



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. K-2616

This Certificate consists of 3 pages

This is to certify that the
Plastic Pipes, Thermoplastic

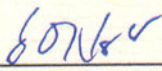
with type designation(s)
+GF+ Fuseal Sea Drain Piping System

Manufactured by
Georg Fischer Sloane, Inc.
Little Rock, AR 72206, United States

is found to comply with
Det Norske Veritas' Rules for Classification of Ships

Application
Non-essential system for water up to 1.76 bar / 10 in-Hg vacuum / 80°C. For installation according to DNV Rules and Manufacturer's Specification. The piping system is not tested w.r.t. Fire Endurance. Tested to Low Flame Spread acc. ASTM D635.

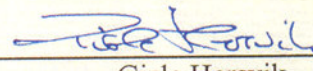
Place and date
Høvik, 2004-09-09
for DET NORSKE VERITAS AS


John Olav Nøkleby
Head of Section



Local Office
DNV New Orleans

This Certificate is valid until
2008-12-31


Gisle Hersvik
Surveyor

Notice: 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.

If any person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In this provision "Det Norske Veritas" shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.



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

Size (inch)	Diameter (inch)	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

Fittings:

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

Joining methods:

Fusion

Application/Limitation

The approval covers non-pressure drainage system rated to 1.76 bars (25 % loading) and 10 in-Hg vacuum (30 % vacuum) for fresh and sea water up 180°F (approx. 80°C), 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.

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

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

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)).



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Type Approval documentation

1. Letter/email from DNV New Orleans of 2004-08-12, incl.:
 - Application for Type Approval dated 2004-07-14.
 - Initial Survey Report from DNV New Orleans of 2004-07-16 / 2004-08-09.
 - Test results and product specification
2. Email from +GF+, Sloane, USA of 2004-08-27.
3. Various email correspondences April – August 2004.

Tests carried out

Type Testing carried out according to **Type Approval documentation**.

Marking of product

Product shall be marked with *manufacturer's name*; **+GF+, USA** and *type designation*; **FUSEAL** and/or as given below:

Pipes: +GF+ Fuseal PPFR110 F1412 USA
Fittings: +GF+ (or GSR) PPFR USA
Collar: +GF+ (or GSR) PPFR USA

Certificate Retention/Renewal Survey

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.

Survey to be performed after two (2) years (Certificate Retention Survey) and at renewal after four (4) years (Certificate Renewal Survey).

The main elements of the survey are:

- 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 Type Approval Certificate.

END OF CERTIFICATE

Hevo