

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Flexible Hoses of Non-Metallic Material with Permanently Fitted Couplings**

with type designation(s)

4SPMSHA (EN856), 4SHPLUS (EN856), R12MSHA (EN856), R13MSHA (EN856), R15MSHA (SAE J517)

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.**

Type:	Temperature range:	Max. working press.:	Sizes:
4SPMSHA (EN856)	-40°C to +100°C	280 - 450 bar	DN6 to DN25
4SHPLUS (EN856)	-40°C to +100°C	280 - 420 bar	DN19 to DN51
R12MSHA (EN856)	-40°C to +121°C	175 - 280 bar	DN10 to DN51
R13MSHA (EN856)	-40°C to +121°C	350 bar	DN19 to DN38
R15MSHA (SAE J517)	-40°C to +121°C	420 bar	DN19 to DN38

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

Five type of hose assemblies: 4SPMSHA (according to EN856/SAE J517), 4SHPLUS (according to EN856/SAE J517), R12MSHA (according to EN856/SAE J517), R13MSHA (according to EN856/SAE J517), R15MSHA (according to SAE J517)

Hoses are made of oil resistant NBR rubber tube, reinforced with 4 or 6 layers of steel wire spirals and weather and oil resistant cover

Coupling designations:

Hose size			4SPMSHA	4SHPlus	R12MSHA	R13MSHA	R15MSHA
inch	DN	Dash	Ferrule				
¼	6	-4	8S004S-04	-	-	-	-
3/8	10	-6	8S004S-06	-	8S004S-06	-	-
½	12	-8	8S004S-08	-	8S004S-08	-	-
5/8	16	-10	8S004S-10	-	8S004S-10	-	-
¾	19	-12	8S004S-12	8I004S-12	8S004S-12	8I004S-12	8I004S-12
1	25	-16	8S004S-16	8I004S-16	8S004S-16	8I004S-16	8I004S-16
1 ¼	31	-20	-	8I004S-20	8S014S-20	8I006S-20	8I006S-20
1 ½	38	-24	-	8I004S-24	8S014S-24	8I006S-24	8I006S-24
2	51	-32	-	8I004S-32	8S014S-32	-	-
			Insert				
For all sizes			series 2	series 3	series 2	series 3	series 3

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 at the temperature range mentioned on the front page
- water based Hydraulic fluids and air -40°C to +70°C
- fresh water 0°C to +70°C

Maximum working pressure (in bar)

Hose size			4SPMSHA	4SHPlus	R12MSHA	R13MSHA	R15MSHA
inch	DN	Dash					
¼	6	-4	450	-	-	-	-
3/8	10	-6	445	-	280	-	-
½	12	-8	415	-	280	-	-
5/8	16	-10	350	-	280	-	-
¾	19	-12	350	420	280	350	420
1	25	-16	280	380	280	350	420
1 ¼	31	-20	-	325	210	350	420
1 ½	38	-24	-	290	175	350	420
2	51	-32	-	280	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.

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.