DNV·GL

Certificate No:
TAP00001NZ

TYPE APPROVAL CERTIFICATE

This is to certify:

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

with type designation(s)
R4 SAE100R4 PLUS MSHA

Issued to
CATERPILLAR FLUID SYSTEMS SRL
Cernusco sul Naviglio, MI, 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.

Temperature range:	**-40°C to +135°C**
Max. working press.:	**3 to 21 bar**
Sizes:	**DN19 to DN102**

Issued at **Høvik** on **2019-04-03**
This Certificate is valid until **2023-12-31**.
DNV GL local station: **Milan**

Approval Engineer: **Adel Samiei**

for **DNV GL**

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.

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Job Id: **262.1-016818-5**
Certificate No: **TAP00001NZ**

Product description

Hose assembling type R4 PLUS SAE100 R4 MSHA with one and two piece Anchor end fitting

Hose design: Oil resistant NBR rubber tube; reinforced with 2 layers of textile braid; weather and oil resistant cover
Couplings designation: One and two pieces Anchor fitting type
Coupling Material: 11SMnPb30, 11SMnPb37
Hose and coupling manufacturer: Caterpillar Fluid Systems srl, Via delle Industrie 30/32 – 03100, Frosinone (FR) – ITALY

Application/Limitation

This certificate is valid for the specific assembly of hose and coupling type as specified, assembled and delivered by: Caterpillar Fluid Systems srl, Via delle Industrie 30/32 – 03100, Frosinone (FR) – ITALY

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

- petroleum based hydraulic fluid -40°C to +135°C (only for sizes DN19 and DN102) (*)
- water based Hydraulic fluids and air -40°C to +70°C
- fresh water 0°C to +70°C

(*) Sizes other than DN19 and DN102 are not allowed to be used in piping systems for flammable media systems where failure may result in flooding, except in cases where such hoses are installed on open decks, as defined in SOLAS II-2/Reg. 9.2.3.3.2.2(10) and not used for fuel oil lines.

Maximum working pressure:

Hose designation	Size			Max working pressure (bar)
	DN	dash	inch	
R4Plus-12	19	-12	¾	21
R4Plus-16	25	-16	1	17
R4Plus-20	31	-20	1 ¼	14
R4Plus-24	38	-24	1 ½	11
R4Plus-32	51	-32	2	7
R4Plus-40	63	-40	2 ½	4
R4Plus-48	76	-48	3	4
R4Plus-56	89	-56	3 ½	3
R4Plus-64	102	-64	4	3

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.

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) are 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 DNVGL-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 DNVGL-RU-SHIP Pt.4 Ch.6 Sec.9, then they shall be separately type approved.'

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

Tests carried out

Dimensional Check Test, Change in Length Test, Burst Test, Cold Flexibility Test, Ozone Resistance Test, Impulse Test, fluid resistance Test 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.

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.