

# TYPE APPROVAL CERTIFICATE

**This is to certify:****That the Pipe Couplings**

with type designation(s)  
**RFC34, RFC64, RFC74, RFAC48**

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:** See certificate  
**Max. working press.:** See certificate  
**Sizes:** 1 1/2", 2", 2 1/2", 3", 4", 5"

Issued at **Høvik** on **2018-12-21**

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 retain ring in grooved pipe, loose flange with o-ring seals in seal plate.  
 Flanges RFC34, DN38, DN51, DN64, DN76 drilled to ISO 6162-1  
 Flanges RFC64, DN38, DN51 drilled to ISO 6162-2  
 Flanges RFC74, DN64, DN76, DN100 drilled to ISO 6164  
 Flanges RFAC48, DN115, DN127 drilled to TM1 property – 8 bolt standard

#### Materials:

Pipe: E235 & E355 (EN10305-4), 1.4401, 1.4404 & 1.4462 (EN10216-5)  
 Flange: S355J2+N (EN10025), AISI C1045, ASTM A519 1026,  
 1.4401, 1.4404 & 1.4462 (EN10028-7)  
 Retain Ring: AISI 302  
 Bolt and nut: ISO898-1 Grade 10.9 min., SAE J429 Grade 8 min.  
 Bolt and nut for 350 bar RFAC48-450/500/600: Brighton MET L9, min tensile 180 Ksi.  
 O-ring material: Nitrile (Buna N), Fluoroelastomer (Viton)

### Application/Limitation

maximum working pressure:

Part No.	Size		Pressure Rating
	DN	inch	
RFC34-150	38	1 1/2"	210
RFC34-200	51	2"	210
RFC34-250	64	2 1/2"	175
RFC34-300	76	3"	140
RFC64-150	38	1 1/2"	420
RFC64-200	51	2"	420

Part No.	Size		Pressure Rating
	DN	inch	
RFC74-250	64	2 1/2"	400
RFC74-300	76	3"	400
RFC74-400	100	4"	400
RFAC48-450	115	4 1/2"	275
RFAC48-500	127	5"	275

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

<ol style="list-style-type: none"> <li>1) Flammable fluids (flash point ≤ 60°C)               <ul style="list-style-type: none"> <li>- Vent lines <sup>(1)</sup></li> <li>- Cargo oil lines</li> <li>- Crude oil washing lines</li> </ul> </li> <li>2) Inert gas               <ul style="list-style-type: none"> <li>- Water seal effluent lines</li> <li>- Scrubber effluent lines</li> <li>- Main Lines <sup>(1) (2)</sup></li> <li>- Distribution lines <sup>(1)</sup></li> </ul> </li> <li>3) Flammable fluids (flash point &gt; 60°C)               <ul style="list-style-type: none"> <li>- Cargo Oil lines <sup>(1)</sup></li> <li>- Fuel oil lines <sup>(2)</sup></li> <li>- Lubricating oil lines <sup>(2)</sup></li> <li>- Hydraulic oil <sup>(2)</sup></li> <li>- Thermal oil <sup>(2)</sup></li> </ul> </li> <li>4) Fresh water               <ul style="list-style-type: none"> <li>- Cooling water system</li> <li>- Condensate return</li> <li>- Non-essential system</li> </ul> </li> <li>5) Sounding/vent               <ul style="list-style-type: none"> <li>- Water tanks/Dry spaces</li> <li>- Oil tanks (f.p. &gt; 60°C) <sup>(2)</sup></li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>6) Sea water <sup>(3)</sup> <ul style="list-style-type: none"> <li>- Bilge lines</li> <li>- Water filled fire extinguishing systems, e.g. sprinkler systems</li> <li>- Non water filled fire extinguishing systems, e.g. foam, drencher systems</li> <li>- Fire main (not permanently filled)</li> <li>- Ballast system</li> <li>- Cooling water system</li> <li>- Tank cleaning services</li> <li>- Non-essential systems</li> </ul> </li> <li>7) Sanitary/drains/scuppers               <ul style="list-style-type: none"> <li>- Deck drains (internal) <sup>(4)</sup></li> <li>- Sanitary drains</li> <li>- Scuppers and discharge (overboard)</li> </ul> </li> <li>8) Miscellaneous               <ul style="list-style-type: none"> <li>- Starting/Control air</li> <li>- Service air (non-essential)</li> <li>- Brine</li> <li>- CO2 system</li> <li>- Steam</li> </ul> </li> </ol>
<p><sup>(1)</sup> Only in pump rooms and open decks.  <sup>(2)</sup> 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.  <sup>(3)</sup> Please consider that Carbon Steel and Stainless steel grade 316 are not seawater</p>	

Job Id: **262.1-017491-2**  
Certificate No: **TAP0000022**

resistant materials and shall not be used in seawater applications.  
(4) Only above bulkhead deck of passenger ships and freeboard deck of cargo ships.

Minimum and maximum operating temperature is limited by the non-metallic seals:

Nitrile: -20°C to +180°C  
Viton: -20°C to +200°C

### **Type Approval documentation**

Assembly drawing No. RFC34-050-26mm, RFC34-075-36mm, RFC34-100-39mm, RFC34-125-46mm, RFC34-150-56mm, RFC34-200-66mm, RFC34-250-80mm, RFC34-300-97mm, RFC64-050-26mm, RFC64-075-36mm, RFC64-100-39mm, RFC64-125-46mm, RFC64-150-56mm, RFC64-200-66mm, RFC74-250-80mm, RFC74-300-97mm, RFC74-400-115mm, RFAC48-450 ASSY, RFAC48-500-SCHXXS, RFAC48-600-SCHXXS, RFAC48-800-SCHXXS

Type Approval Test Report, Burst Test, Impulse and Vibration Test, DNV witnessed (Jan. 15, 2003).

Fire Test Report SwRI project No. 01.10085.01.706d, 01.10085.01.706e, 01.10085.01.706f, dated 2004-04-14 & 01.19577.01.803 dated 2014- 06-18

Test Results for Increased Pressure Rating for 5",6",8", dated August 12, 2008

Pull out test report number 18.18055.18.116 dated 2018-06-06

### **Tests carried out**

Hydraulic Proof Pressure Test, Hydraulic Burst Pressure Test, Simultaneous Pressure Pulsation and Vibration Test, 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 a survey every second year, to verify that the conditions for the type approval are complied with and witness on the burst pressure test on selection of sizes.