

TYPE APPROVAL CERTIFICATE

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

Issued to

Shanghai Shangsui Holding Group Co., Ltd.
Shanghai, China

is found to comply with

DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems**DNV GL class programme DNVGL-CP-0072 – Type approval – Thermoplastic 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 **2020-06-16**This Certificate is valid until **2025-06-15**.DNV GL local station: **Shanghai**for **DNV GL**Approval Engineer: **Hagen Markus**

Olaf Drews
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.



Product description

Polypropylene PP-R piping system consisting of pipes and fittings.

For further details refer to product catalogue "SHSU – TYPE SELECTION MANUAL OF PRODUCT"

Pipes Nominal pressure PN0.6 (MPa), SDR17.6, S8.3

Outer diameter O.D. [mm]	20	25	32	40	50	63	75	90	110	125	140	160
Wall thickness t [mm]	1.8	1.8	1.9	2.3	2.9	3.6	4.3	5.1	6.3	7.1	8.0	9.2

O.D. [mm]	180	200	225	250	280	315	355	400
t [mm]	10.2	11.4	12.8	14.2	15.9	17.9	20.1	22.7

Pipes Nominal pressure PN1.0 (MPa), SDR11, S5

Outer diameter O.D. [mm]	20	25	32	40	50	63	75	90	110	125	140	160
Wall thickness t [mm]	2.5	2.4	3.0	3.7	4.6	5.8	6.9	8.2	10.0	11.4	12.8	14.6

O.D. [mm]	180	200	225	250	280	315	355	400
t [mm]	16.4	18.2	20.5	22.8	25.5	28.7	32.3	36.4

Pipes Nominal pressure PN1.6 (MPa), SDR7.25, S3.125

Outer diameter O.D. [mm]	20	25	32	40	50	63	75	90	110	125	140	160
Wall thickness t [mm]	2.8	3.5	4.5	5.6	6.9	8.7	10.4	12.5	15.2	17.2	19.3	22.0

O.D. [mm]	180	200	225	250	280
t [mm]	24.8	27.6	31.0	34.5	38.6

Fittings

Size range and pressure classes same as specified for pipes

Fitting types

Injection socket fittings: Tee 90° (equal and reduced), Equal straight, Reducer
Hot melt fittings: Elbow 90°, 45°, Injection Ring, Tee 90° (equal and reduced), four-way, cap Reducer
Butt Weld Fittings: Tee, Elbow 90°, 45°, 22,5°

Joining techniques

Hot melt butt welding, Hot melt socket welding

Service parameter

Service temperature range	0°C up to + 40°C
Nominal external pressure rating	0.45 MPa

Permissible service pressure (MOP) at lower and elevated temperatures¹

Temperature	0°C up to 20°C	30°C	40°C
Maximum allowable working pressure (bar) for non-essential systems	6	5.04	4.2
	10	8.04	7
	16	13.44	11.2

Notes

¹ Reference CJJ/T98-2014 "Technical specification for plastic pipeline engineering of building water supply"

Maximum allowable working pressure for service temperatures above 40°C to be confirmed by manufacturer for each application.

Application/Limitation

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".

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 area.

Reference to Table 1- Fire endurance requirements matrix	Item	Piping system
Freshwater		
Non-essential systems	22	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		
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 fire endurance level of L3 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.

Extent of Type Tests applicable to piping system dependent on application

Fire endurance level

The PE 100 piping system as specified in this certificate is not tested with respect to Fire Endurance characteristics.

Flame spread

Surface flame spread characteristics is confirmed by ADTMD635:18, Classification HB.

Smoke and toxicity

The PP-R 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

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 designing and installation of the piping system the instructions specified in the "SHSU Installation Services" document 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, Ch6, Section 10 – 4 Joining of plastic pipes 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.

Job Id: **262.1-031393-1**
Certificate No: **TAK00001UM**

Type Approval documentation

Tests carried out

Internal short-term pressure test, Long-term internal pressure evaluation acc. to ISO9080,
External pressure test, Flame spread test, Vicat softening temperature, External load test, Tensile
strength and Ring stiffness test, Aging and Fatigue test, Liquid absorption test, Welding qualification test.

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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 the products product is to enable traceability to this Type Approval Certificate.

Product	Scope	Example
Pipes and fittings	Brand	SHANGSU
	Material grade	PP-R
	Standard	GB/T13663.2-2018
	Outer diameter OD (mm)	50
	Pressure rating	PN0.6, SDR17.6, S8.3
	Colour	Grey

Periodical assessment

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

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

End of certificate