Certificate number: 43613/C0 BV
File number: ACM 135/2764/1
Product code: 2104I

This certificate is not valid when presented without the full attached schedule composed of 7 sections. Full certificate is to be requested to the manufacturer

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TYPE APPROVAL CERTIFICATE

This certificate is issued to

Manuli Ryco Hydraulics Sdn Bhd

KEDAH - MALAYSIA

for the type of product

NON-METALLIC HOSES (FLEXIBLE PIPES) ASSEMBLIES

Flexible Hoses of Non-Metallic Material with Permanently Fitted Couplings
acc. to SAE 100 R1AT, EN 853 1SN and EN 857 1SC

Requirements:
Bureau Veritas Rules for the Classification of Steel Ships

This certificate is issued to attest that Bureau Veritas Marine & Offshore did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 12 Oct 2031

For Bureau Veritas Marine & Offshore,
At BV KUALA LUMPUR, on 12 Oct 2026,
Azwan Yahya

This certificate was created electronically and is valid without signature

This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with Bureau Veritas Marine & Offshore. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of Bureau Veritas Marine & Offshore available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against Bureau Veritas Marine & Offshore for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION

Flexible Hoses of Non-Metallic Material with Permanently Fitted Couplings acc. to SAE 100R1AT, EN 853 1SN and EN 857 1SC

1.1 - Design Specifications

Oil resistant synthetic rubber reinforced with one braid of high tensile steel wire, cover of oil and abrasion resistant synthetic rubber.

DIEHARD T1D	T13D	T14D	T15D	T16D	T18D	T110D	T112D	T116D	T120D	T124D	T132D
DN (mm)	5	6	8	10	12	16	19	25	31	38	51
Max. Design Pressure (bar)	250	225	215	180	160	130	105	90	65	50	40

Temperature range from - 40 °C to + 100 °C.

Design standards: AS 3791 100R1AT / DIN 20022-1SN / EN 853 Type 1SN / ISO 1436 Types R1AT & 1SN / SAE 100R1AT

The maximum design pressure is not to exceed one quarter of the burst pressure at the service temperature.

SLIDER T1S	T13S	T14S	T15S	T16S	T18S	T110S	T112S	T116S	T120S	T124S	T132S
DN (mm)	5	6	8	10	12	16	19	25	31	38	51
Max. Design Pressure (bar)	250	225	215	180	160	130	105	90	65	50	40

Temperature range from - 40 °C to + 100 °C.

Design standards: AS 3791 100R1AT / DIN 20022-1SN / EN 853 Type 1SN / ISO 1436 Types R1AT & 1SN / SAE 100R1AT

The maximum design pressure is not to exceed one quarter of the burst pressure at the service temperature.

DF1	DF14D	DF15D	DF16D	DF18D	DF110D	DF112D	DF116D
DN (mm)	6	8	10	12	16	19	25
Max. Design Pressure (bar)	225	215	180	160	130	105	90

Temperature range from - 40 °C to + 100 °C.

Design standards: EN 857 Type 1SC / ISO 11237 Type 1SC

The maximum design pressure is not to exceed one quarter of the burst pressure at the service temperature.

T1F Fire suppression	T13F	T14F	T15F	T16F	T18F	T110F	T112F	T116F
DN (mm)	5	6	8	10	12	16	19	25
Max. Design Pressure (bar)	250	225	215	180	160	130	105	90

Temperature range from - 40 °C to + 100 °C.

Design standards: AS 3791 100R1AT / DIN 20022-1SN / EN 853 Type 1SN / ISO 1436 Types R1AT & 1SN / SAE 100R1AT

The maximum design pressure is not to exceed one quarter of the burst pressure at the service temperature.

SURVIVOR RQP1	RQP14	RQP15	RQP16	RQP18	RQP110	RQP112	RQP116
DN (mm)	6	8	10	12	16	19	25
Max. Design Pressure (bar)	225	215	180	160	130	120	90

Temperature range from - 40 °C to + 150 °C.

Design standards: AS 3791 100R1AT / DIN 20022-1SN / EN 853 Type 1SN / ISO 1436 Types R1AT & 1SN / SAE 100R1AT

The maximum design pressure is not to exceed one quarter of the burst pressure at the service temperature.

DIEHARD DK1D/S	DK14D/S	DK15D/S	DK16D/S	DK18D/S	DK110D/S	DK112D/S	DK116D/S	DK120D/S
DN (mm)	6	8	10	12	16	19	25	31
Max. Design Pressure (bar)	295	250	230	200	150	125	110	100

Temperature range from - 40 °C to + 100 °C.

Design standards: EN 857 Type 1SC / ISO 11237 Type 1SC

The maximum design pressure is not to exceed one quarter of the burst pressure at the service temperature.

1.2 - Materials

Part	Materials
Inner tube	Black,Oil resistant synthetic rubber
Reinforcement	One steel wire braid of high tensile steel wire acc. to SAE 100R1
Cover	Black, oil, ozone and abrasion resistant synthetic rubber, black Oil and weather resistant rubber
Coupling	Carbon steel AISI / SAE 12L14 , 1010, 1020, 1040, 1045 (Standard) Electroplated Fe/Zn12c acc. to AS1789 Stainless Steel 316 ASTM A276 or equivalent (Option)

End fittings according to manufacturer's specifications.

When other choices of materials are used per manufacturer's recommendations, the BV agreement is to be obtained.

2. DOCUMENTS AND DRAWINGS

- RYCO metric crimp chart and rapid numbers RYCO-MKT0300 document N° RH-WI-61 rev.09 dated 21/12/2017
- RYCO Hydraulics company profile N° RHY-CP0608

No departure from the above documents shall be made without the prior consent of the Society. The manufacturer must inform the Society of any modification or changes to these documents and drawings.

3. TEST REPORTS

3.1 - Tests carried out: Dimensional control and physical test, burst pressure test at 4 times the maximum design pressure, impulse test, proof pressure, cold flexibility, oil resistance, abrasion resistance, visual inspection and ozone resistance tests.

- Impulse test certificate N° 2671i for SURVIVOR RQP1, RQP112 dated 05/04/2007, N°5043i for RQP14 dated 20/11/012, N°5044i for RQP18 dated 20/11/2012
- Dimensional control and physical test for T1F Fire suppression, T14F, T18F, T112F dated 2012
- T1F Fire suppression certificate N° 2441-030 dated 16/12/2015
- SURVIVOR RQP1 test certificate N° 2438-030 dated 17/12/2015
- DIEHARD T1D test report N° RHAU-TD-T120D dated 11/07/2014
- Test report including dimensional check, cover adhesion test, proof pressure test at 2 times the design pressure, leakage test, cold flexibility test, ozone resistance test and oil resistance test for model DK1D dated 31/07/2019
- Burst pressure test report N°RH-BT-003/18 dated 18/10/2018 for the model DK1D.

3.2 - Fire resistance test according to ISO 15540

- Fire suppression T1F, T18F test certificate N° RH-FT-29 dated 17/11/2005 witnessed by DNV
- Fire suppression T1F, T14F test certificate N° RH-FT-31 dated 29/11/2005 witnessed by DNV
- Fire suppression T1F, T112F test certificate N° RH-FT-32 dated 29/11/2005 witnessed by DNV
- SURVIVOR RQP1, RQP14 test certificate N° RH-FT-22 dated 17/11/2005, RQP18 report N° RH-FT-23 dated 16/11/2005, RQP116 report N° RH-FT-24 dated 16/11/2005 witnessed by DNV
- DF1 test certificate N° RH-FT-137 dated 19/07/2013 witnessed by DNV
- Fire resistance test carried on flexible hoses assemblies type DK1D witnessed by DNV dated 18/10/2018

4. APPLICATION / LIMITATION

4.1 - May be used for the following services on board: Fuel oil*, lubricating oil*, hydraulic oil*, compressed air, fresh water, sea water*, sanitary, bilge, ballast water, Class III steam systems.

** When required, only approved fire resistant type (fire resistance type tested hoses) is to be used as per above design specifications.*

4.2 - End fittings as per manufacturer's catalogue. The hoses are to be entirely assembled in the manufacturer's workshop.

4.3 - The hoses assemblies are to be installed according to manufacturer's instructions and Bureau Veritas Rules.

4.4 - Hose assemblies must be fabricated using Ryco Hydraulics hoses, Ryco Hydraulics fittings, Ryco Hydraulics Ferrule and Ryco Hydraulics hose assembly equipment.

4.5 - Flexible hoses assemblies for essential services or containing either flammable or toxic media are not to exceed 1.5 meters in length.

4.6 - Not to be used as Cargo transfert hose.

4.7 - Not to be used in high pressure fuel oil injection systems in accordance with the relevant requirements stated in *NR 467, Pt C, Ch 1, Sec 10 [2.6.3]*.

4.8 - The use of metallic material is restricted according to Bureau Veritas Rules *NR 467, Pt C, Ch 1, Sec 10, Table 5*.

4.9 - Taper threaded end fittings are not to be used in engine rooms, nor any place containing an ignition source unless otherwise suitably screened at the Society's Surveyor satisfaction.

4.10 - Not to be used in case of high level of vibrations where fitted to engines, pumps, compressors and other sources of high vibrations.

5. PRODUCTION SURVEY REQUIREMENTS

5.1 - The products are to be supplied by **Manuli Ryco Hydraulics Sdn Bhd** in compliance with the type and the requirements described in this certificate.

5.2 - This type of product is within the category IBV of Bureau Veritas Rule Note *NR 320*.

5.3 - Bureau Veritas product certificate is required.

5.4 - Each flexible hose together with its connections is to is to undergo a hydrostatic test under a pressure at least equal to 1.5 times the maximum service pressure and provided with the manufacturer's pressure test report and conformity of production.

5.5 - For information, **Manuli Ryco Hydraulics Sdn Bhd**. has declared to Bureau Veritas the following production sites:

Production site	Location	Hose	Hose couplings	Hose assemblies	Adaptors
Fluiconnecto Ryco Australia Pty Ltd	**99 Calarco Drive Derrimut, AUSTRALIA**			**x**	
Manuli RYCO Hydraulics (Dalian) Co. Ltd.	**38 Yingri Rd., Ying Cheng Zi Industrial Zone, Gan Jing Zi District, Dalian, China**		**x**		**x**
Manuli RYCO Hydraulics Sdn. Bhd.	**PLOT 207 KUALA KETIL INDUSTRIAL ESTATE KUALA KETIL 09300 KEDAH MALAYSIA**	**x**		**x**	
Fluiconnecto USA	**1207 Rankin Rd, 77073 HOUSTON UNITED STATES OF AMERICA**			**x**	
Fluiconnecto USA	**410 Keystone Drive Suite B, Warrendale, PA 15086 UNITED STATES OF AMERICA**			**x**	
Fluiconnecto USA	**1007 W 10th ST. Pella, IA 50219 UNITED STATES OF AMERICA**			**x**	
Manuli Hydraulics (Suzhou) Co., Ltd.	**No.85 Xinglin Street, Suzhou Industrial Park, Suzhou, Jiangsu Province, China**	**x**		**x**	

6. MARKING OF PRODUCT

Each hose assembly shall be at least clearly and indelibly marked with:

- Manufacturer name or logo
- Date of manufacture (month/year)
- Type designation
- Nominal Diameter
- Pressure rating
- Temperature rating
- Bureau Veritas' Mark

7. OTHERS

It is **Manuli Ryco Hydraulics Sdn Bhd**.'s responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

This certificate supersedes the Type Approval Certificate No. 43613/B2 BV issued by the Society.

***** END OF CERTIFICATE *****