

TYPE APPROVAL CERTIFICATE

This is to certify:

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

with type designation(s)

1SN, 1SC, 1SN-K Semperpac, 2SN, 2SC, 2SN-K Semperpac, 4SP, 4SH

Issued to

**Semperit Technische Produkte Gesellschaft m.b.H.
Wimpassing, Austria**

is found to comply with

DNV GL class programme DNVGL-CP-0183 – Type approval – Flexible hoses

DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems

DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition January 2018

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:
1SN	-40 °C up to +100 °C	40 bar up to 225 bar	DN 6 up to DN 51
1SC	-40 °C up to +100 °C	88 bar up to 225 bar	DN 6 up to DN 25
1SN-K Semperpac	-40 °C up to +100 °C	100 bar up to 290 bar	DN 6 up to DN 25
2SN	-40 °C up to +100 °C	80 bar up to 400 bar	DN 6 up to DN 51
2SC	-40 °C up to +100 °C	165 bar up to 400 bar	DN 6 up to DN 25
2SN-K Semperpac	-40 °C up to +100 °C	175 bar up to 450 bar	DN 6 up to DN 31
4SP	-40 °C up to +100 °C	165 bar up to 445 bar	DN 10 up to DN 51
4SH	-40 °C up to +100 °C	250 bar up to 420 bar	DN 19 up to DN 51

Issued at **Hamburg** on **2019-06-21**

This Certificate is valid until **2024-06-20**.

DNV GL local station: **Augsburg**

Approval Engineer: **Andrii Pishchanskyi**



for **DNV GL**

Digitally Signed By: **Pewe, Henning**
Location: **DNV GL Hamburg, Germany**
Signing Date: **2019-06-25**, on behalf of

Olaf Drews
Head of Section



Hose 1SN be equivalent of MARKHIP® TF1SN/06 * Hose 2SN be equivalent of MARKHIP® TF2SN/06 * Hose 1SC be equivalent of MARKHIP® TF1PD/06
Hose 2SN-K be equivalent of MARKHIP® TF2SN/06 * Hose 2SN-K be equivalent of MARKHIP® TF2SN/06 * Hose 4SP be equivalent of MARK-IP® TF4SP/06

Job Id: **262.1-007783-5**
Certificate No: **TAP00001V5**

Product description

Type	Description
1SN	Synthetic rubber hose with one internal steel wire braid according to DIN 853 1SN.
2SN	Synthetic rubber hose with two internal steel wire braids according to DIN 853 2SN.
1SN-K SEMPERPAC	Synthetic rubber hose with one internal steel wire braid.
2SN-K SEMPERPAC	Synthetic rubber hose with two internal steel wire braids.
1SC	Synthetic rubber hose with one internal steel wire braid according to DIN 857 1SC.
2SC	Synthetic rubber hose with two internal steel wire braids according to DIN 857 2SC.
4SP	Synthetic rubber hose reinforced with 4 spirally wrapped steel plies according to EN 856 4SP.
4SH	Synthetic rubber hose reinforced with 4 spirally wrapped steel plies according to EN 856 4SH.

Hoses

Hoses are produced by Semperit Technische Produkte Gesellschaft m.b.H. at Wimpassing, Austria.

Hose end fittings

Hose end fittings are made of carbon steel and produced by VOSS Fluid S.r.l. at Osnago LC, Italy.

The following assembling locations are approved:

- 1 Semperit Technische Produkte Gesellschaft m.b.H.
Triesterbundesstraße 26
A-2632 Wimpassing
- 2 Semperflex Shanghai Ltd.
1255 Cang Gong Road
Shanghai Chemical Industrial Park
CN-Shanghai 201417
- 3 Semperflex Optimit s.r.o.
Vitkovská c.p. 391/29
CZ-74235 Odry
- 4 Semperflex Asia Corporation Ltd.
Sri Trang Building No. 10 Soi 10
Phetkasem Rd.,
Hatyai,
TH-Songkhla 90110
- 5 VOSS Fluid S.r.l.
Via A. Stoppani, 13,
23875, Osnago (LC)

Responsibility

Semperit Technische Produkte Gesellschaft m.b.H. takes the responsibility that the design and production of the hoses, hose end fittings and manufacturing of hose assemblies are in compliance with Rules, Standards and/or Regulations listed on page 1 of this certificate.

Hose 1SN be equivalent of MARKHIP® TF1SN/06 * Hose 2SN be equivalent of MARKHIP® TF2SN/06 * Hose 1SC be equivalent of MARKHIP® TF1PD/06
Hose 2SC be equivalent of MARKHIP® TF2PD/06 * Hose 2SN-K be equivalent of MARKHIP® TF2TP /06 * Hose 4SP be equivalent of MARKHIP® TF4SP/06

Job Id: **262.1-007783-5**
Certificate No: **TAP00001V5**

Application/Limitation

Hose assemblies are approved for use with petroleum base hydraulic fluids, water glycol and water emulsion hydraulic fluids, fuel oil, lubrication oil, compressed air, fresh water and sanitary.

Maximum working pressure [bar] is as follows:

Type \ DN	6	8	10	12	16	19	25	31	38	51
1SN	225	215	180	160	130	105	88	63	50	40
2SN	400	350	330	275	250	215	165	125	90	80
1SN-K	290	250	230	200	150	125	110	N/A	N/A	N/A
2SN-K	450	420	385	350	290	280	200	175	N/A	N/A
1SC	225	215	180	160	130	105	88	N/A	N/A	N/A
2SC	400	350	330	275	250	215	165	N/A	N/A	N/A
4SP	N/A	N/A	445	425	350	350	320	210	185	165
4SH	N/A	N/A	N/A	N/A	N/A	420	380	350	290	250

Hoses assemblies are not approved for application under pressure below atmospheric or vacuum.

For compressed air or gases above 16 bar the cover is to be pin pricked.

Installation

Flexible hoses are only to be used where it is necessary due to vibrations or flexible mounting on 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.

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

Type Approval documentation

1. Semperit's test reports dated 12.08.85, Ing. FX/wh. and 19.08.86, 19.08.86, 06.10.97, 21.12.98, 11.02.99, 30.04.04;
2. WTD 71 fire test reports 29/96, 31/98, 30/98, 18/04, 19/04, 31/04, 32/04, 38/04, 39/04, 10/04, 11/04, 12/04, 13/04, 14/04, 15/04, 16/04, 17/04, 20/04, 21/04, 22/04, 23/04, 25/04, 26/04, 27/04, 28/04, 29/04, 30/04, 33/04, 34/04, 35/04, 36/04, 40/04, 42/04, 46/04, 47/04;
3. SEMPERIT Hydraulic and Pressure Washer Hoses, publication date April 2017;
4. VOSS Fluid LARGA "Hydraulisch steel tube fittings and hose couplings", edition 18, dated 10/2016;
5. Crimping data sheet VOSS / Semperit No. QP C HG 5306A1 Version 1 dated 12-2018;
6. Certificates of compliance with the order EN 10204 - 2.2 dated 2017-09-15.

Tests carried out

1. Change in length;
2. Cold flexibility test;
3. Resistance against liquid;
4. Cover adhesion test;
5. Ozone resistance test;
6. Fire resistance test;
7. Impulse test;
8. Burst test.

Job Id: **262.1-007783-5**
Certificate No: **TAP00001V5**

Marking of product

Each hose assembly shall be permanently marked on the hose end fitting as follows:

Content	Example
Manufacturer's name and trade name	VOSS, L
Type designation	1SN
Hose size	12
Date code	2Q19

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days) to verify that the conditions for the Type Approval are complied with. Refer to DNVGL-CP-0338, Sec.4.

Hose 1SN be equivalent of MARKHIP® TF1SN/06 * Hose 2SN be equivalent of MARKHIP® TF2SN/06 * Hose 1SC be equivalent of MARKHIP® TF1PD/06
Hose 2SC be equivalent of MARKHIP® TF2PD/06 * Hose 2SN-K be equivalent of MARKHIP® TFSTP /06 * Hose 4SP be equivalent of MARKHIP® TF4SP/06



TYPE APPROVAL CERTIFICATE
No. MAC337517CS/001

This is to certify that the product identified below is in compliance with the regulations herewith specified.

<i>Description</i>	Non metallic flexible hoses
<i>Type</i>	462 - 462TC - 462ST
<i>Applicant</i>	PARKER HANNIFIN MANUFACTURING SRL VIA G.B. PIRELLI, 6 22070 Veniano (CO) ITALY
<i>Manufacturer</i>	PARKER HANNIFIN MANUFACTURING SRL
<i>Place of manufacture</i>	VIA G.B. PIRELLI, 6 22070 Veniano (CO) ITALY
<i>Reference standards</i>	RINA Rules for the Type Approval of Flexible Hoses and Expansion Joints

Issued in **Genoa** on **January 15, 2018**. This Certificate is valid until **January 14, 2023**

RINA Services S.p.A.
Franca Parisi

This certificate consists of this page and 1 enclosure

Hose 462 be equivalent of MARKHIP® TFTP /00

RINA Services S.p.A.
Via Corsica, 12/A 16128 Genova
Tel +39 010 53887
Fax +39 010 5361000



TYPE APPROVAL CERTIFICATE

No. **MAC337517CS/001**

Enclosure - Page 1 of 2

462 - 462TC - 462ST

Reference documents

Parker Hannifin specifications nos. HS-462 dated 31/01/2001 and HS-K46 dated 03/03/1995.

Parker Catalogue No. 4400.

Test Report No. 2004/CS/01/4286 of 27/12/2005 of RINA Milan Office.

Test Report No. 2012/MI/01/932 of 31/10/2012 of RINA Milan Office.

Reference Standard

EN 857 - 2SC

Materials/components

Lining:

Nitrile polymer, oil resistant.

Reinforcement:

Two braids of high tensile steel wire.

Cover:

Synthetic rubber, resistant to oil and weathering;

TC = Tough Cover - highly abrasion resistant synthetic rubber;

ST = Super Tough Cover - extreme abrasion resistant (synthetic rubber with a special polyethylene coating).

End fittings:

Steel (46 series).

Technical characteristics

Maximum allowable working pressure at ambient temperature according to the following table:

Item	Nominal Diameter (mm)	Inside Diameter (mm)	Max. working pressure (MPa)
-4	6	6,2 - 6,7	40 (42.5)*
-5	8	7,7 - 8,3	35 (40)*
-6	10	9,3 - 10,1	33 (35)*
-8	12	12,5 - 13,3	27,5 (31)*
-10	16	15,7 - 16,6	25 (28)*
-12	19	18,8 - 19,8	21,5 (28)*
-16	25	25,3 - 26,4	16,5 (21)*

* Note: the values in parenthesis are above the ones foreseen in the reference Standard - The maximum working pressures of hoses intended for marine applications are not to exceed the ones foreseen by the reference Standard - see acceptance conditions

Working temperature: from -40°C to +100°C

RINA Services S.p.A.
Via Corsica, 12 - 16128 Genova
Tel +39 010 53851
Fax +39 010 5351000



Hose 462 be equivalent of MARKHIP® TFTP/00

TYPE APPROVAL CERTIFICATE

No. MAC337517CS/001

Enclosure - Page 2 of 2

462 - 462TC - 462ST

Field of application

Hydraulic systems with a hydraulic oil having a flash point not less than 150°C (closed cup test).

Acceptance conditions

The installation on board of the piping system is to be carried out by qualified personnel in accordance with the manufacturer's instructions.

The flexible hoses are to be installed in order to satisfy the requirements of para. 5.9.3 of Part C, Ch 1, Sec 10 of RINA Rules.

The acceptance of the a.m. products on board ship and other units classified with RINA is subject to the satisfactory outcome of testing as per RINA Rules.

For hoses assemblies to be used at temperatures below -10°C, couplings in normalized steel are to be used.

The maximum working pressures of hoses intended for marine applications shall not exceed the ones foreseen in the reference Standard.

The product (hose and fittings) is to be marked, for traceability, with the following data: nominal diameter, design conditions, Manufacturer's name or trademark, designation type reference.

Remarks

This certificate annuls and replaces the previous certificate No. MAC171511CS/004 issued on 15 November 2012.

Genoa January 15, 2018

RINA Services S.p.A.
Via Corsica, 12 - 16128 Genova
Tel +39 010 53851
Fax +39 010 5351000



Hose 462 be equivalent of MARKHIP® TFTP/00

TYPE APPROVAL CERTIFICATE

This is to certify:

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

with type designation(s)
492, 492TC and 492ST, 462, 462TC and 462ST

Issued to
Parker Hannifin Manufacturing S.r.l.
Veniano CO, Italy

is found to comply with
DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition July 2015
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:
492, 492TC and 492ST	-40°C to +100°C (see page 2)	75 to 280 bar (see page 2)	DN6 to DN31 (see page 2)
462, 462TC and 462ST	-40°C to +100°C (see page 2)	70 to 425 bar (see page 2)	DN6 to DN76 (see page 2)

Issued at **Høvik** on **2017-11-21**

This Certificate is valid until **2022-06-30**.
DNV GL local station: **Milan**

Approval Engineer: **Adel Samiei**

for DNV GL
Digitally Signed By: Marveng, Marianne Spæren
Location: DNV GL Høvik, Norway



Marianne Marveng
Head of Section

Hose 462 be equivalent of MARKHIP® TFTP/00

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.



Job Id: **262.1-017480-5**
 Certificate No: **TAP000000E**
 Revision No: **1**

Product description

1) Hose assemblies 492, 492TC and 492ST according to EN 857 1SC - ISO 11237 1SC

Construction:

- Inner Tube: Nitrile (NBR)
- Reinforcement: one high-tensile steel wire braid
- Cover: synthetic rubber
Highly abrasion resistance synthetic rubber
Synthetic rubber with a special polyethylene coating

Couplings: Parker coupling series 46 made from carbon steel or 316 stainless steel

2) Hose assemblies 462, 462TC and 462ST according to EN 857 2SC - ISO 11237 2SC

Construction:

- Inner Tube: Nitrile (NBR)
- Reinforcement: one high-tensile steel wire braid
- Cover: synthetic rubber
Highly abrasion resistance synthetic rubber
Synthetic rubber with a special polyethylene coating

Couplings: Parker coupling series 46/48 (for all sizes) & 43 (for sizes up to DN51)
made from carbon steel or 316 stainless steel

Hoses made by: Parker Hannifin, Italy

Couplings made by: Parker Hannifin, Germany

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.

Maximum working pressure:

Hose size (DN)	Type			Coupling series	Maximum working pressure in bar
6	492-4	492TC-4	492ST-4	46	280
8	492-5	492TC-5	492ST-5	46	250
10	492-6	492TC-6	492ST-6	46	225
12	492-8	492TC-8	492ST-8	46	190
16	492-10	492TC-10	492ST-10	46	150
19	492-12	492TC-12	492ST-12	46	150
25	492-16	492TC-16	492ST-16	46	110
31	492-20	-	492ST-20	46	75

Hose size (DN)	Type			Coupling series	Maximum working pressure in bar
6	462-4	462TC-4	462ST-4	46/48 - 43	425
8	462-5	462TC-5	462ST-5	46/48 - 43	400
10	462-6	462TC-6	462ST-6	46/48 - 43	350
12	462-8	462TC-8	462ST-8	46/48 - 43	310
16	462-10	462TC-10	462ST-10	46/48 - 43	280
19	462-12	462TC-12	462ST-12	46/48 - 43	280
25	462-16	462TC-16	462ST-16	46/48 - 43	210
31	462-20	462TC-20	462ST-20	46/48 - 43	172
38	-	462TC-24	-	46/48 - 43	146
51	-	462TC-32	-	46/48 - 43	112
63	-	462TC-40	-	46/48	70
76	-	462TC-48	-	46/48	70

Hose 462 be equivalent of MARKHIP® TFTP / 00

The hose may be used for the following application: Petroleum base hydraulic fluids, water glycol and water oil emulsion hydraulic fluids, compressed air & fresh water.

Hose assemblies covered by this certificate are suitable for:

Job Id: **262.1-017480-5**
Certificate No: **TAP000000E**
Revision No: **1**

- Petroleum base hydraulic fluids within a temperature range of -40°C to +100°C
- Water base hydraulic fluids within a temperature range of -40°C to +70°C.
- Fresh water and compressed air within a temperature range of 0°C to +70°C.

Each hose assembly is before delivery to be hydraulic pressure tested to 1.5 times the maximum working pressure and to be delivered with the pressure test report 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 the machinery. The hoses shall not replace/be used where permanent piping is possible/required and must only be fitted in places where they are always accessible.

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

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

The cover of hoses for gaseous applications shall be pin-pricked.

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

Hose assemblies covered by this certificate shall not be used in systems subject to pressure below atmospheric or vacuum conditions.

Type Approval documentation

Parker catalogue 4400/UK (Hydraulic hoses, Fittings & equipment) April 2017 pages Cab-17,-20,-21,-28,-29,-30

Burst pressure & change in length test reports (witnessed by DNV surveyor) numbers 2101, 2102, 2104 & 2107 dated 2010-07-05, 2151, 2152 & 2153 dated 2010-09-28, 2123 & 2125 dated 2010-09-28

Fire test reports done by LAPI 560.0IS0110/14, 561.0IS0110/14 & 562.0IS0110/14

Fire test reports done by LAPI 735.0IS0110/04, 736.0IS0110/04, 737.0IS0110/04, 738.0IS0110/04 and 739.0IS0110/04

Rubber hose test specification Nr. 047,48,49,50,51,52,53,54 dated 2014-06-24

Manufacturer's burst test reports witnessed by DNV 1384, 1445, 1446, 1386, 1435, 1436 and 1437 dated 2004-08-10 and 2004-10-19.

HS-K46, Crimp standard 46 series dated 1995-03-03

Rubber hose test specification Nr. 001,2,3,4,5,6,7,8,9,10 (dated 2015-05-12)

Rubber hose test specification Nr. 021,022,023 (April 2014)

Burst pressure test, change in length test & dimensional check test N° 3297, 3298, 3299, 3300, 3301, 3302, 3304, 3307 (dated 2017-07-24) & 3303, 3306 (dated 2017-07-25)

Tests carried out

Fire, Burst, Impulse, Change in length, Abrasion, Adhesion, Oil resistance, Cold flexibility, Ozone resistance, Dimensional check

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
- Size

Periodical assessment

For retention of the Type Approval, a DNV GL 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 DNVGL-CP-0338.

Hose 462 be equivalent of MARKHIP® TFTPR /00



Job Id: **262.1-017480-5**
Certificate No: **TAP000000E**
Revision No: **1**

Renewal assessment

For renewal of this certificate, during the renewal assessment (as described in DNVGL-CP-0338), burst pressure tests shall be witnessed on every 3rd sizes of each type.

Hose 462 be equivalent of MARKHIP® TFTPR /00



CERTIFICATE NUMBER
EFFECTIVE DATE
EXPIRY DATE
ABS TECHNICAL OFFICE

19-GE1907311-PDA
09-Oct-2019
08-Oct-2024
Genoa Engineering Department

CERTIFICATE OF Product Design Assessment

This is to certify that a representative of this Bureau did, at the request of

PARKER HANNIFIN MANUFACTURING SRL

located at

**HOSE PRODUCTS DIVISION EUROPE, VIA G.B. PIRELLI, 6,
VENIANO (CO), Italy, 22070**

assess design plans and data for the below listed product. This assessment is a representation by the Bureau as to the degree of compliance the design exhibits with applicable sections of the Rules. This assessment does not waive unit certification or classification procedures required by ABS Rules for products to be installed in ABS classed vessels or facilities. This certificate, by itself, does not reflect that the product is Type Approved. The scope and limitations of this assessment are detailed on the pages attached to this certificate.

Product Flexible Hose

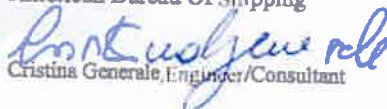
Model 462, 462TC, 462ST, 492, 492TC, 492ST

This Product Design Assessment (PDA) Certificate remains valid until 08/Oct/2024 or until the Rules and/or Standards used in the assessment are revised or until there is a design modification warranting design reassessment (whichever occurs first).

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or previous to the effective date of the ABS Rules and standards applied at the time of PDA issuance. Use of the Product for non-ABS units is subject to agreement between the manufacturer and intended client.

American Bureau Of Shipping


Cristina Generale, Engineer/Consultant

NOTE: This certificate evidences compliance with one or more of the Rules, Guides, standards or other criteria of ABS or a statutory, industrial or manufacturer's standards. It is issued solely for the use of ABS, its committees, its clients or other authorized entities. Any significant changes to the aforementioned product without approval from ABS will result in this certificate becoming null and void. This certificate is governed by ABS Rules 1-1-A3/5.9 Terms and Conditions of the Request for Product Type Approval and Agreement (2010)



Marine & Offshore
Division

Certificate number: 18837/C0 BV

File number: ACM 135/2647/01

Product code: 21041

This certificate is not valid when presented without the full attached schedule composed of 7 sections

www.veristar.com

TYPE APPROVAL CERTIFICATE

This certificate is issued to

PARKER HANNIFIN MANUFACTURING S.r.l. Hose Products Division Europe
Veniano (CO) - ITALY

for the type of product

NON-METALLIC HOSES (FLEXIBLE PIPES) ASSEMBLIES
H29 and H31

Requirements:

- BUREAU VERITAS Rules for the Classification of Steel Ships
- BUREAU VERITAS Rules for the Classification of Offshore Units

This certificate is issued to attest that BUREAU VERITAS did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 02 Feb 2022

For BUREAU VERITAS,

At BV GENOA, on 02 Feb 2017,

Carlo Bozzetti



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with BUREAU VERITAS. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of BUREAU VERITAS Marine & Offshore Division available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against BUREAU VERITAS for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

The electronic version is available at: <http://www.veristarp.com/veristarnb/jsp/viewPublicPdfTypepec.jsp?id=817pfdhccs>

BV Mod. Ad.E 530 October 2014

This certificate consists of 3 page(s)

Hose H29 be equivalent of MARKHIP® TFSS4 /00
Hose H31 be equivalent of MARKHIP® TFR9R /00

THE SCHEDULE OF APPROVAL

I. PRODUCT DESCRIPTION

Hoses H29 and H31

1.1 Hose H29 according to EN 856 Type 4SH

Hose H29	-12	-16	-20	-24	-32
Size (mm)	19.1	25.4	31.8	38.1	50.8
Maximum working pressure (MPa)	43	40	35	31	28

Fitting Series: Parlock Interlock V4 (Carbon steel & Stainless Steel)

Temperature range: - 40 °C to + 100 °C

The maximum working pressure is not to exceed one quarter of the burst pressure at the service temperature

1.2 Hose H31 according to EN 856 Type 4SP

Hose H31	-4	-6	-8	-10	-12	-16
Size (mm)	6.3	9.5	12.7	15.9	19.1	25.4
Maximum working pressure (MPa)	50	44.5	41.5	39	35	31

Fitting Series: Parlock Interlock VS and V4 (Carbon steel)

Temperature range: - 40 °C to + 100 °C

The maximum working pressure is not to exceed one quarter of the burst pressure at the service temperature

1.3 Material specification

Tube	Oil resistant synthetic rubber
Reinforcement	Four high tensile steel wire (H29 and H31)
Cover	Oil, weather and abrasion resistant synthetic black rubber
Fittings	Carbon steel / Stainless Steel

When other choices of materials are used per manufacturer's recommendations, the BV agreement is to be obtained.

2. DOCUMENTS AND DRAWINGS

- PARKER specifications HS-H29 and HS-H31
- Catalogue 4400/UK (Sheets Da-18 and Da-22) for H29/H31
- Workshop Certification Bulletins B12 and B12.1 rev. 2011/01/28

No departure from the above documents shall be made without the prior consent of the Society. The manufacturer must inform the Society of any modification or changes to these documents and drawings.

3. TEST REPORTS

3.1 Tests carried out: dimension check, change in length, burst test, pressure test, impulse test, oil resistance test, ozone resistance test, cold flexibility test, fire resistance test: Tests reports N° 1400 to 1404 (H29) dated 14/10/2015 and N° 1416 to 1423 (H31) dated 10/08/2004.

3.2 The fire resistance tests according to ISO 15540: 1999 and ISO 15541: 1999 were carried out at LAPI laboratory (Italy) and found in order as per the following test reports:

- Test reports N° 583.0IS0110/04 (H29-12), N° 629.0IS0110/04 (H29-20), N° 584.0IS0110/04 (H29-32) dated 01/07/2004, 766.0IS0110/04 (H31-4) dated 29/07/2004 and N° 631.0IS0110/04 (H31-12) dated 01/07/2004.

4. APPLICATION / LIMITATION

4.1 May be used on the following services:

- Sea water and fresh water, compressed air, fuel oil, lub oil, hydraulic oil

4.2 End fittings as per manufacturer's catalogue. The hoses are to be entirely assembled in the manufacturer's workshop.

4.3 The installation of hose assemblies is to be in accordance with the manufacturer's instructions and the Society's Rules. Requirements to take into consideration forces due to vibration. The hoses are not to be used on services when vibration test required in Bureau Veritas Rules.

4.4 The hoses are to be limited to a length necessary to provide for relative movement between fixed and flexibly mounted items of machine/equipment or systems and are only to be used in lengths up to 2 m. The hoses are to be installed in clearly visible and readily accessible locations at all times.

Hose H29 be equivalent of MARKHIP® TFS24 /00
Hose H31 be equivalent of MARKHIP® TFR9R /00

4.5 The use of stainless steel is restricted as per BUREAU VERITAS rules.

4.6 Taper threaded end connections are not to be used for oil circuits in engine rooms nor any place containing an ignition source unless otherwise suitably screened at the Society's Surveyor satisfaction.

5. PRODUCTION SURVEY REQUIREMENTS

5.1 The products are to be supplied by **PARKER HANNIFIN MANUFACTURING Hose Products Division Europe** in compliance with the type and the requirements described in this certificate.

5.2 This type of product is within the category IBV of Bureau Veritas Rule Note NR320.

5.3 BV product certificate is required.

5.4 The certificate of approval covers the hoses completely assembled in Parker factories approved by Bureau Veritas. This certificate may be also valid for other companies authorised by Parker when same specifications, tolerances, equipment and quality control procedures are used. In all cases, the BV agreement is to be obtained.

5.5 Each hose with end fittings is to be hydraulically pressure tested to twice the maximum working pressure and provided with the manufacturer's pressure test report and conformity of production.

PARKER HANNIFIN MANUFACTURING S.r.l. Hose Products Division Europe has declared to Bureau Veritas the following production site:

PARKER HANNIFIN MANUFACTURING S.r.l. Hose Products Division Europe
Via G.B. Pirelli,6
22070 Veniano (CO)
ITALY

6. MARKING OF PRODUCT

Each hose with end fittings shall be clearly and indelibly marked with at least:

- Manufacturer name or logo
- Type designation
- Date of manufacture
- Nominal Diameter
- Pressure Rating
- Temperature Rating
- Society's brand as relevant

7. OTHERS

It is **PARKER HANNIFIN MANUFACTURING S.r.l. Hose Products Division Europe** 's responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

This certificate supersedes Type Approval Certificate N° 18837/B2 BV issued by the Society.

*** END OF CERTIFICATE ***

Hose H29 be equivalent of MARKHIP® TFSS4 /00
Hose H31 be equivalent of MARKHIP® TFR9R /00



TYPE APPROVAL CERTIFICATE
No. MAC256919CS/002

This is to certify that the product identified below is in compliance with the regulations herewith specified.

Description	Non metallic flexible hoses
Type	H29 - H29TC - H29ST
Applicant	PARKER HANNIFIN MANUFACTURING SRL VIA G.B. PIRELLI, 6 22070 VENIANO (CO) ITALY
Manufacturer	PARKER HANNIFIN MANUFACTURING SRL
Place of manufacture	VIA G.B. PIRELLI, 6 22070 VENIANO (CO) ITALY
Reference standards	RINA Rules for the Type Approval of Flexible Hoses and Expansion Joints

Issued in **Genoa** on **November 18, 2019**. This Certificate is valid until **November 17, 2024**


RINA Services **S.p.A.**
Marco Dardano

This certificate consists of this page and 1 enclosure

Hose H29 be equivalent of MARKHIP® TFSS4 /00


RINA Services **S.p.A.**
Via Edison 17 - 16128 Genova
Tel +39 010 53851
Fax +39 010 6361000



TYPE APPROVAL CERTIFICATE

No. MAC256919CS/002

Enclosure - Page 1 of 2

H29 - H29TC - H29ST

Reference documents

Parker Catalogue No. 4000.

Reference Standard

EN 856 - 4SH; ISO 3862 - 4SH.

Materials/components

Lining:

Synthetic rubber, oil resistant.

Reinforcement:

Four spirals of high tensile steel wire, separated by a synthetic rubber layer.

Cover:

Synthetic rubber, oil and weathering resistant.

TC = Tough Cover - highly abrasion resistant;

ST = Super Tough Cover - extreme abrasion resistant.

End fittings:

Carbon or stainless steel - series V4.

Technical characteristics

Maximum allowable working pressure at ambient temperature according to the following table:

Item	Nominal Diameter (mm)	Inside Diameter (mm)	Max. working pressure (MPa)
-12	20	19.1	42.0
-16	25	25.4	38.0
-20	32	31.8	32.5
-24	38	38.1	29.0
-32	50	50.8	25.0

Working temperature: from -40°C to +100°C

Field of application

Hydraulic systems with a hydraulic oil having a flash point not less than 150°C (closed cup test).

Tests carried out

Burst test (Test Report No. 14/GE/1387/01 dated 15/07/2014 of RINA Genoa Office).



TYPE APPROVAL CERTIFICATE

No. MAC256919CS/002

Enclosure - Page 2 of 2

H29 - H29TC - H29ST

Acceptance conditions

The installation on board of the piping system is to be carried out by qualified personnel in accordance with the manufacturer's instructions.

The flexible hoses are to be installed in order to satisfy the requirements of para. 5.9.3 of Part C, Ch 1, Sec 10 of RINA Rules.

The acceptance of the a.m. products on board ships and other units classified with RINA is subject to the satisfactory outcome of testing as per RINA Rules.

For hoses assemblies to be used at temperatures below -10°C, couplings in stainless steel or normalized carbon steel are to be used.

The product (hose and fittings) is to be marked, for traceability, with the following data: nominal diameter, design conditions, Manufacturer's name or trademark, designation type reference.

Remarks

This certificate annuls and replaces the previous ones Nos. MAC086814CS/005 and MAC086814CS/006 issued on 19/09/2014.

Genoa November 18, 2019

RINA Services S.p.A.
Via Corsica, 12 - 16128 Genova
Tel. +39 010 5381000
Fax +39 010 5381000



Hose H29 be equivalent of MARKHIP® TFSS4 /00

TYPE APPROVAL CERTIFICATE**This is to certify:****That the Flexible Hoses of Non-Metallic Material with Permanently Fitted Couplings**with type designation(s)
H29/H29TC/H29ST, H31/H31TC/H31ST

Issued to

Parker Hannifin Manufacturing S.r.l.
Veniano CO, Italy

is found to comply with

DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition July 2015
DNV GL class programme DNVGL-CP-0183 – Type approval – Flexible hoses**Application :****Product(s) approved by this certificate is/are accepted for installation on vessels classed by DNV GL.**

Type:	Temperature range:	Max. working press.:	Sizes:
H29/H29TC/H29ST	-40°C to +100°C (dependent on medium)	280 to 430 bar (dependent on size)	DN19 to DN51
H31/H31TC/H31ST	-40°C to +100°C (dependent on medium)	310 to 500 bar (dependent on size)	DN6 to DN25

Issued at **Høvik** on **2017-12-28**This Certificate is valid until **2022-12-27**.DNV GL local station: **Milan**Approval Engineer: **Adel Samiei**for **DNV GL**

Digitally Signed By: Marveng, Marianne Spæren

Location: DNV GL Høvik, Norway

Marianne Spæren Marveng
Head of SectionHose **H29** be equivalent of **MARKHIP® TFSS4 /00**
Hose **H31** be equivalent of **MARKHIP® TFR9R /00**

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.



Job Id: **262.1-016585-2**
Certificate No: **TAP000016Y**

Product description

Hose H29, H29TC, H29ST: (Constructed according to EN 856 4SH - ISO 3862 4SH)

Oil resistant synthetic rubber inner tube, four spirals of high tensile steel wire reinforcement separated by a synthetic rubber layer. Oil, weather, fire and abrasion resistant synthetic black rubber cover. (TC = Tough Cover, ST = Super Tough Cover)

Hose H31, H31TC, H31ST: (Constructed according to EN 856 4SP - ISO 3862 4SP)

Oil resistant synthetic rubber inner tube, four spirals of high tensile steel wire reinforcement separated by a synthetic rubber layer. Oil, weather, fire and abrasion resistant synthetic black rubber cover. (TC = Tough Cover, ST = Super Tough Cover)

Couplings:

Hose H29/-TC/-ST : Parker coupling series V4 made of carbon steel or 316 stainless steel
Hose H31/-TC/-ST : Parker coupling series VS- V4 made of carbon steel or 316 stainless steel
Hoses made by: Parker Hannifin, Italy
Couplings made by: Parker Hannifin, Germany

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.

The hose may be used for the following application: Petroleum base hydraulic fluids, water glycol and water oil emulsion hydraulic fluids, compressed air & fresh water.

Maximum working pressure:

Type			Hose size (DN)	Max working pressure (bar)
H29-12	H29TC-12	H29ST-12	19	430
H29-16	H29TC-16	H29ST-16	25	400
H29-20	H29TC-20	H29ST-20	31	350
H29-24	H29TC-24	H29ST-24	38	310
H29-32	H29TC-32	H29ST-32	51	280
H31-4	H31TC-4	H31ST-4	6	500
H31-6	H31TC-6	H31ST-6	10	445
H31-8	H31TC-8	H31ST-8	12	415
H31-10	H31TC-10	H31ST-10	16	390
H31-12	H31TC-12	H31ST-12	19	350
H31-16	H31TC-16	H31ST-16	25	310

Temperature range:

Medium	Temperature range
Petroleum base hydraulic fluids	-40 °C to 100 °C
Water and water based hydraulic fluids	-40 °C to 85 °C
Compressed air	-40 °C to 70 °C

Each hose assembly is before delivery to be hydraulic pressure tested to 1.5 times the maximum working pressure and to be delivered with the pressure test report 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 the machinery. The hoses shall not replace/be used where permanent piping is possible/required and must only be fitted in places where they are always accessible.

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

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

Hose H29 be equivalent of MARKHIP® TFSS4 /00
Hose H31 be equivalent of MARKHIP® TFR9R /00

Job Id: **262.1-016585-2**
Certificate No: **TAP000016Y**

The cover of hoses for gaseous applications shall be pin-pricked.

Hose assemblies covered by this certificate shall not be installed in systems subject to pressure below atmospheric or vacuum conditions.

Type Approval documentation

Parker catalogue 4400/UK (Hydraulic hoses, Fittings & equipment) April 2017 pages Cab37,Cab38,Eb-17
Manufacturer's test reports No: 1411, 1412, 1413, 1414, 1415, 1415, 1417, 1418, 1419, 1420, 1421, 1422 and 1423 dated 2004-08-10.

Manufacturer's burst test report witnessed by DNV 1416, 1411, 1414, 1419 and 1422 dated 2004-08-10.
Manufacturer's crimping tables: Bulletin 4480-B28-1/UK.

LAPI Fire test reports No: 583.0IS0110/04, 629.0IS0110/04, 584.0IS0110/04, 766.0IS0110/04, 631.0IS0110/04, 632.0IS0110/04 and 633.0IS0110/04 dated 2004-06-7/18 and 2004-07-19.

Burst pressure test and leakage test reports N°3310-11-12-13 dated 2017-07-24

Tests carried out

Fire, Burst, Impulse, Change in length, Abrasion, Adhesion, Oil resistance, Cold flexibility, Ozone resistance, Dimensional check

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
- Size

Periodical assessment

For retention of the Type Approval, a DNV GL 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 DNVGL-CP-0338.

Hose H29 be equivalent of MARKHIP® TFSS4 /00
Hose H31 be equivalent of MARKHIP® TFR9R /00



CERTIFICATE NUMBER 19-GE1872365-PDA

EFFECTIVE DATE 29-Jul-2019

EXPIRATION DATE 28-Jul-2024

ABS TECHNICAL OFFICE GENOA ENGINEERING

CERTIFICATE OF Product Design Assessment

This is to certify that a representative of this Bureau did, at the request of

**PARKER HANNIFIN MANUFACTURING SRL.
HOSE PRODUCTS DIVISION EUROPE**

located at

Via G.B.Pirelli, 6 Veniano (CO), ITALY, 22070

assess design plans and data for the below listed product. This assessment is a representation by the Bureau as to the degree of compliance the design exhibits with applicable sections of the Rules. This assessment does not waive unit certification or classification procedures required by ABS Rules for products to be installed in ABS classed vessels or facilities. This certificate, by itself, does not reflect that the product is Type Approved. The scope and limitations of this assessment are detailed on the pages attached to this certificate.

Product Hose, Rubber Flexible Hose

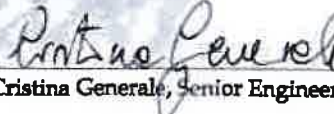
Model Parker Hose Style R42-R42TC-R42ST

This Product Design Assessment (PDA) Certificate remains valid until 28 July 2024 or until the Rules and/or Standards used in the assessment are revised or until there is a design modification warranting design reassessment (whichever occurs first).

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or previous to the effective date of the ABS Rules and standards applied at the time of PDA issuance. Use of the Product for non-ABS units is subject to agreement between the manufacturer and intended client.

American Bureau of Shipping


Cristina Generale, Senior Engineer

NOTE: This certificate evidences compliance with one or more of the Rules, Guides, standards or other criteria of ABS or a statutory, industrial or manufacturer's standards. It is issued solely for the use of ABS, its committees, its clients or other authorized entities. Any significant changes to the aforementioned product without approval from ABS will result in this certificate becoming null and void. This certificate is governed by ABS Rules 1-1-A3/5.9 Terms and Conditions of the Request for Product Type Approval and Agreement (2010)

PARKER HANNIFIN MANUFACTURING SRL
HOSE PRODUCTS DIVISION EUROPE
VIA G.B. PIRELLI, 6
VENIANO (CO)
Italy 22070
Telephone: +39 031936111
Fax: +39031936664
Email: info@parker.com
Web: www.parker.com

Tier: 3 - Type Approved, unit certification not required

Product: Hose, Rubber Flexible Hose

Model: Parker Hose Style R42-R42TC-R42ST

Intended Service:

Petroleum Base Hydraulic Fluid and Lubricant Oils - Water, Water/Oil Emulsion and Water/Glycol Hydraulic Fluids - Compressed Air.

Description:

Oil-resistant synthetic rubber hoses reinforced with four or six high tensile steel wires, covered with a synthetic rubber sheath. R42 standard hose, R42TC flame resistant cover, R42ST abrasion resistant cover.

Rating:

See Attached Table 1. Manufacturer recommended fittings V4 and V6 series

Temperature range:

- Petroleum Base Hydraulic Fluid and Lubricant Oils, -40 deg C to +121 deg C;
- Water, Water/Oil Emulsion and Water/Glycol Hydraulic Fluids up to +85 deg C;
- Compressed Air, up to +70 deg C.

Service Restriction:

- 1) Unit Certification is not required for this product. If the manufacturer or purchaser requests an ABS Certificate for compliance with a specification or standard, the specification or standard, including inspection standards and tolerances, must be clearly defined.
- 2) Hoses are to be complete with factory assembled end fittings or factory supplied end fittings installed in accordance with manufacturer's specifications.
- 3) End connections are to comply with applicable requirements and limitation of the ABS Marine Vessels Rules (4-6-2/5.5.4, 4-6-2/5.5.5, 4-6-7/3.5.1, 4-6-7/5.3.2).
- 4) Hose assemblies are to be installed only where flexibility is required, in clearly visible and readily accessible locations, and are not to be subject to torsional deflection under normal conditions; hose length is to be limited to that required by flexibility only.
- 5) Not to be used in high pressure fuel oil injection systems, steam systems or oil supply lines to boilers.
- 6) Not to be used for installations where repeated and/or frequent flexing is expected.

Comments:

- 1) For traceability to this type approval the final 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
- 2) In general, flexible hoses are to be limited to a length necessary to provide for relative movement between fixed and flexibly mounted items of machinery, equipment or systems.
- 3) The manufacturer has provided a declaration about the control of, or the lack of asbestos in this product.

Notes/Drawing/Documentation:

- Drawing No. 3, R42 TS-ST Declaration of conformity letter, Revision: 0, Pages: 1
- Drawing No. 4, Test ISO 3862-type R15 STR R42 at Parker, dated 4 Feb 2019 Revision: 0, Pages: 6
- Drawing No. Form ABS PDA xR42 - rev May2019, new request form, Revision: 1, Pages: 1
- Drawing No. IC-40-26 (630), USMSHA Certificate, Revision: 1, Pages: 1
- Drawing No. Parker R42 Declaration of conformity, Revision: 0, Pages: 1
- Drawing No. R42 , Burst test report signed by DNV at Parker, dated 25 Jul 2017, Revision: 0, Pages: 6

Hose R42 be equivalent of MARKHIP® TFRG4 /00

PARKER HANNIFIN MANUFACTURING SRL
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Telephone: +39 031936111
Fax: +39031936664
Email: info@parker.com
Web: www.parker.com

Tier: 3 - Type Approved, unit certification not required

Drawing No. Table 1, Hose Specification Table 1, Revision: 1, Pages: 1

Terms of Validity:

This Product Design Assessment (PDA) Certificate 19-GE1872365-PDA, dated 29/Jul/2019 remains valid until 28/Jul/2024 or until the Rules or specifications used in the assessment are revised (whichever occurs first).

This PDA is intended for a product to be installed on an ABS classed vessel, MODU or facility which is in existence or under contract for construction on the date of the ABS Rules or specifications used to evaluate the Product.

Use of the Product on an ABS classed vessel, MODU or facility which is contracted after the validity date of the ABS Rules and specifications used to evaluate the Product, will require re-evaluation of the PDA.

Use of the Product for non ABS classed vessels, MODUs or facilities is to be to an agreement between the manufacturer and intended client.

STANDARDS

ABS Rules:

Rules for Conditions of Classification, Part I - 2019, 1-1-4/7.7, 1-1-A3, 1-1-A4, which covers the following:
2019 Steel Vessels Rules 4-6-2/5.7
2019 Marine Vessels Rules 4-6-2/5.7
2019 Steel Vessels Under 90 Meters (295 Feet) in Length, 4-1-1/9.19
2019 Offshore Support Vessels, 4-6-2/5.7

Rules for Conditions of Classification, Part I - 2019 Rules for Building and Classing Mobile Offshore Units 1-1-4/9.7, 1-1-A2, 1-1-A3, which covers the following:
2019 Mobile Offshore Units Rules 4-2-1/11.29

National:
NA

International:
ISO 3862 type R15 (2017 edition)

Government:
NA

EUMED:
NA

OTHERS:
NA

Hose R42 be equivalent of MARKHIP® TFRG4 /00




TYPE APPROVAL CERTIFICATE
No. MAC256919CS/001

This is to certify that the product identified below is in compliance with the regulations herewith specified.

Description	Non metallic flexible hoses
Type	R42 - R42TC - R42ST
Applicant	PARKER HANNIFIN MANUFACTURING SRL VIA G.B. PIRELLI, 6 22070 VENIANO (CO) ITALY
Manufacturer	PARKER HANNIFIN MANUFACTURING SRL
Place of manufacture	VIA G.B. PIRELLI, 6 22070 VENIANO (CO) ITALY
Reference standards	RINA Rules for the Type Approval of Flexible Hoses and Expansion Joints

Issued in **Genoa** on **November 18, 2019**. This Certificate is valid until **November 17, 2024**


RINA Services S.p.A.
Marco Dardano

This certificate consists of this page and 1 enclosure

Hose R42 be equivalent of MARKHIP® TFRG4 /00


RINA Services S.p.A.
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tel +39 010 53851
Fax +39 010 5351000



TYPE APPROVAL CERTIFICATE

No. MAC256919CS/001

Enclosure - Page 1 of 2

R42 - R42TC - R42ST

Reference documents

Parker Catalogue No. 4000.

Reference Standard

ISO 3862 - R15.

Materials/components

Lining:

Synthetic rubber, oil resistant.

Reinforcement:

Four or six spirals of high tensile steel wire, separated by a synthetic rubber layer.

Cover:

Synthetic rubber, oil and weathering resistant.

TC = Tough Cover - highly abrasion resistant;

ST = Super Tough Cover - extreme abrasion resistant.

End fittings:

Carbon or stainless steel - series V4 (dimensions from -10 to -16), series V6 (dimensions from -20 to -32).

Technical characteristics

Maximum allowable working pressure at ambient temperature according to the following table:

Item	Nominal Diameter (mm)	Inside Diameter (mm)	Max. working pressure (MPa)
-10	16	15,9	42,0
-12	20	19,1	42,0
-16	25	25,4	42,0
-20	32	31,8	42,0
-24	40	38,1	42,0
-32	50	50,8	42,0

Working temperature: from -40°C to +120°C

Field of application

Hydraulic systems with a hydraulic oil having a flash point not less than 150°C (closed cup test).

RINA Services S.p.A.
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Hose R42 be equivalent of MARKHIP® TFRG4 /00

TYPE APPROVAL CERTIFICATE

No. MAC256919CS/001

Enclosure - Page 2 of 2

R42 - R42TC - R42ST

Tests carried out

Burst test (Test Report No. 14/GE/1387/01 dated 15/07/2014 of RINA Genoa Office).

Acceptance conditions

The installation on board of the piping system is to be carried out by qualified personnel in accordance with the manufacturer's instructions.

The flexible hoses are to be installed in order to satisfy the requirements of para. 5.9.3 of Part C, Ch 1, Sec 10 of RINA Rules.

The acceptance of the a.m. products on board ships and other units classified with RINA is subject to the satisfactory outcome of testing as per RINA Rules.

For hoses assemblies to be used at temperatures below -10°C, couplings in stainless steel or normalized carbon steel are to be used.

The product (hose and fittings) is to be marked, for traceability, with the following data: nominal diameter, design conditions, Manufacturer's name or trademark, designation type reference.

Remarks

This certificate annuls and replaces the previous ones Nos. MAC086814CS/002 and MAC086814CS/004 issued on 25/08/2019.

Genoa November 18, 2019

RINA Services S.p.A.
Via Corallo 12 - 16128 Genova
Tel. +39 010 53851
Fax +39 010 5351000



Hose R42 be equivalent of MARKHIP® TFRG4 /00

TYPE APPROVAL CERTIFICATE

This is to certify:

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

with type designation(s)
R42/R42TC/R42ST

Issued to
Parker Hannifin Manufacturing S.r.l.
Veniano CO, Italy

is found to comply with
DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition July 2015
DNV GL class programme DNVGL-CP-0183 – Type approval – Flexible hoses

Application :

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

Temperature range: -40°C to 125°C (dependent on medium)
Max. working press.: 420 bar
Sizes: DN6, 10, 12, 16, 19, 25, 31, 38 and 51

Issued at **Høvik** on **2017-12-28**

This Certificate is valid until **2022-12-27**.
DNV GL local station: **Milan**

Approval Engineer: **Adel Samiei**



for **DNV GL**
Digitally Signed By: Marveng, Marianne Spæren
Location: DNV GL Høvik, Norway

Marianne Spæren Marveng
Head of Section

Hose R42 be equivalent of MARKHIP® TFRG4 /00

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.



Job Id: **262.1-016585-3**
Certificate No: **TAP000016Z**

Product description

R42, R42TC, R42ST (according to SAE J517 R15 - ISO 3862 R15)
Synthetic rubber inner tube, four or six spirals of high tensile steel wire reinforcement separated by a synthetic rubber layer. Oil, weather, fire and abrasion resistant synthetic black rubber cover.
(TC = Tough Cover, ST = Super Tough Cover)

Couplings: Parker coupling series V4/V6 made of carbon Steel or 316 stainless steel
Hoses made by: Parker Hannifin, Italy
Couplings made by: Parker Hannifin, Germany

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.

The hose may be used for the following application: Petroleum base hydraulic fluids, water glycol and water oil emulsion hydraulic fluids, compressed air & fresh water.

Maximum working pressure:

Type			Hose size (DN)	Max working pressure (bar)
R42-10	R42TC-10	R42ST-10	16	420
R42-12	R42TC-12	R42ST-12	19	420
R42-16	R42TC-16	R42ST-16	25	420
R42-20	R42TC-20	R42ST-20	31	420
R42-24	R42TC-24	R42ST-24	38	420
R42-32	R42TC-32	R42ST-32	51	420

Temperature range:

Medium:	Temperature range:
Petroleum base hydraulic fluids	-40 °C to 125 °C
Water and water based hydraulic fluids	-40 °C to 85 °C
Compressed air	-40 °C to 70 °C

Each hose assembly is before delivery to be hydraulic pressure tested to 1.5 times the maximum working pressure and to be delivered with the pressure test report 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 the machinery. The hoses shall not replace/be used where permanent piping is possible/required and must only be fitted in places where they are always accessible.

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

Hoses covered by this certificate shall not be installed in systems with pressure below atmospheric or vacuum conditions.

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

The cover of hoses for gaseous applications shall be pin-pricked.

Type Approval documentation

Parker catalogue 4400/UK (Hydraulic hoses, Fittings & equipment) April 2017 pages Cab37,Cab38,Eb-17
Drawings of the V6 series coupling

Manufacturer's test reports No: 1405, 1406, 1407, 1408, 1409 and 1410.

Manufacturer's burst test report witnessed by DNV 1405, 1408 and 1410 dated 2004-10-08 and 2004-10-19.

Manufacturer's crimping tables: Bulletin 4480-B28-1/UK.

Hose R42 be equivalent of MARKHIP® TFRG4 /00



Job Id: **262.1-016585-3**
Certificate No: **TAP000016Z**

LAPI Fire test reports No: 630.0IS0110/04, 767.0IS0110/04 and 768.0IS0110/04 dated 2004-06-18 and 2004-07-19.

Burst pressure test and leakage test reports N°3314 and N°3315 dated 2017-07-24

Tests carried out

Dimensional Check, Proof Pressure, Change in Length, Burst, Cold Flex, Oil Resistance, Ozone Resistance, Cover- and Tube- Adhesion Test, Impulse 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
- Size

Periodical assessment

For retention of the Type Approval, a DNV GL 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 DNVGL-CP-0338.

Hose R42 be equivalent of MARKHIP® TFRG4 /00



TYPE APPROVAL CERTIFICATE
No. MAC337517CS/003

This is to certify that the product identified below is in compliance with the regulations herewith specified.

<i>Description</i>	Non metallic flexible hoses
<i>Type</i>	H31 - H31TC - H31ST
<i>Applicant</i>	PARKER HANNIFIN MANUFACTURING SRL VIA G.B. PIRELLI, 6 22070 VENIANO (CO) ITALY
<i>Manufacturer</i>	PARKER HANNIFIN MANUFACTURING SRL
<i>Place of manufacture</i>	VIA G.B. PIRELLI, 6 22070 VENIANO (CO) ITALY
<i>Reference standards</i>	RINA Rules for the Type Approval of Flexible Hoses and Expansion Joints

Issued in **Genoa** on **January 15, 2018**. This Certificate is valid until **January 14, 2023**

RINA Services S.p.A.
Franca Parisi

This certificate consists of this page and 1 enclosure

Hose H31 be equivalent of MARKHIP® TFR9R /00

RINA Services S.p.A.
Via Corsica, 12 - 16138 Genova
Tel +39 010 53851
Fax +39 010 5351000



TYPE APPROVAL CERTIFICATE

No. **MAC337517CS/003**

Enclosure - Page 1 of 2

H31 - H31TC - H31ST

Reference documents

Parker Hannifin specifications nos. HS-H31 dated 27/04/2004, HS-KV4 dated 07/11/2003 and HS-KVS dated 02/06/2004.

Parker Catalogue No. 4400.

Test Report No. 2004/CS/01/4286 of 27/12/2005 of RINA Milan Office.

Test Report No. 2012/MI/01/932 of 31/10/2012 of RINA Milan Office.

Reference Standard

EN 856 - 4SP, ISO 3862-1 - 4SP.

Materials/components

Lining:

Polychloroprene synthetic rubber, oil resistant.

Reinforcement:

Four spiral plies of high tensile steel wire.

Cover:

Synthetic rubber, resistant to oil and weathering.

TC = Tough Cover - highly abrasion resistant synthetic rubber;

ST = Super Tough Cover - extreme abrasion resistant (synthetic rubber with a special polyethylene coating).

End fittings:

Steel, VS series (for items -6 to -16) and V4 series (for items -6 to -32).

Technical characteristics

Maximum allowable working pressure at ambient temperature according to the following table:

Item	Nominal Diameter (mm)	Inside Diameter (mm)	Max. working pressure (MPa)
-6	10	9,3 - 10,1	44.5
-8	12	12,3 - 13,5	41.5
-10	16	15,5 - 16,7	35 (39)*
-12	19	18,6 - 19,8	35
-16	25	25,0 - 26,4	28 (31)*
-20	31	31,4 - 33,0	21 (28)*
-24	38	37,7 - 39,3	18,5 (26)*
-32	51	50,4 - 52,0	16,5 (21)*

* Note: the values in parenthesis are above the ones foreseen in the reference Standard - The maximum working pressures of hoses intended for marine applications are not to exceed the ones foreseen by the reference Standard - see acceptance conditions

Working temperature: from -40°C to +100°C.

RINA Services S.p.A.
Via Corsica, 12 - 16128 Genova
Tel +39 010 53851
Fax +39 010 5351000



Hose H31 - be equivalent of MARKHIP® TFR9R /00

TYPE APPROVAL CERTIFICATE

No. MAC337517CS/003

Enclosure - Page 2 of 2

H31 - H31TC - H31ST

Field of application

Hydraulic systems with a hydraulic oil having a flash point not less than 150°C (closed cup test).

Acceptance conditions

The installation on board of the piping system is to be carried out by qualified personnel in accordance with the manufacturer's instructions.

The flexible hoses are to be installed in order to satisfy the requirements of para. 5.9.3 of Part C, Ch 1, Sec 10 of RINA Rules.

The acceptance of the a.m. products on board ship and other units classified with RINA is subject to the satisfactory outcome of testing as per RINA Rules.

For hoses assemblies to be used at temperatures below -10°C, couplings in normalized steel are to be used.

The maximum working pressures of hoses intended for marine applications shall not exceed the ones foreseen in the reference Standard.

The product (hose and fittings) is to be marked, for traceability, with the following data: nominal diameter, design conditions, Manufacturer's name or trademark, designation type reference.

Remarks

This certificate annuls and replaces the previous certificate No. MAC171511CS/006 issued on 15 November 2012.

Genoa January 15, 2018

RINA Services S.p.A.
Via Corsica, 12 - 16128 Genova
Tel +39 010 53851
Fax +39 010 5351000



Hose H31 be equivalent of MARKHIP® TFR9R /00



Confirmation of Product Type Approval

Please refer to the "Service Restrictions" shown below to determine if Unit Certification is required for this product.

This certificate reflects the information on the product in the ABS Records as of the date and time the certificate is printed.

Pursuant to the Rules of the American Bureau of Shipping (ABS), the manufacturer of the below listed product held a valid Manufacturing Assessment (MA) with expiration date of 11-JAN-2023. The continued validity of the Manufacturing Assessment is dependent on completion of satisfactory audits as required by the ABS Rules.

And; a Product Design Assessment (PDA) valid until subject to continued compliance with the Rules or standards used in the evaluation of the product.

The above entitle the product to be called Product Type Approved.

The Product Design Assessment is valid for products intended for use on ABS classed vessels, MODUs or facilities which are in existence or under contract for construction on the date of the ABS Rules used to evaluate the Product.

ABS makes no representations regarding Type Approval of the Product for use on vessels, MODUs or facilities built after the date of the ABS Rules used for this evaluation.

Due to wide variety of specifications used in the products ABS has evaluated for Type Approval, it is part of our contract that; whether the standard is an ABS Rule or a non-ABS Rule, the Client has full responsibility for continued compliance with the standard.

Product Name: Flexible Wire Braided Rubber Hose Assembly
Model Name(s): DS1-T; DS2-T; DS2-SC; DS5

Presented to:

DIESSE RUBBER HOSES SPA
VIA PROVINCIALE, 8
BERGAMO 24040
Italy

Intended Service:	Hydraulic systems (mineral and vegetable oils, oils in aqueous emulsion, water, air)
Description:	Oil resistant synthetic rubber hoses reinforced with one or two high tensile steel wire braids, covered with a synthetic rubber sheath (one steel braid plus one textile braid for DS5 only)
Tier:	3
Ratings:	Model DS1 - T: from DN5 to DN51, from 250 bar to 40 bar Model DS2 - T: from DN5 to DN51, from 415 bar to 80 bar Model DS2 - C: from DN6 to DN25, from 420 bar to 185 bar Model DS5: from DN5 to DN46, from 207 bar to 24 bar For additional details, please refer to attachment.
Service Restrictions:	1) Unit Certification is not required for this product. If the manufacturer or purchaser request an ABS Certificate for compliance with a specification or standard, the specification or standard, including inspection standards and tolerances, must be clearly defined. 2) Hoses are to be complete with factory assembled end fittings or factory supplied end fittings installed in accordance with manufacturer's specifications. 3) End connections are to comply with applicable requirements and limitation of Rules (4-6-2/5.5.4, 4-6-2/5.5.5, 4-6-7/3.5.1, 4-6-7/5.3.2). 4) Hose assemblies are to be installed only where flexibility is required and are not to be subject to torsional deflection under normal conditions; hose length is to be limited to that required by flexibility only. 5) Not to be used for installations where repeated

Hose DS1-T be equivalent of MARKHIP® TF1SN/08 * Hose DS2-T be equivalent of MARKHIP® TF2SN/08 * Hose DS2-SC be equivalent of MARKHIP® TF1PR/08

and/or frequent flexing is expected. 6) Flexible Hoses are to be permanently marked by the manufacturer with the following details: Hose manufacturer's name or trademark, date of manufacturer (month/year), designation type reference, nominal diameter, pressure and temperature rating in accordance with Steel Vessel Rules 4-6-2/5.7.6

Comments: The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product. Only the Manufacturer's approved end fittings are to be used, as per the Manufacturer's recommendations

Notes / Documentation: Fire test for DS1 dated 24 Feb 2005 at LAPI Laboratory Fire test for DS2 dated 12 Feb 2005 and 24 March 2005 at LAPI Laboratory Fire test for DS5 dated 24 Feb 2005 at LAPI Laboratory Test report DS5 dated 19 April 2005 at DIESSE Plant Test report DS1 dated 15 April 2005 at DIESSE Plant Test report DS2 dated 29 April 2005 at DIESSE Plant

Term of Validity: This Product Design Assessment (PDA) Certificate 17-GE1697177-PDA, dated 12/Jan/2018 remains valid until 11/Jan/2023 or until the Rules or specifications used in the assessment are revised (whichever occurs first). This PDA is intended for a product to be installed on an ABS classed vessel, MODU or facility which is in existence or under contract for construction on the date of the ABS Rules or specifications used to evaluate the Product. Use of the Product on an ABS classed vessel, MODU or facility which is contracted after the validity date of the ABS Rules and specifications used to evaluate the Product, will require re-evaluation of the PDA. Use of the Product for non ABS classed vessels, MODUs or facilities is to be to an agreement between the manufacturer and intended client.

ABS Rules: The Rules for Conditions of Classification, Part 1 2017 - Steel Vessels Rules 1-1-4/7.7, 1-1-A3, 1-1-A4, which covers the following: Rules for Building and Classing Steel Vessels (2017) 4-6-2/5.7, 4-6-7/3.5.2 Rules for Building and Classing Steel Vessels Under 90 Meters (295 feet) in Length (2017) 4-4-1/9.19 Rules for Building and Classing Steel Vessels for Service on Rivers and Intracoastal Waterways (2017) 4-3-1/7.21 Guide for Building and Classing Yachts (2017)1-1-3/3.3, 1-1-Appendix 3 and 5 and 4-1-1/Table 3, 4-4-1/9.19 Rules for Building and Classing Steel Barges (2017) 4-1-1/1 Rules for Building and Classing High Speed Craft 1-1-4/11. (2017) 4-4-1/9.19 Rules for Building and Classing Offshore Support Vessels (OSV Rules) (2017) 4-6-2/5.7 The Rules for Conditions of Classification, Part 1 2017 - Offshore Units and Structures 1-1-A2, 1-1-A3, which covers the following: Rules for Building and Classing Mobile Offshore Drilling Units (2017) 1-1-4/9.7, Appendix 2 and 3

National Standards:

International Standards: EN 853/1SN Ed. 2015 (DS1-T); EN 853/2SN Ed. 2015 (DS2-T); EN 857/2SC Ed. 2015 (DS2-SC); SAE 100R5 (DS5) Ed. 2015; ISO 15540 Ed. 2016

Government Authority:

EUMED:

Others:

Model Certificate	Model Certificate No	Issue Date	Expiry Date
PDA	17-GE1697177-PDA	12-JAN-2018	11-JAN-2023



ABS Programs

ABS has used due diligence in the preparation of this certificate and it represents the information on the product in the ABS Records as of the date and time the certificate was printed. Type Approval requires Drawing Assessment, Prototype Testing and assessment of the manufacturer's quality assurance and quality control arrangements. Limited circumstances may allow only Prototype Testing to satisfy Type Approval. The approvals of Drawings and Products remain valid as long as the ABS Rule, to which they were assessed, remains valid. ABS cautions manufacturers to review and maintain compliance with all other specifications to which the product may have been assessed. Further, unless it is specifically indicated in the description of the product; Type Approval does not necessarily waive witnessed inspection or survey procedures (where otherwise required) for products to be used in a vessel, MODU or facility intended to be ABS classed or that is presently in class with ABS. Questions regarding the validity of ABS Rules or the need for supplemental testing or inspection of such products should, in all cases, be addressed to ABS.

Hose DS1-T be equivalent of MARKHIP® T1SN/08 * Hose DS2-T be equivalent of MARKHIP® T1SN/08 * Hose DS2-SC be equivalent of MARKHIP® T1SN/08 * Hose DS2-SC be equivalent of MARKHIP® T1SN/08

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, DS2-T, JCK (Jack Hose), FAHRENHEIT 302/2

Issued to
Diesse Rubber Hoses S.p.A.
Filago BG, Italy

is found to comply with
DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition July 2015
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:
DS1-T	-40°C to +100°C	40 bar to 225 bar	DN5 to DN51
DS2-T	-40°C to +100°C	80 bar to 415 bar	DN5 to DN51
JCK (Jack Hose)	-40°C to +100°C	700 bar	DN6 & DN10
FAHRENHEIT 302/2	-40°C to +150°C	80 bar to 400 bar	DN5 to DN51

Issued at **Høvik** on **2017-05-05**

This Certificate is valid until **2022-05-04**.

DNV GL local station: **Milan**

for **DNV GL**

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.



Job Id: **262.1-024201-1**
 Certificate No: **TAP00000UH**

Product description

4 types of hose assemblies:

DS1-T Accoridng to EN 853 1SN
 Tube: Black synthetic rubber resistant to oil
 Reinforcement: One high tensile steel braid
 Cover: Black, synthetic rubber resistant to oil, abrasion and weather condition
 STANDARD,MSHA, MSHA HARC, MSHA ENDLESS, HARC, ENDLESS COVERS
 Coupling: Intertraco coupling type K DN≤25
 Intertraco coupling type J DN>25

DS2-T Accoridng to EN 853 2SN
 Tube: Black synthetic rubber resistant to oil
 Reinforcement: Two high tensile steel braids
 Cover: Black, synthetic rubber resistant to oil, abrasion and weather condition
 STANDARD,MSHA, MSHA HARC, MSHA ENDLESS, HARC, ENDLESS COVERS
 Coupling: Intertraco coupling type K DN≤25
 Intertraco coupling type J DN>25

JCK (Jack Hose)
 Tube: Black synthetic rubber resistant to oil
 Reinforcement: Two high tensile steel braids
 Cover: Black, synthetic rubber resistant to oil, abrasion and weather condition
 STANDARD,MSHA, MSHA HARC, MSHA ENDLESS, HARC, ENDLESS COVERS
 Coupling: Intertraco coupling type K

FAHRENHEIT 302/2 Accoridng to EN 853 2SN
 Tube: Black synthetic rubber resistant to oil
 Reinforcement: Two high tensile steelbraids
 Cover: Black or blue, synthetic rubber resistant to oil, abrasion and weather condition
 STANDARD,MSHA, MSHA HARC, MSHA ENDLESS, HARC, ENDLESS COVERS
 Coupling: Intertraco coupling type K DN≤25
 Intertraco coupling type J DN>25

Hoses are manufactured: Diesse Rubber Hoses S.P.A.
 Couplings are manufactured: Intertraco according to Intertraco fitting catalogue 1P013 dated September 2013

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.

Maximum working pressure:

Size		DS1-T		DS2-T		JCK (Jack Hose)		FAHRENHEIT 302/2	
DN	size	Hose	(bar)	Hose	(bar)	Hose	(bar)	Hose	(bar)
06	-4	1SN-06-04	225	2SN-06-04	400	JCK-06-04	700	2FF-06-04	400
08	-5	1SN-08-05	215	2SN-08-05	350	-	-	2FF-08-05	350
10	-6	1SN-10-06	180	2SN-10-06	330	JCK-10-06	700	2FF-10-06	330
12	-8	1SN-12-08	160	2SN-12-08	275	-	-	2FF-12-08	275
16	-10	1SN-16-10	130	2SN-16-10	250	-	-	2FF-16-10	250
19	-12	1SN-19-12	105	2SN-19-12	215	-	-	2FF-19-12	225
25	-16	1SN-25-16	87	2SN-25-16	165	-	-	2FF-25-16	165
31	-20	1SN-31-20	62	2SN-31-20	125	-	-	2FF-31-20	125
38	-24	1SN-38-24	50	2SN-38-24	90	-	-	2FF-38-24	90
51	-32	1SN-51-32	40	2SN-51-32	80	-	-	2FF-51-32	80

Hose assemblies are suitable for use with:

- Hydraulic fluids in accordance with ISO 6734-4 (with exception of HFD-R, HFD-S and HFD-T) at temperature ranging from -40°C to 100°C
- Water based fluids at temperature ranging from -40°C to 70°C

Job Id: **262.1-024201-1**
Certificate No: **TAP00000UH**

– Water at temperature ranging from 0°C to 70°C
Except FAHRENHEIT 302/2 which is suitable for -40°C to +150°C for hydraulic fluids (maximum temperature for air shall not be more than +121°C)

Flexible hoses are only to be used in short lengths 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.

All hose assemblies delivered under the DNV GL type approval scheme shall be subject to a pressure test at 1.5 times the maximum working pressure and shall be delivered with the pressure test report with reference to the type approval certificate.

The hose assemblies must only be fitted in places where they are always accessible.

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

Hose assemblies covered by this certificate shall not be used in system subject to pressure below atmospheric or vacuum condition.

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

Tests carried out

Fire test, burst test, Dimensional check test, Change in length test, Cold flexibility test, Oil resistance test, Cover adhesion test, Ozone resistance test, Impulse 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
- Size

Hose DS1-T be equivalent of MARKHIP® TF15N/08 * Hose DS2-T be equivalent of MARKHIP® TF25N/08

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, DS2-T, FIGHTER 1SC, FIGHTER DS 2SC/R16, DS17, MASTER, OVERMASTER, 1 STARK, 2 STARK

Issued to

Diesse Rubber Hoses S.p.A.
Filago BG, BG, Italy

is found to comply with

DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition January 2018
DNV GL class programme DNVGL-CP-0183 – Type approval – Flexible hoses

Application :

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

Type:	Temperature range:	Max. working press.:	Sizes:
DS1-T	-40°C to +100°C	40 to 225 bar	DN6 to 51
DS2-T	-40°C to +100°C	80 to 400 bar	DN6 to 51
FIGHTER 1SC	-40°C to +100°C	100 to 275 bar	DN6 to 25
FIGHTER DS 2SC/R16	-40°C to +100°C	185 to 420 bar	DN6 to 25
DS17	-40°C to +100°C	210 bar	DN6 to 25
MASTER	-40°C to +100°C	165 to 400 bar	DN6 to 31
OVERMASTER	-40°C to +100°C	250 to 480 bar	DN8 to 25
1 STARK	-40°C to +100°C	100 to 295 bar	DN6 to 31
2 STARK	-40°C to +100°C	175 to 450 bar	DN6 to 31

Issued at **Høvik** on **2019-07-11**

This Certificate is valid until **2022-12-31**.

DNV GL local station: **Milan**

Approval Engineer: **Adel Samiei**



for **DNV GL**
Digitally Signed By: Ragavendhra Rao, Vishnumurthi

Location: DNV GL Høvik, Norway

on behalf of

Zeinab Sharifi
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.



Job Id: **262.1-008998-3**
 Certificate No: **TAP00001RK**

Product description

Nine types of flexible hose with permanently fitted couplings. Hoses made of covers Black synthetic rubber (SBR/CR), resistant to abrasion, oils and weather conditions, and Synthetic rubber inner tube (NBR) resistant to oils, reinforced with one or two high tensile steel braids.

DS1-T: 1SN hoses according to EN 853 / SAE 100 R1AT
 DS2-T: 2SN hoses according to EN 853 / SAE 100 R2AT
 FIGHTER 1SC: 1SC hoses according to EN 857
 FIGHTER DS 2SC/R16: 2SC hoses according to EN 857 / SAE 100 R16
 DS17: SAE 100 R17
 Master: Constructed according to SAE 100 R16
 Overmaster: Constructed according to SAE 100 R16
 1 STARK: Constructed according to EN857 1SC
 2 STARK: Constructed according to EN857 2SC

Hose made by Diesse Rubber Hoses S.p.A., Italy

Hose size			DS1-T	DS2-T	FIGHTER 1SC	FIGHTER DS 2SC/R16
DN	DASH	inch				
6	-4	¼	BXT1/BNK1	BXT2	BXC/BNK1	BXT1/BNK1
8	-5	5/16	BXT1/BNK1	BXT2	BXC/BNK1	BXT1/BNK1
10	-6	3/8	BXT1/BNK1	BXT2	BXC/BNK1	BXT1/BNK1
12	-8	½	BXT1/BNK1/BXT2	BXT2	BXC/BNK1	BXT1/BNK1
16	-10	5/8	BXT1/BNK1	BXT2	BXC/BNK1	BXT1/BNK1
19	-12	¾	BXT1/BNK1/BXT2	BXT2	BXC/BNK1	BXT1/BNK1
25	-16	1	BXT1/BNK1/BSN2	BXT2/BSN2	BXC/BNK1	BXT1/BNK1
31	-20	1 ¼	BXT1/ BSN2	BXT2/BSN2	-	-
38	-24	1 ½	BXT1/ BSN2	BXT2/BSN2	-	-
51	-32	2	BXT1/ BSN2	BXT2/BSN2	-	-

Hose size			R17	MASTER	OVERMASTER	1 STARK	2 STARK
DN	DASH	inch					
6	-4	¼	BXC/BNK1	BXLP	-	BNK1	BNK1
8	-5	5/16	BXC/BNK1	BXLP	BXLP	BNK1	BNK1
10	-6	3/8	BXC/BNK1	BXLP	BXLP	BNK1	BNK1
12	-8	½	BXC/BNK1/BXT2	BXLP	BXLP	BNK1	BNK1/BXT2
16	-10	5/8	BXT1/BNK1/BXT2	BXLP	BXLP	BNK1	BNK1
19	-12	¾	BXT1/BNK1/BXT2	BXLP	BXLP	BNK1	BNK1
25	-16	1	BXT1/BNK1/BSN2	BXLP	BXLP	BNK1	BNK1
31	-20	1 ¼	-	BXLP	-	BXT1	BXT1

Couplings: Made by Tieffe SPA, Italy
 Coupling material: 11SMnPb37 UNI EN10277

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.

Hose assemblies covered by this certificate are suitable for use with:

- Petroleum based hydraulic fluids 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 DS1-T be equivalent of MARKHIP® TF1SN/08 * Hose DS2-T be equivalent of MARKHIP® TF2SN/08

Job Id: **262.1-008998-3**
 Certificate No: **TAP00001RK**

Maximum working pressure in bar:

Hose size			DS1-T	DS2-T	FIGHTER 1SC	FIGHTER DS 2SC/R16	DS17	MASTER	OVERMASTER	1 STARK	2 STARK
inch	DN	Dash									
¼	6	-4	225	400	275	420	210	400	-	295	450
5/16	8	-5	215	350	255	380	210	400	480	250	420
3/8	10	-6	180	330	215	350	210	400	450	230	390
½	12	-8	160	275	170	310	210	350	400	200	350
5/8	16	-10	130	250	150	280	210	275	350	150	290
¾	19	-12	105	215	125	240	210	235	320	125	280
1	25	-16	88	165	100	185	210	185	250	110	200
1 ¼	31	-20	63	125	-	-	-	165	-	100	175
1 ½	38	-24	50	90	-	-	-	-	-	-	-
2	51	-32	40	80	-	-	-	-	-	-	-

Flexible hoses are only to be used in short lengths 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 hose assemblies must only be fitted in places where they are always accessible. 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.

Hose assemblies covered by this certificate shall not be used in system subject to pressure below atmospheric or vacuum condition.

The cover of hoses for gaseous applications shall be pin-pricked.

Production testing

All hose assemblies delivered under the DNV GL type approval scheme shall be subject to a pressure test at 1.5 times the maximum working pressure and shall be delivered with the pressure test report with reference to this type approval certificate.

Type Approval documentation

Test reports for DS1-T:

- Reports no.1, no.2, no.3 & no.4 dated 2005-04-07 and report numbers 87,88,89,90,91,92,93,94,95,96 dated 2018-12-12 (burst pressure test reports and change in length tests are witnessed by DNV GL surveyor)
- 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) 315.0IS0110/05 dated 2005-03-16 (DN6), 316.0IS0110/05 dated 2005-03-16 (DN19), 317.0IS0110/05 dated 2005-03-16 (DN51).

Test reports for DS2-T:

- Reports no.5, no.6, no.7 & no.8 dated 2005-04-07 Report numbers 98,99,100,101,102,103 dated 2018-12-12 (burst pressure test reports and change in length tests are witnessed by DNV GL surveyor)
- 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) 318.0IS0110/05 dated 2005-03-16 (DN6), 319.0IS0110/05 dated 2005-03-16 (DN19), 320.0IS0110/05 dated 2005-03-16 (DN51) and reports 107/2018 and 108/2018 witnessed by DNV GL

Test reports for DS1-SC:

- Reports no.9, no.10 & no.10 dated 2005-04-07
- Impulse test reports 294 dated 2004-03-08 (DN6), 278 dated 2004-02-03 (DN10), 348 dated 2004-10-02 (DN19)

Hose DS1-T be equivalent of MARKHIP® TF1SN/08 * Hose DS2-T be equivalent of MARKHIP® TF2SN/08

Job Id: **262.1-008998-3**
Certificate No: **TAP00001RK**

- Fire Test reports (done by LAPI) 324.0IS0110/05 dated 2005-03-17 (DN6), 325.0IS0110/05 dated 2005-03-17 (DN12), 326.0IS0110/05 dated 2005-03-17 (DN25) and reports 109,110,111/2018 witnessed by DNV GL

Test reports for DS2-SC:

- Reports no.12, no.13 & no.14 dated 2005-04-07 and report numbers 110,111,112,113,114 & 115 dated 2018-12-12 (burst pressure test reports and change in length tests are witnessed by DNV GL surveyor)
- 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) 321.0IS0110/05 dated 2005-03-16 (DN6), 322.0IS0110/05 dated 2005-03-17 (DN12), 323.0IS0110/05 dated 2005-03-17 (DN25).

Test Reports for DS-17:

- Fire test reports 115,116,117,118,119/2018 witnessed by DNV GL
- report numbers 116,117,118,119,120,121,122,123 dated 2018-12-12 (burst pressure test reports and change in length tests are witnessed by DNV GL surveyor)

Test Reports for Master:

- Reports no.15, no.16 & no.17 dated 2010-04-27 and report numbers 124,125,126 dated 2018-12-12 (burst pressure test reports and change in length tests are witnessed by DNV GL surveyor)
- 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) 1387.0IS0110/10 dated 2010-10-14 (DN6), 1388.0IS0110/10 dated 2010-10-14 (DN12), 1389.0IS0110/10 dated 2010-10-14 (DN25)

Test Reports for Overmaster:

- Reports no.18 & no.19 dated 2010-04-27 and report numbers 191,127,128 dated 2018-12-12 (burst pressure test reports and change in length tests are witnessed by DNV GL surveyor)
- Burst test reports dated 2012-02-12 for 3/8", ¾" witnessed by DNV local station Milan
- Fire Test reports (done by LAPI) 1390.0IS0110/10 dated 2010-10-14 (DN10), 1391.0IS0110/10 dated 2010-10-14 (DN12), 1579.0IS0110/10 dated 2010-10-14 (DN25)

Test Reports for 1-STARK:

- Report numbers 129,130 & 131 dated 2018-12-12 (burst pressure test reports and change in length tests are witnessed by DNV GL surveyor)
- Fire test report numbers 120/2018, 121/2018 & 122/2018 witnessed by DNV GL surveyor

Test Reports for 2-STARK:

- Report numbers 132,133,134 & 135 dated 2018-12-12 (burst pressure test reports and change in length tests are witnessed by DNV GL surveyor)
- Fire test report numbers 123/2018,124/2018,125/2018&126/2018 witnessed by DNV GL surveyor

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

Manufacturer's catalogue 2018 edition.

Tieffe Coupling Catalogue, 2002-B.

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

Tests carried out

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

Marking of product

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

- hose manufacturer's name or trademark;
- date of manufacture (month/year);
- designation type reference;
- nominal diameter;
- pressure rating;
- temperature rating.

Hose DS1-T be equivalent of MARKHIP® TF1SN/08 * Hose DS2-T be equivalent of MARKHIP® TF2SN/08



Job Id: **262.1-008998-3**
Certificate No: **TAP00001RK**

Periodical assessment

For retention of the Type Approval, a DNV GL 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 DNVGL-CP-0338.

Hose DS1-T be equivalent of MARKHIP® TF1SN/08 * Hose DS2-T be equivalent of MARKHIP® TF2SN/08

TYPE APPROVAL CERTIFICATE

This is to certify:

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

with type designation(s)
1SN, 1SC, 1SN-K Semperpac, 2SN, 2SC, 2SN-K Semperpac, 4SP, 4SH

Issued to
Semperit Technische Produkte Gesellschaft m.b.H.
Wimpassing, Austria

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 :

Products approved by this certificate is accepted for installation on all vessels classed by DNV GL.

Type:	Temperature range:	Max. working press.:	Sizes:
1SN	-40°C to +100°C	40 bar up to 225 bar	DN6 - DN51
1SC	-40°C to +100°C	88 bar up to 225 bar	DN6 - DN25
1SN-K Semperpac	-40°C to +100°C	100 bar up to 290 bar	DN6 - DN31
2SN	-40°C to +100°C	80 bar up to 400 bar	DN6 - DN51
2SC	-40°C to +100°C	165 bar up to 400 bar	DN6 - DN25
2SN-K Semperpac	-40°C to +100°C	175 bar up to 450 bar	DN6 - DN31
4SP	-40°C to +100°C	165 bar up to 445 bar	DN10 - DN51
4SH	-40°C to +100°C	250 bar up to 420 bar	DN19 - DN51

Issued at **Høvik** on **2017-12-18**

This Certificate is valid until **2022-12-17**.

DNV GL local station: **Augsburg**

Approval Engineer: **Christian Kaemmer**



for **DNV GL**
Digitally Signed By: Drews, Olaf
Location: DNV GL Hamburg, Germany
Signing Date: 16.01.2018

Olaf Drews
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.



Hose 1SN be equivalent of MARKHIP® TF15N/06 • Hose 2SN be equivalent of MARKHIP® TF25N/06 • Hose 1SC be equivalent of MARKHIP® TF1PD/06
Hose 2SC be equivalent of MARKHIP® TF2PD/06 • Hose 2SN-K be equivalent of MARKHIP® TFSTP /06 • Hose 4SP be equivalent of MARKHIP® TF4SP/06

Product description

Design:

- Semperit 1SN: Synthetic rubber hose with one internal steel wire braid according to SAE 100 R1AT or DIN 853 1SN.
- Semperit 1SC: Synthetic rubber hose with one internal steel wire braid according to DIN 857 1SC.
- Semperpac 1SN-K: Synthetic rubber hose with one internal steel wire braid.
- Semperit 2SN: Synthetic rubber hose with two internal steel wire braids according to SAE 100 R2AT or DIN 853 2SN.
- Semperit 2SC: Synthetic rubber hose with two internal steel wire braids according to DIN 857 2SC.
- Semperpac 2SN-K: Synthetic rubber hose with two internal steel wire braids.
- Semperit 4SP: Synthetic rubber hose reinforced with 4 spirally wrapped steel plies according to EN 856 4SP.
- Semperit 4SH: Synthetic rubber hose reinforced with 4 spirally wrapped steel plies according to EN 856 4SH.

Maximum working pressure:

DN Size (mm)	Maximum working pressure (bar)							
	1SN	1SC	1SN-K	2SN	2SC	2SN-K	4SP	4SH
6	225	225	290	400	400	450		
8	215	215	250	350	350	420		
10	180	180	230	330	330	385	445	
12	160	160	200	275	275	350	425	
16	130	130	150	250	250	290	350	
19	105	105	125	215	215	280	350	420
25	88	88	110	165	165	200	320	380
31	63	-	100	125	-	175	210	350
38	50	-	-	90	-	-	185	290
51	40	-	-	80	-	-	165	250

Temperature range: -40°C to + 100°C, max. 120°C intermediate.

Production places of hoses, hose end fittings and hose assemblies:

Semperit Technische Produkte Gesellschaft m.b.H., Triesterbundestrasse 26, A-2632 Wimpassing, Austria

Semperflex Shanghai Ltd., 1255 CAng Gong Road, Shanghai Chemical Industrial Park, CN-Shanghai 201417, P.r. China

Semperflex Optimit s.r.o., Vitkovska c.p. 391/29, CZ-74235 Odry, Czech Republic

Semperflex Asia Corporation Ltd., Sri Trang Building No. 10.Soi 10, Phetkasem Rd., Hatai. TH-Songkhla 90110, Thailand

Coupling design and manufacture: Tieffe S.p.A, Italy. Coupling material: carbon steel and stainless steel.

Job Id: **262.1-015728-2**
Certificate No: **TAP0000164**

Responsibility

Semperit Technische Produkte Gesellschaft m.b.H. takes the responsibility that the design and production of the hoses, hose end fittings and manufacturing of hose assemblies are in compliance with Rules, Standards and/or Regulations listed on page 1 of this certificate.

Application/Limitation

Hose assemblies are approved for use with petroleum base hydraulic fluids, water glycol and water emulsion hydraulic fluids, fuel oil, lubrication oil, compressed air, water and sanitary.

Flexible hoses are only to be used in short lengths where it is necessary for flexible mounting of the machinery. They shall not replace/be used where permanent piping is possible/required.

For compressed air and/or gases above 16 bar the cover is to be pin prickled.

Installation

The hose assemblies must only be fitted in places where they are always accessible.

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.

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.

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

Documentation as is listed in NPS job no. 262.1-015728-1
Tiefe catalogue "Hydraulic Hose Fittings and adapters" 2011 edition
25 Burst pressure test reports dated 21-09-2017 witnessed by DNVGL Surveyor.

Tests carried out

Dimensional check test, Change in length test, Burst test, Oil resistance test, Cover Adhesion test, Impulse test, Ozone resistance test, Vacuum test, Cold flexibility and Fire test.

Production testing

All hose assemblies shall be subject to a pressure test at 1.5 times the maximum working pressure and shall be delivered with the pressure test report with reference to the type approval certificate.

Hose 1SN be equivalent of MARKHIP® TF1SN/06 * Hose 2SN be equivalent of MARKHIP® TF2SN/06 * Hose 1SC be equivalent of MARKHIP® TF1PD/06
Hose 2SC be equivalent of MARKHIP® TF2PD/06 * Hose 2SN-K be equivalent of MARKHIP® TF5TP /06 * Hose 4SP be equivalent of MARKHIP® TF4SP/06

Job Id: **262.1-015728-2**
Certificate No: **TAP0000164**

Marking of product

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

Manufacturer's name and trade mark
Type designation
Hose size
Date code

Periodical assessment

For retention of the type approval certificate periodical assessments shall be carried out at production places by DNVGL surveyor.
The objective of the periodical assessment is to verify that the design and production conditions for the type approval have not been altered.

Main scope of the assessment:

- verification of the production and quality control system
- review of quality control documentation of recent deliveries
- review of drawings in production to verify any design changes which may have an impact on data specified in the type approval certificate, performance and range of application
- verification of the product marking

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

In connection with the renewal assessment, a surveyor shall witness / review test reports with respect to the following tests on every 3rd size appropriate test reports to be submitted:

- dimensional check, change in length test,
- pressure test with 1.5 times M.A.W.P. and burst test (witnessed by DNV GL surveyor)

Hose 1SN be equivalent of MARKHIP® TF1SN/06 * Hose 2SN be equivalent of MARKHIP® TF2SN/06 * Hose 1SC be equivalent of MARKHIP® TF1PD/06
Hose 2SC be equivalent of MARKHIP® TF2PD/06 * Hose 2SN-K be equivalent of MARKHIP® TF5TP /06 * Hose 4SP be equivalent of MARKHIP® TF4SP/06



CERTIFICATE NUMBER
19-GD1826221-PDA

DATE
05 Mar 2019

ABS TECHNICAL OFFICE
Gdynia Engineering Department

CERTIFICATE OF Design Assessment

This is to certify that a representative of this Bureau did, at the request of
SEMPERIT TECHNISCHE PRODUKTE GESELLSCHAFT
M.B.H

assess design plans and data for the below listed product. This assessment is a representation by the Bureau as to the degree of compliance the design exhibits with applicable sections of the Rules. This assessment does not waive unit certification or classification procedures required by ABS Rules for products to be installed in ABS classed vessels or facilities. This certificate, by itself, does not reflect that the product is Type Approved. The scope and limitations of this assessment are detailed on the pages attached to this certificate.

Product: **Hose, Non-metallic Flexible Hydraulic**
Model: **DIN EN 853 1 SN, DIN EN853 2 SN, DIN EN857 1 SC, DIN EN857 2 SC,
SEMPERPAC 1 SN-K, SEMPERPAC 2 SN-K, DIN EN 856 4 SP, DIN EN 856 4
SH**

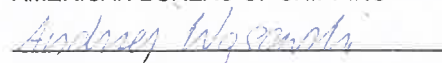
This Product Design Assessment (PDA) Certificate 19-GD1826221-PDA, dated 05/Mar/2019 remains valid until 04/Mar/2024 or until the Rules or specifications used in the assessment are revised (whichever occurs first).

This PDA is intended for a product to be installed on an ABS classed vessel, MODU or facility which is in existence or under contract for construction on the date of the ABS Rules or specifications used to evaluate the Product.

Use of the Product on an ABS classed vessel, MODU or facility which is contracted after the validity date of the ABS Rules and specifications used to evaluate the Product, will require re-evaluation of the PDA.

Use of the Product for non ABS classed vessels, MODUs or facilities is to be to an agreement between the manufacturer and intended client.

AMERICAN BUREAU OF SHIPPING


Andrzej Wasowski
Engineer/Consultant

Hose 1SN be equivalent of MARKHIP® TF1SN/06 • Hose 2SN be equivalent of MARKHIP® TF2SN/06 • Hose 1SC be equivalent of MARKHIP® TF1PD/06
Hose 2SC be equivalent of MARKHIP® TF2PD/06 • Hose 25N-K be equivalent of MARKHIP® TF25N/06 • Hose 25N-K be equivalent of MARKHIP® TF25N/06
Hose 4SP be equivalent of MARKHIP® TF4SP/06

TERMS & CONDITIONS OF ABS DESIGN ASSESSMENT

1. AGREEMENT

Unless otherwise agreed in writing, all services rendered and certificates issued are governed by the terms and conditions of the "Request for Product Type Approval and Agreement" (the "Agreement") which are hereby incorporated by reference.

2. REPRESENTATIONS AS TO DESIGN ASSESSMENT

A certificate of design assessment represents that the product design meets the ABS, statutory, industrial or manufacturer's standard described on the reverse hereof and that the manufacturer has established a systematic quality monitoring system sufficient to show its capacity to consistently manufacture a product which meets the designated standards. ABS is not a substitute for the independent judgment of professional designers or engineers nor a substitute for the quality control procedures of constructors, steel makers, suppliers, manufacturers and vendors of marine structures, materials, machinery or equipment. ABS represents solely to the manufacturer or other client of ABS that it will use due diligence in developing Rules, Guides and standards and in surveying the plant as called for by ABS criteria for type approval.

3. SUSPENSION OF CERTIFICATION

Any of the following events will cause immediate suspension of the certificate of design assessment unless the change is submitted to ABS for a new review and audit.

- a) Redesign of the product or products covered by this certificate;
- b) Change in production methods;
- c) Substantial change in management organization;
- d) Substantial change in frequency or curriculum for personnel training;
- e) Refusing access to ABS personnel for periodic or annual audits;
- f) Failure to correct a non-compliance identified during an audit or in service;
- g) Failure to pay ABS fees.

4. VALIDITY

The validity, applicability and interpretation of a certificate issued under the terms of or in contemplation of ABS Type Approval are governed by the Rules, Guides and standards of American Bureau of Shipping which shall remain the sole judge thereof. Nothing contained in this certificate or in

any report issued in contemplation of this certificate shall be deemed to relieve any designer, builder, owner, manufacturer, seller, supplier, repairer, operator or other entity of any warranty express or implied, nor create any interest, right, claim or benefit in any third party. It is understood and agreed that nothing expressed herein is intended or shall be construed to give any person, firm or corporation other than the parties hereto, any right, remedy, or claim hereunder or under any of the provisions herein contained; all of the provisions hereof are for the sole and exclusive benefit of the parties hereto.

5. LIMITATION

ABS makes no representations beyond those contained herein and in the provisions of the Agreement regarding its reports, statements, plan review, surveys, certificates or other services.

6. HOLD HARMLESS

The party to whom this certificate is issued, and his assignee and successor in interest, agree to indemnify and hold harmless ABS from and against any and all claims, demands, lawsuits, or actions for damages, including legal fees, to persons or other legal entities and property, tangible, intangible, or otherwise which may be brought against ABS incidental to, arising out of or in connection with the work done, services performed or material to be furnished under this certificate, except for those claims caused solely and completely by the negligence of ABS, its agents, employees, officers, directors or subcontractors.

7. ARBITRATION

Any and all differences and disputes of whatsoever nature arising out of this agreement shall be put to arbitration in the City of New York pursuant to the laws relating to the arbitration there in force, before a board of three persons, consisting of one arbitrator to be appointed by ABS, one by Client, and one by the two so chosen. The decision of any two of the three on any point or points shall be final. Until such time as the arbitrators finally close the hearings either party shall have the right by written notice served on the arbitrators and on an officer of the other party to specify further disputes or difference under this Agreement for hearing and determination. The arbitration is to be conducted in accordance with the rules of the Society of Maritime Arbitrators, Inc. The arbitrators may grant any relief, other than punitive damages,

which they, or a majority of them, deem just and equitable and within the scope of the agreement of the parties, including, but not limited to, specific performance. Awards made in pursuance to this clause may include costs including a reasonable allowance for attorney's fees and judgment may be entered upon any award made hereunder in any court having jurisdiction. ABS and client hereby mutually waive any and all claims to punitive damages in any forum.

Client shall be required to notify ABS within thirty (30) days of the commencement of any arbitration between it and third parties which may concern ABS's work in connection with this Agreement and shall afford ABS an opportunity, at ABS's sole option, to participate in the arbitration.

8. TIME BAR TO LEGAL ACTION

Any statutes of limitation notwithstanding, Client expressly agrees for itself and its affiliated companies that its right to bring or to assert against ABS any and all claims, demands or proceedings whether in arbitration or otherwise shall be waived unless (a) notice is received by ABS within thirty (30) days after Client or its affiliates had notice of or should reasonably have been expected to have had notice of the basis for such claims; and (b) arbitration or legal proceedings, if any, based on such claims or demands of whatever nature are commenced within one (1) year of the date of such notice to ABS.

9. LIMITATION OF LIABILITY

The combined liability of American Bureau of Shipping, its officers, employees, agents or subcontractors for any loss, claim, or damage arising from negligent performance or non-performance of any services under this Agreement, of from breach of any implied or express warranty of workmanlike performance in connection with the services, or from any other reason, to any person, corporation, partnership, business entity, sovereign, country or nation, shall be limited to the greater of a) \$100,000 or b) an amount equal to ten times the sum actually paid for the services alleged to be deficient.

The limitation of liability may be increased up to an amount twenty-five times that sum paid for services upon receipt of Client's written request at or before the time of performance of service and upon payment by Client of an additional fee of \$10.00 for every \$1,000.00 increase in the limitation.

SEMPERIT TECHNISCHE PRODUKTE GESELLSCHAFT M.B.H

TRIESTER BUNDESSTR, 26

VAT ID: ATU14234201

A-2632 WIMPASSING

Austria

Telephone: 0043-2630-310-608

Fax: 0043-2630-310-320

Email: semperflex@semperitgroup.com

Web: www.semperitgroup.com

Tier: 2 - PDA Issued

Product: Hose, Non-metallic Flexible Hydraulic

Model: DIN EN 853 1 SN, DIN EN853 2 SN, DIN EN857 1 SC, DIN EN857 2 SC, SEMPERPAC 1 SN-K, SEMPERPAC 2 SN-K, DIN EN 856 4 SP, DIN EN 856 4 SH

Intended Service:

Marine & Offshore Applications - Hydraulic Fluids, Lubricating Fluids, Oily Water Emulsions, Water-Glycol Solutions and for Compressed Air.

Description:

One Wire Braid Hydraulic Hoses DIN EN 853 1 SN & DIN EN 857 1 SC consist of:

Tube: synthetic rubber, resistant against hydraulic fluids

Reinforcement: one braid of high tensile steel wire

Cover: abrasion and ozone resistant synthetic rubber

Two Wire Braid Hydraulic Hoses DIN EN 853 2 SN & DIN EN 857 2 SC consist of:

Tube: synthetic rubber, resistant against hydraulic fluids

Reinforcement: two braids of high tensile steel wire

Cover: abrasion and ozone resistant synthetic rubber

Specialites Wire Braid Hydraulic Hoses SEMPERPACK 1 SN-K & SEMPERPACK 2 SN-K consist of:

Tube: synthetic rubber, resistant against hydraulic fluids

Reinforcement: one or two braids of high tensile steel wire

Cover: abrasion and ozone resistant synthetic rubber

Multispiral Hydraulic Hoses DIN EN 856 4 SP & DIN EN 856 4 SH consist of:

Tube: synthetic rubber, resistant against hydraulic fluids

Reinforcement: four high tensile steel wire spiral layers

Cover: abrasion and ozone resistant synthetic rubber

Rating:

Temperature Range: -40°C to 100°C (max 120°C intermittent)

Working Pressure depends on Hose Type and Size (see attached document)

Type: Temperature range: Max. working press.: Sizes:

1SN: -40°C to +100°C, 40 bar up to 225 bar, DN6 - DN51

1SC: -40°C to +100°C, 88 bar up to 225 bar, DN6 - DN25

1SN-K Semperpac: -40°C to +100°C, 100 bar up to 290 bar, DN6 - DN31

2SN: -40°C to +100°C, 80 bar up to 400 bar, DN6 - DN51

2SC: -40°C to +100°C, 165 bar up to 400 bar, DN6 - DN25

2SN-K: Semperpac: -40°C to +100°C, 175 bar up to 450 bar, DN6 - DN31

4SP: -40°C to +100°C, 165 bar up to 445 bar, DN10 - DN51

4SH: -40°C to +100°C, 250 bar up to 420 bar, DN19 - DN51

Service Restriction:

1. Unit Certification is not required for this product. If the manufacturer or purchaser request an ABS Certificate for compliance with a specification or standard, the specification or standard, including inspection standards and tolerances, must be clearly defined.

2. These flexible hose assemblies (a flexible hose with end fittings) are not to be applicable in high pressure fuel oil injection systems and in fixed fire extinguishing systems.

3. The type of end fittings utilized (e.g. threaded, flanged, etc.) are to comply with the applicable requirements and limitations of the Marine Vessels Rules 4-6-2/5.7.3b).

4. Prototype testing evidence of each type of hose/end fitting combination is to be made available to our attending Surveyor before installation on board with a particular reference to pressure, impulse, fire resistance and burst

Hose 1SN be equivalent of MARKHIP® TF1SN/06 * Hose 2SN be equivalent of MARKHIP® TF2SN/06 * Hose 1SC be equivalent of MARKHIP® TF1PD/06
Hose 2SC be equivalent of MARKHIP® TF2PD/06 * Hose 2SN-K be equivalent of MARKHIP® TF2STP/06 * Hose 4SP be equivalent of MARKHIP® TF4SP/06

SEMPERIT TECHNISCHE PRODUKTE GESELLSCHAFT M.B.H

TRIESTER BUNDESSTR, 26

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Email: semperflex@semperitgroup.com

Web: www.semperitgroup.com

Tier: 2 - PDA Issued

pressure tests.

5. End fittings made of aluminum are not to be used in the flexible hose assembly.

Comments:

1. The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product.
2. The flexible hoses are to be complete with factory assembled end fittings or factory supplied ends made of steel only and installed in accordance with manufacturer's procedures in accordance with Marine Vessels Rules 4-6-2/5.7.3b).
3. Hose assemblies are to be installed only when flexibility is required and are not to be subject to torsional deflection under normal conditions. In addition, the length of the hose is to be limited to that required for flexibility only as indicated in Marine Vessels Rules 4-6-2/5.7.4.
4. Flexible hoses are to be permanently marked by the manufacturer with the following details: hose manufacturer's name or trademark, date of manufacturer (month/year), designation type reference, nominal diameter, pressure and temperature rating in accordance with Marine Vessels Rules 4-6-2/5.7.6. Because a flexible hose assembly is made up of items from different manufacturers, the components are to be clearly identified and traceable to evidence of prototype testing.

Notes/Drawing/Documentation:

1. TIEFFE Catalogue 2011 for Hydraulic Hoses Fittings and Adaptors
2. TIEFFE Fittings Steel Properties
3. Hose Test Reports in accordance to EN 10204-2.2 approved by recognized organization dated 2013-07-18.
 - a. Hydrostatic test according EN ISO 1402 / TIEFFE fittings,
 - b. Cold Flexibility test according EN24672
 - c. Oil resistance test according ISO 1817
 - d. Adhesion test according EN28033
 - e. Ozone resistance test according EN27326
 - f. Vacuum test according EN ISO 7233
 - g. Impulse test according ISO 6903 / TIEFFE fittings
4. Fire Tests Reports in accordance to: UNI EN ISO 15540:2003, LAPI Laboratorio Prevenzione Incendi, Lab. Ref. 602/13
 - a. DIN EN 857 1 SC - DN6, DN12, DN25
 - b. DIN EN 857 2SC - DN6, DN12, DN25
 - c. DIN EN 856 4SH - DN19, DN31
 - d. DIN EN 856 4SP - DN51
 - e. SEMPERPAC 1SNK - DN 6, DN12, DN25
5. Folder List:
 - a. 1SC_July16_01, 1SC
 - b. 1SN_July16, 1SN,
 - c. 2SC_July16, 2SC,
 - d. 2SN_July16, 2SN,
 - e. 4SH_July18, 4SH,
 - f. 4SP_July16, 4SP,
 - g. Semperpac_1SN-K_July16, 1SN-K,
 - h. Semperpac_2SN-K_Dec17, 2SN-K,

Terms of Validity:

This Product Design Assessment (PDA) Certificate 19-GD1826221-PDA, dated 05/Mar/2019 remains valid until 04/Mar/2024 or until the Rules or specifications used in the assessment are revised (whichever occurs first).

This PDA is intended for a product to be installed on an ABS classed vessel, MODU or facility which is in existence or under contract for construction on the date of the ABS Rules or specifications used to evaluate the Product.

Hose 15N be equivalent of MARKHIP® TF15N/06 * Hose 25N be equivalent of MARKHIP® TF25N/06 * Hose 15C be equivalent of MARKHIP® TF15C/06
Hose 25C be equivalent of MARKHIP® TF25C/06 * Hose 25N-K be equivalent of MARKHIP® TF25N-K/06 * Hose 45P be equivalent of MARKHIP® TF45P/06

SEMPERIT TECHNISCHE PRODUKTE GESELLSCHAFT M.B.H

TRIESTER BUNDESSTR, 26

VAT ID: ATU14234201

A-2632 WIMPASSING

Austria

Telephone: 0043-2630-310-608

Fax: 0043-2630-310-320

Email: semperflex@semperitgroup.com

Web: www.semperitgroup.com

Tier: 2 - PDA Issued

Use of the Product on an ABS classed vessel, MODU or facility which is contracted after the validity date of the ABS Rules and specifications used to evaluate the Product, will require re-evaluation of the PDA.

Use of the Product for non ABS classed vessels, MODUs or facilities is to be to an agreement between the manufacturer and intended client.

STANDARDS

ABS Rules:

2019 Rules for Conditions of Classification - Offshore Units and Structures 1-1-4/9.7, 1-1-A2, 1-1-A3, which covers the following:

2019 Mobile Offshore Drilling Units Rules: 4-2-1/11.29

2019 Mobile Offshore Units Rules: 4-2-1/11.29

2019 Rules for Conditions of Classification, 1-1-4/7.7, 1-1-A3, 1-1-A4, which covers the following:

2019 Steel Vessels Rules: 4-6-2/5.7

2019 Steel Vessels Rules Under 90 Meters in Length: 4-4-1/9.19

2019 Offshore Supply Vessels Rules: 4-6-2/5.7

2019 Guide for Building and Classing Yachts: 4-1-1/3.3, 4-4-1/9.19

2019 Marine Vessels Rules: 4-6-2/5.7

2019 Rules for Conditions of Classification - High Speed Crafts 1-1-4/11.9, 1-1-A2, 1-1-A3, which covers the following:

2019 High Speed Crafts Rules 4-4-1/9.19

National:

NA

International:

NA

Government:

NA

EUMED:

NA

OTHERS:

NA

Hose 15N be equivalent of MARKHIP® TF15N/06 * Hose 25N be equivalent of MARKHIP® TF25N/06 * Hose 15C be equivalent of MARKHIP® TF15PD/06
Hose 25C be equivalent of MARKHIP® TF25PD/06 * Hose 25N-K be equivalent of MARKHIP® TF5TP /06 * Hose 45P be equivalent of MARKHIP® TF45P/06



SEMPERIT TECHNISCHE PRODUKTE
GESELLSCHAFT M.B.H (WCN 448190)
Cert. No. 19-GD1826221-PDA
Issuance date: 05-Mar-2019
Expiration Date: 04-Mar-2024

Ratings:

DN Size (mm)	Maximum working pressure (bar)							
	1SN	1SC	1SN-K	2SN	2SC	2SN-K	4SP	4SH
6	225	225	290	400	400	450	-	-
8	215	215	250	350	350	420	-	-
10	180	180	230	330	330	385	445	-
12	160	160	200	275	275	350	425	-
16	130	130	150	250	250	290	350	-
19	105	105	125	215	215	280	350	420
25	88	88	110	165	165	200	320	380
31	63	-	100	125	-	175	210	350
38	50	-	-	90	-	-	185	290
51	40	-	-	80	-	-	165	250