

# TYPE APPROVAL CERTIFICATE

Certificate No:  
**TAP00001T1**  
Revision No:  
**1**

## This is to certify:

That the Flexible hoses of metallic material with permanently fitted couplings

with type designation(s)

**SP.M.9700, SP.M.9750, SP.M.9750 (Cryogenic), SP.M.9755, SP.M.9600, SP.M.9650, SP.M.9655, SP.M.9770, SP.M.9777**

Issued to

**Tubiflex S.P.A.**  
**Orbassano, TO, Italy**

is found to comply with

**DNV rules for classification – Ships Pt.4 Ch.6 Piping systems**  
**DNV rules for classification – Ships Pt.5 Ch.7 Liquefied gas tankers**  
**DNV-OS-D101 – Marine and machinery systems and equipment, Edition July 2021**  
**DNV class programme DNV-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.

Type:	Temperature range:	Max. working press.:	Sizes:
SP.M.9700	-55°C to +550°C	0.5 to 5 bar (see page 3)	DN10 to DN300 (see page 3)
SP.M.9750	-55°C to +550°C	2 to 75 bar (see page 3)	DN10 to DN300 (see page 3)
SP.M.9750 (Cryogenic)	-196°C to +50°C	22 to 35 bar (see page 3)	DN25, 32, 40 and 50
SP.M.9755	-55°C to +550°C	3 to 105 bar (see page 3)	DN10 to DN300 (see page 3)
SP.M.9600	-55°C to +550°C	0.4 to 3 bar (see page 3)	DN10 to DN150 (see page 3)
SP.M.9650	-55°C to +550°C	10 to 75 bar (see page 3)	DN10 to DN150 (see page 3)
SP.M.9655	-55°C to +550°C	15 to 105 bar (see page 3)	DN10 to DN150 (see page 3)
SP.M.9770	-55°C to +550°C	12.7 bar to 17.2 bar (see page 3)	DN200, 250, 300
SP.M.9777	-55°C to +550°C	21.3 bar to 24.8 bar (see page 3)	DN200, 250

Issued at **Høvik** on **2022-09-21**

for **DNV**

This Certificate is valid until **2023-10-20**.

DNV local station: **Italy/Malta CMC**

Approval Engineer: **Maheshraja Venkatesan**

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**Sinisa Sedlan**  
**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

Flexible hoses of metallic material with permanently fitted couplings.

### Hose types:

SP.M.9700.XX.XXX – without braid (narrow pitch)  
 SP.M.9750.XX.XXX – one braid (narrow pitch)  
 SP.M.9755.XX.XXX – two braids (narrow pitch)

SP.M.9770.XX.XXX – one braided braid (narrow pitch)  
 SP.M.9777.XX.XXX – two braided braids (narrow pitch)

SP.M.9600.XX.XXX – without braid (very narrow pitch)  
 SP.M.9650.XX.XXX – one braid (very narrow pitch)  
 SP.M.9655.XX.XXX – two braids (very narrow pitch)

### Couplings:

SA.R.1110 – fixed male tapered thread  
 SA.R.1120 – fixed male cylindrical thread  
 SA.R.2221 – swivel female with flat seat  
 SA.R.2222 – swivel female with conical seat  
 SA.R.3100 – weld end  
 SA.R.4130 – male adaptor tapered/cylindrical thread with inverse conical seat  
 SA.R.51001 – fixed flange  
 SA.R.5201 – swivel flange

### Materials:

Hoses	Stainless steel	AISI 316L	1.4404/ 1.4435	EN 10028-7
		AISI 321	1.4541	EN 10028-7
		ASTM B575	2.4819*	DIN 17750
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	Stainless steel	316L	1.4404	EN 10088-1
		304	1.4301	EN 10088-1

\*Only to be used for hoses SP.M.97XX

## 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.

Applications: hydraulic and lubricating oil, fuel oil, compressed air, fresh water, seawater, condensate, steam, gases, fire fighting systems, refrigerants, and sanitary systems.

Hose type SP.M.97XX with material 2.4819 DIN 17750 may be used in seawater applications, all other hoses are not accepted to be used in seawater applications.

Hose type SP.M.9750 of sizes DN25, DN32, DN40 and DN50 made of austenitic stainless steel are allowed to be used in LNG/LPG applications; All other types and sizes are not allowed to be installed in LNG/LPG applications.

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
	2.4819	1	0.97	0.92	0.88	0.83	0.79	0.74	0.72	0.70	-	-	-
	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

Maximum working pressure:

Size (DN)	SP.M.9700	SP.M.9750	SP.M.9750 (Cryogenic)	SP.M.9755	SP.M.9770	SP.M.9777
10	5 bar	75 bar	-	105 bar	-	-
12	5 bar	70 bar	-	100 bar	-	-
16	4 bar	65 bar	-	90 bar	-	-
20	3 bar	50 bar	-	75 bar	-	-
25	3 bar	40 bar	35 bar	60 bar	-	-
32	3 bar	35 bar	31 bar	50 bar	-	-
40	2 bar	30 bar	26 bar	40 bar	-	-
50	1 bar	25 bar	22 bar	32 bar	-	-
65	1 bar	20 bar	-	25 bar	-	-
80	1 bar	18 bar	-	22 bar	-	-
100	1 bar	14 bar	-	20 bar	-	-
125	1 bar	12.5 bar	-	18 bar	-	-
150	0.8 bar	10 bar	-	15 bar	-	-
200	0.8 bar	6 bar	-	9 bar	17.2 bar	24.8 bar
250	0.6 bar	3.5 bar	-	5 bar	12 bar	21.3 bar
300	0.5 bar	2 bar	-	3 bar	12.7 bar	-

Size (DN)	SP.M.9600	SP.M.9650	SP.M.9655
10	3 bar	75 bar	105 bar
12	2.5 bar	70 bar	100 bar
16	2 bar	65 bar	90 bar
20	1.8 bar	50 bar	75 bar
25	1.8 bar	40 bar	60 bar
32	1.5 bar	35 bar	50 bar
40	1.5 bar	30 bar	40 bar
50	0.6 bar	25 bar	32 bar
65	0.6 bar	20 bar	25 bar
80	0.5 bar	18 bar	22 bar
100	0.5 bar	14 bar	20 bar
125	0.4 bar	12.5 bar	18 bar
150	0.4 bar	10 bar	15 bar

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 SP.M.9750 sizes DN10 to DN100).

The hoses are not to be used in systems subjected to cyclic loading (except hose SP.M.9750 sizes DN10 to DN100 and hose SP.M.9650 sizes DN10 to DN100).

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 fulfil requirements in DNV Rules Pt.2 Ch.4.

End connections shall fulfil the restrictions in Pt.4 Ch.6 Sec.9 [5] and Pt.5 Ch.7 Sec.5, as applicable 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 use 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 are 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 DNV-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.

## Type Approval documentation

Burst test reports witnessed by DNV GL

Pliability test reports dated September 1998

Pliability test reports 11\_1-18, 11\_2-18, 11\_3-18, 11\_4-18, 11\_5-18, 11\_6-18, 11\_7-18, 11\_8-18, 11\_9-18, 11\_10-18, dated 17/12-2018

Fittings catalogue G110

Hose catalogue parflex, B10 and B20

Test report nos. SPS/0154/22, SPS/0155/22, SPS/0156/22 and SPS/0157/22 witnessed by DNV dated 2022/05/19

Technical report no. REL/0079/22 dated 19/05/2022 reviewed by DNV Milan

## Tests carried out

Burst test, Pliability (bending) test, fatigue test, cyclic pressure and burst testing as per Pt.5 Ch.7 Sec.5 [11.6.3] only for type SP.M.9750 of DN32 and DN40

## 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 DNV-CP-0338.