Certificate number: 43720/C0 BV
File number: ACM 135/2764/5
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 Type Isobaric hoses acc. to SAE 100 R12/13/15/17/19, EN 856 4SP, ISO 3862 Type R15 and ISO 18752-BC

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: 25 Sep 2031

For Bureau Veritas Marine & Offshore,
At BV KUALA LUMPUR, on 25 Sep 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 Type Isobaric hoses acc. to SAE 100 R12/13/15/17/19, EN 856 4SP, ISO 3862 Type R15 and ISO 18752-BC

1.1 - Design specifications of type Isobaric Spiral

Isobaric Spiral: Synthetic rubber inner tube, multiple alternating layers of spiralled high tensile steel wire and resistant rubber cover.

H3000	H3020D/S	H3024D/S	H3032D/S
DN size (mm)	31	38	51
Max. Design Pressure (bar)	215	215	215

Design standards: EN 856 Type 4SP / ISO 18752-DC / SAE 100R12

H4000	H4006D/S*	H4008/D/S	H4010D/S	H4012D/S	H4016D/S	H4020D/S	H4024D/S	H4032D/S
DN (mm)	10	12	16	19	25	31	38	51
Max. Design Pressure (bar)	280	280	280	280	280	280	280	280

Design standards: EN 856 Type 4SP / ISO 18752-DC / SAE 100R12

H5000	H5006D/S	H5008/D/S	H5010D/S	H5012D/S/C	H5016D/S/C	H5020D/S/C	H5024D/S/C	H5032D/S
DN (mm)	10	12	16	19	25	31	38	51
Max. Design Pressure (bar)	350	350	350	350	350	350	350	350

Design standards: ISO 18752-CC / SAE100R13

H6000	H6006D/S*	H6008/D/S	H6010D/S	H6012D/S	H6016D/S	H6020D/S	H6024/D/S	H6032D/S
DN (mm)	10	12	16	19	25	31	38	51
Max. Design Pressure (bar)	420	420	420	420	420	420	420	420

Design standards: ISO 18752-CC / SAE100R15 / ISO 3862 Type R15

Temperature range for H5000C specifically from: - 60 °C to + 100 °C.

Temperature range from - 40 °C to + 121 °C.

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

*May be used for oil and sea water systems only with fire sleeve protection.

1.2 - Design specifications of type Isobaric Braid

Isobaric braid: Synthetic rubber inner tube, one or two braids of high tensile steel wire and resistant rubber cover.

T3000	T3004D/S	T3005/D/S	T3006D/S	T3008D/S	T3010D/S	T3012D/S	T3016D/S
DN (mm)	6	8	10	12	16	19	25
Max. Design Pressure (bar)	245	245	215	215	215	215	215

Design standards: ISO 18752-BC / SAE 100R17

T3600	T3604D/S	T3605/D/S	T3606D/S	T3608D/S	T3610D/S	T3612D/S	T3616D/S
DN (mm)	6	8	10	12	16	19	25
Max. Design Pressure (bar)	250	250	250	250	250	250	250

Design standard: ISO 18752-BC

T4000	T4004D/S	T4005/D/S	T4006D/S	T4008D/S	T4010D/S	T4012D/S
DN (mm)	6	8	10	12	16	19
Max. Design Pressure (bar)	280	280	280	280	280	280

Design standards: ISO 18752-BC / SAE 100R19

T5000	T5004D/S	T5005/D/S	T5006D/S	T5008D/S
DN (mm)	6	8	10	12
Max. Design Pressure (bar)	350	350	350	350

Design standard: ISO 18752-BC

T6000	T6004D/S	T6005D/S	T6006D/S
DN (mm)	6	8	10
Max. Design Pressure (bar)	420	420	420

Design standard: ISO 18752-BC

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

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

1.3 - Materials

Part	Materials
Inner tube	Oil resistant CR-NBR rubber (Neoprene), black Oil resistant synthetic rubber (Nitrile)
Reinforcement	Layer of steel wire braid
Cover	Oil 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 Hydraulics Isobaric hose brochure N° RHGP-MKT dated 23/03/2016
- 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: Burst at 4 times the maximum design pressure, change in length, impulse, hydrostatic pressure, cold flexibility, oil resistance, abrasion resistance and ozone resistance tests.

- Isobaric spiral and isobaric braid test reports dated 27/08/2012, 07/01/2014 and 07-18/07/2014

- DIEHARD T3600 test reports N° 2443-030, 2444-030 dated 16/12/2015

3.2 - Fire resistance test according to ISO 15540

- DIEHARD T3KD test certificates N° RH-FT-63~68 dated 09/09/2009 witnessed by DNV

- Fire resistance test reports N° RH-FT-83~85 dated 25/09/2012, N°RH-FT-86~92 dated 26/09/2012, N° RH-FT-132~134, RH-FT-139~140 dated 19/07/2013, N° RH-FT-85 dated 25/09/2012, N° RH-FT-94, RH-FT-95 and RH-FT-96 dated 27/09/2012, N° RH-FT-103~107, RH-FT-110~111, RH-FT-114~121 dated 22/11/2012, N° RH-FT-127, RH-FT-130 dated 15/03/2013 and N° RH-FT-97~124 dated 21/11/2012 witnessed by DNV

- Fire resistance test report N° IRH-FT-014/13~016/13 dated 26/09/2013 N° RH-IFT-004/14~005/14 dated 15/10/2014, RH-IFT-001/14~002/14 dated 12/04/2014, IRH-FT-001/13~004/13 dated 16-17/05/2013

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 (hoses assembled with or without fire sleeve protection) 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. 43720/B2 BV issued by the Society.

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