TYPE APPROVAL CERTIFICATE

Certificate no.:
TAP00000Z1
Revision No:
4

This is to certify:

that the Pipe Couplings

with type designation(s)
PYPLOK DM series (DM20, DM60, DM80), PYPLOK DP40 series (DP40N & DP40M)

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.

Type:	Temperature range:	Max. working press.:	Sizes:
PYPLOK DM series (DM20, DM60, DM80)	**-55°C to +205°C (dependent on the sealing)**	**215 bar to 483 bar (dependent on the material, size & type)**	**1/4" to 2" (DM20 and DM60) - 6 to 60 mm (DM80)**
PYPLOK DP40 series (DP40N & DP40M)	**-55°C to +205°C (dependent on the sealing)**	**25 - 31 - 35 bar (dependent on the size)**	**2 1/2" - 3" - 4" & OD: 44.5 & 57 mm**

Issued at **Høvik** on **2025-01-13**

This Certificate is valid until **2026-12-31**.
DNV local unit: **Montreal**

Approval Engineer: **Sarah Miller**

for **DNV**

Digitally Signed By:
Bosman van der Merwe
Location: DNV Høvik, Norway

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

Swage type compression coupling with two O-ring seals at each end. Approved Fire-Resistant type in accordance with ISO 19921/2, 8min Dry /22min Wet Test.

Materials:		
	Carbon steel	ASTM A350 Gr.LF2 Class 1
	Stainless steel	ASTM A479 Gr.316, S32205, S32750, S31803
	Copper Nickel alloy	70/30 CuNi, Alloy C71500

Application/Limitation

Maximum working pressure:

DM20			
Size	Stainless Steel	Carbon Steel	Copper Nickel 70/30
¼" (DN8)	415 bar	345 bar	269 bar
3/8" (DN10)	415 bar	345 bar	269 bar
½" (DN15)	407 bar	339 bar	264 bar
¾" (DN20)	400 bar	333 bar	260 bar
1" (DN25)	393 bar	328 bar	255 bar
1 ¼" (DN32)	390 bar	325 bar	253 bar
1 ½" (DN40)	390 bar	325 bar	253 bar
2" (DN50)	330 bar	276 bar	215 bar

DM60			
¼"	483 bar	402 bar	313 bar
3/8"	400 bar	333 bar	260 bar
½"	420 bar	350 bar	273 bar
5/8"	420 bar	350 bar	273 bar
¾"	414 bar	345 bar	269 bar
1"	400 bar	333 bar	260 bar
1 ¼"	400 bar	333 bar	260 bar
1 ½"	390 bar	325 bar	253 bar
2"	330 bar	275 bar	215 bar

DP40M Series			
44.5 (DN40)	N.A.	N.A.	31 bar
57 (DN50)	N.A.	N.A.	31 bar

DP40N series			
Size	Stainless Steel	Carbon Steel	Copper Nickel 70/30
2 ½" (DN65)	35 bar	35 bar	25 bar
3" (DN80)	35 bar	35 bar	25 bar
4" (DN100)	35 bar	35 bar	25 bar

DM80			
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 are approved to be used according to the latest requirements of governing rules in following applications:

Systems		***Classification of Piping system***	***With O-ring/dry/wet fire tested Condition +6)***
Flammable fluids (flash point ≤ 60 °C)			
1.	Cargo oil lines	dry	+1)
2.	Crude oil washing lines	dry	+1)
3.	Vent lines	dry	+2)
Inert gas			
4.	Water seal effluent lines	wet	+
5.	Scrubber effluent lines	wet	+
6.	Main lines	dry	+1)
7.	Distribution lines	dry	+1)
Flammable fluids (flash point > 60 °C)			
8.	Cargo oil lines	dry	+1)
9.	Fuel oil lines	wet	+
10.	Lubricating oil lines	wet	+
11.	Hydraulic oil	wet	+
12.	Thermal oil	wet	+
Sea water			

Systems		***Classification of Piping system***	***With O-ring/dry/wet fire tested Condition +6)***
13.	Bilge lines	dry/wet	+5)
14.	Water filled fire extinguishing systems, e.g. sprinkler systems	wet	+5)
15.	Non water filled fire extinguishing systems, e.g. foam, drencher systems	dry/wet	+5)
16.	Fire main (not permanently filled)	dry/wet	+5)
17.	Ballast system	wet	+5)
18.	Cooling water system	wet	+5)
19.	Tank cleaning services	dry	+5)
20.	Non-essential systems	dry, dry/wet, wet	+5)
Fresh water			
21.	Cooling water system	wet	+
22.	Condensate return	wet	+
23.	Non-essential systems	dry, dry/wet, wet	+
Sanitary/drains/scuppers			
24.	Deck drains (internal)	dry	+4)
25.	Sanitary drains	dry	+
26.	Scuppers and discharge (overboard)	dry	+
Sounding/vent			
27.	Water tanks/dry spaces	dry/wet	+
28.	Oil tanks (f.p > 60 °C)	dry	+
Miscellaneous			
29.	Starting/control air	dry	+3)
30.	Service air (non essential)	dry	+
31.	Brine	wet	+
32.	CO_2 system (outside protected space)	dry	NP
33.	CO_2 system (inside protected space)	dry	+
34.	Steam	wet	+

Abbreviations

+ Application permitted
NP Application not permitted

Footnotes

1) Not permitted in pump rooms and open decks.
2) Not permitted 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.
3) Not permitted in machinery spaces of category A.
4) Permitted only above bulkhead deck of passenger ships and freeboard deck of cargo ships.
5) Pipe couplings made of austenitic stainless steel material grades covered by this certificate are not permitted to use in sea-water applications.
6) Pipe Coupling with Carbon Steel, Stainless Steel and Copper Nickel materials are considered fire resistance types fulfilling “8min dry + 22min wet conditions”

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

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

NBR (Perbunan®)	:	-20°C to +180°C
Viton	:	-26°C to +205°C
EPDM	:	-55°C to +205°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:

Temperature	20°C	50°C	100°C	150°C	205°C
Carbon Steel ASTM A350 Gr.LF2	1	1	1	0.89	0.80
Stainless Steel A479 Gr.316, S32205, S32750, S31803	1	0,95	0,85	0,77	0.70
Cu/Ni 70/30, C71500	1	0,97	0,96	0,93	0.86

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/ vacuum condition or for gases having an oxygen content exceeding 25%

Pipe coupling where pressure-tight joints are made on the threads with parallel or tapered threads are not approved for piping systems conveying toxic or flammable media or services where fatigue, severe erosion or crevice corrosion is expected to occur as per DNV-RU-SHIP Pt.4 Ch.6 Sec.9 [5.2.6]. Pipe coupling is limited to the following applications solely:

1. CO_2 systems inside of protected spaces and CO_2 cylinder rooms;
2. Threaded joints for direct connectors of pipe lengths with tapered thread shall be allowed for:
    a. Class I, outside diameter not more than 33.7 mm;
    b. Class II and class III;
3. Threaded joints with parallel thread shall be allowed for class III.

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
Burst Pressure test & Leakage test report witnessed by DNVGL surveyor dated 2018-04-13 (DP40N – 4")
Pull-out test report SwRI 18.18055.18.108 witnessed by DNV GL surveyor dated 2018-03-21 (DP40N – 4")
Fire test report SwRI 01.23234.18.402 dated 2018-04-13 (DP40N – 4")
Vibration and impulse test report dated 2018-10-01 (DP40N – 4")
Burst pressure test and tightness test reports stamped as witnessed by DNV dated 2020-05-28
Fire test report number 01.24919.01.608 issued by Southwest Research institute dated 2020-07-28
Pull out test report number 18.18055.20.110 issued by Southwest Research institute dated 2020-08-06
Renewal burst pressure test reports: DNV-001, DNV-002, DNV-003
Fire test report : No. 01.28401.24.202i, No. 01.28401.24.202e, No. 01.28401.24.202c, No.01.28401.24.202a, No. 01.28401.24.202g issued by Southwest Research Institude dated 2024-10-07
Fire test report : No.01.28401.01.206c, No.01.28401.01.206h, NO.01.28401.01.206a, NO.01.28401.01.206d issued by Southwest Research Institude dated 2024-09-10
Fire test report No. 01.28401.01.206a Dated: 2024-06-13
Fire test report No. 01.28401.01.206d Dated: 2024-06-14
Fire test report No. 01.28401.24.202a Dated: 2024-10-07
Fire test report No. 01.28401.01.206c Dated: 2024-06-12
Fire test report No. 01.28401.01.206h Dated: 2024-06-13
Fire test report No. 01.28401.24.202c Dated: 2024-09-03
Fire test report No. 01.28401.24.202e Dated: 2024-08-29 and 2024-09-03
Fire test report No. 01.28401.01.206h Dated: 2024-06-13
Fire test report No. 01.28401.24.202c Dated: 2024-08-29 and 2024-09-03
Fire test report No. 01.28401.24.202i Dated: 2024-08-29 and 2024-09-03
Fire test report No. 01.28401.24.202g Dated: 2024-08-29 and 2024-09-03
Material Report data sheet for correction in Viton's maximum and minimum Temperature
Material Report data sheet for correction in EPDM's maximum and minimum Temperature

Tests carried out

Leakage test, burst pressure test, hydraulic proof test, impulse test, vibration test, 8min dry / 22min Wet Fire Test, pull-out test

Marking of product

For traceability with this type approval the couplings are at least to be marked with:

- manufacturer's name or trademark
- type designation and size

Periodical assessment

This certificate is only valid if required periodical assessments are carried out with satisfactory results.

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.

To check the validity of this certificate, please look it up in https://approvalfinder.dnv.com.