGL-CP-0338.