DNV·GL

Certificate No:
TAP0000191

TYPE APPROVAL CERTIFICATE

This is to certify:

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

with type designation(s)
HWB313, HWB323, HWB315, HWB325, PS-4SP391, PS-4SH-392, PS-R12/393P3, PS-R13/397, PS-R15/398, PS-R15/3P8, HWBR16/32F, HWBR17/31C-32C, W3-HWB300, HWB2N-K32S, HWB2N-K32U

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

is found to comply with
DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition January 2018
DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
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 GL.

Type:	Temperature range:	Max. working press.:	Sizes:
HWB313	See page 6	40 bar to 250 bar	DN 5 to DN 51
HWB323	See page 6	80 bar to 415 bar	DN 5 to DN 51
HWB315	See page 6	88 bar to 225 bar	DN 6 to DN 25
HWB325	See page 6	165 bar to 400 bar	DN 6 to DN 25
PS-4SP391	See page 6	280 bar to 450 bar	DN 6 to DN 25
PS-4SH-392	See page 6	250 bar to 420 bar	DN 19 to DN 51
PS-R12/393P3	See page 6	175 bar to 280 bar	DN 10 to DN 51
PS-R13/397	See page 6	345 bar	DN 19 to DN 51
PS-R15/398	See page 6	420 bar	DN 10 to DN 51
PS-R15/3P8	See page 6	420 bar	DN 10 to DN 51
HWBR16/32F	See page 6	125 bar to 400 bar	DN 6 to DN 31
HWBR17/31C-32C	See page 6	210 bar	DN 6 to DN 25
W3-HWB300	See page 6	327 bar to 500 bar	DN 10 to DN 25
HWB2N-K32S	See page 6	200 bar to 450 bar	DN 6 to DN 25
HWB2N-K32U	See page 6	225 bar to 450 bar	DN 6 to DN 25

Issued at **Høvik** on **2018-09-28**
This Certificate is valid until **2021-06-30**.
DNV GL local station: **Istanbul**

for **DNV GL**

Approval Engineer: **Maheshraja Venkatesan**

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.

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Product description

15 different types of non-metallic hose assemblies with permanently fitted 'INTERTRACO' couplings:-

1. HWB313 (FORCESTREAM 1AT)
   Hoses designed & constructed according to SAE 100R1 AT from SAE J517/ 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.

2. HWB323 (FORCESTREAM 2AT)
   Hoses designed & constructed according to SAE 100R2 AT from SAE J517/ 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.

3. HWB315 (FORCESTREAM 1SC)
   Hoses 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.

4. HWB325 (FORCESTREAM 2SC)
   Hoses 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.

5. PS-4SP391 (POWERSTREAM 4SP)
   Hoses 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.

6. PS-4SH392 (POWERSTREAM 4SH)
   Hoses 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.

7. PS-R12/393P3 (POWERSTREAM R12+)
   Hoses designed & constructed according to EN 856 R12 comprising of
   Tube : oil & glycol fluid 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.

8. PS-R13/397 (POWERSTREAM R13)
   Hoses 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.

9. PS-R15/398 (POWERSTREAM R15)
   Hoses 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.

10. PS-R15/3P8 (POWERSTREAM R15+)
    Hoses 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.

11. HWBR17/31C-32C (FORCESTREAM R17)
    Hoses designed & constructed according to SAE 100R17 from SAE J517 comprising of
    Tube : oil & glycol fluid resistant synthetic rubber;
    Reinforcement : 1 or 2 layers of spiral plies of steel wire;
    Cover : oil, abrasion and weather resistant synthetic rubber.

12. HWBR16/32F (SELPLUS 2S)
    Hoses designed & constructed according to SAE 100R16 from SAE J517 comprising of
    Tube : oil & glycol fluid resistant synthetic rubber;
    Reinforcement : 2 layers of spiral plies of steel wire;
    Cover : oil, abrasion and weather resistant synthetic rubber.

13. W3-HWB300 (WOOD)
    Tube : oil & glycol fluid resistant synthetic rubber;
    Reinforcement : 3 layers of high tensile steel wire braid;
    Cover : oil, abrasion and weather resistant synthetic rubber.

14. HWB2N-K32S (SUPERSTREAM 2K)
    Tube : oil & glycol fluid resistant synthetic rubber;
    Reinforcement : 2 layers of high tensile steel wire braid;
    Cover : oil, abrasion and weather resistant synthetic rubber.

15. HWB2N-K32U (ULTRASTREAM 2K)
    Tube : oil & glycol fluid resistant synthetic rubber;
    Reinforcement : 2 layers of high tensile steel wire braid;
    Cover : oil, abrasion and weather resistant synthetic rubber.

Coupling details:-

Coupling manufacturer : Intertraco italia Spa,
Via Amaldi Edoardo, 1A, 46029 Suzzara MN, Italy

Material of construction : Carbon steel fittings: S355J2C UNI EN 10277-2,
36SMnPb14 UNI EN 10277-3, 11SMnPb37 UNI EN 10277-3,
11SMnPb30 UNI EN 10277-3, C45 UNI EN 10277-2
Stainless steel fittings: X2CrNiMo 17-12-2 EN 10088-3

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.

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

Nominal size, ID			HWB313 (FORCESTREAM 1AT)		HWB323 (FORCESTREAM 2AT)	
			Max. working pressure (bar)	Coupling type	Max. working pressure (bar)	Coupling type
SAE	inch	DN		Ferrule part #		
-3	3/16″	5	250	B+SN03T-03	415	B+SN03T-03
-4	¼″	6	225	B+SN03T-04	400	B+SN03T-04
-5	5/16″	8	215	B+SN03T-05	350	B+SN03T-05
-6	3/8″	10	180	B+SN03T-06	330	B+SN03T-06
-8	½″	12	160	B+SN03T-08	275	B+SN03T-08
-10	5/8″	16	130	B+SN03T-10	250	B+SN03T-10
-12	¾″	19	105	B+SN03T-12	215	B+SN03T-12
-16	1″	25	88	B+SN03T-16	165	B+SN03T-16
-20	1 ¼″	31	63	B+SN03T-20	125	B+SN03T-20
-24	1 ½″	38	50	B+SN03T-24	90	B+SN03T-24
-32	2″	51	40	B+SN03T-32	80	B+SN03T-32

Nominal size, ID			HWB315 (FORCESTREAM 1SC)		HWB325 (FORCESTREAM 2SC)	
			Max. working pressure (bar)	Coupling type	Max. working pressure (bar)	Coupling type
SAE	inch	DN				
-4	¼″	6	225	B+SCX0T-04	400	B+SN03T-04
-5	5/16″	8	215	B+SCX0T-05	350	B+SN03T-05
-6	3/8″	10	180	B+SCX0T-06	330	B+SN03T-06
-8	½″	12	160	B+SCX0T-08	275	B+SN03T-08
-10	5/8″	16	130	B+SCX0T-10	250	B+SN03T-10
-12	¾″	19	105	B+SCX0T-12	215	B+SN03T-12
-16	1″	25	88	B+SCX0T-16	165	B+SN03T-16

Nominal size, ID			PS-4SP391 (POWERSTREAM 4SP)		PS-4SH392 (POWERSTREAM 4SH)	
			Max. working pressure (bar)	Coupling type	Max. working pressure (bar)	Coupling type
SAE	inch	DN				
-4	¼″	6	450	B+S042004	-	-
-6	3/8″	10	445	B+S042006	-	-
-8	½″	12	415	B+S042008	-	-
-10	5/8″	16	350	B+S042010	-	-
-12	¾″	19	350	B+S042012	420	I+S004I-12
-16	1″	25	280	B+S042016	380	I+S004I-16
-20	1 ¼″	31	-	-	350	I+S004I-20
-24	1 ½″	38	-	-	290	I+S004I-24
-32	2″	51	-	-	250	I+S004I-32

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Nominal size, ID			PS-R12/393P3 (POWERSTREAM R12+)		PS-R13/397 (POWERSTREAM R13)	
SAE	inch	DN	Max. working pressure (bar)	Coupling type	Max. working pressure (bar)	Coupling type
-6	3/8″	10	280	B+S042006	-	-
-8	½″	12	280	B+S042008	-	-
-10	5/8″	16	280	B+S042010	-	-
-12	¾″	19	280	B+S042012	345	I+S004I-12
-16	1″	25	280	B+S042016	345	I+S004I-16
-20	1 ¼″	31	210	B+S042020	345	I+S006I-20
-24	1 ½″	38	175	B+S042024	345	I+S006I-24
-32	2″	51	175	B+S042032	345	I+S006I-32

Nominal size, ID			PS-R15/398 (POWERSTREAM R15)		PS-R15/3P8 (POWERSTREAM R15+)	
SAE	inch	DN	Max. working pressure (bar)	Coupling type	Max. working pressure (bar)	Coupling type
-6	3/8″	10	420	B+S042006	420	B+S042006
-8	½″	12	420	B+S042008	420	B+S042008
-10	5/8″	16	420	B+S043010	420	B+S043010
-12	¾″	19	420	I+S004I-12	420	I+S004I-12
-16	1″	25	420	I+S004I-16	420	I+S004I-16
-20	1 ¼″	31	420	I+S006I-20	420	I+S006I-20
-24	1 ½″	38	420	I+S006I-24	420	I+S006I-24
-32	2″	51	420	I+S006I-32	420	I+S006I-32

Nominal size, ID			HWBR16/32F (SELPLUS 2S)				
SAE	inch	DN	OD max. (mm)	Min. bend radius (mm)	Max. working pressure (bar)	Min. burst pressure (bar)	Coupling type
-4	¼″	6	13.2	50	400	1600	B+SN03T-04
-5	5/16″	8	15.0	55	350	1400	B+SN03T-05
-6	3/8″	10	17.1	65	330	1320	B+SN03T-06
-8	½″	12	20.7	90	275	1100	B+SN03T-08
-10	5/8″	16	23.8	100	250	1000	B+SN03T-10
-12	¾″	19	27.7	120	215	860	B+SN03T-12
-16	1″	25	35.5	150	165	660	B+SN03T-16
-20	1 ¼″	31	42.6	210	125	500	B+SN03T-20

Nominal size, ID			HWBR17 (FORCESTREAM R17)	
SAE	inch	DN	Max. working pressure (bar)	Coupling type
H31C-ONE WIRE				
-4	¼″	6	210	B+SCX0T-04
-5	5/16″	8	210	B+SCX0T-05
-6	3/8″	10	210	B+SCX0T-06
-8	½″	12	210	B+SCX0T-08
H32C-TWO WIRES				
-8	½″	12	210	B+SN03T-08
-10	5/8″	16	210	B+SN03T-10
-12	¾″	19	210	B+SN03T-12
-16	1″	25	210	B+SN03T-16

Nominal size, ID			W3-HWB300 (WOOD)				
SAE	inch	DN	OD max. (mm)	Min. bend radius (mm)	Max. working pressure (bar)	Min. burst pressure (bar)	Coupling type
-6	3/8″	10	22.0	120	500	2000	B+S0420-06

-8	½"	12	25.2	160	470	1880	B+S0420-08
-10	5/8"	16	28.8	210	410	1640	B+S0420-10
-12	¾"	19	32.5	260	375	1500	B+S0420-12
-16	1"	25	40.5	310	327	1308	B+S0420-16

Nominal size, ID			HWB2N-K32S (SUPERSTREAM 2K)				
SAE	inch	DN	OD max. (mm)	Min. bend radius (mm)	Max. working pressure (bar)	Min. burst pressure (bar)	Coupling type
-4	¼"	6	13.1	45	450	1800	B+SN03T-04
-5	5/16"	8	15.0	60	420	1680	B+SN03T-05
-6	3/8"	9	17.1	70	385	1540	B+SN03T-06
-8	½"	12	20.3	90	345	1380	B+SN03T-08
-10	5/8"	16	23.7	130	290	1160	B+SN03T-10
-12	¾"	19	27.7	160	280	1120	B+SN03T-12
-16	1"	25	35.6	210	200	800	B+SN03T-16

Nominal size, ID			HWB2N-K32U (ULTRASTREAM 2K)				
SAE	inch	DN	OD max. (mm)	Min. bend radius (mm)	Max. working pressure (bar)	Burst pressure (bar)	Coupling type
-4	¼"	6	13.1	45	450	1800	B+SN03T-04
-5	5/16"	8	14.7	55	420	1680	B+SN03T-05
-6	3/8"	10	17.1	65	385	1540	B+SN03T-06
-8	½"	12	20.3	80	345	1380	B+SN03T-08
-10	5/8"	16	25.0	90	320	1280	B+SN03T-10
-12	¾"	19	29.3	120	300	1200	B+SN03T-12
-16	1"	25	35.8	160	225	900	B+SN03T-16

Fluid medium	Temperature range	
	PS-R12/393P3, PS-R13/397, PS-R15/398 & PS-R15/3P8	HWB313, HWB323, HWB315, HWB325, PS-4SP391, PS-4SH392, HWBR16/32F, HWBR17/31C-32C, W3-HWB300, HWB2N-K32S & HWB2N-K32U
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

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

Each hose assembly is before delivery to be hydraulic pressure tested to 1.5 times the maximum working pressure, and delivered with the manufacturer's pressure test certificate with reference to this type approval certificate.

Flexible hoses are only to be used where it is necessary due to vibrations or flexible mounting of machinery. The hose shall not replace/be used where permanent piping is possible/required. Hoses shall only be fitted in places where they are always accessible.

The hoses covered by this certificate are not permitted on boiler fronts.

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

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

Type Approval documentation

Tests carried out
Dimensional check, Change in length, burst, cover adhesion, oil resistance, cold flexbility, ozone resistance, impulse, leakage, vacuum & fire resistance tests.

Marking of product
For traceability to this type approval, each hose assembly shall be marked on the hose end fitting atleast with the following particulars:

- Manufacturers name or trademark
- Hose type and size
- Maximum working pressure

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.