Certificate No:
TAK000029B

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Plastic Piping System, Thermoplastic

with type designation(s)
PP-R Pipes and Fittings

Issued to
Jiangsu Xilin Plastic Cement Co., Ltd.
Yangzhong, Jiangsu, **China**

is found to comply with
DNV rules for classification – Ships Pt.4 Ch.6 Piping systems
DNV class programme DNV-CP-0072 – Type approval – Thermoplastic piping systems

Application :

For use in non-essential systems.
External pressure rating: 3.3 bar.

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV.

Issued at **Hamburg** on **2023-09-26**
This Certificate is valid until **2028-09-25**.
DNV local unit: **Nanjing NB & CMC**

Approval Engineer: **Joachim Rehbein**

for **DNV**

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 AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") 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

PP-R Pipes and Fittings: Polypropylene random copolymer (PP-R)

Pressure classes: PN10, PN16.

Nominal internal pressure PN: 10 bar, 16 bar.
(Short-term internal pressure with SF=4)

External pressure rating: 3.3 bar
(Collapse pressure with SF=3)

Pipes:

	Nominal pressure PN[1] [bar]	
	PN 10	**PN 16**
Nominal outside diameter dn	**nominal wall thickness e [mm]**	
20	3.0	3.0
25	3.0	3.5
32	3.0	4.5
40	3.7	5.6
50	4.6	6.9
63	5.8	8.7
75	6.9	10.4
90	8.2	12.5
110	10.0	15.2
125	11.4	17.2
140	12.8	19.3
160	14.6	21.9

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

Fittings:
90° elbow, 90° tee, flange.
Size range and pressure classes same as specified for pipes.

Joining techniques:
Socket-welding

Service parameters:

Nominal external pressure rating	3.3 bar
Service temperature range	-20°C up to 95°C

Note:
1: Pressure reduction at elevated temperature to be observed

Production places

Jiangsu Xilin Plastic Cement Co., Ltd., Yongxing Industrial Zone, Baqiao Town, Yangzhong City, Jiangsu Province, P.R. China.

Responsibility

The Company takes the responsibility that both design and production are following rules, standards and/or regulations listed on page 1 of this certificate.

Application/Limitation

For installation in accordance with DNV 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 DNV Rules Pt.4, Ch.6, Sec.2 – 1.7 Plastic pipes Table 1- “Fire endurance requirements matrix”.

Reference to Table 1[1]	Item	Piping system[1]
Freshwater (non-essential)	22	- Potable hot and cold-water piping systems and bunker lines. - Chilled water and cooling water piping of air condition systems. - Potable water treatment systems (Osmosis and Evaporation)
Sanitary and drains and scuppers (internal)	24	- Deck drains, - Sanitary drains such as black and grey water. - Wastewater 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.

Not approved for installation locations where “NA” or “X” is indicated.
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 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.

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.

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 D635:22, classification HB.

Smoke and toxicity
The piping systems is not tested with respect to smoke and toxicity characteristics.

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

Installation

For designing and installation of the piping system the instructions specified in the “Installation Services” document are to be observed.
In addition, the installation requirements specific to the ship as specified by the shipyard as well as DNV Rules Pt.4, Ch.6, Sec.10 – 4 Joining of plastic pipes 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 DNV-CP-0072 - Table 1 “Requirements for manufacturers quality control”.
Appropriate works certificate to be issued for each batch.

Marking of product

The pipes and fittings are marked as follows:

Scope	Example
Manufacturer name and or trademark	Jiangsu Xilin Plastic Cement Co., Ltd., China
Nominal outside diameter and nominal wall thickness	dn20X3.0
Grade of material	PPR
Maximum internal service pressure	PN16
Production date and serial number	P20170908003
Standard no.	ISO 1178
Temperature range	-40~95°C
Phone number	0511-88125886

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.

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 Type Approval, a DNV 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 DNV-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.dnv.com.

END OF CERTIFICATE