

TYPE APPROVAL CERTIFICATE

This is to certify:

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

with type designation(s)

ROCKMASTER/1SN, ROCKMASTER/2SN, ROCKMASTER/2SC, TRACTOR/1SC, TRACTOR/1SN, TRACTOR/2SC, TRACTOR/2SN

Issued to

JLLC MANULI HYDRAULICS MANUFACTURING BEL
Orsha, Belarus

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:
ROCKMASTER/1SN	-40°C to 100°C	See certificate	DN6,8,10,12
ROCKMASTER/2SN	-40°C to 100°C	See certificate	DN6,8,10
ROCKMASTER/2SC	-40°C to 100°C	See certificate	DN6,8,10,12
TRACTOR/1SC	-40°C to 100°C	See certificate	DN6,8,10
TRACTOR/1SN	-40°C to 100°C	See certificate	DN6,8,10,12
TRACTOR/2SC	-40°C to 100°C	See certificate	DN6,8,10,12
TRACTOR/2SN	-40°C to 100°C	See certificate	DN6,8,10,12

This Certificate is valid until **2022-01-11**.

Issued at **Høvik** on **2017-01-12**

for **DNV GL**

DNV GL local station: **St. Petersburg**

Approval Engineer: **Adel Samiei**

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Marianne Spæren Marveng
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

Product description

Seven types of hose assemblies:

Tractor/2SN and Tractor/2SC:

- Hose:
- Tube: Oil Resistance synthetic rubber
- Reinforcement: Two high tensile steel braids
- Cover: Environment resistant synthetic rubber

Coupling:

- STD MF2000 couplings (M03400)

Tractor/1SN and Tractor/1SC:

Hose:

- Tube: Oil Resistance synthetic rubber
- Reinforcement: One high tensile steel braids
- Cover: Environment resistant synthetic rubber

Coupling:

- STD MF2000 couplings (M03400) for T1SN
- STD MF2000 couplings (M03300) for T1SC

Rockmaster/2SN and Rockmaster/2SC :

Hose:

- Tube: Oil Resistance synthetic rubber
- Reinforcement: Two high tensile steel braids
- Cover: Synthetic rubber with high ozone, weather and heat resistance

Coupling:

- STD MF2000 couplings (M03400)

Rockmaster/1SN:

Hose:

- Tube: Oil Resistance synthetic rubber
- Reinforcement: One high tensile steel braid
- Cover: Synthetic rubber with high ozone, weather and heat resistance

Coupling:

- STD MF2000 couplings (M03400)

Hoses and couplings are made by Manuli Hydraulics. (Hoses are made by Manuli Hydraulics in Belarus – Couplings are made by Manuli Hydraulics Polska S.A. in Poland)

Application/Limitation

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
- Water at temperature ranging from 0°C to 70°C

Maximum working pressure for each type and size:

HOSE SIZE			Maximum Working Pressure (bar)						
DN	Dash	inch	R1SN	R2SN	R2SC	T1SC	T1SN	T2SC	T2SN
6	-4	¼"	225	400	400	225	225	400	400
8	-5	5/16"	215	350	350	215	215	350	350
10	-6	3/8"	180	350	330	180	180	330	330
12	-8	½"	160	-	275	-	160	275	275

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.

Job Id: **262.1-022253-1**
Certificate No: **TAP00000NS**

Hose assemblies with couplings made of carbon steel are not to be used at temperatures below -10°C unless the material is normalized.

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.

The hose assemblies covered by this certificate shall not be installed in systems subject to pressure pulsation.

Type Approval documentation

Manufacturer's catalogue for each type

Fire test reports witnessed by DNV local surveyor - Shanghai:

R1SN – DN6 dated 2011-05-23 / R1SN – DN25 dated 2011-05-23 / R1SN – DN60 dated 2010-12-28 / R2SC – DN6 dated 2011-01-13 / R2SC – DN31 dated 2011-01-25 / R2SC – DN76 dated 2011-01-21 / R2SN – DN6 dated 2011-01-13 / R2SN – DN25 dated 2010-11-22 / R2SN – DN60 dated 2011-01-19 / T2SC (T2K) – DN76 dated 2011-01-19 / T2SN (T2T) – DN60 dated 2011-01-19

Fire test reports:

696.OIS0110/06 dated 2006-06-08 T2K (T2SC) DN12 (Done by LAPI) / 877.OIS0110/06 dated 2006-07-24 T2K (T2SC) DN51 (Done by LAPI)

Fire test reports (Done by LAPI): 959.OIS0110/16 (R2SN-DN10) & 960.OIS0110/16 (T2SN-DN12)

LAPI Fire test reports No: 1036.OIS0110/06, 1037.OIS0110/06, 1038.OIS0110/06 (T1SN)

Fire test report: DNV GL-Ref.-No.: 10-072843, 12-003525 (T1SC)

Vacuum test, ozone resistance test, cold flexibility test reports dated May 2016.

Dimensional check and Cover adhesion test reports.

Tests carried out

Cold flexibility, oil resistance, ozone, vacuum, change in length, cover adhesion, dimensional check, fire & burst 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
- Additional marking at manufacturer's option

Periodical assessment

For retention of the Type Approval, DNV GL Surveyor shall perform a periodical assessment every second year, to verify that the conditions for the type approval are complied with and to burst tests on a selection of sizes.

The tests are to be performed with the type of couplings fitted that are Type Approved with the hoses.