



CERTIFICATE NUMBER

DATE

05-YO117616-2-PDA -DUP2

01 November 2013

ABS TECHNICAL OFFICE

Singapore Engineering Services

CERTIFICATE OF DESIGN ASSESSMENT

This is to Certify that a representative of this Bureau did, at the request of
NOV FGS MALAYSIA SDN BHD - SENAI

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: Thermosetting, Fiberglass (FRP) Pipe, Fittings and Joints

MODEL: Bondstrand Filament Wound, Fiberglass Reinforced Piping System - S2000M WD, S7000M WD, S2400 WD (S2410/12/14/16/20/25 WD) & S2400CWD (S2410/12/14/16/20/25C WD)

This Product Design Assessment (PDA) Certificate 05-YO117616-2-PDA -DUP2, dated 01/Nov/2013 remains valid until 31/Oct/2018 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.

AMERICAN BUREAU OF SHIPPING


Kee Wing (Keith) Yeo

Engineer

AB258(01/10)

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 committee, its clients or other authorized entities. Any significant changes to the aforementioned manufacturing process without approval from ABS will result in this certificate becoming null and void. This certificate is governed by the terms and conditions as contained in ABS Rule 1-1-A3/5.9 Terms and Conditions of the Request for Product Type Approval and Agreement (2010).



NOV FGS MALAYSIA SDN BHD
PLO 202, SENAI INDUSTRIAL PARK,
PHASE IV, SENAI, JOHOR,
MALAYSIA - 81400

Reference: MP/T1086468
File Ref: T-8-6-TA
Project No: 3104978

01 November 2013

05-YO117616-2-PDA-DUP2

Bondstrand Filament Wound, Fiberglass Reinforced Piping System
S2000M WD, S7000M WD, S2400 WD (S2410/12/14/16/20/25 WD)
& S2400CWD (S2410/12/14/16/20/25C WD)

Gentlemen:

We have your application and the agreement from NOV FGS SINGAPORE (PTE) LTD to issue your company a Duplicated Product Design Assessment (PDA-DUP) Certificate.

We also have your acknowledgement 04 Jan 2013 that you will accept the PDA-DUP Certificate and recognize that primary control belongs to the NOV FGS SINGAPORE (PTE) LTD. You will be responsible for the continued validity of this PDA-DUP Certificate, and will be obliged to maintain contact with the OEM to stay aware of any changes in the product.

We also have received copies of the approved OEM drawings. The list of drawings is shown below.

In order to hold a PDA-DUP, it is mandatory for the manufacturer to also hold a valid Manufacturing Assessment (MA). If you do not have a valid MA, an assessment must be completed within 90 days of the issue of the PDA-DUP. Manufacturing Assessment audits must be kept current for the term of the PDA-DUP certificate. Overdue audits or an expired MA will invalidate the PDA-DUP.

Enclosed is your original copy of the Duplicated Certificate of Design Assessment (PDA-DUP). Your details are published on our web site at www.typeapproval.org and can also be downloaded there.

Please be sure that you understand the scope and conditions of the validity of the certificate. In particular we draw your attention to the restrictions on the certificate and any service restrictions for Unit Certification.

This PDA is intended for products to be used on ABS classed vessels, MODUs or facilities which are in existence or under contract for construction on the date of the ABS Rules used to evaluate the Product. The use of the product in a non ABS classed vessel, MODU or facility is to be mutual agreement between your company and your client

We recommend that you monitor the ABS Rules and other standards used in the approval. These Rules and standards often change on an annual basis, and you must comply with the new Rules and standards in order for the product to be used on an ABS classed vessel or facility contracted under the new Rules or specifications.

We do caution you that the use of the ABS logo is copyrighted. Our "Product Type Approval" Logo may be used as long as you are conducting regular audits of your manufacturing process. Please contact our Survey Office/s, nearest to the location/s of fabrication/construction/assembly. The office will arrange for the production testing as may be necessary and audit of your quality assurance and control arrangements. To find an office, please use the directory of ABS offices on the ABS Web Site at www.eagle.org. You may also ask the ABS Program staff at Tel. (281) 877-6107, Fax (281) 877-6591, or e-mail absta-programs@eagle.org.

PACIFIC DIVISION

438B ALEXANDRA ROAD, #06-05, BLK B ALEXANDRA TECHNOPARK, SINGAPORE 119968
TEL: 65-6276-8700 FAX: 65-6272 2195 (SED) 65-6276 8130 (ESD) EMAIL: ABSSingapore@eagle.org WEB: www.eagle.org
CO. UEN: S58FC1284D



To: NOV FGS MALAYSIA SDN BHD

Reference: MP/T1086468
Project Number: 3104978

01 November 2013

We appreciate your confidence in ABS type Approval. If you should have any comments relative to the scope and conditions of the assessment of your product, or if we can be of any further assistance, please do not hesitate to contact us. Please also find enclosed our invoice to cover the cost of the issue of the PDA.

Very truly yours.

ABS

Yeo Kee Wing (Keith)
Principal Engineer
Ship/Offshore Engineering Systems

Enc.: PDA 05-YO117616-2-PDA-DUP2

cc:
Original Equipment Manufacturer (OEM): NOV FGS SINGAPORE (PTE) LTD

ABS SG Files (12IRF2674)

ABS Surveyor (via ABS Eagle Construct System)

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01 November 2013

Drawings List

Drawing No	Revision No	Drawing Title
05YO117616-3 PDA - Cover Letter_76639536	0	Review Letter from EPN : 3038365
HDB Test Report_76639199	0	Performance Test Report
PD2000M-WD(15.04.13)	0	PD2000M-WD(15.04.13)
PD2410 WD(12.04.13)	0	PD2410 WD(12.04.13)
PD2410C WD(12.04.13)	0	PD2410C WD(12.04.13)
PD2412 WD(12.04.13)	0	PD2412 WD(12.04.13)
PD2412C WD(12.04.13)	0	PD2412C WD(12.04.13)
PD2414 WD(02.10.12)	0	PD2414 WD(02.10.12)
PD2414C WD(15.04.13)	0	PD2414C WD(15.04.13)
PD2416 WD(15.04.13)	0	PD2416 WD(15.04.13)
PD2416 WD(15.04.13)-0	0	PD2416 WD(15.04.13)
PD2416C WD(15.04.13)	0	PD2416C WD(15.04.13)
PD2420 WD(15.04.13)	0	PD2420 WD(15.04.13)
PD2420C WD(15.04.13)	0	PD2420C WD(15.04.13)
PD2425 WD(15.04.13)	0	PD2425 WD(15.04.13)
PD2425C WD(15.04.13)	0	PD2425C WD(15.04.13)
PD7000M-WD(12.04.13)	0	PD7000M-WD(12.04.13)
T0289, 6in & 12in L3 & L3 Dry-Wet Testing 2000M-WD pipe with QL Joint - SwRI_76639101	0	T0289, 6in & 12in L3 & L3 Dry-Wet Testing 2000M-WD pipe with QL Joint - SwRI_76639101
T0291, 2-inch and 12-inch, 2mm Pitt-Char 2000M-WD pipe with QL Joint - SwRI_76639013	0	T0291, 2-inch and 12-inch, 2mm Pitt-Char 2000M-WD pipe with QL Joint - SwRI_76639013

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CO. UEN: S58FC1284D

FIBER GLASS SYSTEMS (SUZHOU) CO. LTD

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Product: Thermosetting, Fiberglass (FRP) Pipe, Fittings and Joints

Model: Bondstrand Filament Wound, Fiberglass Reinforced Piping System - S2000M WD, S7000M WD, S2400 WD (S2410/12/14/16/20/25 WD) & S2400CWD (S2410/12/14/16/20/25C WD)

Intended Service:

Applications refer to 4-6-3/Table 1 of 2012 Steel Vessels Rules, 4-2-2/Table 2 of MODU Rules & Appendix 1 Section 2/Table 1 of Rules for Building and Classing Facilities on Offshore Installations.

Description:

Bondstrand Filament Wound, Fiberglass Reinforced Piping, with Fire Protective Coating or Tape for Fire Endurance Level 3 WD

Ratings:

(1a) S2000M WD (Nominal size 1 inch to 16 inch): Pressures to 17.2 bar with temperature 120 degree C; (1b) S2000M WD (Nominal size 18 inch to 40 inch): Pressures to 15.5 bar with temperature 120 degree C; (2a) S7000M WD (Nominal size 1 inch to 16 inch): Pressures to 17.2 bar with temperature 120 degree C; (2b) S7000M WD (Nominal size 18 inch to 40 inch): Pressures to 15.5 bar with temperature 120 degree C; (3) S2410 WD & S2410C WD: Nominal Pressure - 10 bar, Temperature to 120 degree C, Nominal Diameter (inch) x Minimum Reinforced Wall Thickness (mm) - 2x1.8, 3x1.8, 4x1.8, 6x2.0, 8x2.6, 10x3.0, 12x3.4, 14x3.6, 16x4.0, 18x4.4, 20x4.9, 22x5.3, 24x5.8, 26x6.4, 28x6.9, 30x7.4, 32x7.9, 36x8.8 & 40x9.8; (4) S2412 WD & S2412C WD: Nominal Pressure - 12 bar, Temperature to 120 degree C, Nominal Diameter (inch) x Minimum Reinforced Wall Thickness (mm) - 2x1.8, 3x1.8, 4x1.8, 6x2.2, 8x2.7, 10x3.4, 12x4.0, 14x4.3, 16x5.0, 18x5.5, 20x6.1, 22x6.6, 24x7.2, 26x8.0, 28x8.6, 30x9.2, 32x9.8, 36x11.0 & 40x12.3; (5) S2414 WD & S2414C WD: Nominal Pressure - 14 bar, Temperature to 120 degree C, Nominal Diameter (inch) x Minimum Reinforced Wall Thickness (mm) - 2x1.8, 3x1.8, 4x1.8, 6x2.5, 8x3.2, 10x4.0, 12x4.8, 14x5.2, 16x5.9, 18x6.5, 20x7.2, 22x8.0, 24x8.8, 26x9.6, 28x10.3, 30x11.1, 32x11.8, 36x13.2 & 40x14.8; (6) S2416 WD & S2416C WD: Nominal Pressure - 16 bar, Temperature to 120 degree C, Nominal Diameter (inch) x Minimum Reinforced Wall Thickness (mm) - 2x1.8, 3x1.8, 4x2.0, 6x2.9, 8x3.7, 10x4.6, 12x5.5, 14x6.1, 16x6.9, 18x7.6, 20x8.4, 22x9.3, 24x10.1, 26x11.2, 28x12.1, 30x13.0, 32x13.8, 36x15.5 & 40x17.3; (7) S2420 WD & S2420C WD: Nominal Pressure - 20 bar, Temperature to 120 degree C, Nominal Diameter (inch) x Minimum Reinforced Wall Thickness (mm) - 2x1.8, 3x1.8, 4x2.2, 6x3.3, 8x4.3, 10x5.3, 12x6.3, 14x6.9, 16x7.9, 18x8.7, 20x9.6, 22x10.6, 24x11.6, 26x 12.9, 28x13.8, 30x14.8, 32x15.8, 36x17.7 & 40x19.8; (8) S2425 WD & S2425C WD: Nominal Pressure - 25 bar, Temperature to 120 degree C, Nominal Diameter (inch) x Minimum Reinforced Wall Thickness (mm) - 2x1.8, 3x2.2, 4x2.8, 6x4.1, 8x5.3, 10x6.7, 12x7.9, 14x8.7, 16x10.0, 18x11.0, 20x12.2, 22x13.4, 24x14.6, 26x16.1, 28x17.4, 30x18.6, 32x19.9, 36x22.3 & 40x24.8;

Service Restrictions:

(1) Applications are limited to piping on open decks and within tanks, cofferdams, void spaces, pipe tunnels and duct where low flame spread characteristics of the pipes are not required in accordance with 4-6-3/5.13 of the 2012 Steel Vessels Rules. (2) The installation is to be in accordance with the ABS Rules/Guides, the manufacturer's recommendations, and to the satisfaction of the attending Surveyor. (3) The material of construction are to be suitable for the intended service and consistent with the manufacturer's recommendations. Plastic pipes are to be electrically conductive if the pipe passes through a hazardous zone, in accordance with 4-6-3/5.15 of the Steel Vessel Rules, 4-2-2/7.5.8 of MODU Rules and Appendix 1, Section 2.15 of Rules for Building and Classing Facilities on Offshore Installations. S2000M WD and S2400 WD piping may not be used where electrically conductive piping is required. S7000M WD and S2400C WD piping is acceptable where electrically conductive piping is required. (4) 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.

FIBER GLASS SYSTEMS (SUZHOU) CO. LTD

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Comments:

This Design Assessment (DA) Certificate is effective as far as DA Certificates for original products (01-SG248534-PDA/3 for Models 2000M & 7000M and 01-SG248533/5-PDA for Models 2400 & 2400C, dated 12 December 2012) are effective.

Notes / Drawings / Documentation:

NA

Term of Validity:

This Product Design Assessment (PDA) Certificate 05-YO117616-2-PDA -DUP3, dated 05/Nov/2013 remains valid until 04/Nov/2018 or until the Rules or specifications used in the assessment are revised (whichever occurs first).

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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:**

The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product. The Rules applicable to this assessment are: 2012 Steel Vessel Rules 1-1-4/7.7, 1-1-Appendix 3 & 4-6-3, MODU Rules 4-2-2/7, Rules for Building and Classing Facilities on Offshore Installations Appendix 1 (Level 3 Modified Test)

National:

NA

International:

1. IMO Resolution A. 753(18) Level 3 Fire Endurance Test, as amended by IMO MSC.313(88)
2. ASTM Standard D635-06
3. ASTM Standard D1599
4. ASTM Standard D2992-91

Government Authority:

NA

EUMED:

NA

Others:

NA