DNV·GL

Certificate No:
TAP00000YN

TYPE APPROVAL CERTIFICATE

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, VE8 Marine, VE8M Marine, HOG

Issued to
ZEC S.P.A.
Colorno PR, Italy

is found to comply with
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:
AT8S	see certificate	413 bar	3/16", 1/4" & 3/8"
MTH1LT	see certificate	70 bar to 325 bar (see certificate)	3/16", 1/4", 5/16", 3/8", 1/2", 5/8", 3/4", 1" & 1 1/4"
MTK Marine	see certificate	200 bar to 700 bar (see certificate)	3/16", 1/4", 5/16", 3/8", 1/2", 5/8", 3/4" & 1"
MTKM Marine	see certificate	275 bar to 800 bar (see certificate)	1/4", 3/8", 1/2", 5/8", 3/4", 1" & 1 1/4"
OL7 Marine	see certificate	70 bar to 250 bar (see certificate)	1/8", 5/32", 3/16", 1/4", 5/16", 3/8", 1/2", 5/8", 3/4" & 1"
VE8 Marine	see certificate	145 bar to 420 bar (see certificate)	1/8", 3/16", 1/4", 5/16", 3/8", 1/2", 5/8", 3/4" & 1"
VE8M Marine	see certificate	250 bar to 700 bar (see certificate)	5/32", 3/16", 1/4", 3/8", 1/2", 3/4", 1" & 1 1/4"
HOG	see certificate	345 bar to 1034 bar (see certificate)	3/16", 1/4", 3/8", 1/2", 5/8", 3/4" & 1"

Issued at **Høvik** on **2017-06-21**
This Certificate is valid until **2022-06-20**.
DNV GL local station: **Milan**

for **DNV GL**

Approval Engineer: **Maheshraja Venkatesan**

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.

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

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
   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 reinforcment
   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 reinforcment
   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 reinforcment
   Cover polyurethane cover
   Couplings : Swaged ferrule type A

Material of construction for couplings :

- Type A : Zinc plated carbon steel (for all hose series except HOG); stainless steel (only for HOG series)
- Type B : Zinc plated carbon steel
- Type C : Stainless steel
- Type D : Stainless steel
- Type E : Zinc plated carbon steel

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

Ferrule types & manufacturing locations:

- Type A : 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

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
-4	1/4	6.4	12.7	50	413	1655	A
-6	3/8	9.7	16.5	75	413	1655	A

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	1/4	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	1/2	13.0	19.2	75	190	760	A/B/C/D
-10	5/8	16.3	23.3	110	150	600	A
-12	3/4	19.2	25.5	150	130	520	A
-16	1	25.6	32.5	185	105	420	A
-20	1 1/4	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	1/4	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	1-1/4	32.0	45.2	350	275	1100	A

5. OL7 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	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	A
-4	1/4	6.4	11.8	50	345	1380	A
-4	1/4	6.4	14.8	50	689	2758	A
-4	1/4	6.4	14.8	50	775	3102	A
-6	3/8	9.7	16.0	80	345	1380	A
-6	3/8	9.7	18.0	90	689	2758	A
-8	1/2	13.0	22.0	100	345	1380	A
-8	1/2	13.0	24.0	110	517	2068	A
-10	5/8	16.0	25.5	180	345	1380	A
-12	3/4	19.1	28.8	210	345	1380	A
-16	1	25.4	37.2	230	345	1380	A

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.

Fluid medium & temperature range:

Fluid medium	Temperature range	
	AT8S	MTH1LT, OL7 MARINE 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

Hose assemblies covered by this certificate are not fire safe & also shall not be used in sea water applications.

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.

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.

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.

For compressed air or gases above 16 bar the cover should be pin prickled.

Type Approval documentation

Tests carried out

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

Marking of product

For traceability to this type approval, each hose assembly shall be marked on the hose end fitting atleast with the following particulars:

- Manufacturers name or trademark
- Hose type & size
- Test pressure
- Manufacturer identification number

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform a survey every second year, to verify that the conditions for the type approval are complied with and also to witness burst pressure test on every 3rd size from each type during renewal.
The tests shall be performed in accordance with procedures given in DNVGL-CP-0183.
The tests are to be performed with the same type of couplings fitted that are Type Approved with the hoses.