

# TYPE APPROVAL CERTIFICATE

**This is to certify:****That the Flexible Hoses of Non-Metallic Material with Permanently Fitted Couplings**with type designation(s)  
**2SN, 4SP, 4SH**

Issued to

**TEKNO HOSE SPA**  
**ARIANO IRPINO, Italy**

is found to comply with

**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 page 2.

<b>Type:</b>	<b>Temperature range:</b>	<b>Max. working press.:</b>	<b>Sizes:</b>
<b>2SN</b>	<b>dependent on medium</b>	<b>dependent on size</b>	<b>DN 5, 6, 8, 10, 12, 16, 19, 25, 31, 38</b>
<b>4SP</b>	<b>dependent on medium</b>	<b>dependent on size</b>	<b>DN 6, 10, 12, 16, 19, 25, 31, 38</b>
<b>4SH</b>	<b>dependent on medium</b>	<b>dependent on size</b>	<b>DN 19, 25, 31, 38</b>

This Certificate is valid until **2019-06-30**.Issued at **Høvik** on **2015-04-09**for **DNV GL**DNV GL local station: **Naples**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-15199**  
File No: **791.70**  
Job Id: **262.1-018256-1**

## Product description

Three types of hose assemblies :

Hose assembly type Tekno/2SN with wire braided reinforced hoses for medium-high pressure lines according to EN853/SAE 100 R2AT

Hose assembly type TEKNOSPIR/4SP with wire spiralled reinforced hoses for medium pressure power Lines according to EN856

Hose assembly type TEKNOSPIR/4SH with wire spiralled reinforced hoses for extra high pressure power Lines according to EN856

Hoses: made by TEKNO HOSE SPA, ARIANO IRPINO, Italy

Carbon steel Couplings made by: VITILLO SpA, Via Camporeale Zona PIP, 83031 Ariano Irpino (AV).

Coupling for TEKNO/2SN:

Size	Type	Insert	FERRULE
DN5 - 3/16"	TH2SN03	FDG0304	B12T03N
DN6 - 1/4"	TH2SN04	FDG0404	B12T04N
DN8 - 5/16"	TH2SN05	FDG0506	B12T05N
DN10 - 3/8"	TH2SN06	FDG0606	B12T06N
DN12 - 1/2"	TH2SN08	FDG0808	B12T08N
DN16 - 5/8"	TH2SN10	FDG1010	B12T10N
DN19 - 3/4"	TH2SN12	FDG1212	B12T12N
DN25 - 1"	TH2SN16	FDG1616	B12T16N
DN31 - 1 1/4"	TH2SN20	FDG2020	B12T20N
DN38 - 1 1/2"	TH2SN24	FDG2424	B12T24N

Coupling for TEKNOSPIR/4SP:

Size	Type	Insert	FERRULE
DN6 - 1/4"	TS4SP04	FDG0404	B9R04
DN10 - 3/8"	TS4SP06	FDG0606	B9R06
DN12 - 1/2"	TS4SP08	FDG0808	B9R08
DN16 - 5/8"	TS4SP10	FDG1010	B9R10
DN19 - 3/4"	TS4SP12	FDG1212	B9R12
DN25 - 1"	TS4SP16	FDG1616	B9R16
DN31 - 1 1/4"	TS4SP20	FDG2020	B9R20
DN38 - 1 1/2"	TS4SP24	FDG2424	B9R24

Coupling for TEKNOSPIR/4SH:

Size	Type	Insert	FERRULE
DN19 - 3/4"	TS4SH12	KFDG1212	KB4SH12
DN25 - 1"	TS4SH16	KFDG1616	KB4SH16
DN31 - 1 1/4"	TS4SH20	KFDG2020	KB4SH20
DN38 - 1 1/2"	TS4SH24	KFDG2424	KB4SH24

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## Application/Limitation

They 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

Size	Maximum working pressure 2SN	Maximum working pressure 4SP	Maximum working pressure 4SH
DN5 - 3/16"	415 bar	-	-
DN6 - 1/4"	400 bar	450 bar	-
DN8 - 5/16"	350 bar	445 bar	-
DN10 - 3/8"	330 bar	415 bar	-
DN12 - 1/2"	275 bar	350 bar	-
DN16 - 5/8"	250 bar	350 bar	-
DN19 - 3/4"	215 bar	350 bar	420 bar
DN25 - 1"	165 bar	280 bar	380 bar
DN31 - 1 1/4"	125 bar	210 bar	325 bar
DN38 - 1 1/2"	90 bar	185 bar	290 bar

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.

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

Each hose assembly is before delivery to be hydraulic pressure tested to 1.5 times the maximum working pressure.

Hose assemblies delivered from the certificate holder shall be delivered with pressure test report with reference to the type approval 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.

Hose assemblies delivered from an authorized assembler shall in addition to the pressure test report with reference to the type approval certificate be delivered with a copy of the written authorization stamped by DNV.

The hoses can be used in short lengths for ordinary machinery purposes in the systems mentioned on the front page. The hoses are not to be installed where fixed piping is possible/required.

Hoses shall not be subjected to pressures below atmospheric pressure.

Flexible hoses of these types are not to be used on boiler fronts.

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

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The hose assemblies shall not be installed in drilling equipment and systems.

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

Carbon steel used in couplings shall be normalized when the minimum design temperature is -10°C or below. This normalisation shall be performed after welding if the couplings are welded.

## **Type Approval documentation**

Specification for hose type TEKNO/2SN rev.1 sett-09  
Specification for hose type TEKNOSPIR/4SP rev.1 sett-09  
Specification for hose type TEKNOSPIR/4SH rev.1 sett-09  
Vitilo coupling catalogue rev.1 sett-09

Burst test reports dated 2015-01-26 for 2SN (DN6, DN12, DN19, DN38), 4SP (DN6, DN12, DN19, DN38) & 4SH (DN19) and dated 2015-02-20 for 4SH (DN25, DN38) witnessed by DNV GL local station Naples

Impulse test reports for 2SN:

No.00000480 (DN6) dated 2014-02-10 / No.00000488 (DN10) dated 2015-01-14 / No.00000483 (DN16) dated 2014-02-24 / No.00000500 (DN25) dated 2015-01-15 / No.00000714 (DN38) dated 2014-02-24

Impulse test reports for 4SP:

No.00000711 (DN6) dated 2014-02-12 / No.00000733 (DN10) dated 2015-01-14 / No.00000417 (DN16) dated 2014-02-28 / No.00000709 (DN25) dated 2015-01-15 / No.00000481 (DN38) dated 2014-02-24

Impulse test reports for 4SH:

No.00000716 (DN19) dated 2014-03-03 / No.00000712 (DN25) dated 2014-02-17 / and report for DN38 dated 2014-02-19

Change in length test reports for all three types dated 2015-01-26

Cold flexibility test report according to ISO10619-2 Method B for:

2SN (DN6, DN16, DN38) dated 2014-03-03  
4SP (DN6, DN16, DN38) dated 2014-03-03  
4SH (DN19, DN25, DN38) dated 2014-03-03

Cover adhesion test reports according to ISO8033:

2SN: 565-F<sub>bis</sub> / 2014 dated 2014-11-13 (DN38) & 565-A<sub>bis</sub> / 2014 dated 2014-11-13 (DN6)  
4SP: 565-B<sub>bis</sub> / 2014 dated 2014-11-13 (DN6) & 565-E<sub>bis</sub> / 2014 dated 2014-11-13 (DN25)  
4SH: 565-D<sub>bis</sub> / 2014 dated 2014-11-13 (DN25) & 565-C<sub>bis</sub> / 2014 dated 2014-11-13 (DN19)

Ozone resistance test reports:

565-A<sub>bis</sub> / 2014 dated 2014-11-13 for 2SN  
565-D<sub>bis</sub> / 2014 dated 2014-11-13 for 4SP (applicable for 4SH)

Oil resistance test report 565-L<sub>bis</sub> / 2014 dated 2014-11-13 according to ISO1817:2011

Fire test reports done by LAPI:

No.416.0ISO110/12 dated 2012-04-10 for 2SN (DN6)  
No.417.0ISO110/12 dated 2012-04-10 for 2SN (DN16)  
No.418.0ISO110/12 dated 2012-04-10 for 2SN (DN38)  
No.710.0ISO110/12 dated 2012-05-30 for 4SP (DN6)  
No.711.0ISO110/12 dated 2012-05-30 for 4SP (DN16)  
No.1092.0ISO110/12 dated 2012-08-30 for 4SP (DN38)  
No.1497.0ISO110/11 dated 2011-12-02 for 4SH (DN19)  
No.1498.0ISO110/11 dated 2011-12-02 for 4SH (DN25)

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No.1499.OIS0110/11 dated 2011-12-02 for 4SH (DN38)

### **Tests carried out**

Burst test, Impulse test, Change in length, Cold flexibility test, Cover adhesion test, Ozone resistance test, Oil resistance test, 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**