

TYPE APPROVAL CERTIFICATE

Certificate No:
TAP0000136
Revision No:
1

This is to certify:

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

with type designation(s)

EN853 1SN, EN853 2SN, EN857 1SC, EN857 2SC, EN856 4SP, EN856 4SH, EN856 R13 & SAE100 R15 with PH Couplings

Issued to

Polimer Kaucuk San.ve Paz. A.S.
ISTANBUL, Turkey

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 GL class programme DNVGL-CP-0183 – Type approval – Flexible hoses

Application :

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

Temperature range: see page 3
Max. working press.: 40 bar to 450 bar (see page 3)
Sizes: DN05 to 51 (see page 3)

Issued at **Høvik** on **2021-10-22**

for **DNV**

This Certificate is valid until **2026-06-30**.

DNV local station: **Istanbul**

Approval Engineer: **Renata Rossi**

Zeinab Sharifi
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

8 different types of non-metallic hose assemblies with permanently fitted PH couplings:-

1. EN 853 Type 1SN
 Hose assemblies designed & constructed according to EN 853 1SN comprising of
 - Tube : oil resistant synthetic rubber;
 - Reinforcement : 1 layer of high tensile steel wire braid ;
 - Cover : oil, abrasion and weather resistant synthetic rubber;
 - Couplings designation : Ferrule: P1 / Insert: DKOS (or equivalent insert according to PH catalogue Section 2)

2. EN 853 Type 2SN
 Hose assemblies designed & constructed according to EN 853 2SN comprising of
 - Tube : oil & glycol resistant synthetic rubber;
 - Reinforcement : 2 layers of high tensile steel wire braid ;
 - Cover : oil, abrasion and weather resistant synthetic rubber.
 - Couplings designation : Ferrule: P2 – DN05 & P3 – DN06 to DN 38 / Insert: DKOS (or equivalent insert according to PH catalogue Section 2)

3. EN 857 Type 1SC
 Hose assemblies designed & constructed according to EN 857 1SC comprising of
 - Tube : oil & glycol resistant synthetic rubber;
 - Reinforcement : 1 layer of high tensile steel wire braid;
 - Cover : oil, abrasion and weather resistant synthetic rubber.
 - Couplings designation : Ferrule: P9 – DN06 to DN12 & P1 – DN16 to DN25 / Insert: DKOS (or equivalent insert according to PH catalogue Section 2)

4. EN 857 Type 2SC
 Hose assemblies designed & constructed according to EN 857 2SC comprising of
 - Tube : oil & glycol resistant synthetic rubber;
 - Reinforcement : 2 layers of high tensile steel wire braid ;
 - Cover : oil, abrasion and weather resistant synthetic rubber.
 - Couplings designation : Ferrule: P1 / Insert: DKOS (or equivalent insert according to PH catalogue Section 2)

5. EN 856 Type 4SP
 Hose assemblies designed & constructed according to EN 856 4SP comprising of
 - Tube : Oil & glycol resistant synthetic rubber;
 - Reinforcement : 4 layers of spiral plies of steel wire wrapped in alternating directions. Each spiral wire ply shall be separated by an insulating layer of synthetic rubber;
 - Cover : oil, abrasion and weather resistant synthetic rubber.
 - Couplings designation : Ferrule: P3 / Insert: DKOS (or equivalent insert according to PH catalogue Section 2)

6. EN 856 Type 4SH
 Hose assemblies constructed according to EN 856 4SH comprising of
 - Tube : oil & glycol resistant synthetic rubber;
 - Reinforcement : 4 layers of spiral plies of steel wire wrapped in alternating directions. Each spiral wire ply shall be separated by an insulating layer of synthetic rubber;
 - Cover : oil, abrasion and weather resistant synthetic rubber.
 - Couplings designation : P4-I / Insert: I-SFS6 (or equivalent insert according to PH catalogue Section 3)

7. EN 856 Type R13

Hose assemblies designed & constructed according to EN 856 R13 comprising of

- Tube : oil & glycol fluid resistant synthetic rubber;
- Reinforcement : 4 or 6 layers of spiral plies of steel wire wrapped in alternating directions. Each spiral wire ply shall be separated by an insulating layer of synthetic rubber;
- Cover : oil, abrasion and weather resistant synthetic rubber.
- Couplings designation : P6-I / Insert: I-SFS6 (or equivalent insert according to PH catalogue Section 3)

8. SAE100R15

Hose assemblies designed & constructed according to SAE 100R15 from SAE J517 comprising of

- Tube : oil & glycol fluid resistant synthetic rubber;
- Reinforcement : 4 or 6 layers of spiral plies of steel wire wrapped in alternating directions. Each spiral wire ply shall be separated by an insulating layer of synthetic rubber;
- Cover : oil, abrasion and weather resistant synthetic rubber.
- Couplings designation : P7-I / Insert: I-SFS6 (or equivalent insert according to PH catalogue Section 3)

Material of construction for End fittings:

- Stainless steel AISI 316Ti/ 1.4571

Manufacturing locations

- Hoses : Polimer Kaucuk San.ve Paz. A.S., Istanbul, Turkey
- End fittings : PH Industrie-Hydraulik GmbH & Co. KG,
Wuppermannshof 8,
D-58256 Ennepetal, Germany

Application/Limitation

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.

Nominal size, ID			Max working pressure [bar]							
SAE	Inch	DN	1SN	2SN	1SC	2SC	4SP	4SH	R13	R15
-3	3/16"	05	250	415	-	-	-	-	-	-
-4	1/4"	06	225	400	225	400	450	-	-	-
-5	5/16"	08	215	350	215	350	-	-	-	-
-6	3/8"	10	180	330	180	330	445	-	-	-
-8	1/2"	12	160	275	160	275	415	-	-	-
-10	5/8"	16	130	250	130	250	350	-	-	-
-12	3/4"	19	105	215	105	215	350	420	345	420
-16	1"	25	88	165	88	165	280	380	345	420
-20	1 1/4"	31	63	125	-	-	210	325	345	420
-24	1 1/2"	38	50	90	-	-	185	290	345	420
-32	2"	51	40	-	-	-	165	250	345	420

Fluid medium	Temperature range	
	Types R12 & R13	Types 1SN, 2SN, 1SC, 2SC, 4SP & 4SH
Hydraulic fluids as per ISO 6743-4 with exception of HFD R, HFD S & HFD T	-40°C to +120°C	-40°C to +100°C
Water based fluids	-40°C to +70°C	-40°C to +70°C
Air & water	0°C to +70°C	0°C to +70°C

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

Flexible hoses shall be limited to a length necessary to provide for relative movement between fixed and flexibly mounted items of machinery/equipment or systems.

Flexible hoses shall be accessible for inspection. Means shall be provided to isolate flexible hoses used in systems for fuel oil, lubricating oil, sea-water cooling and compressed air.

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

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

Hose assemblies covered by this certificate shall not be used in system subject to pressure below atmospheric or vacuum condition.

The outer end of the pipe coupling (performing the connection to the fixed piping) is not covered by this certificate and shall follow the below requirements:

- Flanged ends shall be according to a recognized standard
- Slip-on threaded joints having pipe threads where pressure-tight joints are made on the threads with parallel or tapered threads, shall comply with requirements of a recognized standard. Limitations stated in DNV-RU-SHIP Pt.4 Ch.6 Sec.9 [5.2.6] to be followed.
- If these outer ends are going to be part of a mechanical joint as covered by Table 10 DNV-RU-SHIP Pt.4 Ch.6 Sec.9, then they shall be separately type approved.

Production testing

All hose assemblies delivered under the DNV 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 this type approval certificate.

Type Approval documentation

<u>Document No.</u>	<u>Rev.</u>	<u>Title</u>
212517 03 44	-	SEL Hydraulik hose catalogue fated 01.04.2015
-	-	PH Industrie-Hydarulik fittings catalogue 2019
IMP.4032	-	Hydraulic hoses impulse test report for size 2" EN 853 1SN (Non skive) dated 16.04.2017
IMP.18032	-	Hydraulic hoses impulse test report for size 2" EN 853 1SN (Skive) dated 19.04.2017
IMP.4029	-	Hydraulic hoses impulse test report for size 2" EN 853 2SN (Skive) dated 7.04.2017
IMP.16028	-	Hydraulic hoses impulse test report for size 3/16" EN 853 1SN (Non skive) dated 26.04.2017
IMP.15028	-	Hydraulic hoses impulse test report for size 3/16" EN 853 2SN (Non skive) dated 27.04.2017
IMP.4036	-	Hydraulic hoses impulse test report for size 5/8" EN 853 1SN (Non skive) dated 24.04.2017
IMP.4034/1	-	Hydraulic hoses impulse test report for size 5/8" EN 853 1SN (Skive) dated 20.04.2017
IMP.17026/1	-	Hydraulic hoses impulse test report for size 5/8" EN 853 2SN (Skive) dated 21.04.2017
TR-035390A	-	P-14045 – DNV renewal TA certification – EN 853 1SN-HWB313 dated Oct 9, 2019
TR-035391A	-	P-14045 – DNV renewal TA certification – EN 853 2SN-HWB323 dated Oct 9, 2019
KK18-3590, KK18-3591, KK18-4614, KK18-4619, KK18-4621, KK18-4620, KK18-4676, KK18-4677	-	Test reports for EN 853 type 1SN witnessed by DNV Surveyor
KK18-4606, KK18-4622, KK18-4639, KK18-4678	-	Test reports for EN 853 type 2SN witnessed by DNV Surveyor
IMP.9033	-	Hydraulic hoses impulse test report for size 1 ¼" EN 856 4SH (Skive) dated 30.06.2017
IMP.3013	-	Hydraulic hoses impulse test report for size 1 ¼" EN 856 R13 (Skive) dated 5.05.2017
-	-	Hydraulic hoses impulse test report for size ¼" EN 856 4SP (Skive) dated 29.01.2018
-	-	Hydraulic hoses impulse test report for size 2" EN 856 4SH (Skive) dated 15.01.2018
IMP.3016	-	Hydraulic hoses impulse test report for size 2" EN 856 4SP (Skive) dated 27.07.2017
IMP.19020	-	Hydraulic hoses impulse test report for size 2" EN 856 R13 (Skive) dated 7.04.2017
-	-	Hydraulic hoses impulse test report for size ¾" EN 856 4SH (Skive) dated 24.01.2018

IMP.8058	-	Hydraulic hoses impulse test report for size ¾" EN 856 4SP (Skive) dated 23.05.2017
IMP.10026	-	Hydraulic hoses impulse test report for size ¾" EN 856 R13 (Skive) dated 29.05.2017
TR-035399A	-	P-14045 – DNV renewal TA certification – EN 856 4SH-PS-4SH392 dated Oct 9, 2019
TR-035397A	-	P-14045 – DNV renewal TA certification – EN 856 4SP-PS-4SP391 dated Oct 9, 2019
TR-035402A	-	P-14045 – DNV renewal TA certification – EN 856 R13-PS-R13/397 dated Oct 9, 2019
KK18-4656, KK18-4657, KK18-4658	-	Test reports for EN 856 type R13 witnessed by DNV Surveyor
KK18-4652, KK18-4651, KK18-4650, KK18-4649	-	Test reports for EN 856 type 4SP witnessed by DNV Surveyor
KK18-4653, KK18-4654, KK18-4655	-	Test reports for EN 856 type 4SH witnessed by DNV Surveyor
IMP.18033	-	Hydraulic hoses impulse test report for size 1" EN 857 1SC (Non skive) dated 22.04.2017
IMP.15027	-	Hydraulic hoses impulse test report for size 1" EN 857 2SC (Non skive) dated 24.04.2017
IMP.18051	-	Hydraulic hoses impulse test report for size 1" EN 857 2SC (Non skive) dated 28.07.2017
IMP.12014	-	Hydraulic hoses impulse test report for size 1" EN 857 2SC (Skive) dated 21.04.2017
IMP.15025	-	Hydraulic hoses impulse test report for size 1" EN 857 1SC (Non skive) dated 17.04.2017
IMP.15026	-	Hydraulic hoses impulse test report for size 1" EN 857 2SC (Non skive) dated 20.04.2017
IMP.16026/1	-	Hydraulic hoses impulse test report for size ½" EN 857 1SC (Non skive) dated 21.04.2017
IMP.16026	-	Hydraulic hoses impulse test report for size ½" EN 857 2SC (Skive) dated 21.04.2017
IMP.11018	-	Hydraulic hoses impulse test report for size ¼" EN 857 1SC (Non skive) dated 10.05.2017
IMP.11017	-	Hydraulic hoses impulse test report for size ¼" EN 857 2SC (Non skive) dated 6.05.2017
IMP.11019/2	-	Hydraulic hoses impulse test report for size ¼" EN 857 2SC (Non skive) dated 22.04.2017
IMP.11019/1	-	Hydraulic hoses impulse test report for size ¼" EN 857 2SC (Skive) dated 22.04.2017
TR-035393A	-	P-14045 – DNV renewal TA certification – EN 857 1SC-HWB315 dated Oct 9, 2019
TR-035394A	-	P-14045 – DNV renewal TA certification – EN 853 1SN-HWB325 dated Oct 9, 2019
KK18-4608, KK18-4609, KK18-4645, KK18-4644, KK18-4611 & KK18-4610	-	Test reports for EN 857 type 2SC witnessed by DNV Surveyor
KK18-4641, KK18-4701, KK18-4643	-	Test reports for EN 857 type 1SC witnessed by DNV Surveyor
IMP.3009	-	Hydraulic hoses impulse test report for size 1½" SAE100 R15 (Skive) dated 4.04.2017
-	-	Hydraulic hoses impulse test report for size 1" SAE100 R15 (Skive) dated 5.06.2017
IMP.7022	-	Hydraulic hoses impulse test report for size ¾" SAE100 R15 (Skive) dated 29.06.2017
TR-035403A	-	P-14045 – DNV renewal TA certification – SAE100R15-PS-R15/398 dated Oct 9, 2019
KK18-4612, KK18-4659, KK18-4664	-	Test reports for SAE100 R15 witnessed by DNV Surveyor
KK20-2150	-	Test report for hose 2SN 1 ½" dated 28.04.2020
TR-038522A	-	Summary Test report of 2SN 1 ½" Project for DNV including fire test report witnessed by DNV Surveyor dated Apr 29, 2020
-	-	Renewal burst test report witnessed by DNV surveyor dated 2021-09-16



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Tests carried out

Dimensional check, Change in length, Burst pressure, Impulse, Fluid resistance, Ozone resistance, Cold flexibility, Fire and Cover adhesion tests

Marking of product

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

- Hose manufacturer's name or trademark;
- Date of manufacture (month/year);
- Designation type reference;
- Nominal diameter;
- Pressure rating;
- Temperature rating.

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 DNVGL-CP-0338.