



Marine & Offshore

Certificate number: 43613/B1 BV

File number: ACM 135/2764/1

Product code: 21041

This certificate is not valid when presented without the full attached schedule composed of 7 sections

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TYPE APPROVAL CERTIFICATE

*This certificate is issued to***RYCO HYDRAULICS Pty Ltd**

Derrimut - AUSTRALIA

*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: 25 Jun 2026****For Bureau Veritas Marine & Offshore,**

At BV BRISBANE, on 04 Aug 2021,

Lu GUO



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.

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BV Mod. Ad.E 530 June 2017

This certificate consists of 5 page(s)

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.

| AVENGER T1A | T13A | T14A | T15A | T16A | T18A | T110A | T112A | T116A | T120A | T124A | T132A |
|-----------------------------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| DN (mm) | 5 | 6 | 8 | 10 | 12 | 16 | 19 | 25 | 31 | 38 | 51 |
| Max. Working Pressure (bar) | 250 | 225 | 215 | 180 | 160 | 130 | 105 | 90 | 65 | 50 | 40 |

Temperature range (°C): -40 up to +100

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

| 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. Working Pressure (bar) | 250 | 225 | 215 | 180 | 160 | 130 | 105 | 90 | 65 | 50 | 40 |

Temperature range (°C): -40 up to +100

The maximum working 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. Working Pressure (bar) | 250 | 225 | 215 | 180 | 160 | 130 | 105 | 90 | 65 | 50 | 40 |

Temperature range (°C): -40 up to +100

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

| DF1 | DF14E/D | DF15E/D | DF16E/D | DF18E/D | DF110E/D | DF112E/D | DF116E/D |
|-----------------------------|---------|---------|---------|---------|----------|----------|----------|
| DN (mm) | 6 | 8 | 10 | 12 | 16 | 19 | 25 |
| Max. Working Pressure (bar) | 225 | 215 | 180 | 160 | 130 | 105 | 88 |

Temperature range (°C): -40 up to +100

The maximum working 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. Working Pressure (bar) | 250 | 225 | 215 | 180 | 160 | 130 | 105 | 90 |

Temperature range (°C): -40 up to +100

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

| ADVANTAGE T1E | T13E | T14E | T15E | T16E | T18E | T110E | T112E | T116E | T120E | T124E | T132E |
|-----------------------------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| DN (mm) | 5 | 6 | 8 | 10 | 12 | 16 | 19 | 25 | 31 | 38 | 51 |
| Max. Working Pressure (bar) | 250 | 225 | 215 | 180 | 160 | 130 | 105 | 90 | 65 | 50 | 40 |

Temperature range (°C): -40 up to +100

The maximum working 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. Working Pressure (bar) | 225 | 215 | 180 | 160 | 130 | 120 | 90 |

Temperature range (°C): -40 up to +150

The maximum working 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. Working Pressure (bar) | 295 | 250 | 230 | 200 | 150 | 125 | 110 | 100 |

Temperature range (°C): -40 up to +100

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

1.2 - 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 working pressure, impulse test, proof pressure, cold flexibility, oil resistance, abrasion resistance, visual inspection and ozone resistance tests.

- ADVANTAGE DF1E, DF14E, ADVANTAGE T1E, T18E, T116E, T132E test reports dated 08/09/2010
- Report on burst pressure for model DF14E test report N° EB0D1/KK dated 23/09/2010 witnessed by DNV
- Impulse test certificate N° KP3 010/11 for AVENGER T1A ,T14A dated 21/02/2011
- Impulse test certificate N° 4763i for DIEHARD T1D, T18D dated 20/11/2012
- Impulse test certificate N° 4796i for AVENGER T1A, T112A and N° 4083i for AVENGER T1A, T124A dated 15/08/2012
- 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
- AVENGER T1A test reports N° RHAU-TA-T14A~T112A dated 16/09/2013
- DIEHARD T1D test report N° RHAU-TD-T120D dated 11/07/2014
- ADVANTAGE DF1E test report dated 22/01/2016
- 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

- ADVANTAGE DF1E, DF14E test certificate N° RH-FT-72 dated 23/09/2010 witnessed by DNV
- ADVANTAGE DF1E, DF18E test certificate N° RH-FT-73 dated 23/09/2010 witnessed by DNV
- 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
- ADVANTAGE T1E, T14E, T18E, T112E test certificate N° RH-FT-77 dated 23/09/2010 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: Hydraulics systems, compressed air, fresh water and sanitary systems.
- 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 are to be limited to a length necessary to provide for relative movement between fixed and flexibly mounted items of machine/equipment or systems and are only to be used in lengths up to 2 m. The hoses are to be installed in clearly visible and readily accessible locations at all times.
- 4.4 - The hoses assemblies are to be installed according to manufacturer's instructions and Bureau Veritas Rules.
- 4.5 - 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.
- 4.6 - 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 **RYCO HYDRAULICS Pty. Ltd.** 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 NR320.
- 5.3 - BV product certificate is required.
- 5.4 - Each hose with end fittings is to be hydraulically pressure tested to 1.5 times the maximum working pressure and provided with the manufacturer's pressure test report and conformity of production.
- 5.5 - For information, **RYCO HYDRAULICS Pty. Ltd.** has declared to Bureau Veritas the following production sites:

| Production site | Location | Hose | Hose couplings | Hose assemblies | Adaptors |
|--|--|------|----------------|-----------------|----------|
| RYCO HYDRAULICS Pty. Ltd. | 99 Calarco Drive, Derrimut, Victoria, 3026, AUSTRALIA | | x | x | x |
| RYCO HYDRAULICS (Dalian) Ltd. | 38 Ying Ri Road, Ying Cheng Zi Industrial Zone, Gan Jing Zi District DALIAN 116036, CHINA | | x | x | x |
| RYCO HYDRAULICS Sdn. Bhd. | Plot 207, Kuala Ketil Industrial Estate 09300 Kuala Ketil, Kedah Darulaman MALAYSIA | x | | x | |
| RYCO HYDRAULICS (Dalian) Ltd. Suzhou Branch | 7 Building, N°85, Xingun Street, Suzhou Industrial zone, China(Jiangsu) Pilot Free Trade Zone | | | x | |
| RYCO HYDRAULICS Inc. | 1616 Greens Road Houston, Texas, 77032 USA | | | 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
- Society's brand as relevant

7. OTHERS

It is **RYCO HYDRAULICS Pty. Ltd.**'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/B0 BV issued by the Society.

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