



Certificate No:
TAK0000263

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Plastic Piping System, Thermoplastic

with type designation(s)
EXPERT PVC-U

Issued to

Jingjiang Haihong Plastics & Rubbers Science-Technology Co., Ltd
Jingjiang, 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 :

External pressure resistance: 0.3MPa, Flame spread class ASTM D635-2018 HB

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

Issued at **Hamburg** on **2024-05-27**

This Certificate is valid until **2029-05-26**.

for **DNV**

DNV local unit: **Jiangyin NB & CMC**

Approval Engineer: **Hagen Markus**

Sven Klinger
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.



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Product description

Plastic piping system made of Unplasticized Polyvinylchloride (PVC-U).

Nominal pressure values PN for pipe joints are based on Internal Pressure Short Term Tests on pipe spools with safety factor of 4.

References to documents:

"Specification Application Materials PVC-U for Type Approval-Haihong".

Pipes - PN1.0MPa - SDR21 - Series S10

Outside diameters and minimum wall thickness

OD [mm]	20	25	32	40	50	63	75	90	110	125	140	160
t [mm]	2.0	2.0	2.0	2.0	2.4	3.0	3.6	4.3	5.3	6.0	6.7	7.7

OD [mm]	180	200	225	250	280	315
t [mm]	8.6	9.6	10.8	11.9	13.4	15.0

Pipes PN1.6MPa - SDR13.6, Series S6.3

Outside diameters and minimum wall thickness

OD [mm]	20	25	32	40	50	63	75	90	110	125	140	160
t [mm]	2.0	2.0	2.4	3.0	3.7	4.7	5.6	6.7	8.1	9.2	10.3	11.8

OD [mm]	180	200	225	250	280	315
t [mm]	13.3	14.7	16.6	18.4	20.6	23.2

External pressure resistance

External pressure rating is the sum of vacuum pressure inside the pipe and pressure outside the pipe.

For application in suction lines the vacuum pressure inside the pipe reduces the external pressure rating.

External pressure resistance: 0.3MPa, safety factor: 3.

Fitting types

Elbow 90°, 45°, Tee (equal), Reducer Tee, Bushing

Double Piece Flange (loose flange), Blind Flange, Cap

Coupling (socket), Reducer Coupling, Female Adaptor, Male Adaptor

Joining technique

Solvent cementing

Long-term permissible maximum allowable working pressure (MAWP¹ in MPa) based on 25 years lifetime, non-essential systems

Piping system	0°C up to 20°C ³	30°C	40°C	50°C	60°C
PN1.0MPa - SDR21	1.0	0.8	0.7	0.6	0.5
PN1.6MPa - SDR13.6	1.6	1.3	1.2	1.0	0.8

Note

¹ SF 1.6/25 years. In case of chemical presence, please contact authorised manufacturer representative

Production places

Pipes and fittings

No. 23, Xinwang Road, Jingjiang Economic and Technological Development Zone

Application/Limitation

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

Approved installation locations where "0" is specified in the matrix. Appropriate footnotes are to be observed.

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

Application table

Reference to Table 1 – Fire endurance requirements matrix	Item	Piping systems
Freshwater		
Non-essential systems	22	Potable hot and chilly 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 wastewater treatment and discharge lines to shore
Sea water		
Non- essential systems	19	Piping systems of Ballast Water Management Systems (BWMS). ¹

Notes

¹ For installation location where "L3 and higher levels" are required, metallic shut-off valves are to be fitted at the boundary to the ballast piping system of the ship. The 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 PVC-U 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 PVC-U Marine Grade PN16 piping systems 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

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 construction and installation of the piping system the instructions specified in the HAIHONG "Plastic pipe construction and installation" are to be observed.

In addition, the DNV-RU-SHIP Pt.4 Ch.6, Section 10 Para. 4 Joining of plastic pipes are to be observed.

Bulkhead penetration

General

When plastic pipes pass through watertight bulkheads or decks, the watertight integrity of the bulkhead or deck is to be maintained by installation of external pressure resistant pipe types specified in tables on page 2.

External pressure resistance level required by water head or/and vacuum in the pipe is to be observed.

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.

Plastic pipes passing 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-RU-SHIP Pt.4 Ch.6 Section 3 – [1.4 Fittings on watertight bulkheads].

Special cases

Passenger vessels – SOLAS Ch. II-1 – Reg. 13.2.3

On passenger vessels, where the watertight bulkhead is also a fire division, pipe penetration design shall comply to MSC.429(98), Section Reg. 13.2.3 are to be observed.

As an alternative to a type approved penetration system the following penetration design may be accepted:

A steel spool piece of 900 mm in length, preferable 450 mm on each side, with thickness according to DNV-RU-SHIP Pt.4 Ch. 6 Sec.9 [1.2.1] is arranged at the watertight penetration.

The pipe shall be flanged or similar to each side of the steel spool piece. No valve(s) are required at the penetration, unless required by the assumptions made in the damage stability calculations.

Reference Pt 4 Ch.6 – Sec. 2 - Materials (1.7.6)

Type Approval documentation

Tests carried out

Production Testing

Each batch of pipes and fittings shall be subjected to product tests as specified "EXPERT Quality control table in production for UPVC Pipes and Fittings".

Appropriate works certificate 2.2 acc. to EN 10204 to be issued.

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 name	EXPERT
	Material grade	PVC-U
	Dimension OD	63
	Pressure class	SDR13.6/PN16
	Production date	2023.11.16
	Colour	Grey
	Traceability code	HH231116060201
	Country of Origin	China

Periodical assessment

For retention of the Type Approval, a DNV Surveyor shall perform periodical assessment to verify that the conditions for the Type Approval are complied with. Refer to the Class Programme DNV-CP-0338, Section 4.



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In addition, burst pressure testing on pipe spools made of different pipe/fitting sizes and fitting types to be carried out during renewal of the certificate.

To check the validity of this certificate, please look it up in <https://approvalfinder.dnv.com>

End of certificate