



CERTIFICATE NUMBER 18-SG1802656-PDA-DUP

EFFECTIVE DATE 14-December-2018

EXPIRATION DATE 13-December-2023

ABS TECHNICAL OFFICE Singapore Engineering Services

CERTIFICATE OF

Product Design Assessment

This is to certify that a representative of this Bureau did, at the request of

RYCO HYDRAULICS INC.

located at

1616 GREENS ROAD, HOUSTON, TX, UNITED STATES 77032

assess design plans and data for the below listed product. This assessment is a representation by the Bureau as to the degree of compliance the design exhibits with applicable sections of the Rules. This assessment does not waive unit certification or classification procedures required by ABS Rules for products to be installed in ABS classed vessels or facilities. This certificate, by itself, does not reflect that the product is Type Approved. The scope and limitations of this assessment are detailed on the pages attached to this certificate.

Product Flexible Hose

Model BT1, D2B, DF1D, DK1D, DK1S, DF2D, DK2D, DK2S, H12D, H12S, H13D, H3000D, H4000D, H5000D, H6000D, H3000S, H4000S, H5000C, H5000S, H6000S, M2, R4SHD, R4SPD, RQP1, RQP2, RQP5, RTH1, SR, SRF, SRX, TXA2D, T1D, T1F, T1S, T2C, T2D, T2S, T5, T3000D, T4000D, T5000D, T6000D, T3000S, T3600C, T3600D, T3600S, T4000S, T5000S and T6000S

This Product Design Assessment (PDA) Certificate remains valid until 13-December-2023 or until the Rules and/or Standards used in the assessment are revised or until there is a design modification warranting design reassessment (whichever occurs first).

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or previous to the effective date of the ABS Rules and standards applied at the time of PDA issuance. Use of the Product for non-ABS units is subject to agreement between the manufacturer and intended client.

American Bureau of Shipping

Vibin Chandrabose, Engineer/Consultant

NOTE: This certificate evidences compliance with one or more of the Rules, Guides, standards or other criteria of ABS or a statutory, industrial or manufacturer's standards. It is issued solely for the use of ABS, its committees, its clients or other authorized entities. Any significant changes to the aforementioned product without approval from ABS will result in this certificate becoming null and void. This certificate is governed by ABS Rules 1-1-A3/5.9 Terms and Conditions of the Request for Product Type Approval and Agreement (2010)

RYCO HYDRAULICS INC.

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Web: ryco.com.au

Tier: 3 - Type Approved, unit certification not required

Product: Flexible Hose

Model: BT1, D2B, DF1D, DK1D, DK1S, DF2D, DK2D, DK2S, H12D, H12S, H13D, H3000D, H4000D, H5000D, H6000D, H3000S, H4000S, H5000C, H5000S, H6000S, M2, R4SHD, R4SPD, RQP1, RQP2, RQP5, RTH1, SR, SRF, SRX, TXA2D, T1D, T1F, T1S, T2C, T2D, T2S, T5, T3000D, T4000D, T5000D, T6000D, T3000S, T3600C, T3600D, T3600S, T4000S, T5000S and T6000S

Intended Service:

For use on ships and offshore installations, as short lengths in fresh water, seawater, hydraulic, pneumatic, fuel oil and lube oil systems.

Description:

See attached document.

Rating:

See attached document.

Service Restriction:

1. Unit certification is not required for this product. If the manufacturer or purchaser request an ABS Certificate for compliance with a specification or standard, the specification or standard, including inspection standards and tolerances, must be clearly defined.
2. Flexible hoses are not acceptable in high pressure fuel oil injection systems. See 4-6-2/5.7.2 of the ABS Steel Vessels Rules.

Comments:

1. The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product.
2. The flexible hoses are to be installed in accordance with the manufacturer's procedures and are to be permanently marked by the manufacturer in accordance to 4-6-2/5.7.6 of ABS Steel Vessels Rules.
3. Rubber hoses intended for use in bilge, ballast, compressed air, oil fuel, lubricating, hydraulic and thermal oil systems are to incorporate a single or double closely woven integral wire braid or other suitable material reinforcement. Rubber hoses intended for use in oil supply lines to burners, the hoses are to have external wire braid protection in addition to the integral reinforcement. See 4-6-2/5.7.3 of ABS Steel Vessels Rules
4. The use of hose clamps and similar types of end attachments is not acceptable for flexible hoses in piping systems for steam, flammable media, starting air or for sea water where failure may result in flooding. In other piping systems, the use of hose clamps may be accepted where the working pressure is less than 5 bar (5.1 kgf/cm², 72.5 psi) and provided there are at least two stainless steel hose clamps at each end connection. The hose clamps are to be at least 12 mm (0.5 in.) wide and are not to be dependent upon spring tension to remain fastened. See 4-6-2/5.7.3 (b) 4-6-4/13.7 and 4-6-4/15.5.1 of ABS Steel Vessels Rules.

Notes/Drawing/Documentation:

Drawing No. Datasheet, Ryco Flexible Hose, Revision: -, Pages: 49

Drawing No. Burst Test Reports, Ryco Burst Test Reports, Revision: -, Pages: 9

Drawing No. Fire Test Reports - 2005, Ryco Fire Test Reports, Revision: -, Pages: 22

Drawing No. Fire Test Reports - 2006, Ryco Fire Test Reports, Revision: -, Pages: 8

Drawing No. Fire Test Reports - 2012, Ryco Fire Test Reports, Revision: -, Pages: 19

Drawing No. Fire Test Reports - 2013, Ryco Fire Test Reports, Revision: -, Pages: 21

Drawing No. Fire Test Reports - 2014, Ryco Fire Test Reports, Revision: -, Pages: 1

Drawing No. Fire Test Reports - 2016, Ryco Fire Test Reports, Revision: -, Pages: 7

Drawing No. Fire Test Reports - 2017, Ryco Fire Test Reports, Revision: -, Pages: 33

Drawing No. Fire Test Reports - 2018, Ryco Fire Test Reports, Revision: -, Pages: 12

Drawing No. Impulse Test Reports, Ryco Impulse Test Reports, Revision: -, Pages: 54

Drawing No. Burst and Impulse Test Reports, Ryco Burst and Impulse Test Reports, Revision: -, Pages: 34

See pages 50 to 53 of the attachment for the Ryco test report number and date.

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Tier: 3 - Type Approved, unit certification not required

Terms of Validity:

This Product Design Assessment (PDA) Certificate 18-SG1802656-PDA-DUP, dated 14/Dec/2018 remains valid until 13/Dec/2023 or until the Rules or specifications used in the assessment are revised (whichever occurs first).

This PDA is intended for a product to be installed on an ABS classed vessel, MODU or facility which is in existence or under contract for construction on the date of the ABS Rules or specifications used to evaluate the Product.

Use of the Product on an ABS classed vessel, MODU or facility which is contracted after the validity date of the ABS Rules and specifications used to evaluate the Product, will require re-evaluation of the PDA.

Use of the Product for non ABS classed vessels, MODUs or facilities is to be to an agreement between the manufacturer and intended client.

STANDARDS

ABS Rules:

ABS Rules for Conditions of Classification (2018) 1-1-4/7.7, 1-1-A3 and A4, which covers the following:
2018 Rules for Building and Classing Steel Vessels 4-6-2/5.5, 4-6-2/5.7, 4-6-2/7.3, 4-6-2/Table 6, 4-6-2/Table 7, 4-6-4/Table 4, 4-6-5/Table 3, 4-6-5/Table 5, 4-6-6/Table 7, 4-6-7/Table 1 and 4-6-7/3.5.2
2018 Rules for Building and Classing Steel Vessels Under 90 Meters (295 feet) in Length 4-4-1/9.19
2018 Rules for Building and Classing Offshore Support Vessels 4-6-2/5.7
2018 Rules for Building and Classing Steel Vessels for Service on Rivers and Intracoastal Waterways 4-3-1/7.21

ABS Rules for Conditions of Classification - High Speed Crafts (2018) 1-1-4/11.9, 1-1-A2 and A3 which covers the following:
2018 Rules for Building and Classing High-Speed Crafts 4-4-1/9.19

National:
NA

International:
NA

Government:
NA

EUMED:
NA

OTHERS:
NA