DNV·GL

Certificate No:
TAK00001HU

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Plastic Pipes, Fibre Reinforced Thermosetting

with type designation(s)
HGP-E09C; PN9 bar Filament Wound Glassfibre Reinforced Epoxy (GRE) Pipes and Fittings

Issued to
HLB Co., Ltd.
Ulsan, Republic of Korea

is found to comply with
DNV GL class programme DNVGL-CP-0070 – Type approval – Fibre reinforced thermosetting plastic piping systems
DNV GL rules for classification – Ships
DNV GL offshore standards
IMO Resolution A.753(18). Guidelines for the Application of Plastic Pipes on Ships

Application :

For use in essential piping systems and in piping systems serving the main functions, with installation according to DNV GL Rules and Manufacturer's recommendations. The piping system is conductive, for installations in gas hazardous areas. The piping system is approved to Fire Endurance L3 according to IMO Resolution A.753(18), and to Low Flame Spread according to ASTM D635-10.

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Issued at **Høvik** on **2019-03-18**
This Certificate is valid until **2024-03-17**.
DNV GL local station: **Ulsan**

Approval Engineer: **Gisle Hersvik**

for **DNV GL**

Rikard Törnqvist
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.

© DNV GL 2014. DNV GL and the Horizon Graphic are trademarks of DNV GL AS.

Product description

HGP-E09C; Filament Wound Glassfibre Reinforced Epoxy (GRE) Pipes and Fittings

- Sizes / Nominal diameter [DN]: 1 – 36 inch (25 – 900 mm)
- Maximum Operating Temperature: 93ºC
- Design Internal Pressure: 9 bar
- Design External Pressure: 3.5 bar

Pipes: Minimum reinforced wall thickness in mm

DN [mm]	25	32	40	50	65	80	100	125	150	200	250	300
Thickness [mm]	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	6.0	7.0

DN [mm]	350	400	450	500	550	600	650	700	750	800	850	900
Thickness [mm]	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	15.5	16.0	16.5	17.0

Fittings:
Elbows, Tees, Saddles, Reducers, Flanges, Sockets, Couplings, Adaptors
- other fittings to be tested prior to installation in classed vessels.

Joining Methods:
Bell & Spigot, Butt & Wrap, Flange Joint, Expansion Coupling Joint.

Application/Limitation

For use in essential piping systems and in piping systems serving the main functions as defined in DNV GL Rules for Classification of Ships, Pt.1 Ch.1 Sec.1 [Table 2].

The installation of the piping system shall be according to DNV GL Rules and Manufacturer's recommendations.

The piping system is approved as:
- conductive, for installations in gas hazardous areas.

Test of conductivity is to be carried out after installation of piping system.

Maximum operating temperature is +93ºC. For applications with operating temperature above +30ºC, the permissible pressure is to be reduced according to DNV GL Rules for Classification of Ships, Pt.4 Ch.6 Sec.9, Table 9.

Fire Endurance
The piping system is approved to Fire Endurance L3, according to IMO Resolution A.753(18).

Low Flame Spread
The piping system is approved to Low Flame Spread, according to ASTM D635-10 (accepted as an alternative to IMO FTP Code, Annex 1, Part 5).

Smoke Generation & Toxicity
The piping system has not been tested to Smoke Generation & Toxicity characteristics.

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

When plastic pipes pass through watertight bulkheads or decks, the watertight integrity of the bulkhead or deck is to be maintained.

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

Tests carried out

Type Testing carried out in accordance with **Type Approval documentation**.

Marking of product

The pipes and fittings are to be marked. The marking shall at least include the following information:
- *Product name*
- *Manufacturers name*
- *Pressure rating*
- *Temperature rating*

The marking is to be carried out in such a way that it is visible, legible and indelible. The marking of product is to enable traceability to the DNV GL Type Approval Certificate.

Periodical assessment

The scope of the Periodical Assessment is to verify that the conditions stipulated for the Type Approval is complied with and that no alterations are made to the product design or choice of materials.

Periodical Assessment to be performed after 2 and 3.5 years (Certificate Retention) and at renewal after 5 years (Certificate Renewal).

The main elements of the Periodical Assessment are to:
- Ensure that **Type Approval documentation** is available.
- Review design, materials, production process, and performance with respect to possible changes, in order to ensure compliance with **Type Approval documentation** and/or referenced material specifications.
- Ensure traceability between manufacturer's product marking and the DNV GL Type Approval Certificate.

END OF CERTIFICATE