Marine & Offshore

Certificate number: 05835/G0 BV
File number: ACM 135/0604/000
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

TPR Fiberdur GmbH & Co. KG

Aldenhoven - GERMANY

for the type of product

THERMOSETTING MATERIAL PIPES AND FITTINGS

VINYLESTER/EPOXY RESIN PIPES and FITTINGS - VE/EP

Requirements:
BUREAU VERITAS Rules for the Classification of Steel Ships
BUREAU VERITAS Rules for the Classification of Offshore Units
IMO Resolution A.753(18)

This certificate is issued to attest that Bureau Veritas Marine & Offshore did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate is a renewal of certificate N° 05835/F0 BV expiring on 20/02/2025

This certificate will expire on: 20 Feb 2030

For Bureau Veritas Marine & Offshore,
At BV HAMBURG, on 31 Jan 2025,
Adama Diene

This certificate was created electronically and is valid without signature

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 Marine & Offshore. 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 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 Marine & Offshore 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

Vinylester/Epoxy Resin Pipes and Fittings - VE/EP

- Fiberdur filament-wound pipes are manufactured from Vinylester resin (type GRVE) or epoxy resin (GREP) and glassfiber rovings in the filament-winding process.
- Fittings are elbows, tees, saddles, sockets, flanges.
- Connections between pipes and fittings are cylindrical, conical, plain end.
- Joints are bonded type, laminated type, mechanical couplings, flanged type, rubber seal lock joint.

1 Rating:

Product Range Data – VE/CS VE Fibermarine and VE/CSVE Fibermarine Highline

Conductive and non conductive		Nominal Diameter (mm)	Nominal Pressure (bar)
GRVE=VE **Glass reinforced Vinylester**	**GRE=EP** **Glass reinforced Epoxy**		
VE CS VE	EP CS EP	25-800	10
VE CS VE	EP CS EP	25-800	16
VE Fibermarine CS VE Fibermarine	EP Fibermarine CS EP Fibermarine	25-800	10
VE Fibermarine CS VE Fibermarine	EP Fibermarine CS EP Fibermarine	25-800	16
VE Fibermarine HighLine CS VE Fibermarine HighLine	EP Fibermarine HighLine CS EP Fibermarine HighLine	25-800	16

Conductive and non conductive		Nominal Diameter (mm)	Nominal Pressure (bar)
GRVE=VE **Glass reinforced Vinylester**	**GRE=EP** **Glass reinforced Epoxy**		
VE CS VE	EP CS EP	900-1000	10
VE Fibermarine CS VE Fibermarine	EP Fibermarine CS EP Fibermarine	900-1000	10
VE Fibermarine HighLine CS VE Fibermarine HighLine	EP Fibermarine HighLine CS EP Fibermarine HighLine	900-1000	10

Remarks:

- VE and EP 0,5mm liner, CS VE and CS EP 2,5 mm liner, All with topcoat of 0,3 mm.
- VE, CS VE, EP and CS EP with DN>100 are not collapse resistant.
- The Fibermarine pipe withstand full vacuum, safety factor 3:1 (collapse pressure 3 bar).
- The Fibermarine HighLine withstand full vacuum plus 3 bar outside pressure, safety factor 3:1 (collapse pressure 12bar).

Pipe Wall Thickness reinforced (mm) excluding interior chemical resistant liner 0.5 mm/2.5 mm and topcoat 0.3 mm

DN (mm)	VE 10 & CS VE 10 (mm) EP 10 & CS EP10 (mm)	VE 16 & CS VE 16 (mm) EP 16 & CS EP 16 (mm)	VE Fibermarine 10, 16 CS VE Fibermarine 10, 16 (mm) EP Fibermarine 10, 16 CS EP Fibermarine 10, 16 (mm)	VE Fibermarine HighLine 16 CS VE Fibermarine HighLine 16 (mm) EP Fibermarine HighLine 16 CS EP Fibermarine HighLine 16 (mm)
25	1.6	1.6	1.6	1.6
40	1.6	1.6	1.6	1.6
50	1.6	1.6	1.6	1.6
65	1.6	1.6	1.6	1.9
80	1.6	1.6	1.6	2,3
100	1.6	1.6	1.8	2,9
125	2.0	2.0	2.3	3,6
150	1.6	2.4	2.7	4,3
200	2.0	3.2	3.6	5,7
250	2.4	3.6	4.5	7.1
300	3.2	4.8	5.3	8.5
350	4.0	5.6	6.2	9.9
400	4.0	6.4	7.1	11.3
450	4.8	7.2	8.0	12.7
500	4.8	7.2	8.8	14.2
600	5.6	8.8	10.6	17.0
700	6.4	10.4	12.4	19.8
800	7.2	12.0	14.1	22.6

DN (mm)	VE 10 & CS VE 10 (mm) EP 10 & CS EP10 (mm)	VE Fibermarine 10 CS VE Fibermarine 10 (mm) EP Fibermarine 10 CS EP Fibermarine 10 (mm)	VE Fibermarine HighLine 10 CS VE Fibermarine HighLine 10 (mm) EP Fibermarine HighLine 10 CS EP Fibermarine HighLine 10 (mm)
900	12.8	15.9	25.4
1000	14.4	17.6	28.3

Maximum service pressure in relation to the service temperatures according to the manufacturer's recommendation

Service Temperature (°C)	VE 16, CS VE 16 VE Fibermarine 16 CS VE Fibermarine VE Fibermarine Highline CS VE Fibermarine Highline	EP 16, CS EP 16 EP Fibermarine 16 CS EP Fibermarine EP Fibermarine Highline CS EP Fibermarine Highline	VE 10, CS VE 10 VE Fibermarine 10 CS VE Fibermarine	EP 10, CS EP 10 EP Fibermarine 10 CS EP Fibermarine
-40 / +65	16	16	10	10
+80	10	16	6	10
+95	6	11	4	7

Product Range Data – ISO Pipes

ISO Pipes	Nominal Diameter (mm)	Nominal Pressure (bar)	Collapse Pressure (bar)	External Pressure (bar)
VE ISO CS VE ISO	40-300	10	12 – 3.15	4 – 1.05
VE ISO CS VE ISO	40-300	16		

Nominal structural wall thickness in mm (excl. internal liner 0.5 mm or 2.5 mm and topcoat 0.3 mm)

DN	Inside Diameter ID (mm)	Structural wall thickness S3 (mm)	Collapse Pressure (bar)	External Pressure (bar)
40	41,9	2	12,0	4
50	53,9	2	12,0	4
65	67,9	2	12,0	4
80	83,0	2	7,5	2,5
100	107,1	2,4	6,3	2,1
125	131,8	4,1	12,0	4,0
150	160,1	3,8	6,9	2,3
200	209,4	4,3	5,7	1,9
250	262,8	4,7	3,8	1,3
300	312,2	6,1	3,15	1,05

1.2 Materials: Raw material as per manufacturer's specification

2. DOCUMENTS AND DRAWINGS

Catalogue Fiberdur Product Data 2017

- Product specification
- Description of fabrication process
- Quality control arrangement
- Instructions for handling, installation and bonding
- Product Data sheet ISO

3. TEST REPORTS

3.1 Tests carried out:

- Internal pressure resistance test per report MP 2/7108-85 of 17/06/1994 from TÜV
- Fire resistance test per report 027 A/96/CI/R 102 of 28/03/1996 from GERBAM
- Flame spread test per report LAB1B950008F of 04/01/1996 from BV

3.2 Fire endurance tests L3 according to IMO resolution A.753:

- Fire endurance test for Fiberdur DN 200 VE16 pipe spool with a conical adhesive bonded joint per report 2008-Efectis-R0248 of April 2008 from Efectis Nederland BV.
- Fire endurance test for Fiberdur DN 200 EP16 and DN 500 pipe spool with a conical adhesive bonded joint per report 2011-Test reports R1026 (2011) and R1027 (2011) from Efectis Nederland BV.
- Fire endurance test on epoxy , Test conducted by Efectes The Netherlands: Test reports R1026 (2011) and R1027 (2011)
- 2016-Efectis-R001549 TPR Fiberdur GmbH , EP DN 50
- 2016-Efectis-R001607 TPR Fiberdur GmbH, VE DN50
- 2016-Efectis-R001615 TPR Fiberdur GmbH, EP DN 100

- 2016-Efectis-R001618 TPR Fiberdur GmbH, VE DN 100
- 2016-Efectis-R001623 TPR Fiberdur GmbH, EP DN 25
- 2016-Efectis-R001624 TPR Fiberdur GmbH, VE DN 25
- 2023-Efectis-R000308 TPR Fiberdur GmbH, ISO DN 150 VE
- 2023-Efectis-R000315 TPR Fiberdur GmbH, DN 150 FibermarineVE
- 2023-Efectis-R000325 TPR Fiberdur GmbH, DN 150 Fibermarine EP
- 2023-Efectis-R000326 TPR Fiberdur GmbH, ISO DN 150 EP
- 2024-Efectis-R000306 TPR Fiberdur GmbH, ISO DN 50 VE
- 2024-Efectis-R000307 TPR Fiberdur GmbH, ISO DN 250 VE
- 2024-Efectis-R000308 TPR Fiberdur GmbH, DN 250 Fibermarine.

3.3 Flame Spread ASTM D635-06

- Flame spread test according to ASTM D635-06 for Fiberdur VE per report 102010.50/07.171 from Sintef NBL.
- Flame spread test according to ASTM D635-06 for Fiberdur EP per report 102010.50/11.074 from Sintef NBL.

3.4 Pressure test:
- Test Report Nr. April 2010 / nr. 01: Endurance test (1000 hours) according ASTM 1598 for VE 20 elbow, T-pipe DN250 and reducer DN250/150 & DN400/250 at internal pressure 50 bar at 65 °C.
- Test Report Nr. April 2010 / nr. 02: Endurance test (1000 hours) according ASTM 1598 for pipe and fitting VE 16 DN250 at internal pressure 43 bar at 65 °C.
- Test Report Nr. Oct 2008 / nr. 01:Medium term test according to ASTM D 1598 for VE 16 pipe DN400 and T-pipe DN150 & DN200 at internal pressure 43 bar at 65 °C.

3.5 Collapse test:
- Test Reports Nr. November 2022_Nr1 - November 2022_Nr5 performed on ISO-Pipes DN125 – DN300

4. APPLICATION / LIMITATION

4.1 Pipes and fittings are approved for use in locations according to Pt C, Ch 1, App 3, Table 1 of BUREAU VERITAS Rules or Appendix 4 of IMO Resolution A.753 (18) when the abbreviations "O or NA" are specified. For instance domestic water system (hot/cold, sea and fresh water), chilled and potable water systems, sanitary systems, heating systems and non-essential systems.

4.2 These pipes cannot be used in hazardous areas.

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

4.4 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 Surveyors.

4.5 Pipes and fittings have not been type tested for smoke generation and toxicity.

5. PRODUCTION SURVEY REQUIREMENTS

5.1 The products are to be supplied by **TPR Fiberdur GmbH & Co. KG** in compliance with the type described in this certificate.

5.2 This type of product is within the category HBV of BUREAU VERITAS Rule Note NR 320 and as such does not require a BV product certificate.

5.3 **TPR Fiberdur GmbH & Co. KG** has to make the necessary arrangements to have its works recognized by Bureau Veritas in compliance with the requirements of NR 320 for HBV products.

5.4 For information, **TPR Fiberdur GmbH & Co. KG** has declared to BUREAU VERITAS the following production site:
TPR Fiberdur GmbH & Co. KG
Aldenhoven
GERMANY

5.5 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.

6. MARKING OF PRODUCT

The pipes and fittings are to be permanently marked with at least::
- Manufacturer's name or logo
- Type and Size of the Product
- Maximum Working Pressure
- Design standard
- Raw material
- Date of fabrication and/or Serial Number

7. OTHERS

7.1 It is **TPR Fiberdur GmbH & Co. KG**'s responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

7.2 This certificate supersedes the Type Approval Certificate N° 05835/F0 BV issued on 20/02/2020 by the Society.

***** END OF CERTIFICATE *****