

TYPE APPROVAL CERTIFICATE

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

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.



Product description

Pipes and Fittings made of polypropylene random copolymer (PP-R).

Pressure class: PN6, PN10, PN16

Pipes:

Outer Diameter, nominal DN [mm]	Wall thickness, nominal e_n [mm]		
	Internal pressure, nominal PN¹ [bar]		
	6	10	16
20	-	2.5	2.8
25	-	2.7	2.8
32	-	3.0	3.6
40	2.3	3.7	4.5
50	2.9	4.6	5.6
63	3.6	5.8	7.1
75	4.3	6.8	8.4
90	5.1	8.2	10.1
110	6.3	10.0	12.3
125	7.1	11.4	14.0
140	8.0	12.7	15.7
160	9.1	14.6	17.9
180	10.2	16.4	-
200	11.4	18.2	-
225	12.8	20.5	-
250	14.2	22.8	-
280	15.9	25.5	-
315	17.9	28.7	-
355	20.1	32.3	-
400	22.7	36.4	-

Note:

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

Fittings:

Elbows 45°/90°, tees, reducers, caps.

Joining method:

Hot melt butt welding

Hot melt socket welding

Service parameter

Service temperature range ¹	-20°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 limits ¹

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
6	4.6	4.6	4.0	3.6	-	-
10	8.7	8.7	7.6	6.7	6.0	5.2
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 Rules and Manufacturer's Specification.

The PP-R 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".

The installation is not approved in locations where "NA" or "X" is indicated. The PP-R piping system is approved for installation in gas hazardous areas.

Item	Piping system ¹	
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 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.

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

Surface flame spread characteristics is confirmed by ASTM D635: HB.

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.

Job Id: **262.1-034174-1**
Certificate No: **TAK00001YG**

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 instruction of manufacturer "Construction Technology Procedures" is 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 and 10 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.

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	
	Material grade	PP-R
	Standard	GB/T18742.1-2017
	Nominal outside diameter and nominal wall thickness	32*3.6
	Pressure rating	PN16
	Temperature rating	70°C
	Colour	grey
	Manufacturer information/traceability code/date of production	xxxxxxxxxxx

Periodical assessment

A condition for retention of the TA 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