DNV·GL

Certificate No:
TAK00000B2

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Plastic Pipes, Thermoplastic

with type designation(s)
+GF+ Fuseal Sea Drain Piping System

Issued to
Georg Fischer Harvel LLC
Easton PA, United States

is found to comply with
DNV GL class programme DNVGL-CP-0072 – Type approval – Thermoplastic piping systems
DNV GL rules for classification – Ships

Application :

Non-essential system for water up to 1.76 bar / 25 in-Hg vacuum / 80ºC. For installation according to DNV GL Rules and Manufacturer's Specification. The piping system is not tested w.r.t. Fire Endurance, Toxicity and Smoke Generation. The piping system is tested to Low Flame Spread according to ASTM D635.

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

This Certificate is valid until **2021-05-23**.

Issued at **Høvik** on **2016-05-24**

for **DNV GL**

DNV GL local station: **Houston**

Approval Engineer: **Gisle Hersvik**

Arnstein Gloppen
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.

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Job Id: **262.1-004252-3**
Certificate No: **TAK00000B2**

Product description

+GF+ Fuseal Sea Drain Polypropylene Piping System;
Pipes: **+GF+ Fuseal Sea Drain**
Fittings: **+GF+ Fuseal II (Sea Drain)**

Details as given in Technical Manual for "+GF+ Fuseal / PPro-Seal".

Pipes and fittings: Schedule 40 (Non-Pressure for Fuseal), Flame Retardant Pipe (Bluish Color)

Size [inch]	Diameter [inch]	Minimum Wall Thickness [inch]
1 ½	1.900	0.145
2	2.375	0.154
3	3.500	0.216
4	4.500	0.237
6	6.625	0.280
8	8.625	0.322
10	10.750	0.365
12	12.750	0.406

Fittings, types:
Tees, bends, reducers, wyes, adapters, couplings, caps, bushings, expansion joint, flanges, adapters, fusion collars

Joing methods:
Electrofusion

Manufactured by

Georg Fischer Harvel LLC, 7777 Sloane Drive, Little Rock, AR 72206, USA

DNV GL local station: Houston

Responsibility

The Company (stated on the front page of this Certificate) takes the responsibility that both design and production are in compliance with Rules, Standards and/or Regulations listed on page 1 of this certificate.

Application/Limitation

The approval covers non-pressure drainage system rated to 1.76 bars (25 % loading) and 25 in-Hg vacuum (83 % vacuum) for fresh and sea water up 180°F (approx. 80ºC), for short intervals up to 210°F (approx. 100°C), including non-essential system, black & grey water sanitary drains internal, drainage system for black & grey water, scuppers & discharges (overboard), sounding/air and venting of water tanks/dry spaces, vent pipes, etc. In maritime applications on open decks and within tanks, cofferdams, void spaces, pipe tunnels and ducts.

For installation according to DNV GL Rules and Manufacturer's Specification.

Fire Endurance:
The piping system is not tested with respect to Fire Endurance performance.

Low Flame Spread:
The piping system is tested with respect to Low Flame Spread performance in accordance with ASTM D635 (accepted as an alternative to the test procedure in IMO Resolution A.653(16)).

Toxicity and Smoke Generation:
The piping system is not tested with respect to Toxicity and Smoke Generation.

Type Approval documentation
Tests carried out

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

Marking of product

The pipes and fittings shall be marked with *manufacturer's name*; **+GF+** and *type designation*; **FUSEAL** and/or as given below:

Pipes:
+GF+ Fuseal® SCH40 (pipe size) PPFR110 AS/NZS 7671 License No. WM74612 Approval Mark PP-H MFR-C ASTM F1412 CSA B181.3 cNSFus-cw-U.P. Code Corrosive Waste Made in USA

Fittings:
+GF+ (fitting size) USA PPFR ASTM F1412 NSF-pw B181.3

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 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