



CERTIFICATE NUMBER

11-HS661726-PDA-DUP

DATE

17 March 2011

ABS TECHNICAL OFFICE

Veracruz Engineering

## CERTIFICATE OF DESIGN ASSESSMENT

This is to Certify that a representative of this Bureau did, at the request of  
**FIBER GLASS SYSTEMS (SUZHOU) CO. LTD (A VARCO  
COMPANY) - SUZHOU**

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

MODEL: **Green Thread 16M / 16M-C**

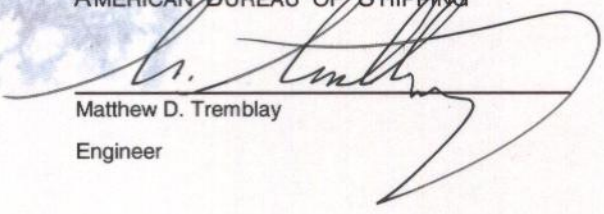
This Product Design Assessment (PDA) Certificate 11-HS661726-PDA-DUP, dated 17/Mar/2011 remains valid until 16/Mar/2016 or until the Rules or specifications used in the assessment are revised (whichever occurs first).

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

  
Matthew D. Tremblay

Engineer

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 the terms and conditions as contained in ABS Rules 1-1-A3/5.9 Terms and Conditions of the Request for Product Type Approval and Agreement (2010).

**FIBER GLASS SYSTEMS (SUZHOU) CO. LTD (A VARCO COMPANY)**

NO. 848 LITAGHE ROAD  
XIANGCHENG ECONOMIC DEVELOPMENT ZONE  
SUZHOU  
JIANGSU 215131  
China  
Telephone: 86-512-8518 0099-315  
Fax: 86-512-8518 0101  
Email: peter.pang@nov.com

**MA Certificate No.** 11-SQ1799213-X1

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

**Model:** Green Thread 16M / 16M-C

**Intended Service:**

Marine & Offshore Application - Piping Systems for Cargo (Flammable Cargoes with flash point < 60 °C); Inert Gas; Flammable Liquids (flash point > 60 °C); Seawater, Freshwater, Sanitary/Drains/Scuppers, Vents/Sounding, Miscellaneous (Brine, produced Fluids, Process Piping), in open Decks, within Tanks, Cofferdam, Void Spaces, Pipe Tunnels and Ducts requiring IMO Level 3 or lower Fire Endurance Rating.

**Description:**

Fiberglass Reinforced Thermosetting Resin Piping Systems in sizes ranging from 1" (25mm) through 36" (900mm) diameter with 0.02" (0.5mm) reinforced resin-rich liner.

Pipe and Fittings are manufactured as either non-conductive (16M) or electrically conductive (16M-C) versions.

**Ratings:**

GREEN THREAD 16M and GREEN THREAD 16M-C are rated to 232 psi (16 bar) in sizes from 1" (25mm) through 36" (900mm) diameter.

Maximum operating temperature: 110 °C.

Maximum external pressure: 55 psi (3.8 bar)

Fire integrity level: 1 & 1.5 inch diameter Level-0; >1.5 - 36 inch diameter Level-3

**Service Restrictions:**

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.

- i) Each pipe spool is to be hydrostatically tested in accordance with ABS Steel Vessel Rules 4-6-3/9, at the manufacturer's production facility. Where usage of 16M-C is required for electrical conductivity (see ABS Steel Vessel Rules 4-6-3/5.15), testing and survey requirements of ABS Steel Vessel Rules 4-6-3/7.7 are applicable.
- ii) Where plastic pipes are to be utilized for any installation within tanks or other locations which may be subject to a vacuum condition inside the pipe or a head of liquid on the outside of the pipe, external pressure is to be considered. The pipe is to be designed for an external pressure of not less than the sum of the pressure imposed by the maximum potential head of liquid outside the pipe plus full vacuum of 14.5 psi (1 bar) inside the pipe. The maximum external pressure for a pipe is to be determined by dividing the collapse test pressure by a safety factor of 3. This collapse pressure may be verified experimentally or determined by a combination of testing and calculation methods (see ABS Steel Vessel Rules 4-6-3/5.3). These details are to be submitted to ABS before installation of the pipe, for ABS approval on a case by case basis.
- iii) 1" (25 mm) and 1.5" (40 mm) diameter piping not rated for IMO Level 3 Service.
- iv) Joint bonding procedures and qualification test results to be submitted for review (See ABS Steel Vessel Rules 4-6-3/3.5 viii).
- v) The sum of the longitudinal stresses due to pressure, weight and other dynamic and sustained loads is not to exceed the allowable stress in the longitudinal direction. (See ABS SVR 4-6-3/5.5).
- vi) For installation only on open decks and within tanks, cofferdams, void spaces, pipe tunnels and ducts (see ABS SVR 4-6-3/5.13.1).

**Comments:**

None

**Notes / Drawings / Documentation:**

Supporting Documentation:

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**Supporting Documentation:**

Type designation  
Name and address of the manufacturer  
Product description  
Field of application and special limitations of the product  
Product specification/data sheet  
Installation instructions  
Description of Production Processes  
Description of quality control arrangement  
Test results (from test already carried out) with references to Standards, Methods, etc.  
Information regarding marking of the product or packaging  
In-service experience  
Witnessed type test results  
Testing plan  
Appendix A - Photographic Documentation  
Appendix B - Level 3 Pipe Test Data  
Appendix C - Client Supplied Construction Details/drawings  
Appendix S - Testing Plan

**Term of Validity:**

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**STANDARDS**

**ABS Rules:**

2011 Steel Vessels Rules 1-1-4/7.7, 1-1-Appendix 3, 4-6-3/3.1, 3.5(i), 5.1, 5.3, 5.7, 5.9, 5.11.3, 5.15.3, 5.17, 9, 15, 19; 2008 MODU Rules 4-2-2/7; 2009 Guide for Building and Classing Facilities on Offshore Installations Appendix 1.

**National:**

NA

**International:**

NA

**Government Authority:**

IMO Resolution A.753 (18) Appendix 2 Test Method for Fire Endurance Testing of Water-Filled Plastic Piping.

**EUMED:**

NA

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**Others:**

NA