DNV·GL

TYPE APPROVAL CERTIFICATE

Certificate No:
TAP00000SC
Revision No:
1

This is to certify:

That the Flexible Hoses of Non-Metallic Material with Permanently Fitted Couplings

with type designation(s)
PH-277 4SP EN856 MSHA, PH-278 4SH EN856 MSHA, PH-177 R12 EN856 / SAE 100 R12 MSHA, PH-178 R13 EN856 / SAE 100 R13 MSHA, PH-279 SAE 100 R15 MSHA

Issued to
POLYHOSE INDIA (RUBBER) PVT. LTD.
Tamilnadu, India

is found to comply with
DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
DNV GL class programme DNVGL-CP-0183 – Type approval – Flexible hoses
DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition January 2018

Application :

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

Type:	Temperature range:	Max. working press.:	Sizes:
PH-277 4SP EN856 MSHA	**See certificate**	**165 to 445 bar (see certificate)**	**DN10, 12, 16, 19, 25, 31, 38 & 51**
PH-278 4SH EN856 MSHA	**See certificate**	**250 to 420 bar (see certificate)**	**DN19, 25, 31, 38 & 51**
PH-177 R12 EN856 / SAE 100 R12 MSHA	**See certificate**	**175 to 280 bar (see certificate)**	**DN10, 12, 16, 19, 25, 31, 38 & 51**
PH-178 R13 EN856 / SAE 100 R13 MSHA	**See certificate**	**350 bar**	**DN19, 25, 31, 38 & 51**
PH-279 SAE 100 R15 MSHA	**See certificate**	**420 bar**	**DN19, 25, 31 & 38**

Issued at **Høvik** on **2018-06-28**

This Certificate is valid until **2022-02-02**.
DNV GL local station: **Mumbai CMC**

Approval Engineer: **Iselinn Vindstad**

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

Hose types:

1. POLYHOSE Type Designation: PH-277 4SP EN856 MSHA
   EXITFLEX Type Designation: EF-277 EN856 4SP MSHA
   FLUIDCOR Type Designation: FC-277 EN856 4SP MSHA
   ANCHOR Type Designation: 4SP EN 856 MSHA

   Design: Flexible rubber hoses reinforced by brass coated four steel wire spiral.
   Inner Tube: Oil and water resistant synthetic neoprene based rubber blend.
   Reinforcement: Four layers of high tensile steel wire spiral.
   Cover: Neoprene Based Rubber Blend, Weather, oil, abrasion and ozone resistant.
   Couplings: Two-piece Anchor series 2 or one-piece Fluidcor series 3 made of carbon steel - C20 / C35 / C45 (IS 1570-2), EN3B (BS 970-1), or stainless steel 304 / 316 (ASTM A479).

2. POLYHOSE Type Designation: PH-278 4SH EN856 MSHA
   EXITFLEX Type Designation: EF-278 EN856 4SH MSHA
   FLUIDCOR Type Designation: FC-278 EN856 4SH MSHA
   ANCHOR Type Designation: 4SH EN 856 PLUS MSHA

   Design: Flexible rubber hoses reinforced by brass coated four steel wire spiral.
   Inner Tube: Oil and water resistant synthetic neoprene based rubber blend.
   Reinforcement: Four layers of high tensile steel wire spiral.
   Cover: Neoprene Based Rubber Blend, Weather, oil, abrasion and ozone resistant.
   Couplings: Two-piece Anchor series 3 or two-piece Fluidcor series 2 made of carbon steel - C20 / C35 / C45 (IS 1570-2), EN3B (BS 970-1), or stainless steel 304 / 316 (ASTM A479).

3. POLYHOSE Type Designation: PH-177 R12 EN856 / SAE 100 R12 MSHA
   EXITFLEX Type Designation: EF-177 EN856 R12/ SAE 100 R12 MSHA
   FLUIDCOR Type Designation: FC-177 EN856 R12/ SAE 100 R12 MSHA
   ANCHOR Type Designation: R12 EN 856 / SAE 100 R12 MSHA

   Design: Flexible rubber hoses reinforced by brass coated four steel wire spiral.
   Inner Tube: Oil and water resistant synthetic neoprene based rubber blend.
   Reinforcement: Four layers of high tensile steel wire spiral.
   Cover: Neoprene Based Rubber Blend, Weather, oil, abrasion and ozone resistant.
   Couplings: Two-piece Anchor series 2 or one-piece Fluidcor series 3 made of carbon steel - C20 / C35 / C45 (IS 1570-2), EN3B (BS 970-1), or stainless steel 304 / 316 (ASTM A479).

4. POLYHOSE Type Designation: PH-178 R13 EN856 / SAE 100 R13 MSHA
   EXITFLEX Type Designation: EF-178 EN856 R13/ SAE 100 R13 MSHA
   FLUIDCOR Type Designation: FC-178 EN856 R13/ SAE 100 R13 MSHA
   ANCHOR Type Designation: R13 EN 856 / SAE 100 R13 MSHA

   Design: Flexible rubber hoses reinforced by brass coated four or six steel wire spiral.
   Inner Tube: Oil and water resistant synthetic neoprene based rubber blend.
   Reinforcement: Four or six layers of high tensile steel wire spiral.
   Cover: Neoprene Based Rubber Blend, Weather, oil, abrasion and ozone resistant.
   Couplings: Two-piece Anchor series 3 or two-piece Fluidcor series 2 made of carbon steel - C20 / C35 / C45 (IS 1570-2), EN3B (BS 970-1), or stainless steel 304 / 316 (ASTM A479).

5. POLYHOSE Type Designation: PH-279 SAE100 R15 MSHA
   EXITFLEX Type Designation: EF-279 SAE100 R15 MSHA
   FLUIDCOR Type Designation: FC-279 SAE100 R15 MSHA
   ANCHOR Type Designation: R15 SAE 100 MSHA

   Design: Flexible rubber hoses reinforced by brass coated four or six steel wire spiral.
   Inner Tube: Oil and water resistant synthetic neoprene based rubber blend.
   Reinforcement: Four or six layers of high tensile steel wire spiral.
   Cover: Neoprene Based Rubber Blend, Weather, oil, abrasion and ozone resistant.
   Couplings: Two-piece Anchor series 3 or two-piece Fluidcor series 2 made of carbon steel - C20 / C35 / C45 (IS 1570-2), EN3B (BS 970-1), or stainless steel 304 / 316 (ASTM A479).

Hose manufacturer & hose assembling location:
- POLYHOSE INDIA (RUBBER) PVT. LTD., Tamil Nadu, India.

Coupling Manufacturers:
- FLUIDCOR:
  - Fluidcor (Ningbo) Co., Ltd, Jiangbei District, No.566 Jinshan Road, Ningbo 315033, China
  - Polyhose India Pvt. Ltd., No. 1/160, Kannivakkam Village, No. 25, Chengalpattu Taluk, Kancheepuram, Tamil Nadu - 603202, India
- ANCHOR:
  - Caterpillar Fluid Systems SRL, Via Gobetti, 2a - Palazzo C, 20063 Cernusco sul Naviglio (Milano), Italy

Application/Limitation

Fluid medium & temperature range:

Hydraulic oil (for 1, 2 / for 3,4,5)	-40 to +100 °C / -40 to +120 °C
Water	0 to +70 °C
Air	up to +70 °C
Water glycol hydraulic fluids	-40 to +70 °C

1. PH-277 4SP EN856 MSHA

Hose designation	Dash size	DN	Hose I.D.		Maximum working pressure (bar)
			inch	mm	
PH277-06	-6	10	3/8	9.5	445
PH277-08	-8	12	½	12.7	415
PH277-10	-10	16	5/8	16.0	350
PH277-12	-12	19	¾	19.0	350
PH277-16	-16	25	1	25.4	280
PH277-20	-20	31	1 ¼	31.8	210
PH277-24	-24	38	1 ½	38.1	185
PH277-32	-32	51	2	50.8	165

2. PH-278 4SH EN856 MSHA

Hose designation	Dash size	DN	Hose I.D.		Maximum working pressure (bar)
			inch	mm	
PH278-12	-12	19	¾	19.0	420
PH278-16	-16	25	1	25.4	380
PH278-20	-20	31	1 ¼	31.8	325
PH278-24	-24	38	1 ½	38.1	290
PH278-32	-32	51	2	50.8	250

3. PH-177 R12 EN856 / SAE 100 R12 MSHA

Hose designation	Dash size	DN	Hose I.D.		Maximum working pressure (bar)
			inch	mm	
PH177-06	-6	10	3/8	9.5	280
PH177-08	-8	12	½	12.7	280
PH177-10	-10	16	5/8	16.0	280
PH177-12	-12	19	¾	19.0	280
PH177-16	-16	25	1	25.4	280
PH177-20	-20	31	1 ¼	31.8	210
PH177-24	-24	38	1 ½	38.1	175
PH177-32	-32	51	2	50.8	175

4. PH-178 R13 EN856 / SAE 100 R13 MSHA

Hose designation	Dash size	DN	Hose I.D.		Maximum working pressure (bar)
			inch	mm	
PH178-12	-12	19	¾	19.0	350
PH178-16	-16	25	1	25.4	350
PH178-20	-20	31	1 ¼	31.8	350
PH178-24	-24	38	1 ½	38.1	350
PH178-32	-32	51	2	50.8	350

5. PH-279 SAE 100 R15 MSHA

Hose designation	Dash size	DN	Hose I.D.		Maximum working pressure (bar)
			inch	mm	
PH279-12	-12	19	¾	19.0	420
PH279-16	-16	25	1	25.4	420
PH279-20	-20	31	1 ¼	31.8	420
PH279-24	-24	38	1 ½	38.1	420

Austenitic stainless steels (1.4401 and 1.4404) are not to be used in direct contact with seawater.

This certificate is valid for the specific assembly of hose and coupling type as specified, assembled and delivered by the holder (named as manufacturer) of this certificate.

All hose assemblies delivered under this type approval certificate shall be in compliance with an assembly procedure issued by the certificate holder.

For compressed air or gases above 16 bar the cover should be pin prickled.

Flexible hoses are only to be used in short lengths where it is necessary due to vibrations or flexible mounting of the machinery. The hoses shall not replace/be used where permanent piping is possible/required.

The hoses must only be fitted in places where they are always accessible.

Flexible hoses of these types are not to be used in boiler fronts.

The hoses are to be mounted in accordance with the manufacturer’s instructions.

Hoses assemblies covered by this certificate shall not be installed in systems subject to pressure below atmospheric.

Job Id: **262.1-010049-3**
Certificate No: **TAP00000SC**
Revision No: **1**

Type Approval documentation

Polyhose catalogue Rev-3:2014 – Print 2
Polyhose catalogue Hydraulic fittings (page 107 to 119)
Couplings catalogue ref.: CM_2015-11b (Anchor) & 2016-03 (Fluidcor)

Impulse test report nos.: 18 dated 2016-08-23; 10 dated 2016-06-30; 09 dated 2016-06-21; 08 dated 2016-06-13; 07 dated 2016-06-06; 06 dated 2016-05-30; 05 dated 2016-05-19; 04 dated 2016-05-05; 03 dated 2016-04-26; 02 dated 2016-04-14; 01 dated 2016-01-12; 00 dated 2016-02-05; 00 dated 2016-01-27; 00 dated 2016-01-28; 00 dated 2016-01-27

Fire test reports: 1516.0IS0110/16, 1517.0IS0110/16, 1518.0IS0110/16, 1519.0IS0110/16, 1520.0IS0110/16, 1521.0IS0110/16, 1522.0IS0110/16, 1523.0IS0110/16, 1524.0IS0110/16, 1525.0IS0110/16, 1526.0IS0110/16, 1527.0IS0110/16, 1528.0IS0110/16, 1529.0IS0110/16, 1530.0IS0110/16, 1531.0IS0110/16, 1532.0IS0110/16, 1533.0IS0110/16, 1534.0IS0110/16, 1535.0IS0110/16, 1536.0IS0110/16, 1537.0IS0110/16, 1538.0IS0110/16, 1539.0IS0110/16 1540.0IS0110/16, 1541.0IS0110/16, 1542.0IS0110/16, 1543.0IS0110/16, 1544.0IS0110/16, 1545.0IS0110/16, Fire Test Certificates with Form No.: PHIRPL/QA/067 Rev. 0 for variants PH277 4SP EN 856 MSHA 3/8" & PH177 R12 EN 856/ SAE 100 R12 MSHA 3/8 witnessed by DNV GL Surveyor dated 2016-11-06

Adhesion test reports dated 2016-10-03

Burst test certificate nos. 22, 23, 24, 25, 26, 27, 29, 34, 35 & 36 dated 2016-10-21; 28, 32 & 33 dated 2016-10-27; 30 & 31 dated 2016-11-39

General Internal test certificate nos. 58, 59, 60, 61, 63, 64, 65, 66, 67, 68, 69, 71, 72, 73, 74, 75, 76, 77, 79, 80, 81, 82, 83, 84, 85 & 86 dated 2016-10-21; 62, 70, 78, dated 2016-10-27; 87 dated 2016-11-29

Tests carried out

Dimensional check, change in length, cold flexibility, oil resistance, water resistance, cover adhesion, ozone resistance, impulse, fire & burst.

Production testing

All hose assemblies delivered under the DNV GL type approval scheme shall be subject to a pressure test at 1.5 times the maximum working pressure and shall be delivered with the pressure test report with reference to the type approval certificate.

Marking of product

For traceability to this type approval the products are to be marked with:
- Manufacturer's name or trade mark
- Type designation
- Date of manufacturing
- Nominal diameter
- Pressure rating
- Temperature rating

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.