

TYPE APPROVAL CERTIFICATE**This is to certify:****That the Plastic Pipes, Thermoplastic**with type designation(s)
+GF+ SeaDrain White

Issued to

**Georg Fischer Harvel LLC
Little Rock, AR, USA**

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 / 82°C. For installation according to DNV GL Rules and Manufacturer's recommendations. 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.**Issued at **Høvik** on **2019-11-11**for **DNV GL**This Certificate is valid until **2024-11-10**.DNV GL local station: **Houston**Approval Engineer: **Gisle Hersvik****Gustav Heiberg
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

+GF+ SeaDrain White PPFR Piping System

Schedule 40 PPFR, UV protection, Bright white color

Pipes: **+GF+ SeaDrain White**
Fittings: **+GF+ SeaDrain**

Details as given in +GF+ (Preliminary) "SeaDrain® 2020 Product Guide".

Pipes and fittings:

Size [inch]	Size, DN	Diameter [inch]	Minimum Wall Thickness [inch]
1½	DN40	1.900	0.145
2	DN50	2.375	0.154
2½	DN65	2.875	0.203
3	DN80	3.500	0.216
4	DN100	4.500	0.237
6	DN160	6.625	0.280

Fittings, types:

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

Joining methods:

Electrofusion (DN40 to DN160)
Fast-Lock (DN40 to DN100)

Manufactured by

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

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. 82°C), for short intervals up to 212°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 recommendations.

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)/IMO FTP Code, Part 5, Annex 1).

Toxicity and Smoke Generation

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

Electrical conductivity

The piping system is non-conductive, not for installation in gas hazardous area, or used with non-conductive fluids.

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.

Bulkhead and Deck Penetration

Pipe penetration through watertight bulkheads or decks as well as through fire divisions shall be type approved unless the pipe is welded into the bulkhead/deck.

When plastic pipes pass through watertight bulkheads or decks which are also a fire division and a fire may cause flooding of watertight compartments, the watertight integrity of the bulkhead or deck is to be maintained by a metallic shut-off valve fitted at the bulkhead or deck. The operation of this valve shall be provided from above the freeboard deck.

Refer to DNV GL Rules Pt.4, Ch.6 Section 3 – 1.4 Fittings on watertight bulkheads.

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.

Other standards

The products are listed as NSF compliant, ref. NSF/ANSI Standard 14.

Type Approval documentation

1. +GF+ (Preliminary) "SeaDrain® 2020 Product Guide".
2. Documentation as basis for TAK00000B2.
3. Assessment Report from DNV GL Houston of 2019-09-10.
4. Application for Type Approval of 2019-11-05.

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*; **SeaDrain White** and/or as given below:

Pipes:

+GF+ SeaDrain® (PDA+MA) SCH40 (PIPE SIZE) PPFR110 Pipe at 73F (23C): 14.5 psi (1 bar) ASTM-F1412 ASTM-D635-18 (HB) cNSFus ---- (MFG DATE) (EXT. LINE NUMBER) Made in USA

Fittings:

+GF+ (fitting size) USA PPFR ASTM F1412 cNSFus B181.3



Job Id: **262.1-032499-1**
Certificate No: **TAK00001TW**

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 assessments (for Certificate Retention and Certificate Renewal) shall be performed according to DNVGL-CP-0338.

This certificate is only valid if required Periodical assessments are carried out with satisfactory results. To check the validity of this certificate, please look it up in <https://approvalfinder.dnvgl.com>

END OF CERTIFICATE