

# TYPE APPROVAL CERTIFICATE

**This is to certify:**

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

with type designation(s)  
**DS1-T EN853, DS2-T EN853, DS1-SC EN857, DS2-SC EN857, SAE 100 R17, MASTER (Exceeds R16), OVERMASTER**

Issued to  
**DIESSE RUBBER HOSES SPA**  
**FILAGO BG, Italy**

is found to comply with  
**Offshore Standard DNV-OS-D101, Marine and Machinery Systems and Equipment**  
**Det Norske Veritas' Standards for Certification 2.9 No. 5-791.70**  
**Det Norske Veritas' Rules for Classification of Ships Pt.4, Ch.6 "Piping Systems"**

**Application :**

**See the certificate.**

<b>Type:</b>	<b>Temperature range:</b>	<b>Max. working press.:</b>	<b>Sizes:</b>
<b>DS1-T EN853</b>	<b>-40 °C to +100 °C</b>	<b>40 to 225 bar (dep. size, see cert)</b>	<b>DN6 to 51</b>
<b>DS2-T EN853</b>	<b>-40 °C to +100 °C</b>	<b>80 to 400 bar (dep. size, see cert)</b>	<b>DN6 to 51</b>
<b>DS1-SC EN857</b>	<b>-40 °C to +100 °C</b>	<b>100 to 275 bar (dep. size, see cert.)</b>	<b>DN6 to 25</b>
<b>DS2-SC EN857</b>	<b>-40 °C to +100 °C</b>	<b>185 to 420 bar (dep. size, see cert.)</b>	<b>DN6 to 25</b>
<b>SAE 100 R17</b>	<b>-40 °C to +100 °C</b>	<b>Dep. size and type, see cert.</b>	<b>DN6 to 25</b>
<b>MASTER</b>	<b>-40 °C to +100 °C cont.</b>	<b>165 to 400 bar (dep. size, see cert.)</b>	<b>DN6 to 31</b>
<b>(Exceeds R16)</b>	<b>(+125 °C discount.)</b>		
<b>OVERMASTER</b>	<b>-40 °C to +100 °C cont.</b>	<b>250 to 480 bar (dep. size, see cert.)</b>	<b>DN8 to 25</b>
	<b>(+125 °C discount.)</b>		

This Certificate is valid until **2017-12-31**.

Issued at **Høvik** on **2015-02-04**

for **DNV GL**

DNV GL local station: **Milan**

Approval Engineer: **Adel Samiei**

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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.

Certificate No: **P-15160**  
File No: **791.70**  
Job Id: **262.1-008998-2**

## Product description

Flexible hose with permanently fitted couplings.

Couplings: Made by Tieffe SPA, Italy

Coupling material: 11SMnPb37 UNI EN10277

Hose design and couplings:

DS1-T: (1SN hoses according to EN 853 / SAE 100 R1AT)

Cover: Black synthetic rubber (SBR/CR), resistant to abrasion, oils and weather conditions.

Reinforcement: One high tensile steel braid.

Inner tube: Synthetic rubber inner tube (NBR) resistant to oils.

Couplings: Tieffe series BXT1

DS2-T: (2SN hoses according to EN 853 / SAE 100 R2AT)

Cover: Black synthetic rubber (SBR/CR), resistant to abrasion, oils and weather conditions.

Reinforcement: Two high tensile steel braids.

Inner tube: Synthetic rubber inner tube (NBR) resistant to oils.

Couplings: Tieffe series BXT2

DS1-SC: (1SC hoses according to EN 857)

Cover: Black synthetic rubber (SBR/CR), resistant to abrasion, oils and weather conditions.

Reinforcement: One high tensile steel braid.

Inner tube: Synthetic rubber inner tube (NBR) resistant to oils.

Couplings: Tieffe series BXC

DS2-SC: (2SC hoses according to EN 857 / SAE 100 R16)

Cover: Black synthetic rubber (SBR/CR), resistant to abrasion, oils and weather conditions.

Reinforcement: Two high tensile steel braids.

Inner tube: Synthetic rubber inner tube (NBR) resistant to oils.

Couplings: Tieffe series BXT1

SAE 100 R17:

Cover: Black synthetic rubber (SBR/CR), resistant to abrasion, oils and weather conditions

Reinforcement: One high tensile steel braid (For sizes DN6 to DN 12)

Two high tensile steel braids (For sizes above DN 12)

Inner tube: Synthetic rubber inner tube (NBR) resistant to oils

Couplings: Tieffe series BXC (For sizes DN6 to DN 12)

Tieffe series BXT1 (For sizes above DN 12)

Master:

Exceeds SAE 100 R16

Cover: Black synthetic rubber (SBR/CR), resistant to abrasion, oils and weather conditions.

Reinforcement: Two high tensile steel braids.

Inner tube: Synthetic rubber inner tube (CR) resistant to oils.

Couplings: Tieffe series BXLP.

Overmaster:

Exceeds SAE 100 R16

Cover: Black synthetic rubber (SBR/CR), resistant to abrasion, oils and weather conditions.

Reinforcement: Two high tensile steel braids.

Inner tube: Synthetic rubber inner tube (CR) resistant to oils.

Couplings: Tieffe series BXLP.

## Application/Limitation

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Hose assemblies types DS1-T, DS2-T, DS1-SC, DS2-SC & SAE 100 R17 are suitable for use with:

- hydraulic fluids in accordance with ISO 6743-4 with the exception of HFD R, HFD S and HFD T at temperatures ranging from -40 °C to +100 °C
- water based fluids at temperatures ranging from -40 °C to +70 °C
- water at temperatures ranging from 0 °C to +70 °C

Hose types Master and Overmaster are approved for Hydraulic or pneumatic power and control systems for steering gear, lubricating, hydraulic and fuel oil in temperature range -40 °C to +100 °C continuous (+125 °C discontinuous) & seawater, fresh water and sanitary systems in temperature range -40 °C to +70 °C

Maximum working pressure and sizes:

Hose type	Size DN		Maximum working pressure	
	mm	Inches	bar	psi
DS1-T	6	¼	225	3250
	8	5/16	215	3100
	10	3/8	180	2600
	12	½	160	2300
	16	5/8	130	1900
	19	¾	105	1500
	25	1	88	1300
	31	1 ¼	63	900
	38	1 ½	50	725
	51	2	40	580
DS2-T	6	¼	400	5800
	8	5/16	350	5100
	10	3/8	330	4800
	12	½	275	4000
	16	5/8	250	3600
	19	¾	215	3100
	25	1	165	2400
	31	1 ¼	125	1800
	38	1 ½	90	1300
	51	2	80	1150
DS1-SC	6	¼	275	4000
	8	5/16	255	3700
	10	3/8	215	3100
	12	½	170	2470
	16	5/8	150	2180
	19	¾	125	1820
DS2-SC	25	1	100	1450
	6	¼	420	6100
	8	5/16	380	5500
	10	3/8	350	5100
	12	½	310	5100
	16	5/8	280	4100
SAE 100 R17	19	¾	240	3620
	25	1	185	2700
	6	¼	275	4000
	8	5/16	255	3700
	10	3/8	215	3100
	12	½	170	2470
	16	5/8	280	4100

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	19	$\frac{3}{4}$	240	3620
	25	1	185	2700
MASTER	6	$\frac{1}{4}$	400	5850
	8	$\frac{5}{16}$	400	5850
	10	$\frac{3}{8}$	400	5850
	12	$\frac{1}{2}$	350	5150
	16	$\frac{5}{8}$	275	4050
	19	$\frac{3}{4}$	235	3450
	25	1	185	2700
	31	$1 \frac{1}{4}$	165	2400
OVERMASTER	8	$\frac{5}{16}$	480	7000
	10	$\frac{3}{8}$	450	6550
	12	$\frac{1}{2}$	400	5850
	16	$\frac{5}{8}$	350	5150
	19	$\frac{3}{4}$	320	4650
	25	1	250	3650

The hoses may not be used in vacuum systems.

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.

The hose assemblies covered by this type approval may be assembled and delivered by other than the certificate holder under the following conditions:

- The assembler is authorised by a written authorization from the certificate holder. The certificate holder shall keep record of all assembler authorisations.
- Hose assemblies are in accordance with an assembly procedure issued by the certificate holder and the assembler has proved their qualifications by burst testing of a selection of hose/coupling combinations.
- Selection of sizes and burst testing is to be performed in compliance with the DNV Type Approval Programme 5-791.70 and the testing is to be witnessed by DNV.

Flexible hoses are only to be used in lengths up to 2 meters 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 in places where they are always accessible.

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

It must be possible to shut off from the system all flexible hoses used in systems for compressed air, lube oil, fuel oil and petroleum base hydraulic oil.

Each hose is to be hydraulic pressure tested to 1.5 times the working pressure, and delivered with the manufacturer's pressure test report.

Hose assemblies with couplings made of carbon steel are not to be used at temperatures below -10°C unless the material is normalized.

## Type Approval documentation

Test reports for DS1-T:

- Reports no.1, no.2, no.3 & no.4 dated 2005-04-07 containing Change in Length, Burst Test, Cover adhesion test, Oil Resistance test, Ozone resistance test & Cold flexibility test on sizes  $\frac{1}{4}$ " ,  $\frac{3}{8}$ " ,  $\frac{3}{4}$ " ,  $1 \frac{1}{2}$ " , stamped by DNV local station Milan

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- Impulse test reports 276 dated 2004-01-27 (DN6), 332 dated 2004-07-26 (DN10), 390 dated 2005-02-25 (DN19) & 260 dated 2003-12-10 (DN38)
- Fire Test reports (done by LAPI) 315.OIS0110/05 dated 2005-03-16 (DN6), 316.OIS0110/05 dated 2005-03-16 (DN19), 317.OIS0110/05 dated 2005-03-16 (DN51).

Test reports for DS2-T:

- Reports no.5, no.6, no.7 & no.8 dated 2005-04-07 containing Change in Length, Burst Test, Cover adhesion test, Oil Resistamce test, Ozone resistance test & Cold flexibility test on sizes ¼" , 3/8" , ¾" , 1 ½" , stamped by DNV local station Milan
- Impulse test reports 379 dated 2005-01-21 (DN6), 281 dated 2004-02-10 (DN10), 277 dated 2004-02-03 (DN19) & 382 dated 2005-01-28 (DN38)
- Fire Test reports (done by LAPI) 318.OIS0110/05 dated 2005-03-16 (DN6), 319.OIS0110/05 dated 2005-03-16 (DN19), 320.OIS0110/05 dated 2005-03-16 (DN51).

Test reports for DS1-SC:

- Reports no.9, no.10 & no.10 dated 2005-04-07 containing Change in Length, Burst Test, Cover adhesion test, Oil Resistamce test, Ozone resistance test & Cold flexibility test on sizes ¼" , 3/8" , ¾" , stamped by DNV local station Milan
- Impulse test reports 294 dated 2004-03-08 (DN6), 278 dated 2004-02-03 (DN10), 348 dated 2004-10-02 (DN19)
- Fire Test reports (done by LAPI) 324.OIS0110/05 dated 2005-03-17 (DN6), 325.OIS0110/05 dated 2005-03-17 (DN12), 326.OIS0110/05 dated 2005-03-17 (DN25).

Test reports for DS2-SC:

- Reports no.12, no.13 & no.14 dated 2005-04-07 containing Change in Length, Burst Test, Cover adhesion test, Oil Resistamce test, Ozone resistance test & Cold flexibility test on sizes ¼" , 3/8" , ¾" , stamped by DNV local station Milan
- Impulse test reports 324 dated 2004-05-30 (DN6), 318 dated 2004-06-21 (DN10), 319/b dated 2004-06-13 (DN19)
- Fire Test reports (done by LAPI) 321.OIS0110/05 dated 2005-03-16 (DN6), 322.OIS0110/05 dated 2005-03-17 (DN12), 323.OIS0110/05 dated 2005-03-17 (DN25).

Test Reports for Master:

- Reports no.15, no.16 & no.17 dated 2010-04-27 containing Change in Length, Burst Test (for sizes ¼" , 3/8" , ¾" )stamped by DNV local station Milan
- Burst test reports dated 2012-02-12 for ¼" , 3/8" , ½" and dated 2010-03-12 for size ¾" witnessed by DNV local station Milan
- Fire Test reports (done by LAPI) 1387.OIS0110/10 dated 2010-10-14 (DN6), 1388.OIS0110/10 dated 2010-10-14 (DN12), 1389.OIS0110/10 dated 2010-10-14 (DN25)

Test Reports for Master:

- Reports no.18 & no.19 dated 2010-04-27 containing Change in Length, Burst Test (for sizes 3/8" , ¾" )stamped by DNV local station Milan
- Burst test reports dated 2012-02-12 for 3/8" , ¾" witnessed by DNV local station Milan
- Fire Test reports (done by LAPI) 1390.OIS0110/10 dated 2010-10-14 (DN10), 1391.OIS0110/10 dated 2010-10-14 (DN12), 1579.OIS0110/10 dated 2010-10-14 (DN25)

Test Report for R16, R17: dated 30/11-2010 for size ½"witnessed by DNV local station Milan

Manufacturer's catalogue 2003 edition.

Tieffe Coupling Catalogue, 2002-B.

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Letter from LAPI ref. 536/05/AC dated 2005-04-20.

### **Tests carried out**

Change in length, burst, dimensional, impulse, oil resistance, ozone, cold flexibility and fire test.

### **Marking of product**

For traceability to this Type Approval, the products are at least to be marked with:

- Manufacturer's name or trade mark
- Type designation
- Maximum working pressure

### **Periodical assessment**

For retention of the Type Approval, DNV GL Surveyor shall perform a periodical assessment every second year, to verify that the conditions for the type approval are complied with and to witness the following tests on a selection of sizes:

- Dimensional check
- Change in length
- Leakage test
- Burst test

The tests are to be performed with the type of couplings fitted that are Type Approved with the hoses.

**END OF CERTIFICATE**