

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Plastic Pipes, Thermoplastic**with type designation(s)
COOL-FIT 2.0

Issued to

Georg Fischer Piping Systems Ltd.
Schaffhausen, SH, Switzerland

is found to comply with

DNV GL rules for classification – Ships**DNV GL class programme DNVGL-CP-0072 – Type approval – Thermoplastic piping systems****Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**Issued at **Hamburg** on **2018-08-31**This Certificate is valid until **2023-08-30**.DNV GL local station: **Augsburg**for **DNV GL**Approval Engineer: **Hagen Markus**

Olaf Drews
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

The COOL-FIT 2.0 consist of pre-insulated pipes and fittings made of PE 100 inner tube with GF-HE foam insulation of 20mm thickness covered by an outer jacket made of HDPE (pipes) or GF-HE (fittings).

For dimensioning and design refer to GF product specification "COOL-FIT"_Toc469902677, 2016-12.

System overview

Design								
Pipe	PE100 acc. to EN ISO 15494							
Insulation	GF-HE hard foam, closed-porous, halogen-free							
Outer jacket	HDPE (pipe), GF-HE (fittings)							
Temperature and pressure range								
Medium	0°C to +60°C							
Environment	0°C to +55°C							
Nominal internal pressure / Standard Dimension Ratio	PN15 / SDR 11							
Nominal external pressure	1.33 bar							
Pipe dimensions								
Nominal diameter	DN25 up to DN125							
Outer diameter d (mm)	32	40	50	63	75	90	110	140
Wall thickness (mm)	2.9	3.7	4.6	5.8	6.8	8.2	10	12.7
Outer jacket diameter D (mm)	75	90	90	110	125	140	160	200
Fitting types								
Type A	Electrofusion fitting with integrated resistance wires for direct electrofusion pipe-to-fitting connections							
Type B	Spigot fitting with free ends for pipe-to-fitting electrofusion with COOL-FIT 2.0 electrofusion fittings							
Scope of fittings (components)	Electrofusion coupler, Elbows 45°/90°, Equal and reduced T90°, Reducer, Barrel nipple, Installation fitting type 313, Accessories							
Valves	2-Way Ball Valve, Type 546 and Butterfly Valve Type 567 acc. to DNVGL TAK00001B3 and TAK000016X							
Joining techniques	Electrofusion							
Tools	- Electrofusion Machines of type MSA-Series or equivalent machines - Foam removal tool - Clamping tool							

Permissible service pressure and temperature limits ¹

Temperature	0°C up to 10°C	20°C	30°C	40°C	50°C	60°C
Working pressure (bar) ²	15	13	11	9.4	8	7

Notes

¹ For further details refer to GF product specification "COOL-FIT"_Toc469902677, 2016-12

² Based on regression curves acc. to EN ISO 15494:2003

Application/Limitation

The COOL FIT 2.0 plastic piping system is type approved for application in piping systems as listed in "Table 1- Fire endurance requirements matrix" of DNVGL Rules Pt.4, Ch.6, Section 2. as follows:

Reference to Table 1	Item	Piping system ¹
Freshwater		
Non-essential systems	22	Chilled water and cooling water of air condition systems
Miscellaneous	32	Organic and Inorganic salt solutions (Brine), Glycol solutions ²
Sea water		
Non- essential systems	19	Sea water / RSW - Refrigerated sea water ¹

Notes

¹ Approved installation locations where "0" is specified in "Table 1 - Fire endurance requirements matrix".

Appropriate footnotes are to be observed.

² Refer to product specification "COOL-FIT"_Toc469902677, 2016-12

Extent of Type Tests applicable to piping system dependent on application Fire endurance Level

The COOL - FIT 2.0 piping system is not tested with respect to Fire Endurance characteristics.

Flame spread

Surface flame spread characteristics is confirmed by ASTM D 635, Class HB.

Smoke and toxicity

The COOL - FIT 2.0 is not tested in view of smoke nor toxic products in fire as defined in IMO FTP Code, Annex 2 - 2.2.

Electrical conductivity

Not applicable.

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.

Job Id: **262.1-028379-1**
Certificate No: **TAK0000173**

Installation

For designing and installation of the piping system the instructions specified in the Georg Fischer (GF) product specification "COOL-FIT" _Toc469902677, 2016-12 are to be observed.

In addition the installation requirements specific to the ship as specified by the ship yard as well as DNVGL Rules Pt.4, Ch6, Section 9 are to be observed.

The COOL FIT piping system is not approved for installation in gas hazardous area.

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. The fire collars specified in the COOL-FIT specification _Toc469902677 are not included in this type approval.

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.

Type Approval documentation



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Tests carried out

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Production places

Marking of product

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

Product	Example
Pipes	+GF+ COOL-FIT2.0, OD (d) int. pipe, OD (D) ext. pipe, SDR, PN16, batch, production, meter
Fittings	+GF+ COOL-FIT2.0, OD (d) int. pipe, OD (D) ext. pipe, SDR11, Lot number
Colour	Black

Periodical assessment

For retention of the type approval certificate periodical assessments shall be carried out at production places by DNVGL surveyor.

The objective of the periodical assessment is to verify that the design and production conditions for the type approval have not been altered.

Main scope of the assessment:

- verification of the production and quality control system
- review of quality control documentation of recent deliveries
- review of drawings in production to verify any design changes which may have an impact on data specified in the type approval certificate, performance and range of application
- verification of the product marking

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

End of certificate