

# TYPE APPROVAL CERTIFICATE

**This is to certify:**

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

with type designation(s)  
**DS-4SH, DS-4SP, DS12, DS13, DS15**

Issued to  
**DIESE 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 certificate.**

Type:	Temperature range:	Max. working press.:	Sizes:
<b>DS-4SH</b>	<b>-40 °C to +100 °C (+125 °C discount.)</b>	<b>250 to 425 bar (dep. size, see cert)</b>	<b>DN19 to 51</b>
<b>DS-4SP</b>	<b>-40 °C to +100 °C (+125 °C discount.)</b>	<b>165 to 500 bar (dep. size, see cert)</b>	<b>DN6 to 51</b>
<b>DS12</b>	<b>-40 °C to +121 °C cont. (+125 °C discount.)</b>	<b>172 to 276 bar (dep. size, see cert)</b>	<b>DN10 to 51</b>
<b>DS13</b>	<b>-40 °C to +121 °C (+125 °C discount.)</b>	<b>350 bar</b>	<b>DN19 to 51</b>
<b>DS15</b>	<b>-40 °C to +121 °C cont. (+125 °C discount.)</b>	<b>420 bar</b>	<b>DN19 to 38</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**

.....  
**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

Flexible hose with permanently fitted couplings.

Couplings: Made by Tieffe SPA, Italy  
 Coupling materials: 11SMnPb37 UNI EN 10277

Hose design and couplings:

DS-4SH: (exceeds 4SH hoses according to EN 856)

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

Reinforcement: Four high tensile steel spirals.

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

DS-4SP: (exceeds 4SP hoses according to EN 856)

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

Reinforcement: Four high tensile steel spirals.

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

DS12:

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

Reinforcement: Four high tensile steel spirals.

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

DS13:

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

Reinforcement: Four high tensile steel spirals up to DN25, six spirals for DN31 and up.

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

DS15:

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

Reinforcement: Four high tensile steel spirals up to DN25, six spirals for DN31-38.

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

	Ferrule type 1 CX Series	Ferrule type 1 CS Series (Non skive)	Ferrule type 1 CS Series (Skive)	Ferrule type 1 CS Series (Skive 6 spirals)	Ferrule type 1 CH Series (Interlock double skive)
DS-4SP	BXS	BSN4	BSS4	BSS6	-
DS-4SH	BXSH	BSN4	BSS4	-	BHH
DS12	-	BSN4	BSS4	-	-
DS13	-	BSN4	BSS4	BSS6	BH13
DS15	-	BSN4	BSS4	BSS6	BH13

## Application/Limitation

Hose assemblies types DS-4SP and DS-4SH 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

The hoses DS12, DS13 & DS15 may be used for: Hydraulic or pneumatic power and control systems for steering gear, lubricating, hydraulic and fuel oil, seawater, fresh water and sanitary systems.

Maximum working pressure and sizes

Certificate No: **P-15161**  
 File No: **791.70**  
 Job Id: **262.1-008998-2**

Hose type	Size DN		Maximum working pressure	
	mm	Inches	bar	psi
DS-4SH	19	¾	425	6150
	25	1	400	5800
	31	1 ¼	350	5100
	38	1 ½	300	4350
	51	2	250	3625
DS-4SP	6	¼	500	7250
	10	3/8	460	6700
	12	½	440	6400
	16	5/8	400	5800
	19	¾	380	5500
	25	1	325	4700
	31	1 ¼	240	3500
	38	1 ½	210	3000
	51	2	165	2400
DS12	10	3/8	350	4000
	12	½	350	4000
	16	5/8	350	4000
	19	¾	350	4000
	25	1	350	4000
	31	1 ¼	207	3000
	38	1 ½	172	2500
	51	2	172	2500
DS13	19	¾	350	5100
	25	1	350	5100
	31	1 ¼	350	5100
	38	1 ½	350	5100
	51	2	350	5100
DS15	19	¾	420	6100
	25	1	420	6100
	31	1 ¼	420	6100
	38	1 ½	420	6100

The hoses may not be used in vacuum systems.

Hoses (DS12, DS13 & DS15) used for continuous operation at temperatures higher than 100°C will have their lifetime reduced. In such cases more frequent inspections and planned exchange should be a part of the maintenance program.

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.

Certificate No: **P-15161**  
File No: **791.70**  
Job Id: **262.1-008998-2**

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 DS-4SH:

- Test reports no.18 (DN19) & no.19 (DN38) containing Change in Length, Burst Test, Cover adhesion test, Oil Resistamce test, Ozone resistance test & Cold flexibility test; dated 07-04-2005, Stamped by DNV local station Milan
- Impulse test reports 452 dated 2005-07-04 (DN19), 252 dated 2003-11-24 (DN19), 377 dated 2005-01-31 (DN38), 455 dated 2005-07-14 (DN38)
- Fire Test reports (done by LAPI) 333.OIS0110/05 dated 2005-03-18 (DN19), 334.OIS0110/05 dated 2005-03-18 (DN31), 335.OIS0110/05 dated 2005-03-18 (DN51).

Test Reports DS-4SH:

- Test reports no.15 (DN10), no.16 (DN19) & no.17 (DN38) containing Change in Length, Burst Test, Cover adhesion test, Oil Resistamce test, Ozone resistance test & Cold flexibility test; dated 07-04-2005, Stamped by DNV local station Milan
- Impulse test reports 104 dated 2001-03-16 (DN10), 456 dated 2005-07-15 (DN10), 450 dated 2005-06-27 (DN16), 453 dated 2005-07-09 (DN19), 245 dated 2003-10-30 (DN19 & DN40), 451 dated 2005-07-04 (DN40), 244 dated 2003-10-25 (DN40)
- Fire Test reports (done by LAPI) 330.OIS0110/05 dated 2005-03-18 (DN6), 331.OIS0110/05 dated 2005-03-18 (DN16), 332.OIS0110/05 dated 2005-03-18 (DN51).

Test Reports DS12:

- Test reports no.20 (DN10), no.21 (DN19), no. 22 (DN38) containing Change in Length, Burst Test; dated 07-04-2005, Stamped by DNV local station Milan
- Burst test reports dated 2012-02-12 for DN10, DN19 & DN38 witnessed by DNV local station Milan
- Burst Test reports dated 2011-07-11 for DN10, DN19 & DN38 witnessed by DNV local station Milan
- Impulse test reports N° 101/11 completed 19/12/2011 (DN10), N° 037/13 completed 02/04/2013 (DN19), N° 052/12 completed 13/03/2012 (DN38)
- Fire Test reports (done by LAPI) 171.OIS0110/05 dated 2005-02-21 (DN10), 207.OIS0110/05 dated 2005-02-22 (DN19), 286.OIS0110/05 dated 2005-03-10 (DN51).

Test Reports DS13:

Certificate No: **P-15161**  
File No: **791.70**  
Job Id: **262.1-008998-2**

- Test reports no.20 (DN19) & no.21 (DN38) containing Change in Length, Burst Test, Cover adhesion test, Oil Resistance test, Ozone resistance test & Cold flexibility test; dated 07-04-2005, Stamped by DNV local station Milan
- Impulse test reports 286 dated 2004-03-01 (DN19), 378 dated 2005-02-04 (DN38)
- Fire Test reports (done by LAPI) 327.OIS0110/05 dated 2005-03-17 (DN19), 328.OIS0110/05 dated 2005-03-17 (DN31), 329.OIS0110/05 dated 2005-03-17 (DN51).

#### Test Reports DS15:

- Test reports no.33 (DN19) dated 24-03-2005 & no.34 (DN31) dated 07/04-2005 containing Change in Length, Burst Test, Cover adhesion test, Oil Resistance test, Ozone resistance test & Cold flexibility test, Stamped by DNV local station Milan
- Impulse test reports DS R15-12 dated 2005-04-21 (DN19), DS R15-20 dated 2005-04-21 (DN31)
- Fire Test reports (done by LAPI) 288.OIS0110/05 dated 2005-03-10 (DN19), 172.OIS0110/05 dated 2005-02-21 (DN25), 362.OIS0110/05 dated 2005-03-15 (DN38).

Manufacturer's catalogue 2003 edition.

Tieffe Coupling Catalogue, 2002-B.

### 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