Certificate number: 43717/C0 BV
File number: ACM 135/2764/2
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 R2AT, EN 853 2SN and EN 857 2SC

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 100 R2AT, EN 853 2SN and EN 857 2SC

1.1 - Design specifications

Oil resistant synthetic rubber inner tube, 2 braids of high tensile steel wire and oil and abrasion resistant rubber cover.

DIEHARD T2D	T24D	T25D	T26D	T28D	T210D	T212D	T216D	T220D	T224D	T232D	T240D	T248D
DN (mm)	6	8	10	12	16	19	25	31	38	51	63	76
Max. Design Pressure (bar)	420	350	350	350	250	215	175	140	100	90	105	80

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

Design standard: AS 3791 100R2AT / DIN 20022 - 2SN / EN 853 Type 2SN / ISO 1436 Types R2AT & 2SN / SAE 100R2AT

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

DIEHARD TXA2D	TXA28D	TXA210D	TXA212D	TXA216D	TXA220D
DN (mm)	12	16	19	25	31
Max. Design Pressure (bar)	375	350	313	225	175

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

Design standard: AS 3791 100R2AT / BCS 174 / DIN 20022 - 2SN / EN 853 Type 2SN / ISO 1436 Types R2AT & 2SN / SAE 100R2AT

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

DINFLEX DF2	DF24D	DF25D	DF26D	DF28D	DF210D	DF212D	DF216D
DN (mm)	6	8	10	12	16	19	25
Max. Design Pressure (bar)	420	350	350	295	250	215	170

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

Design standard: EN 857 Type 2SC / ISO 11237 Type 2SC / SAE 100R16

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

SLIDER T2S	T24S	T25S	T26S	T28S	T210S	T212S	T216S	T220S	T224S	T232S
DN (mm)	6	8	10	12	16	19	25	31	38	51
Max. Design Pressure (bar)	420	350	350	350	250	215	175	140	100	90

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

Design standard: AS 3791 100R2AT / DIN 20022 - 2SN / EN 853 Type 2SN / ISO 1436 Types R2AT & 2SN / SAE 100R2AT

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

SURVIVOR RQP2	RQP24	RQP25	RQP26	RQP28	RQP210	RQP212	RQP216	RQP220	RQP224	RQP232
DN (mm)	6	8	10	12	16	19	25	31	38	51
Max. Design Pressure (bar)	400	350	350	300	250	215	167	150	100	90

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

Design standard: AS 3791 100R2AT / DIN 20022 - 2SN / EN 853 Type 2SN / ISO 1436 Types R2AT & 2SN / SAE 100R2AT

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

ICEBREAKER T2C	T24C	T25C	T26C	T28C	T210C	T212C	T216C	T220C	T224C	T232C
DN (mm)	6	8	10	12	16	19	25	31	38	51
Max. Design Pressure (bar)	420	350	350	350	250	215	175	140	100	90

Temperature range from - 60 °C to + 100 °C.

Design standard: AS 3791 100R2AT / DIN 20022 - 2SN / EN 853 Type 2SN / ISO 1436 Types R2AT & 2SN / SAE 100R2AT

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

DIEHARD DK2D/S	DK24D/S	DK25D/S	DK26D/S	DK28D/S	DK210D/S	DK212D/S	DK216D/S	DK220D/S
DN (mm)	6	8	10	12	16	19	25	31
Max. Design Pressure (bar)	450	420	385	350	290	280	200	175

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

Design standard: EN 857 Type 2SC / ISO 6805 Type 1 & Type 2 / ISO 6805 Type 4 / ISO 11237 Type 2SC

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

1.2 - Materials

Part	Material
Inner tube	Oil resistant synthetic rubber
Reinforcement	Two steel wire braids
Cover	Oil and abrasion resistant synthetic rubber, black Oil and weather resistant rubber Oil and abrasion resistant synthetic rubber, sheathed with polyethylene
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 21/12/2021
- 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, change in length, impulse, proof pressure, cold flexibility, oil resistance, abrasion resistance and ozone resistance tests.

- Dimension control and physical test for SLIDER T2S, T24S dated 30/12/2011 and T28S dated 23/06/2012
- Impulse certificate RQP24 N° 2775i dated 17/09/2007, RQP220 N°2646i dated 22/03/2007, RQP216 N° 5046i and RQP28 N° 5045i dated 20/11/2012
- DIEHARD TXA2D test report N° 2446-030 and 2445-030 dated 16/12/2015
- ICEBREAKER T2C report N° 2442-030 dated 16/12/2015
- 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 DK2D dated 29/04/2019
- Burst pressure test report N°RH-BT-003/18 dated 18/10/2018 for the model DK2D

3.2 - Fire resistance test according to ISO 15540

- Slider T2S, T24S test certificate N° RH-FT-43, T28S report N° RH-FT-42, T216S N° RH-FT-44 dated 09/02/2006 witnessed by DNV
- SURVIVOR RQP2 RQP24 test certificate N° RH-FT-35 dated 29/11/2005, RQP212 report N° RH-FT-25 dated 16/11/2005,

RQP232 report N° RH-FT-40 dated 30/11/2005 witnessed by DNV

- Fire resistance test carried on flexible hoses assemblies type DK2D 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. 43717/B2 BV issued by the Society.

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