

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-4SH392, PS-R12/393P3,
HWBR17/31C-32C, HWBR16/32F, W3-HWB300, HWB2N-K32S, HWB2N-K32U, HWB1N-K31S

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 all vessels classed by DNV GL.

Type:	Temperature range:	Max. working press.:	Sizes:
HWB313	See page 6	40 to 250 bar	DN 5 to DN 51
HWB323	See page 6	80 to 415 bar	DN 5 to DN 51
HWB315	See page 6	88 to 225 bar	DN 6 to DN 25
HWB325	See page 6	165 to 400 bar	DN 6 to DN 25
PS-4SP391	See page 6	165 to 450 bar	DN 6 to DN 51
PS-4SH392	See page 6	250 to 420 bar	DN 19 to DN 51
PS-R12/393P3	See page 6	175 to 280 bar	DN 10 to DN 51
HWBR17/31C-32C	See page 6	210 bar	DN 6 to DN 25
HWBR16/32F	See page 6	165 to 400 bar	DN 6 to DN 25
W3-HWB300	See page 6	327 to 500 bar	DN 10 to DN 25
HWB2N-K32S	See page 6	200 to 450 bar	DN 6 to DN 25
HWB2N-K32U	See page 6	225 to 450 bar	DN 6 to DN 25
HWB1N-K31S	See page 6	110 to 290 bar	DN 6 to DN 25

Issued at **Høvik** on **2018-01-22**This Certificate is valid until **2021-06-30**.for **DNV GL**DNV GL local station: **Istanbul**Approval Engineer: **Maheshraja Venkatesan**.....
Marianne Spæren Marveng
Head of SectionThis 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

13 different types of non-metallic hose assemblies with permanently fitted 'Tieffe' 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. 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.

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9. 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.

10. 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.

11. 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.

12. 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.

13. HWB1N-K31S (SUPERSTREAM 1K)

Tube : oil & glycol fluid resistant synthetic rubber;
Reinforcement : 1 layer of high tensile steel wire braid;
Cover : oil, abrasion and weather resistant synthetic rubber.

Coupling details:

Coupling manufacturer : Tieffe S.p.a.,
Via Dell'industria 7,
27010 Cura Carpignano (PV), Italy

Material of construction : Grade 11 SMnPb 37 from EN 10277-3

Application/Limitation

Nominal size, ID			HWB313 (FORCESTREAM 1AT)			HWB323 (FORCESTREAM 2AT)		
			Max. working pressure (bar)	Coupling type		Coupling type		
SAE	inch	DN		Ferrule part #	Insert part #	Max. working pressure (bar)	Ferrule part #	Insert part #
-3	3/16"	5	250	BXT103	CX03	415	BXT203	CX03
-4	1/4"	6	225	BXT104/ BNK104	CX04	400	BXT204	CX04
-5	5/16"	8	215	BXT105/ BNK105	CX05	350	BXT205	CX05
-6	3/8"	10	180	BXT106/ BNK106	CX06	330	BXT206	CX06
-8	1/2"	12	160	BXT108/ BNK108	CX08	275	BXT208	CX08
-10	5/8"	16	130	BXT110/ BNK110	CX10	250	BXT210	CX10
-12	3/4"	19	105	BXT112/ BNK112	CX12	215	BXT212	CX12
-16	1"	25	88	BXT116/ BNK116	CX16	165	BXT216	CX16
-20	1 1/4"	31	63	BXT120	CX20	125	BXT220	CX20
-24	1 1/2"	38	50	BXT124	CX24	90	BXT224	CX24
-32	2"	51	40	BXT132	CX32	80	BXT232	CX32

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Nominal size, ID			HWB315 (FORCESTREAM 1SC)			HWB325 (FORCESTREAM 2SC)		
SAE	inch	DN	Max. working pressure (bar)	Coupling type		Max. working pressure (bar)	Coupling type	
				Ferrule part #	Insert part #		Ferrule part #	Insert part #
-4	1/4"	6	225	BXC04/ BNK104	CX04	400	BXT104/ BNK104	CX04
-5	5/16"	8	215	BXC05/ BNK105	CX05	350	BXT105/ BNK105	CX05
-6	3/8"	10	180	BXC06/ BNK106	CX06	330	BXT106/ BNK106	CX06
-8	1/2"	12	160	BXC08/ BNK108	CX08	275	BXT108/ BNK108	CX08
-10	5/8"	16	130	BXC10/ BNK110	CX10	250	BXT110/ BNK110	CX10
-12	3/4"	19	105	BXC112/ BNK112	CX12	215	BXT112/ BNK112	CX12
-16	1"	25	88	BXC16/ BNK116	CX16	165	BXT116/ BNK116	CX16

Nominal size, ID			PS-4SP391 (POWERSTREAM 4SP)			PS-4SH392 (POWERSTREAM 4SH)		
SAE	inch	DN	Max. working pressure (bar)	Coupling type		Max. working pressure (bar)	Coupling type	
				Ferrule part #	Insert part #		Ferrule part #	Insert part #
-4	1/4"	6	450	BXS04	CX04	-	-	-
-6	3/8"	10	445	BXS06	CX06	-	-	-
-8	1/2"	12	415	BXS08	CX08	-	-	-
-10	5/8"	16	350	BXS10	CX10	-	-	-
-12	3/4"	19	350	BXS12	CX12	420	BXS12	CX12
-16	1"	25	280	BXS16	CX16	380	BXS16	CX16
-20	1 1/4"	31	210	BXS20	CX20	350	BXSH20	CX20
-24	1 1/2"	38	185	BXS24	CX24	290	BXSH24	CX24
-32	2"	51	165	BXS32	CX32	250	BXSH32	CX32

Nominal size, ID			PS-R12/393P3 (POWERSTREAM R12)		
SAE	inch	DN	Max. working pressure (bar)	Coupling type	
				Ferrule part #	Insert part #
-6	3/8"	10	280	BXT406	CX06
-8	1/2"	12	280	BXT408	CX08
-10	5/8"	16	280	BXT410	CX10
-12	3/4"	19	280	BXT412A	CX12
-16	1"	25	280	BXT416A	CX16
-20	1 1/4"	31	210	BXS20	CX20
-24	1 1/2"	38	175	BXS24	CX24
-32	2"	51	175	BXS32	CX32

Nominal size, ID			HWBR17 (FORCESTREAM R17)			
			Max. working pressure (bar)	Coupling type		
SAE	inch	DN			Ferrule part #	Insert part #
H31C-ONE WIRE						
-4	¼"	6	210	BNK104	CX04	
-5	5/16"	8	210	BNK105	CX05	
-8	½"	12	210	BNK108	CX08	
H32C-TWO WIRES						
-8	½"	12	210	BNK108	CX08	
-10	5/8"	16	210	BNK110	CX10	
-12	¾"	19	210	BNK112	CX12	
-16	1"	25	210	BNK116	CX16	

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Nominal size, ID			HWBR16/32F (SELPLUS 2S)					Coupling type	
			OD max. (mm)	Min. bend radius (mm)	Max. working pressure (bar)	Min. burst pressure (bar)			
SAE	inch	DN					Ferrule part #	Insert part #	
-4	¼"	6	13.2	50	400	1600	BNK104	CX04	
-5	5/16"	8	15.0	55	350	1400	BNK105	CX05	
-6	3/8"	10	17.1	65	330	1320	BNK106	CX06	
-8	½"	12	20.7	90	275	1100	BNK108	CX08	
-10	5/8"	16	23.8	100	250	1000	BNK110	CX10	
-12	¾"	19	27.7	120	215	860	BNK112	CX12	
-16	1"	25	35.5	150	165	660	BNK116	CX16	

Nominal size, ID			W3-HWB300 (WOOD)					
			OD max. (mm)	Min. bend radius (mm)	Max. working pressure (bar)	Min. burst pressure (bar)	Coupling type	
SAE	inch	DN					Ferrule part #	Insert part #
-6	3/8"	10	22.0	120	500	2000	BXS06	CX06
-8	1/2"	12	25.2	160	470	1880	BXS08	CX08
-10	5/8"	16	28.8	210	410	1640	BXS10	CX10
-12	3/4"	19	32.5	260	375	1500	BXS12	CX12
-16	1"	25	40.5	310	327	1308	BXS16	CX16

Nominal size, ID			HWB2N-K32S (SUPERSTREAM 2K)					
			OD max. (mm)	Min. bend radius (mm)	Max. working pressure (bar)	Min. burst pressure (bar)	Coupling type	
Ferrule part #	Insert part #							
SAE	inch	DN						
-4	¼"	6	13.1	45	450	1800	BXT104/ BNK104	CX04
-5	5/16"	8	15.0	60	420	1680	BXT105/ BNK105	CX05
-6	3/8"	9	17.1	70	385	1540	BXT106/ BNK106	CX06
-8	½"	12	20.3	90	345	1380	BXT108/ BNK108	CX08
-10	5/8"	16	23.7	130	290	1160	BXT110/ BNK110	CX10
-12	¾"	19	27.7	160	280	1120	BXT112/ BNK112	CX12
-16	1"	25	35.6	210	200	800	BXT116/ BNK116	CX16

Nominal size, ID			HWB2N-K32U (ULTRASTREAM 2K)					
			OD max. (mm)	Min. bend radius (mm)	Max. working pressure (bar)	Burst pressure (bar)	Coupling type	
SAE	inch	DN					Ferrule part #	Insert part #
-4	¼"	6	13.1	45	450	1800	BXT104/ BNK104	CX04
-5	5/16"	8	14.7	55	420	1680	BXT105/ BNK105	CX05
-6	3/8"	10	17.1	65	385	1540	BXT106/ BNK106	CX06
-8	½"	12	20.3	80	345	1380	BXT108/ BNK108	CX08
-10	5/8"	16	25.0	90	320	1280	BXT110/ BNK110	CX10
-12	¾"	19	29.3	120	300	1200	BXT112/ BNK112	CX12
-16	1"	25	35.8	160	225	900	BXT116/ BNK116	CX16

Nominal size, ID			HWB1N-K31S (SUPERSTREAM 1K)					
			OD max. (mm)	Min. bend radius (mm)	Max. working pressure (bar)	Min. burst pressure (bar)	Coupling type	
Ferrule part #	Insert part #							
SAE	inch	DN						
-4	¼"	6	12.3	40	290	1160	BXC04/ BNK104	CX04
-5	5/16"	8	14.1	55	250	1000	BXC05/ BNK105	CX05
-6	3/8"	9	17.0	65	230	920	BXC06/ BNK106	CX06
-8	½"	12	19.5	80	200	800	BXC08/ BNK108	CX08
-10	5/8"	16	23.1	105	150	600	BXC10/ BNK110	CX10
-12	¾"	19	27.0	120	150	600	BXC12/ BNK112	CX12
-16	1"	25	34.8	160	110	440	BXC16/ BNK116	CX16

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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.

Fluid medium	Temperature range	
	PS-R12/393P3	HWB313, HWB323, HWB315, HWB325, HWBR16/32F, HWBR17/31C-32C, HWB2N-K32S, HWB2N-K32U, W3-HWB300, PS-4SP391, PS-4SH392 & HWB2N-K32S
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 flexibility, 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 at least 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.