

TYPE APPROVAL CERTIFICATE

Certificate No:
TAP00000ZH
Revision No:
1

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 rules for classification – Ships Pt.4 Ch.6 Piping systems
DNV-OS-D101 – Marine and machinery systems and equipment, Edition July 2021
DNV class programme DNV-CP-0185 – Type approval – Mechanical joints

Application :

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

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 **2022-11-16**

This Certificate is valid until **2026-12-31**.

DNV local station: **Montreal**

Approval Engineer: **Jane Lozanov**

for **DNV**



Digitally Signed By: Sedlan, Sinisa
Location: DNV Høvik, Norway

Sinisa Sedlan
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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



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 | 0.95 | 0.85 | 0.77 | 0.71 |

Couplings covered by this certificate are only to be used in piping classes I (≤60.3mm), II (≤60.3mm), and III in below applications⁽⁴⁾:

| | |
|--|--|
| <p>1) Inert gas</p> <ul style="list-style-type: none"> - Water seal effluent lines - Scrubber effluent lines <p>2) Flammable fluids (flash point > 60°C)</p> <ul style="list-style-type: none"> - Fuel oil lines⁽¹⁾ - Lubricating oil lines⁽¹⁾ - Hydraulic oil⁽¹⁾ - Thermal oil⁽¹⁾ <p>3) Fresh water</p> <ul style="list-style-type: none"> - Cooling water system⁽²⁾ - Condensate return⁽²⁾ - Non-essential system | <p>4) Sanitary/drains/scuppers</p> <ul style="list-style-type: none"> - Deck drains (internal)⁽³⁾ - Sanitary drains - Scuppers and discharge (overboard) <p>5) Sounding/vent</p> <ul style="list-style-type: none"> - Water tanks/dry spaces - Oil tanks (f.p. > 60°C)⁽¹⁾ <p>6) Miscellaneous</p> <ul style="list-style-type: none"> - Service air (non-essential) - Brine - Steam |
| <p>1) Approved fire-resistant types except in cases where such mechanical joints are installed on exposed open decks, as defined in SOLAS II-2/Reg. 9.2.3.3.2.2(10) and not used for fuel oil lines.</p> <p>2) Fire endurance test shall be applied when mechanical joints are installed in machinery spaces of category A.</p> <p>3) Only above bulkhead deck of passenger ships and freeboard deck of cargo ships.</p> <p>4) Carbon Steel and stainless-steel grade 316 covered by this certificate are not seawater resistant and shall not be used in seawater applications</p> | |

Materials and material protection chosen for the specific system shall be suitable for the intended medium and environmental conditions.

Couplings covered by this certificate shall not be installed in systems subject to pressure below atmospheric/ vacuum condition or for gases having an oxygen content exceeding 25%.

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

Compliance and testing requirements related to ISO 6162 and ISO 6164 flange ends are not covered under this scope of approval.

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", FC34-200-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

Renewal burst pressure test reports: DNV-004, DNV-005, DNV-006

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 size

Periodical assessment

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