

TYPE APPROVAL CERTIFICATE

Certificate No:
TAP00000YN
Revision No:
3

This is to certify:

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

with type designation(s)

AT8S, MTH1LT, MTK Marine, MTKM Marine, OL7 Marine & Marine Non-Conductive, VE8 Marine, VE8M Marine, HOG

Issued to

ZEC S.p.A.
Colorno, PR, Italy

is found to comply with

DNV rules for classification – Ships Pt.4 Ch.6 Piping systems
DNV-OS-D101 – Marine and machinery systems and equipment, Edition July 2021
DNV class programme DNV-CP-0183 – Type approval – Flexible non-metallic hoses

Application :

Product(s) approved by this certificate is/are accepted for installation on vessels classed by DNV.

Type:	Temperature range:	Max. working press.:	Sizes:
AT8S	see page 5	413 bar	3/16" to 1/2"
MTH1LT	see page 5	70 bar to 325 bar	3/16" to 1-1/4"
MTK Marine	see page 5	200 bar to 700 bar	3/16" to 1"
MTKM Marine	see page 5	275 bar to 800 bar	1/4" to 1-1/4"
OL7 Marine & Marine Non-Conductive	see page 5	70 bar to 250 bar	1/8" to 1"
VE8 Marine	see page 5	145 bar to 420 bar	1/8" to 1"
VE8M Marine	see page 5	250 bar to 700 bar	5/32" to 1-1/4"
HOG	see page 5	345 bar to 1034 bar	3/16" to 1"

Issued at **Høvik** on **2022-09-12**

This Certificate is valid until **2027-06-20**.

for **DNV**

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

Approval Engineer: **Renata Rossi**

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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

8 different types of non-metallic hose assemblies with permanently fitted couplings :

1. AT8S
Hose constructed according to SAE 100R8 type from SAE J517 comprising of
Tube : thermoplastic polymer inner tube
Reinforcement : two layers of aramidic fiber braid reinforcement
Cover : polyurethane cover
Couplings : swaged ferrule type A/C/F
2. MTH1LT
Hose constructed according to EN 857 1SC comprising of
Tube : thermoplastic polyester inner tube
Reinforcement : single layer of steel wire braid reinforcement
Cover : polyurethane cover
Couplings : Swaged ferrule type A/B/C/D
3. MTK MARINE
Tube : Polyamide inner tube
Reinforcement : One layer of aramide fiber & one layer of high tensile steel wire braid reinforcement
Cover : polyurethane cover
Couplings : Swaged ferrule type A
4. MTKM MARINE
Tube : Polyamide inner tube
Reinforcement : One or two layers of aramidic fiber braids & a high tensile steel wire braid reinforcement
Cover : polyurethane cover
Couplings : Swaged ferrule type A
5. OL7 MARINE & MARINE NON-CONDUCTIVE
Hose constructed according to SAE 100R7 type from SAE J517 comprising of
Tube : thermoplastic polyester inner tube
Reinforcement : One or two layers of polyester fiber reinforcement
Cover : polyurethane cover
Couplings : Swaged ferrule type A/C/D/E
6. VE8 MARINE
Hose constructed according to SAE 100R8 type from SAE J517 comprising of
Tube : polyamide inner tube
Reinforcement : one or two layers of high tenacity textile fiber reinforcement
Cover : polyurethane cover
Couplings : Swaged ferrule type A
7. VE8M MARINE
Hose constructed according to SAE 100R8 type from SAE J517 comprising of
Tube : polyamide inner tube
Reinforcement : two layers of aramidic fiber reinforcement
Cover : polyurethane cover
Couplings : Swaged ferrule type A
8. HOG
Hose constructed according to SAE 100R8 type from SAE J517 comprising of
Tube : inner tube made of polyamide
Reinforcement : two layers of aramidic fiber reinforcement
Cover : polyurethane cover
Couplings : Swaged ferrule type F

Material of construction for couplings :

- Type A : Carbon steel 11SMnPb37 (zinc plated)
- Type B : Carbon steel 11SMnPb37 (zinc plated)
- Type C : Stainless steel AISI 316Ti
- Type D : Stainless steel AISI 316L
- Type E : Carbon steel 11SMnPb37 (zinc plated)
- Type F : Stainless steel AISI 316L

Thermoplastic hose manufacturing location: ZEC S.P.A., Colorno PR, Italy

Ferrule types & manufacturing locations:

- Type A, F : ZEC S.P.A., Colorno PR, Italy
- Type B : Oleomarket Srl (OLMARK), Via Cisa Ligure 123, 42041 Brescello RE, Italy
- Type C : PH Industrie-Hydraulik GmbH & Co. KG, Stefansbecke 37, 45549 Sprockhövel, Germany
- Type D : Custom Fittings Ltd. Rawfolds Way, Spen Valley Industrial Park, Cleckheaton, West Yorkshire, BD19 5LJ, UK
- Type E : Constructed with ZEC ferrule and OLMARK insert

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.

1. AT8S

Nominal size, ID			OD (mm)	Min. bend radius (mm)	Max. working pressure (bar)	Burst pressure (bar)	Ferrule type
SAE	inches	mm					
-3	3/16	4.8	10.5	35	413	1655	A/C/F
-4	¼	6.4	12.7	50	413	1655	A/C/F
-6	3/8	9.7	16.5	75	413	1655	A/C/F
-8	½	13.0	22.0	110	413	1655	A/F

2. MTH1LT

Nominal size, ID			OD (mm)	Min. bend radius (mm)	Max. working pressure (bar)	Burst pressure (bar)	Ferrule type
SAE	inches	mm					
-3	3/16	4.8	10.0	30	325	1300	A/C/D
-4	¼	6.4	11.9	40	300	1200	A/C/D
-5	5/16	8.0	14.0	50	240	960	A/B/C/D
-6	3/8	9.7	16.0	60	225	900	A/B/C/D
-8	½	13.0	19.2	75	190	760	A/B/C/D
-10	5/8	16.3	23.3	110	150	600	A
-12	¾	19.2	25.5	150	130	520	A
-16	1	25.6	32.5	185	105	420	A
-20	1 ¼	32.0	40.0	290	70	280	A

3. MTK MARINE

Nominal size, ID			OD (mm)	Min. bend radius (mm)	Max. working pressure (bar)	Burst pressure (bar)	Ferrule type
SAE	inches	mm					
-3	3/16	4.8	11.3	30	500	2000	A
-4	¼	6.4	14.5	40	700	2800	A
-5	5/16	8.0	16.0	50	500	2000	A
-6	3/8	9.5	18.0	60	425	1700	A
-8	1/2	13.0	22.0	75	375	1500	A
-10	5/8	16.0	25.0	110	250	1000	A
-12	3/4	19.2	28.2	150	225	900	A
-16	1	25.8	35.4	250	200	800	A

4. MTKM MARINE

Nominal size, ID			OD (mm)	Min. bend radius (mm)	Max. working pressure (bar)	Burst pressure (bar)	Ferrule type
SAE	inches	mm					
-4	1/4	6.4	14.5	40	800	3200	A
-6	3/8	9.5	18.8	90	700	2800	A
-8	1/2	13.0	25.2	140	700	2800	A
-10	5/8	16.0	26.0	200	350	1400	A
-12	3/4	19.2	30.2	230	325	1300	A
-16	1	25.8	38.0	250	325	1300	A
-20	1 ¼	32.0	45.2	350	275	1100	A

5. OL7 MARINE & MARINE NON-CONDUCTIVE

Nominal size, ID			OD (mm)	Min. bend radius (mm)	Max. working pressure (bar)	Burst pressure (bar)	Ferrule type
SAE	inches	mm					
-2	1/8	3.5	8.5	12	230	920	A
--	5/32	4.0	8.9	25	250	1000	A
-3	3/16	4.8	10.0	30	210	840	A/C/D/E
-4	1/4	6.4	11.8	35	200	800	A/C/D/E
-5	5/16	8.0	14.3	45	190	760	A/C/D/E
-6	3/8	9.7	16.0	55	175	700	A/C/D/E
-8	1/2	13.0	20.3	75	140	560	A/C/D/E
-10	5/8	16.0	23.5	120	105	420	A
-12	3/4	19.2	26.5	145	90	360	A
-16	1	25.6	33.6	200	70	280	A

6. VE8 MARINE

Nominal size, ID			OD (mm)	Min. bend radius (mm)	Max. working pressure (bar)	Burst pressure (bar)	Ferrule type
SAE	inches	mm					
-2	1/8	3.5	7.1	30	420	1680	A
-3	3/16	4.8	10.0	35	350	1400	A
-4	1/4	6.4	11.8	50	350	1400	A
-5	5/16	8.0	14.3	60	325	1300	A
-6	3/8	9.7	16.0	70	280	1120	A
-8	1/2	13.0	20.3	95	245	980	A
-10	5/8	16.0	23.5	125	195	780	A
-12	3/4	19.2	26.5	150	165	660	A
-16	1	25.6	34.7	200	145	580	A

7. VE8M MARINE

Nominal size, ID			OD (mm)	Min. bend radius (mm)	Max. working pressure (bar)	Burst pressure (bar)	Ferrule type
SAE	inches	mm					
--	5/32	4.0	9.4	30	700	2800	A
-3	3/16	4.8	11.3	30	700	2800	A
-4	1/4	6.4	14.8	50	700	2800	A
-6	3/8	9.7	16.0	80	350	1400	A
-6	3/8	9.7	18.0	90	700	2800	A
-8	1/2	13.0	22.0	100	350	1400	A
-12	3/4	19.2	29.0	205	345	1380	A
-16	1	25.8	35.0	230	250	1000	A
-20	1 1/4	32.0	45.0	350	250	1000	A

8. HOG

Nominal size, ID			OD (mm)	Min. bend radius (mm)	Max. working pressure (bar)	Burst pressure (bar)	Ferrule type
SAE	inches	mm					
-3	3/16	4.8	10.0	35	345	1380	F
-4	1/4	6.4	11.8	50	345	1380	F
-4	1/4	6.4	14.8	50	689	2758	F
-4	1/4	6.4	14.8	50	775	3102	F
-6	3/8	9.7	16.0	80	345	1380	F
-6	3/8	9.7	18.0	90	689	2758	F
-8	1/2	13.0	22.0	100	345	1380	F
-8	1/2	13.0	24.0	110	517	2068	F
-10	5/8	16.0	25.5	180	345	1380	F
-12	3/4	19.1	28.8	210	345	1380	F
-16	1	25.4	37.2	230	345	1380	F

Fluid medium & temperature range:

Fluid medium	Temperature range
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	AT8S	MTH1LT, OL7 MARINE & MARINE NON-CONDUCTIVE MTK MARINE, MTKM MARINE, VE8 MARINE, VE8M MARINE & HOG
Hydraulic fluids as per ISO 6743-4 with exception of HFD R, HFD S & HFD T	-40 to +82 °C	-40 to +100 °C
Water based fluids	-40 to +70 °C	-40 to +70 °C
Air & water	0 to +70 °C	0 to +70 °C

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

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

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.

It must be possible to shut off from the system all flexible hoses used in systems for compressed air.

Hose assemblies shall not be subjected to pressures below atmospheric or vacuum conditions.

Hoses covered by this certificate are not to be used in the following:

- DNV classed drilling units (applications covered by DNV-OS-E101).
- Diving systems (applications covered by DNV-OS-E402).

For compressed air or gaseous applications, the cover should be pin pricked.

The outer end of the pipe coupling (performing the connection to the fixed piping) is not covered by this certificate and shall follow the below requirements:

- Flanged ends shall be according to a recognized standard
- Slip-on threaded joints having pipe threads where pressure-tight joints are made on the threads with parallel or tapered threads, shall comply with requirements of a recognized standard. Limitations stated in DNV-RU-SHIP Pt.4 Ch.6 Sec.9 [5.2.6] to be followed.
- If these outer ends are going to be part of a mechanical joint as covered by Table 8 DNV-RU- SHIP Pt.4 Ch.6 Sec.9, then they shall be separately type approved.

Production testing

Each hose assembly shall be hydrostatically tested at a pressure of 1.5 times the maximum working pressure and be delivered with the pressure test report with reference to this type approval certificate.

Type Approval documentation

Tests carried out

Dimensional Check, Change-in-Length, Leakage, Burst, Impulse, Oil Resistance, cover adhesion & Cold Flexibility tests.

Marking of product

Flexible hoses are to be permanently marked by the manufacturer with the following details:

- 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.