

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Plastic Piping System, Thermoplastic**with type designation(s)
PE-RT

Issued to

Zhenjiang Jingyu pipeline equipment Co. Ltd.
Yangzhong, 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**Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**Issued at **Hamburg** on **2020-11-02**This Certificate is valid until **2025-11-01**.for **DNV GL**DNV GL local station: **Nanjing NB & CMC**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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Job Id: **262.1-034175-1**
Certificate No: **TAK00001YF**

Product description

Pipes and fittings made of polyethylene of raised temperature resistance (PE-RT).

Pressure class: PN10, PN16

Pipes:

Outer Diameter, nominal DN [mm]	Wall thickness, nominal e_n [mm]	
	Internal pressure, nominal PN¹ [bar]	
	10	16
20	2.8	2.8
25	2.8	2.8
32	3.0	3.6
40	3.7	4.5
50	4.6	5.6
63	5.8	7.1
75	6.9	8.4
90	8.2	10.1
110	10.0	12.3
125	11.4	14.0
140	12.8	15.7
160	14.6	17.9

Notes:

1: PN class based on internal pressure – short term tests for pipe with SF 4

Fittings:

Elbows 45°/90°, tees, reducers, caps, flanges.

Joining technique:

Hot melt but welding

Hot melt socket welding

Service parameter

Service temperature range ¹	0°C up to + 70°C
Nominal external pressure rating	1.0 bar

Note:

1: Pressure reduction at elevated temperature to be observed

Permissible working pressure and temperature limits¹

Nominal pressure PN [bar]	Permissible working pressure for non-essential systems[bar]					
	-20°C to 0°C	30°C	40°C	50°C	60°C	70°C
10	8.7	8.7	4.0	3.6	-	-
16	14.0	14.0	12.4	10.9	9.6	8.4

Note:

1: According to manufacturer's instructions

Application/Limitation

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

The PE-RT piping system is type approved for application in piping systems as listed in the table below. Reference DNVGL Rules Pt.4, Ch.6, Section 2 – 1.7 Plastic pipes "Table 1- Fire endurance requirements matrix".

Approved installation locations where "0" is specified, appropriate footnotes are to be observed.
Not approved for installation locations where "NA" or "X" is indicated and not approved for installation in gas hazardous areas.

Item	Piping system ¹	
Freshwater		
22	Non-essential systems	- 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		
24	Sanitary drains (internal)	- Black and grey water including wastewater treatment and discharge lines to shore
Miscellaneous		
29	Service air (non-essential)	
30	Brine	
32	Central vacuum cleaners	

Notes

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

Fire Endurance

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

Low Flame spread

The piping system is tested to Low Flame Spread characteristics, as per ASTM D635-18 (Classification HB).

Smoke Generation & Toxicity

The piping system is not tested with respect to capability of producing excessive quantities of smoke and toxic products as defined in IMO FTP Code, Annex 1: Part 2.

Electrical conductivity

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

Installation

For designing and installation of the piping system the Construction Technology Procedures of manufacturer are to be observed.

In addition the installation requirements specific to the ship as specified by the shipyard as well as DNVGL Rules Pt.4, Ch.6, Section 9 and 10 are to be observed.

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Bulkhead and Deck 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, Sec.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**

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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 GL Type Approval Certificate.

Product	Scope	Example
Pipes and fittings	Brand	
	Material grade	PERT
	Standard	GB/T10002.1-2006
	Nominal outside diameter and nominal wall thickness	63*3
	Pressure rating	PN16
	Temperature rating	95°C
	Colour	grey
	Manufacturer information/traceability code/date of production	XXXXXXXXXX

Periodical assessment

A condition for retention of the certificate in its validity period is that periodical assessments are successfully carried out.

For retention of the certificate, a DNV GL Surveyor shall perform periodical assessment after 2 years and after 3.5 years to verify that the conditions for the Type Approval are complied with. Refer to DNVGL-CP-0338, Sec.4.

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