



MARINE DIVISION

Certificate number: 14050/B0 BV

File number: ACM 135/2631/01

Product code: 2090H.

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

Harbin Star Fiberglass Systems

Harbin - CHINA

for the type of product

THERMOSETTING MATERIAL PIPES AND FITTINGS

Green Thread 175, 175C
Green Thread 250, 250C, 250F

Requirements:

- BUREAU VERITAS Rules for the Classification of Steel Ships
- BUREAU VERITAS Rules for the Classification of Offshore Units

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: 24 Mar 2015

For BUREAU VERITAS,

At BV SHANGHAI, on 24 Mar 2010,

Jennifer Zhang



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 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.

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION

Green Thread® 175, 175C and Green Thread® 250, 250C, 250F

1.1 Design

Pipes and fittings are manufactured as either non-conductive (175, 250, 250F) or electrically conductive (175C, 250C) versions.

1.2 Rating

Model	Nominal Pipe Size	Maxi. Working Pressure	Maxi. Working Temperature
Green Thread 175, 175C	2" - 24"	175 psig (12 bar)	+ 100°C
Green Thread 250, 250C	2" - 24"	250 psig (18 bar)	+ 100°C
Green Thread 250F	1" - 12"	250 psig (18 bar)	+ 100°C

Pipe wall electrical resistance <10 Mohm @1500 volt

1.3 Joints

Model	Nominal Pipe Size	Type	Fittings
Green Thread 175, 175C	2" - 24"	Socket	Elbow, tee, reducing tee, concentric reducer, eccentric reducer, flange, saddle, coupling (1)
	14" - 24"	Taper	
Green Thread 250, 250C	2" - 6"	Socket	
	8" - 24"	Taper	
Green Thread 250F	1" - 6"	Socket	
	8" - 12"	Taper	

(1) - The coupling is to be type approved

Raw material as per manufacturer's specification.

2. DOCUMENTS AND DRAWINGS

2.1 Harbin Star Fiberglass Systems's product data:

- General company description
- Description of fabrication process
- Quality control procedure
- Installation procedure manual
- Tests reports

2.2 Smith Fibercast's product data:

- General authority letter from US parent company
- Tests reports

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 Material properties tests according to the Society Rules were performed at Smith Fibercast facilities: long term tensile stress test, short term pressure resistance test, impact test, external load test and electrical conductivity test.

3.2 Fire endurance test standard as per IMO Level L3 was performed at Southwest Research Institute (USA). The full test details are present in reports N° 01.05234.01.001a (GT 175), N° 01.05234.01.001b (GT 250) and 01.05234.01.001c (GT 250F) dated April 2002.

3.3 Surface flammability testing report N° FT04068 (GT 175 and GT 250) issued by Far East Fire Testing Center (China). The samples were type tested in accordance with the IMO standard resolution A.653(16) and found in order.

3.4 Electrical resistance tests N° 04863-04-0 (GT 250C) issued by Heilongjiang Provincial Institute of Measurement and Verification (China) and N° W2009-2299-1 (GT 175/250C 2") and N° W2009-2299-2 (GT 250C 16") issued by Shanghai Plastics Research Institute (China).

3.5 Longitudinal tensile test N° 04158-12-05 (GT250) issued by Harbin FRP Research Institute (China).

3.6 Behaviour in case of fire (smoke generation and toxicity) is to be deemed satisfactory by the flag authorities of the vessel on board which the piping system is fitted.

4. APPLICATION / LIMITATION

4.1 Green Thread pipes and fittings are approved for use in locations according to Pt C, Ch 1, App 3 [2.3.1] of the Society Rules when the abbreviations "O or NA" are specified and for the level 3 piping system. These intended applications may be:

- Cargo (flammable cargoes f.p. <60°C), inert gas, flammable liquids f.p. >60°C, sea water, fresh water, sanitary/drains/scuppers, sounding/air, miscellaneous

4.2 The products (conductive) can be installed in areas that need conductive application (cargo tanks) and in fire areas (i.e. pump rooms).

4.3 Behaviour in case of fire (smoke generation and toxicity) is to be deemed satisfactory by the flag authorities of the ship on board which the piping system is fitted.

4.5 Detailed drawings of each piping system are to be submitted for review of compliance with the Society Rules and the applicable regulations.

4.6 The pipe and fittings assembly is to be carried out in accordance with the manufacturer's instructions and the person performing these tasks is to be qualified to the satisfaction of the Society Surveyor.

4.7 After completion of the installation a test of conductivity is to be carried out. Earthing wires should be accessible for inspection.

5. PRODUCTION SURVEY REQUIREMENTS :

5.1 The products are to be manufactured, examined and tested by the manufacturer in accordance with the approved type described in this certificate and Requirements stated on the front page of this certificate.

5.2 Production sites are to be recognized by Bureau Veritas as per NR 320 for HBV products. To this end, the manufacturer has to make the necessary arrangements for a Society's Surveyor to perform visits and product audits at the production sites.

5.3 The manufacturer has declared to Bureau Veritas that the products detailed in this certificate are manufactured at Harbin Star Fiberglass Systems, Harbin - China and Fiber Glass Systems (Suzhou) Co., Ltd., Suzhou - China.

5.4 Each pipe and fitting is to be tested by the manufacturer at a hydrostatic pressure not less than 1.5 times the nominal pressure. Other recognised national or international standard may be accepted for pipes and fittings not employing hand lay up techniques. Depending upon the intended application the Society may require the pressure testing of each pipe and/or fitting.

5.5 Bureau Veritas certificate is not required for the product to be fitted on board units to be classed with Bureau Veritas.

6. MARKING OF PRODUCT

Pipes and fittings shall be marked with at least:

- Manufacturer's name or trade name
- Type and size of the product
- Design standard
- Production date

The permanent label for pipe product shall remain legible under normal handling and installation practices.

7. OTHERS

This approval is given with 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.

This certificate supersedes the Type Approval Certificate N° 14050/A0 BV issued on 16/11/2004 by the Society.

*** END OF CERTIFICATE ***

