

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Plastic Pipes, Thermoplastic**

with type designation(s)

PE-RT S4 (SDR9) Pipes and Fittings

Issued to

**Georg Fischer Piping Systems Ltd., Beijing
Beijing, China**

is found to comply with

DNV GL class programme DNVGL-CP-0072 – Type approval – Thermoplastic piping systems**DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems****DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition January 2018****IMO Resolution A.753(18). Guidelines for the Application of Plastic Pipes on Ships****Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**Issued at **Hamburg** on **2019-01-16**This Certificate is valid until **2023-06-30**.for **DNV GL**DNV GL local station: **Tianjin**Approval Engineer: **Joachim Rehbein****Thorsten Lohmann
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.



Job Id: **262.1-015105-3**
Certificate No: **TAK00001FZ**

Product description

PE-RT S4 Pipes and Fittings: Polyethylene of raised temperature resistance (PE-RT)

Dimensions (as per +GF+ PE-RT Product Catalogue):

- d16 to d63 bars
- d16 to d25 coils

Overview

Pipe types	PE-RT						
Outer diameter (O.D.) [mm]	16	20	25	32	40	50	63
Minimum wall thickness (t) [mm]	2.0	2.3	2.8	3.6	4.5	5.6	7.1
Fittings/Couplings							
Materials	Body	PE-RT					
	Insert	NA					
Types ¹	Socket fusion fittings: Elbows, Tees, Couplers, Reducers, Caps, Sockets .						
Joining techniques ¹	Fusion/electro-fusion						

Notes:

¹ Refer to Georg Fischer Piping Systems CH 2320/24 (05.11)

Service parameter

Service temperature range	0°C up to + 70°C (short periods up to 95°C)
Nominal external pressure rating	1.67 bar
Nominal internal pressure	9.5 bar

Production place

Georg Fischer Piping Systems Ltd., Bei Jing
No. 4 Liang Li Wu Jie, East District of Economic Development Zone
Tongzhou District, Bei Jing, China

Responsibility

GEORG FISCHER PIPING SYSTEMS LTD. takes the responsibility that both design and production are in compliance with Rules, Standards and Regulations listed on page 1 of this Certificate.

Application/Limitation

The PE-RT S4 pipes and fittings are 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:

Item	Reference to Table 1 / Piping system ¹	
Seawater		
19	Non-essential systems	- Ballast water management systems (BWMS) ²
Freshwater		
22	Non-essential systems	- Potable hot and cold water and bunker lines - Potable water treatment systems (Osmosis and Evaporation) - Chilled water and cooling water of air condition systems
Sanitary and drains and scuppers		
24	Sanitary drains (internal)	- Black and grey water including waste water treatment and discharge lines to shore
Miscellaneous		
30	Brine	

Notes

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

² 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.

For installation in accordance with DNV GL Rules and Manufacturer's Specification.

For application on mobile offshore units and installations requirements specified in DNVGL-OS-D101 have to be observed.

Extent of Type Tests applicable to piping system dependent on application

Fire endurance Level

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

Flame spread

The piping system is tested to Low Flame Spread in accordance with ASTM D635 (accepted as an alternative to IMO Resolution A.653(16)).

Smoke and toxicity

The piping system is not tested with respect to smoke or toxic products generation in case of fire as defined in IMO FTP Code, Annex 2 - 2.2.

Electrical conductivity

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

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, Ch.6, Section 9 are to be observed.

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

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

Production Testing

Each batch of pipes and fittings shall be subjected to product tests as specified in DNVGL CP - 0072 - Table 1 "Requirements for manufacturers quality control".

Marking of product

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 Type Approval Certificate.

	Scope	Example
Pipes	- Manufacturer name and or trade mark - Nominal outside diameter and wall thickness - Material designation - Application class with design pressure	- +GF+ - d20x2.3 - PE-RT - S4
Fittings	- Manufacturer name and or trade mark - Nominal outside diameter - Material designation	- +GF+ - d20 - PE-RT

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