

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Plastic Pipes, Thermoplastic**with type designation(s)
ecoFIT - PE 80, PE 100 PN16/PN10 Pipes and Fittings

Issued to

Georg Fischer Rohrleitungssysteme AG
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 **2018-10-25**This Certificate is valid until **2023-10-18**.DNV GL local station: **Augsburg**Approval Engineer: **Hagen Markus**for **DNV GL**

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 ecoFIT Polyethylene piping system is made of PE100 and PE80.
Pressure classes PN10 (S8.3/SDR17.6) and PN16 (S5/SDR11).

For further details refer to the following GF product specifications:

- "Marine Product Range", Edition GFDO_8906_4 (10.15)
- "Planning Fundamentals for industrial piping systems", Edition GMST 5989/4 (09.06)
- "System Specification for ecoFIT Piping Systems in Polyethylene (PE)", June 2018

Pipes PN10 (ISO S8.3/SDR17.6)

Outside diameters and minimum wall thickness												
OD [mm]	50	63	75	90	110	125	140	160	180	200	225	250
t [mm]	2.9	3.6	4.3	5.1	6.3	7.1	8.0	9.1	10.2	11.4	12.8	14.2

Outside diameters and minimum wall thickness								
OD [mm]	280	315	355	400	450	500	560	630
t [mm]	15.9	17.9	20.1	22.7	25.5	28.4	33.2	35.7

Pipes PN16 (ISO S5/SDR11)

Outside diameters and minimum wall thickness												
OD [mm]	20	25	32	40	50	63	75	90	110	125	140	160
t [mm]	1.9	2.3	3.0	3.7	4.6	5.8	6.9	8.2	10.0	11.4	12.8	14.6

Outside diameters and minimum wall thickness												
OD [mm]	180	200	225	250	280	315	355	400	450	500	560	630
t [mm]	16.4	18.2	20.5	22.8	25.4	28.6	32.2	36.3	40.9	45.4	50.8	57.2

Fittings

Size range			
PE80		PE100	
SDR17.6, PN10	d20 up to d110	SDR11, PN16	d20 up to d630
		SDR17.6, PN10	
Fitting types			
Bend 90°, Elbow 90°, 45°, 30°, 15°, Seamless bends 90°, 60°, 45°, 30°, 22°, 11° Tee 90°, 45° (equal and reduced) Coupler, Reducer, End cap Flange adaptor, Backing flanges PP-Steel Flanges, PP-V Fixpoint fitting Transition adaptor PE/brass, PE/stainless steel			
Joining techniques			
Electrofusion, Butt fusion, Socket fusion			

Job Id: **262.1-014915-5**
Certificate No: **TAK00001B2**

Service parameter

Service temperature range	- 40°C up to + 60°C
Nominal external pressure rating	1.33 bar

Permissible service pressure at lower and elevated temperatures ¹

Temperature	-40°C up to 20°C	30°C	40°C	50°C	60°C
Maximum allowable working pressure (bar)	10	6.5	5.5	4	2.5
	16	13.6	11.6	5.5	4.2

Notes

¹ Refer to +GF+ Piping Systems:

- "System Specification for ecoFIT Piping Systems in Polyethylene (PE)", June 2018
- "Planning Fundamentals for industrial piping systems", Edition GMST 5989/4 (09.06)

Production places

Pipes	DNV GL Station
GF DEKA GmbH , Kreuzstrasse 22, 35232 Dautphetal-Mornshausen, Germany	Essen, Germany
GF Hakan Plastic , Organize sanayi Bölgesi, 3. Cadde No:11-13, 59500 Cerkezköy, Turkey	Istanbul, Turkey
Fittings	
Georg Fischer Piping Systems Ltd. , Ebnatstrasse 111, 8201 Schaffhausen, Switzerland	Augsburg, Germany
Georg Fischer Wavin AG , Niederlassung Subingen, Industriestrasse 24, 4553 Subingen, Switzerland	

Responsibility

The Georg Fischer Piping Systems Ltd., Schaffhausen, Switzerland takes the responsibility that both design and production are in compliance with Rules, Standards and/or Regulations listed on page 1 of this certificate.

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	Scope	Example
Pipes and fittings	Brand	+GF+, ecoFIT
	Material grade	PE 100
	Standard	EN ISO 15494
	Dimension OD	d250
	Pressure rating PN	PN10
	Production date	Production batch number
	Type of fitting	Bend / ecoFIT
	Colour	Black
	Traceability code	Bar code
	Country of origin	Switzerland

Application/Limitation

The ecoFIT 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:

Approved installation locations where "0" is specified in "Table 1 - Fire endurance requirements matrix". Appropriate footnotes are to be observed.

Reference to Table 1	Item	Piping system
Freshwater		
Non-essential systems	22	Potable hot and cold water and bunkerlines Potable water treatment systems (Osmosis and Evaporation) Chilled water and cooling water of air condition systems
Sanitary and drains and scuppers		
Sanitary drains internal	24	Black and grey water including waste water treatment and discharge lines to shore
Sea water		
Non-essential systems	19	Piping systems of Ballast Water Management Systems (BWMS). ¹
Essential system	16	Ballast water systems
Miscellaneous	30	Brine

Notes

¹ For installation location where "L3 and higher levels" is required, metallic isolation valves are to be fitted at the boundary to the ballast piping system of the ship.

The isolation valves shall be remotely controlled valves from outside the space, e.g. fire control station and the valve shall be a fail-safe-closing type valve.

Extent of Type Tests applicable to piping system dependent on application

Fire endurance level

The ecoFIT piping system as specified in this certificate is not tested with respect to Fire Endurance characteristics.

Flame spread

Surface flame spread characteristics is confirmed by ADTMD635, Classification HB.

Smoke and toxicity

The ecoFIT piping system is tested with respect to generating of smoke and 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.

Installation

For designing and installation of the piping system the instructions specified in the Georg Fischer (GF) "Planning Fundamentals For Industrial Piping Systems" 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 ecoFIT piping system is not approved for installation in gas hazardous area.

Bulkhead penetration

Pipe penetration through watertight bulkheads or decks as well as through fire divisions shall be type approved unless the penetration 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.

Type Approval documentation

Tests carried out

Type Testing carried out in accordance with Type Approval documentation.

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