

TYPE APPROVAL CERTIFICATE

This is to certify:

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

with type designation(s)

PULSAR 111 - NOVA 1, PULSAR 122 - NOVA 2, PULSAR 110CC - CARBONITE 17, PULSAR 114 - NOVA 16, PULSAR 114CC - CARBONITE 16, PULSAR 114HT - NOVA 16 EXTREME, PULSAR 124PLUS - NOVA 12, PULSAR 156PLUS - NOVA 15

Issued to

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

is found to comply with

DNV rules for classification – Ships Pt.4 Ch.6 Piping systems
DNV-OS-D101 – Marine and machinery systems and equipment, Edition July 2021
DNV class programme DNV-CP-0183 – Type approval – Flexible non-metallic hoses

Application :

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

Type:	Temperature range:	Max. working press.:	Sizes:
PULSAR 111 - NOVA 1	-40°C to +100°C	3250PSI to 725PSI	DN06 to DN38
PULSAR 122 - NOVA 2	-40°C to +100°C	5800PSI to 1300PSI	DN06 to DN38
PULSAR 110CC - CARBONITE 17	-40°C to +100°C	3250PSI	DN06 to DN12
PULSAR 114 - NOVA 16	-40°C to +100°C	6500PSI to 2000PSI	DN06 to DN38
PULSAR 114CC - CARBONITE 16	-40°C to +100°C	6500PSI to 2000PSI	DN06 to DN38
PULSAR 114HT - NOVA 16 EXTREME	-55°C to +150°C	6500PSI to 2000PSI	DN06 to DN38
PULSAR 124PLUS - NOVA 12	-40°C to +121°C	6100PSI to 4100PSI	DN06 to DN38
PULSAR 156PLUS - NOVA 15	-40°C to +121°C	6100PSI	DN06 to DN38

Issued at **Høvik** on **2023-02-22**

This Certificate is valid until **2028-02-21**.

for **DNV**

DNV local unit: **Italy/Malta CMC**

Approval Engineer: **Sarah Miller**

Bosman van der Merwe
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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Product description

PULSAR 111 – NOVA 1

According 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: 4200 Series DN≤25 and 4400 series DN>25

PULSAR 122 – NOVA 2

According 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: 4200 Series DN≤25 and 4400 series DN>25

PULSAR 110CC – CARBONITE 17 Exceeding SAE100R17

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
 Couplings: 4200 Series

PULSAR 114 – NOVA 16 Exceeding SAE100R16

Tube: Black synthetic rubber resistant to oil
 Reinforcement: Two high tensile steel braids
 Cover: Black, synthetic rubber resistant to oils, abrasion and weather condition STANDARD, MSHA, MSHA HARC, MSHA ENDLESS, HARC, ENDLESS COVERS
 Coupling: 4200 Series DN≤25 and 4400 series DN>25

PULSAR 114CC – CARBONITE 16 Exceeding SAE100R16

Tube: Black synthetic rubber resistant to oil
 Reinforcement: Two high tensile steel braids
 Cover: Black, synthetic rubber resistant to oils, abrasion and weather condition STANDARD, MSHA, MSHA HARC, MSHA ENDLESS, HARC, ENDLESS COVERS
 Coupling: 4200 Series DN≤25 and 4400 series DN>25

PULSAR 114HT - NOVA 16 EXTREME Exceeding SAE100R16

Tube: Black synthetic rubber resistant to oil
 Reinforcement: Two high tensile steel braids
 Cover: Blue or black, synthetic rubber resistant to oils, abrasion and weather condition
 Couplings: 4200 Series DN≤25 and 4400 series DN>25

PULSAR 124PLUS – NOVA 12 Exceeding SAE100R12

Tube: Black synthetic rubber resistant to oil
Reinforcement: Four high tensile steel spirals
Cover: Black, synthetic rubber resistant to oils, abrasion and weather condition STANDARD, MSHA, MSHA HARC, MSHA ENDLESS, HARC, ENDLESS COVERS
Couplings: 4400 series

PULSAR 156PLUS – NOVA 15 Exceeding SAE100R15

Tube: Black synthetic rubber resistant to oil
Reinforcement: Four high tensile steel spirals up to -20, six spirals -24
Cover: Black, synthetic rubber resistant to oils, abrasion and weather condition STANDARD, MSHA, MSHA HARC, MSHA ENDLESS, HARC, ENDLESS COVERS
Couplings: 4400 series for four spirals DN<31 / 4600 series for six spirals DN≥31

Hose manufacturer:

Diesse Rubber Hoses S.P.A

Coupling manufacturer:

Intertraco according to fitting catalogue
GSIF1P210

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 and assembling locations listed above.

Maximum working pressure:

Diameter	PULSAR 111 - NOVA 1	PULSAR 122 - NOVA 2	PULSAR 110CC - CARBONITE 17	PULSAR 114 - NOVA 16	PULSAR 114CC - CARBONITE 16	PULSAR 114HT - NOVA 16 EXTREME	PULSAR 124PLUS - NOVA 12	PULSAR 156PLUS - NOVA 15
	Pressure (PSI)	Pressure (PSI)	Pressure (PSI)	Pressure (PSI)	Pressure (PSI)	Pressure (PSI)	Pressure (PSI)	Pressure (PSI)
-4	3.250	5.800	3.250	6.500	6.500	6.500	-	-
-6	2.600	4.800	3.250	5.400	5.400	5.400	6.100	-
-8	2.300	4.000	3.250	4.500	4.500	4.500	6.100	-
-10	1.900	3.600	-	4.000	4.000	4.000	6.100	-
-12	1.500	3.100	-	3.500	3.500	3.500	5.500	6.100
-16	1.300	2.400	-	3.050	3.050	3.050	5.100	6.100
-20	900	1.800	-	2.400	2.400	2.400	5.100	6.100
-24	725	1.300	-	2.000	2.000	2.000	4.100	6.100

Homologation for hose and Fittings:

Diameter	PULSAR 111 - NOVA 1	PULSAR 122 - NOVA 2	PULSAR 110CC - CARBONITE 17	PULSAR 114 - NOVA 16	PULSAR 114CC - CARBONITE 16	PULSAR 114HT - NOVA 16 EXTREME	PULSAR 124PLUS - NOVA 12	PULSAR 156PLUS - NOVA 15
-4	4200	4200	4200	4200	4200	4200	4200	-
-6	4200	4200	4200	4200	4200	4200	4400	-
-8	4200	4200	4200	4200	4200	4200	4400	-
-10	4200	4200	-	4200	4200	4200	4400	-
-12	4200	4200	-	4200	4200	4200	4400	4400
-16	4200	4200	-	4200	4200	4200	4400	4400
-20	4400	4400	-	4400	4400	4400	4400	4600
-24	4400	4400	-	4400	4400	4400	4400	4600

Hose assemblies covered by this certificate may be used in systems conveying:

- petroleum based hydraulic fluid at temperature range of -40°C to +100°C or -55°C to +150°C based on the hose type.
- water based Hydraulic fluids at temperature range of -40°C to +70°C
- fresh water at temperature range of 0°C to +70°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.

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

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.

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

The outer end of the pipe coupling (performing the connection to the fixed piping) is not covered by this certificate and shall follow the below requirements:

- Flanged ends shall be according to a recognized standard
- Slip-on threaded joints having pipe threads where pressure-tight joints are made on the threads with parallel or tapered threads, shall comply with requirements of a recognized standard. Limitations stated in DNV-RU-SHIP Pt.4 Ch.6 Sec.9 [5.2.6] to be followed.
- If these outer ends are going to be part of a mechanical joint as covered by Table 10 DNV-RU-SHIP Pt.4 Ch.6 Sec.9, then they shall be separately type approved.

Production testing

All hose assemblies delivered under the DNV 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

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:

- hose manufacturer's name or trademark;
- date of manufacture (month/year);

- designation type reference;
- nominal diameter;
- pressure rating;
- temperature rating.

Periodical assessment

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