

TYPE APPROVAL CERTIFICATE

This is to certify:

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

with type designation(s)

Rockmaster/13, Rockmaster /4SH, Rockmaster /4SP

Issued to

Manuli Hydraulics (Suzhou) Co., Ltd.
Suzhou Jiangsu, China

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

Application :

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

Type: Rockmaster/13	Temperature range: -40 °C to 121 °C	Max. working press.: 350 bar	Sizes: DN19 to DN51
Rockmaster /4SH	Dependent on medium (see certificate)	250 to 450 bar (dep.size, see cert.)	DN16 to DN51
Rockmaster /4SP	Dependent on medium (see certificate)	175 to 485 bar (dep.size, see cert.)	DN6 to DN51

This Certificate is valid until **2020-06-30**.

Issued at **Høvik** on **2015-12-14**

for **DNV GL**

DNV GL local station: **Shanghai**

Approval Engineer: **Adel Samiei**

On behalf of 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

Three types of hose assemblies:

Rockmaster/R13

Hose:

- Tube: Oil Resistance synthetic rubber
- Reinforcement: Four high tensile steel spirals (for DN6 to DN25)
Six high tensile steel spirals (for DN31 to DN51)
- Cover: Synthetic rubber with high ozone, weather and heat resistance

Coupling:

- STD MF2000 couplings (M01500)

Rockmaster/4SP and Rockmaster/4SH

Hose:

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

Coupling:

- STD MF2000 couplings (M01500 for 4SH and M00910 for 4SP)

Hoses and couplings are made by Manuli Hydraulics. (Hoses are made by Manuli Hydraulics (Suzhou) in China & Manuli Rubber Industries SpA in Italy – Couplings are made by Manuli Hydraulics Polska S.A. in Poland)

Application/Limitation

Hose assemblies types Rockmaster/4SP-4SH 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

Hose assembly type Rockmaster/R13 is suitable for petroleum base and water base fluids within a temperature range of -40°C to +121°C. Operating temperatures in excess of +121°C may materially reduce the life of the hose.

Hose assemblies working data:

HOSE SIZE			Maximum Working Pressure (bar)		
DN	Dash	inch	R13	R4SH	R4SP
6	-4	¼"	-	-	485
10	-6	3/8"	-	-	450
12	-8	½"	-	-	420
16	-10	5/8"	-	450	380
19	-12	¾"	350	420	380
25	-16	1"	350	385	320
31	-20	1 ¼"	350	350	210
38	-24	1 ½"	350	300	185
51	-32	2"	350	250	175

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.

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

The hose assemblies covered by this type approval may be assembled and delivered by other than the certificate holder under the following conditions:

- The assembler is authorized by a written authorization from a certificate holder. The certificate holder shall keep record of all assembler authorizations.
- Hose assemblies are in accordance with an assembly procedure issued by the certificate holder and the assembler has proved their qualifications by burst testing of a selection of hose/coupling combinations.
- One sample of each hose type is to be burst tested and the testing is to be witnessed by DNV.

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

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 the type approval certificate.

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

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

Type Approval documentation

Manufacturer's catalogue for each type

Dimensional check, change in length and burst test reports witnessed by DNV local surveyor Shanghai dated 2015-04-20 (R13, R4SH, R4SD)

Fire test reports witnessed by DNV local surveyor - Shanghai:
R13 (DN19-31-51) – R4SH (DN16-25-51) – R4SP (DN6 – 25 - 51)

Production test reports (Oil resistance/Ozone resistance/Cold flexibility/dimensional check test/ change in length/cover adhesion/vacuum) done on all type of hoses made in China & Italy.
Manufacturer's catalogue for each type

Tests carried out

Type tests done according to DNV type approval programme no.5-791.70:
Impulse, burst, cold flexibility, oil resistance, ozone, vacuum, cover adhesion, change in length, dimensional check, 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
- 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 witness the following tests on a selection of sizes:

- Dimensional check
- Change in length
- Burst test

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