



Type Approval Certificate

This is to certify that the undernoted product(s) has/have been tested with satisfactory results in accordance with the relevant requirements of the Lloyd's Register Type Approval System.

Manufacturer	TPR Fiberdur GmbH & Co. KG
Address	Galileo Allee 6, Aldenhoven, 52457, Germany
Type	GRP Piping
Description	Filament wound fiber reinforced thermosetting vinylester resin pipes and fittings, conductive or non-conductive. Joint types: conical or cylindrical adhesive bonded, laminated and flanged types, mechanical couplings and rubber seal lock joints. WT Bulkhead penetration (NOT for passenger ships) available. Fire barrier to be added for small sizes to obtain fire endurance level L3.
Trade Name	Fiberdur VE, Fiberdur CSVE, see Appendix
Application	In ships and offshore installations classed or intended for Classification with Lloyd's Register in the following locations: Open decks, within tanks, cofferdams, void spaces, pipe tunnels, ducts and further locations, where fire endurance tests according to Appendix 2, Level 3 and flame spread test acc. to Appendix 3 of the IMO Resolution A.753 (18) are required.
Specified Standard	Lloyd's Register Rules and Regulations for the Classification of Ships, July 2024; IMO Resolution A 753 (18)

71 Fenchurch Street, London, EC3M 4BS, United Kingdom

Torsten Schroeder

Engineering - Piping/ Decarbonisation -
Senior Specialist to Lloyd's Register EMEA
A member of the Lloyd's Register group

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Ratings see Appendix

Other Conditions The installation of the piping system is to be carried out by well trained personnel in accordance with the instructions and recommendations of the manufacturer respectively in accordance with the installation requirements of the IMO Resolution as applicable.

This certificate is not valid for equipment, the design, ratings or operating parameters of which have been varied from the specimen tested. The manufacturer should notify Lloyd's Register EMEA of any modification or changes to the equipment in order to obtain a valid Certificate.

Previous Version: LR206691TA (99/20020(E4))

The Design Appraisal Document ENS 21178-08, Issue No. 4 and its supplementary Type Approval Terms and Conditions form part of this Certificate.



Appendix

TYPES

Fiberdur VE = GRVE system (VE system additional liner of 0.5 mm)

Fiberdur CSVE = GRVE system (CS VE additional liner of 2.5 mm)

VE = GRVE, Conductive and non-conductive	Nominal Pressure [bar]
VE, CS VE	PN 10 or PN 16
VE Fibermarine, CS VE Fibermarine	PN 10 or PN 16
VE Fibermarine HighLine, CS VE Fibermarine HighLine	PN 16

Nominal Diameter range: DN 25 to DN 1000: PN10 & PN16

DN 1300 to DN 1600: PN 6

RATINGS

Pipes structural wall thickness [mm]

(excluding internal liner 0.5 or 2.5 and topcoat 0.3 mm)

DN	VE 10 CS VE	VE 16 CS VE	VE Fibermarine, CS VE Fibermarine PN10, 16 Collapse pressure 3 bar	VE Fibermarine Highline, CS VE Fibermarine Highline PN16 Collapse pressure 12 bar
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	10.2	12.4	19.8
800	7.2	12.0	14.1	22.6
900	8.0	12.8	15.9	25.4
1000	9.6	14.4	17.6	28.3



RATINGS, cont.

DN1300 to DN1600: PN 6

DN	Structural wall thickness [mm]
1300 - 1600	24,9 to 25,1

Max. internal pressure (bar) depending on temperature:

Temperature:	-50 to +65°C	at 80°C	at 95°C
VE 10, CSVE 10 VE Fibermarine 10 CSVE Fibermarine	10	6	4
VE 16, CSVE 16 VE Fibermarine 16 CSVE Fibermarine 16 VE Fibermarine Highline 16 CSVE Fibermarine Highline 16	16	10	6

Intermediate values may be obtained by interpolation.

VE and CS VE pipes are not collapse resistant.

The Fibermarine pipe withstand full vacuum with safety factor 3:1.

Collapse pressure is 3 bar.

The Fibermarine HighLine withstand full vacuum plus 3 bar external pressure with safety factor 3:1. Collapse pressure is 12 bar.

WT Bulkhead penetration (not for fire divisions) from DN 80 to DN 600,

Water tightness up to 2,5bar

Gas tightness up to 30mbar

A **Fire Barrier** to be added for L3 fire endurance level as follows:

Type of connection	Size of range DN	Fire Barrier ¹
Conical to cylindrical pipe adhesive bounded joint	25 up to 50	10 mm
	> 50 up to 100	5 mm
	> 100 up to 125	2,5 mm
	> or equal to 150	None

Footnote¹ - Final layer of VE / glass laminates