

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Flexible Hoses of Metallic Material with permanently fitted couplings

with type designation(s)
1484-01-xx, 1484-02-xx, 1485-01-xx, 1485-02-xx

Issued to
Hydroscand Special Hoses
MOTALA, Sweden

is found to comply with
DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition January 2018
DNV GL class programme DNVGL-CP-0184 – Type approval – Flexible hoses with permanently fitted couplings

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:
1484-01-xx	-200°C to +550°C	3.5 to 75 bar (size dependant, see page 2)	3/8" to 10" (see page 2)
1484-02-xx	-200°C to +550°C	5 to 105 bar (size dependant, see page 2)	3/8" to 10" (see page 2)
1485-01-xx	-200°C to +550°C	10 to 75 bar (size dependant, see page 2)	3/8" to 6" (see page 2)
1485-02-xx	-200°C to +550°C	15 to 105 bar (size dependant, see page 2)	3/8" to 6" (see page 2)

Issued at **Høvik** on **2020-05-15**

This Certificate is valid until **2025-05-14**.

DNV GL local station: **Sweden CMC**

Approval Engineer: **Maheshraja Venkatesan**



for **DNV GL**
Digitally Signed By: Ragavendhra Rao, Vishnumurthi

Location: DNV GL Høvik, Norway

on behalf of

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 GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") 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

Flexible hoses of metallic materials with permanently fitted couplings

Hose types:

- 1484-01-xx (SP.T.9750), 1 layer of wire braid reinforcement
- 1484-02-xx (SP.T.9755), 2 layers of wire braid reinforcement
- 1485-01-xx (SP.T.9650), 1 layer of wire braid reinforcement
- 1485-02-xx (SP.T.9655), 2 layers of wire braid reinforcement

Materials:

Hoses	Stainless steel	AISI 316L	1.4404/ 1.4435	EN 10028-7
		AISI 321	1.4541	EN 10028-7
Braiding	Stainless steel	AISI 304	1.4301	EN 10088-3
		AISI 321	1.4541	EN 10088-3
		AISI 316L	1.4404	EN 10088-3
		AISI 316L	1.4435	EN 10088-3
Ferrule & End fittings	Stainless steel	316L	1.4404	EN 10088-1
		304	1.4301	EN 10088-1

Hose & ferrule manufacturer : Tubiflex S.P.A., Orbassano TO, Italy
 End fitting manufacturer : Hydroscand Special Hoses, Motala, Sweden

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.

Pressure rating at 20°C:

Size		Maximum working pressure (bar)			
DN	Inch	1484-01-xx	1484-02-xx	1485-01-xx	1485-02-xx
10	3/8	75	105	75	105
12	1/2	70	100	70	100
16	5/8	65	90	65	90
20	3/4	50	75	50	75
25	1	40	60	40	60
32	1 1/4	35	50	35	50
40	1 1/2	30	40	30	40
50	2	25	32	25	32
65	2 1/2	20	25	20	25
80	3	18	22	18	22
100	4	14	20	14	20
125	5	12.5	18	12.5	18
150	6	10	15	10	15
200	8	6	9	-	-
250	10	3.5	5	-	-

Flexible hoses are only to be used 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 on places where they are always accessible for inspection.

The hoses are not to be used in systems where pressure pulsations may occur (except hose 1485-01-xx sizes DN10 to DN100).

The hoses are not to be used in systems subjected to cyclic loading (except hose 1484-01-xx sizes DN10 to DN100 and hose 1485-01-xx sizes DN10 to DN100).

At elevated temperatures, the maximum allowable pressure is to be reduced with the following factors (According to ISO 10380 Table A.4):

Temperature °C	20	50	100	150	200	250	300	350	400	450	500	550	
Material	1.4404	1	0.88	0.74	0.67	0.62	0.58	0.54	0.52	0.50	0.48	0.47	0.47
	1.4435	1	0.88	0.74	0.67	0.62	0.58	0.54	0.52	0.50	0.48	0.47	0.47
	1.4541	1	0.92	0.83	0.78	0.74	0.71	0.67	0.64	0.62	0.61	0.60	0.59
	1.4301	1	0.88	0.73	0.66	0.60	0.56	0.52	0.50	0.48	0.47	0.46	0.42

Hose assemblies covered by this certificate shall not be used as Cargo hoses and/ or in LNG/LPG systems.

It must be possible to shut off from the system all hoses used in the fuel oil, lubricating oil and compressed air systems.

The hoses are to be mounted according to the manufacturer's instructions.

Welding shall fulfill requirements in DNV GL Rules Pt.2 Ch.4. 100% liquid penetrant inspection may be used in lieu of volumetric inspection for double walled designs.

End connections shall fulfil the restrictions in Pt.4 Ch.6 Sec.9 [5] and Pt.6 Ch.2 Sec.5 [11.2] as below:

- Flanges with their pressure-temperature ratings shall be in accordance with a recognised international standard.
- For general machinery systems: threaded joints having pipe threads where pressure-tight joints are made on the threads:
 - 1) with parallel or tapered threads, shall comply with requirements of a recognized national or international standard.
 - 2) Shall not be used for piping systems conveying toxic or flammable media or services where fatigue, severe erosion or crevice corrosion is expected to occur.
 - 3) For cases other than (2), tapered threads are only to be used for outside diameters:
 - not more than 33.7 mm, for class I piping systems
 - not more than 60.3 mm, for class II and III piping systems
 - 4) For cases other than (2), parallel thread is only allowed for class III piping systems where outside diameter is not more than 60.3 mm.
- For general machinery systems: Mechanical joints other than standard bolted flanges are not covered by this certificate and shall be type approved separately in accordance with DNVGL-CP-0185
- Flanges in fuel piping systems shall be of the welding neck, slip-on or socket welding type. For all piping (except open ended lines), the following restrictions apply:
 - 1) For design pressure above 10 bar, only welding neck flanges shall be used.
 - 2) For design temperatures <-10°C slip-on flanges shall not be used in nominal sizes above 100 mm and socket welding flanges shall not be used in nominal sizes above 50 mm.

Production testing

Each hose assembly shall be hydrostatically tested at a hydrostatic pressure of 1.5 times the maximum working pressure and shall be delivered with the pressure test report with reference to the type approval certificate (product certificate is not required).

Type Approval documentation

<u>Document ref.</u>	<u>Rev.</u>	<u>Title</u>
TAP00001T1	-	DNV GL Type approval certificate from Tubiflex S.P.A., Italy
-	-	Authorization letter from Tubiflex dated 06 th May 2020
-	-	Product description

Job Id: **262.1-012788-2**
Certificate No: **TAP0000236**

1484-01 - Catalogue – PARALLELLVECKAD METALLSLANG dated 03.03.2020
- - Burst test reports witnessed by DNV GL Surveyor dated 03.03.2020
with customer pn : HSPSP84116, HSPSP84208, HSPSP84132,
HSPSP84164, HSPSP84216, HSPSP84264, HSPSP84232,
HSPSP84108, HSPSP841128 and HSPSP842128.
Hose art nr - Traceability between Hydros scand and Tubiflex

Tests carried out

Burst test, Pliability (bending) test, fatigue test

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 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.