

TYPE APPROVAL CERTIFICATE**This is to certify:****That the Pipe Couplings**

with type designation(s)
PYPLOK Connector DM series (DM20, DM60, DM80)

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 July 2015
DNV GL class programme DNVGL-CP-0185 – Type approval – Mechanical joints

Application :

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

Temperature range: **Dependent on the sealing (See certificate)**
Max. working press.: **dependent on the material and size (See certificate)**
Sizes: **See certificate**

Issued at **Høvik** on **2017-08-28**

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

DNV GL local station: **Montreal**

Approval Engineer: **Adel Samiei**



for **DNV GL**

Digitally Signed By: Marveng, Marianne Spæren

Location: DNV GL Høvik, Norway

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

Compression swage type coupling with 2 O-ring seals each end. Fire tested in accordance with ISO19920/1.

Materials:

Carbon steel ASTM A350 Gr.LF2
 Stainless steel ASTM A479 Gr.316, S32205, S32750
 70/30 CuNi, Alloy C71500

Application/Limitation

Maximum working pressure for DM20 & DM60 Type:

Size	DM20			DM60		
	Stainless Steel	Carbon Steel	Copper Nickel 70/30	Stainless Steel	Carbon Steel	Copper Nickel 70/30
1/4"	415 bar	345 bar	269 bar	483 bar	402 bar	313 bar
3/8"	415 bar	345 bar	269 bar	400 bar	333 bar	260 bar
1/2"	407 bar	339 bar	264 bar	420 bar	350 bar	273 bar
5/8"	-	-	-	420 bar	350 bar	273 bar
3/4"	400 bar	333 bar	260 bar	414 bar	345 bar	269 bar
1"	393 bar	328 bar	255 bar	400 bar	333 bar	260 bar
1 1/4"	390 bar	325 bar	253 bar	400 bar	333 bar	260 bar
1 1/2"	390 bar	325 bar	253 bar	390 bar	325 bar	253 bar
2"	330 bar	276 bar	215 bar	330 bar	275 bar	215 bar

Maximum working pressure for DM80 Type:

Size (mm)	Stainless Steel	Carbon Steel	Copper Nickel 70/30
6	450 bar	375 bar	390 bar
8	430 bar	355 bar	370 bar
10	415 bar	345 bar	360 bar
12	400 bar	335 bar	345 bar
15	400 bar	335 bar	-
16	400 bar	335 bar	345 bar
18	310 bar	260 bar	-
20	390 bar	325 bar	335 bar
22	305 bar	255 bar	-
25	390 bar	325 bar	335 bar
28	300 bar	325 bar	-
30	390 bar	325 bar	335 bar
35	295 bar	245 bar	-
38	390 bar	325 bar	335 bar
42	390 bar	325 bar	335 bar
50	350 bar	295 bar	305 bar
60	330 bar	275 bar	285 bar

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

- 1) Flammable fluids (flash point $\leq 60^{\circ}\text{C}$)
 - Vent lines
 - Cargo oil lines ⁽¹⁾
 - Crude oil washing lines ⁽¹⁾
- 2) Inert gas
 - Water seal effluent lines
 - Scrubber effluent lines
 - Main lines ⁽¹⁾⁽³⁾
 - Distributions lines ⁽¹⁾
- 3) Flammable fluids (flash point $> 60^{\circ}\text{C}$)

- Cargo oil lines ⁽¹⁾ ⁽³⁾
- Fuel oil lines ⁽³⁾
- Lubricating oil lines ⁽³⁾
- Hydraulic oil ⁽³⁾
- Thermal oil ⁽³⁾
- 4) Sea water ⁽²⁾
 - 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
- 5) Fresh water
 - Cooling water system
 - Condensate return
 - Non-essential system
- 6) Sanitary/drains/scuppers
 - Deck drains (internal) ⁽⁴⁾
 - Sanitary drains
 - Scuppers and discharge (overboard)
- 7) Sounding/vent
 - Water tanks/Dry spaces
 - Oil tanks (f.p. > 60°C) ⁽³⁾
- 8) Miscellaneous
 - Starting/Control air
 - Service air (non-essential)
 - Brine
 - CO2 system
 - Steam

⁽¹⁾ Only in pump rooms and open decks

⁽²⁾ Please consider that Carbon Steel and Stainless steel grade 316 are not seawater resistant materials and shall not be used in seawater applications.

⁽³⁾ 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.

⁽⁴⁾ Only above bulkhead deck of passenger ships and freeboard deck of cargo ships.

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

Perbunan: -20°C to 180°C
 Viton: -20°C to 200°C
 EPDM: -20°C to +200°C (*)

(*) EPDM shall not be used in hydrocarbon services.

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

Temp.	20°C	50°C	100°C	150°C	200°C
Carbon Steel ASTM A350 Gr.LF2	1	1	1	0,89	0,81
Stainless Steel A479 Gr.316, S32205, S32750	1	0,95	0,85	0,77	0,71
Cu/Ni 70/30, C71500	1	0,97	0,96	0,92	0,87

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

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

Job Id: **262.1-014271-3**
Certificate No: **TAP00000Z1**

Type Approval documentation

Tube-mac Catalogue for PYPLOK dated April-2017

Leakage test reports C5126A dated 2009-07-31 & C7513A dated 2009-08-01

Gas Leakage test reports C5126C & C7513C dated 2009-08-01

Burst pressure test reports C5126B dated 2009-07-31 & C7513B dated 2009-08-01

Impulse test reports C5126D & C7513D dated 2009-08-01

Vibration test reports C5126E & C7513E dated 2009-08-01

Southwest research institute fire test report 01.14432.01.205a dated 2009-04-27 & 01.14432.01.205b dated 2009-05-19 & 01.17787.01.802 dated 2013-03-14

Southwest research institute pull out test report 18.18055.16.612 dated 2016-10-11

Tests carried out

Leakage test, burst pressure test, Hydraulic proof test, impulse test, vibration test, fire test, pull-out test

Marking of product

For traceability with this type approval, each fitting is at least to be marked with:

- Manufacturers name or trademark
- Size

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform a survey - every second year and before the expiry date of this certificate - to verify that the conditions for the type approval are complied with and to witness burst testing on samples of fittings selected at random from stock or from the running production.