

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Plastic Pipes, Thermoplastic**with type designation(s)
Schedule 80 PVC 1120 Marine Grade Pipes, Fittings and Valves

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 :****For use in systems for water and sea water up to 16 bar. Service temperature 0°C to 60°C. For installation in accordance with DNV Rules and Manufacturer's Specifications. The piping system is approved to Low Flame Spread in accordance with ASTM D635. The piping system is not tested w.r.t. Fire Endurance characteristics.****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**Issued at **Høvik** on **2019-10-15**This Certificate is valid until **2024-10-14**.DNV GL local station: **Houston**for **DNV GL**Approval Engineer: **Gisle Hersvik**

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.



Product description

Schedule 80 PVC 1120 Pipes and Fittings. Harvel® PVC Pressure Pipe – 20 ft lengths.

- Internal pressure ratings at 73°F (23°C) vary with the pipe size. See below table for pipe sizes versus maximum allowable pressure.
- Nominal external pressure: EP3.5 bar

Pipes:

Dimensions and maximum pressure ratings for Schedule 80 PVC Pipe at 73°F (23°C):

Dimensions [inch]	Wall thickness, min. [inch]	Pressure rating, max. [psi]	Pressure rating, max. [bar]
½	0.147	848	57.7
¾	0.154	688	46.8
1	0.179	630	42.9
1 ¼	0.191	520	35.4
1 ½	0.200	471	32.0
2	0.218	404	27.5
2 ½	0.276	425	28.9
3	0.300	375	25.5
4	0.337	324	22.0
6	0.432	279	19.0
8	0.500	246	16.7
10	0.593	234	15.9
12	0.687	228	15.5

Fittings:

Elbows, Tees, Couplings, End caps.

Vales:

- Ball valves; Type 546, 375, 543
- Check valves; Type 369, 304, 306, 360
- Diaphragm valves; Type 514, 517, 317
- Butterfly valves; 567, 563, VFA02D, VFA11D

Joining technique:

Solvent-cemented joints

Place of manufacture

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

Application/Limitation

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

The approval covers application such as essential and non-essential system, hot and cold water systems chilled and brine water systems, cooling systems (air condition), black and grey water systems, vacuum flush sanitary piping, vents, drains, watertreatment sea-, fresh- and waste water, osmosis systems and evaporation, fresh water bunker lines, etc.

Maximum service pressure: 16 bar.

Service temperature range: 0°C to 80°C.

Fire Endurance

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

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)).

The piping system is not tested with respect to Low Flame Spread performance in accordance with IMO Resolution A.653(16)/IMO FTP Code, Part 5, Annex 1.

Smoke Generation & Toxicity

The piping system is not tested with respect to smoke and toxicity performance in accordance with IMO FPT Code, Part 2, Annex 1.

Electrical conductivity

The piping system is non-conductive, not for installation in gas hazardous area, or use 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 Standard 14 and NSF Standard 61.

Type Approval documentation

Tests carried out

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

Marking of product

Product/package shall be marked with *manufacturer's name*; **Georg Fischer Harvel LLC**, *type designation*, *pressure rating* and *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



Job Id: **262.1-015886-3**
Certificate No: **TAK00001SS**

The scope of the Retention/Renewal Survey 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