



Marine & Offshore
Division

Certificate number: 43720/A0 BV

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Product code: 2104I

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

Footscray - AUSTRALIA

for the type of product

NON-METALLIC HOSES (FLEXIBLE PIPES) ASSEMBLIES

Flexible Hoses of Non-Metallic Material with Permanently Fitted Couplings Type Isobaric hoses

Requirements:

- BUREAU VERITAS Rules for the Classification of Steel Ships

This certificate is issued to attest that BUREAU VERITAS 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: 11 May 2021

For BUREAU VERITAS,

At BV BRISBANE, on 11 May 2016,

Florin ZAHARIA



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. 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 Division 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 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 October 2014

This certificate consists of 4 page(s)

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION

Flexible Hoses of Non-Metallic Material with Permanently Fitted Couplings Type Isobaric hoses

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	H3020A/D/S	H3024A/D/S	H3032A/D/S
DN size (mm)	31	38	51
Max. Working Pressure (bar)	215	215	215

H4000	H4006A/D/S*	H4008A/D/S	H4010A/D/S	H4012A/D/S	H4016A/D/S	H4020A/D/S	H4024A/D/S	H4032A/D/S
DN (mm)	10	12	16	19	25	31	38	51
Max. Working Pressure (bar)	280	280	280	280	280	280	280	280

H5000	H5006A/D/S*	H5008A/D/S	H5010A/D/S	H5012A/D/S	H5016A/D/S	H5020A/D/S	H5024A/D/S	H5032A/D/S
DN (mm)	10	12	16	19	25	31	38	51
Max. Working Pressure (bar)	350	350	350	350	350	350	350	350

H6000	H6006A/D/S*	H6008A/D/S	H6010A/D/S	H6012A/D/S	H6016A/D/S	H6020A/D/S	H6024A/D/S	H6032A/D/S
DN (mm)	10	12	16	19	25	31	38	51
Max. Working Pressure (bar)	420	420	420	420	420	420	420	420

Temperature range (°C): -40 up to +121

The maximum working 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.

AVENGER T3KA	T3K4A	T3K5A	T3K6A	T3K8A	T3K10A	T3K12A	T3K16A
DN (mm)	6	8	10	12	16	19	25
Max. Working Pressure (bar)	210	210	210	210	210	210	210

DIEHARD T3KD	T3K4D	T3K5D	T3K6D	T3K8D	T3K10D	T3K12D	T3K16D
DN (mm)	6	8	10	12	16	19	25
Max. Working Pressure (bar)	210	210	210	210	210	210	210

SLIDER T3KS	T3K4S	T3K5S	T3K6S	T3K8S	T3K10S	T3K12S	T3K16S
DN (mm)	6	8	10	12	16	19	25
Max. Working Pressure (bar)	210	210	210	210	210	210	210

T3000	T3004A/D/S	T3005A/D/S	T3006A/D/S	T3008A/D/S	T3010A/D/S	T3012A/D/S	T3016A/D/S
DN (mm)	6	8	10	12	16	19	25
Max. Working Pressure (bar)	245	245	215	215	215	215	215

T3600	T3604A/D/S	T3605A/D/S	T3606A/D/S	T3608A/D/S	T3610A/D/S	T3612A/D/S	T3616A/D/S
DN (mm)	6	8	10	12	16	19	25
Max. Working Pressure (bar)	250	250	250	250	250	250	250

T4000	T4004A/D/S	T4005A/D/S	T4006A/D/S	T4008A/D/S	T4010A/D/S	T4012A/D/S	T4016A/D/S
DN (mm)	6	8	10	12	16	19	25
Max. Working Pressure (bar)	280	280	280	280	280	280	280

T5000	T5004A/D/S	T5005A/D/S	T5006A/D/S	T5008A/D/S	T5010A/D/S	T5012A/D/S
DN (mm)	6	8	10	12	16	19
Max. Working Pressure (bar)	350	350	350	350	350	350

T6000	T6004A/D/S	T6005A/D/S	T6006A/D/S	T6008A/D/S
DN (mm)	6	8	10	12
Max. Working Pressure (bar)	420	420	420	420

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.

1.3 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 Product Technical Manual N° RHY-RHC0707AUS dated 2015
- 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.07 dated 08/12/2015
- 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 working 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
- Impulse certificate N° 3250i dated 14/09/2009 for T3K4A, T3K6A report N° 3249i dated 10/09/2009, T3K10A report N° 3244i dated 10/09/2009, T3K6A Avenger report N° 4643i dated 20/11/2012, T3K12A Avenger report N° 4855i dated 20/11/2012

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* and sanitary. * 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 installation of hose assemblies is to be in accordance with the manufacturer's instructions to take into consideration forces due to vibration. The hoses are not to be used on services when vibration test is required in the Society's Rules.

4.4 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.

4.5 Taper threaded end connections are not to be used for oil circuits in engine rooms nor any place containing an ignition source unless otherwise suitably screened at the Society's Surveyor satisfaction.

5. PRODUCTION SURVEY REQUIREMENTS

5.1 The products are to be supplied by **RYCO HYDRAULICS Pty. Ltd.** in compliance with the type described in this certificate and in compliance with the requirements stated on the front page of this certificate. This type of product is within the category IBV of Bureau Veritas Rule Note NR320.

5.2 This certificate is also valid for other companies authorised by RYCO HYDRAULICS Pty. Ltd. when same specifications, tolerances, equipment and quality control procedures are used. In such case, the BV agreement is to be obtained.

5.3 Each hose with end fittings is to be hydraulically pressure tested to twice the maximum working pressure and provided with the manufacturer's pressure test report and conformity of production.

5.4 BV product certificate is required.

Places of production

Production site	Location	Hose	Hose couplings	Hose assemblies	Adaptors
RYCO HYDRAULICS Pty. Ltd.	19 Whitehall Street Footscray, VIC 3011 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. Taicang Branch	2nd Building No.88 Dalian East Road Taicang Economy Developing Area Taicang, 215400 Jiangsu Province CHINA			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
- Type designation
- Date of manufacture and lot #
- Society's brand as relevant

7. OTHERS

This approval is given on the understanding that the manufacturer will accept full responsibility for informing shipbuilders or their sub-contractors of the proper method of fitting and general maintenance of the products and of the conditions of this approval.

*** END OF CERTIFICATE ***