

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Plastic Pipes, Fibre Reinforced Thermosetting**

with type designation(s)

250, 250-C, 250-F, 250-CF

Issued to

**Shandong Ocean Pipe Technology Co., Ltd.
Dezhou City, China**

is found to comply with

DNV GL rules for classification – Ships**DNV GL class programme DNVGL-CP-0070 – Type approval – Fibre reinforced thermosetting
plastic piping systems****Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed
by DNV GL.**Issued at **Hamburg** on **2018-08-21**This Certificate is valid until **2023-03-25**.DNV GL local station: **Qingdao**for **DNV GL**Approval Engineer: **Joachim Rehbein**

**Thorsten Lohmann
Head of Section**

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.



Product description

Glas Fibre Reinforced Thermosetting Epoxy Resin Pipe and Fittings (GRE),
Conductive and Non-Conductive.

Type designation:

250, 250-C, 250-F, 250-CF

Symbol definition:

C - Conductive
F - Fire resistance
CF - Conductive & Fire resistance

Design types:

Size range: DN 25 up to DN 1000
Nominal Pressure[MPa]: 1.6
M.A.W.T[°C]: 90
Resin type: Epoxy Resin System
Electrical resistance at 20°C: 0.8 E5 Ohm/m (Types 250-C and 250-CF)

Joining methods

- Flanged joint
- Spigot and socket joint with double sealing ring and locking key made of nylon rod or with gluing
- Tapered joint

Overview pipe wall thickness

Structural wall thickness in mm

Inner diameter [mm]	250 PN16	Collapse pressure [bar]
25.0	3.0	10.0
38.1	3.0	
48.3	3.1	
81.3	3.1	
100.7	4.1	
124.1	4.1	3.0
148.3	4.1	
198.3	5.5	
250.1	7.0	
300.9	8.3	
350.6	9.0	
400.4	10.3	
450.8	11.5	
500.6	12.8	
600.5	15.4	
700.0	18.7	
800.0	21.4	
900.0	24.0	
1000.0	26.9	

Application/Limitation

For Types 250-F, 250-CF:

Open decks, within tanks, cofferdams, void spaces, pipe tunnels, ducts and further locations where fire endurance test according to IMO Res. A.753(18) Appendix 2, L3 is required (ref. to DNVGL Rules Pt.4, Ch.6, Section 2. "Table 1- Fire endurance requirements matrix":

Approved installation locations are where "0" or "L3" is specified.

Appropriate footnotes are to be observed.

For Types 250, 250-C:

Open decks, within tanks, cofferdams, void spaces, pipe tunnels, ducts and further locations where fire endurance test according to IMO Res.A.753(18) is not required. Refer to DNVGL Rules Pt.4, Ch.6, Section 2. "Table 1- Fire endurance requirements matrix":

Approved installation locations are where "0" is indicated.

Maximum internal operating pressure (M.A.W.P.)

Temperature [°C]	250, 250-C, 250-F, 205-CF PN16 [bar]
from -50 up to 60	16
up to 70	15
up to 80	13.5
up to 90	11
Up to 95	9.5

Extent of Type Tests applicable to piping system dependent on application

Fire endurance level

Fire Endurance Level 3 according to IMO Resolution A.753 (18), Appendix 2, includes the following sizes and pipe connections:

Type of connection	Size range DN [mm]	Additional fire protection on pipe and fitting
Adhesive bonded connection	>152 up to 1000	none

Flame spread

Surface flame spread characteristics tested acc. to standard IMO FTP Code, Annex 1, Part 5.

Smoke and toxicity

Smoke and toxicity characteristics tested acc. to standard FTP Code Annex 1, Part 2.

Electrical conductivity

The piping system is limited for installation in non-gas hazardous areas

For installation in gas-hazardous areas conductive piping system is approved.

Electrical conductivity test according to manufacturer instruction is to be carried out after installation of piping system on board ship.

Passenger vessels

For application on passenger vessels additional requirements specified in the Rules and Regulations of the appropriate flag state authority may have to be observed.

Design and Installation of piping systems

For the design and installation of piping systems the manufacturer's instructions are to be observed.

In addition, the installation requirements specific to the ship as well as specified by the IMO 753-(18) are to be observed.

Type approved pipe couplings of flex type may be used only for compensation of thermal expansion and at location where fire endurance test according to IMO Res.753(18) is not required. The use of pipe couplings as main means of connection is not approved. The maximum allowable nominal pressure for pipe couplings is PN 16.

Bulkhead penetration

In case of plastic pipes pass through watertight bulkheads or decks, the watertight integrity of the

bulkhead or deck is to be maintained by selection of GRE pipes with appropriate external pressure strength.

When a plastic pipe penetrates a bulkhead or deck which is also a fire division and a fire may cause flooding of watertight compartments, a metallic shut-off valve shall be fitted at the bulkhead or deck. The operation of this valve shall be provided for from above the freeboard deck.
Refer to DNVGL rules Pt.4,Ch.6 – Section 3.

On passenger vessels, where the watertight bulkhead is also a fire division, the requirements of the SOLAS Chapter II - 1, Regulation 13.2.3. are to be observed.

Type Approval documentation

Type Tests carried out

According to Type Approval documentation"

Production Testing

Each batch shall be subjected to product tests according to manufacturer's instruction.

Marking of product

To ensure traceability from the final product to this type approval certificate each pipe or pipe spool is to be marked at least with:

		Example
Scope		
Manufacturer's name and / or logo		Shandong Ocean Pipe Technologe
Type designation / material of which the pipe or fitting is made		GRE Coupling
Size / dimensions		DN250
Design pressure	internal	1.0Mpa
	external	
Max. working temperature		93°C
Ambient		
Conductive		
Date of fabrication and / or serial number		SDOS-161022

Assessed production site:

Lu Quantun Development Zone, Wucheng County,
Dezhou City 253300, Shandong, China

Periodical assessment

For retention of the type approval certificate periodical assessments shall be carried out at production places by DNVGL surveyor.

The objective of the periodical assessment is to verify that the design and production conditions for the type approval have not been altered.

Main scope of the assessment:

- verification of the production and quality control system
- review of quality control documentation of recent deliveries
- review of drawings in production to verify any design changes which may have an impact on data specified in the type approval certificate, performance and range of application
- verification of the product marking

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate after five years.



Job Id: **262.1-028664-1**
Certificate No: **TAK00001A5**

END OF CERTIFICATE