

TYPE APPROVAL CERTIFICATE

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.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 GL rules for classification – Ships Pt.4 Ch.6 Piping systems**DNV GL class programme DNVGL-CP-0184 – Type approval – Flexible hoses with permanently fitted couplings****DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition January 2018****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*:
SP.M.9700	-200°C to 550°C	0.5 to 5 bar	DN10 to DN300
SP.M.9750	-200°C to 550°C	2 to 75 bar	DN10 to DN300
SP.M.9755	-200°C to 550°C	3 to 105 bar	DN10 to DN300
SP.M.9600	-200°C to 550°C	0.4 to 3 bar	DN10 to DN150
SP.M.9650	-200°C to 550°C	10 to 75 bar	DN10 to DN150
SP.M.9655	-200°C to 550°C	15 to 105 bar	DN10 to DN150
SP.M.9770	-200°C to 550°C	12.7 bar to 17.2 bar	DN200, 250, 300
SP.M.9777	-200°C to 550°C	21.3 bar to 24.8 bar	DN200, 250

* see page 2

Issued at **Høvik** on **2019-04-15**This Certificate is valid until **2023-10-20**.for **DNV GL**DNV GL local station: **Milan**Approval Engineer: **Iselinn Vindstad**

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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.



Job Id: **262.1-010777-4**
Certificate No: **TAP00001T1**

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.

Application: 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.

Maximum working pressure:

Size (DN)	SP.M.9700	SP.M.9750	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	60 bar	-	-
32	3 bar	35 bar	50 bar	-	-
40	2 bar	30 bar	40 bar	-	-

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Size (DN)	SP.M.9700	SP.M.9750	SP.M.9755	SP.M.9770	SP.M.9777
50	1 bar	25 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

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

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).

Hose assemblies covered by this certificate shall not be used 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 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 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

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.



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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.