



Marine & Offshore

Certificate number: SMS.W.II./143619/A.0

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RECOGNITION FOR BV MODE II SCHEME

ERA CO.,LTD.
TAIZHOU - CHINA

Summary of the range of the recognition which is detailed in the subsequent page(s):

Marine Plastic Pipes and Fittings
PERT, DN20~160, PN10 bar, PN16 bar
PE100, DN20~630, PN10 bar, PN16 bar
PPR, DN20~160, PN10 bar, PN16 bar
PVC-U, DN20~200, PN10 bar, PN16 bar

Products are to be manufactured, examined and tested by ERA CO.,LTD. in accordance with the type listed in this certificate and BV rules

This certificate is issued to attest that Bureau Veritas Marine & Offshore has performed, at the above company's request and in compliance with the requirements of NR320, a satisfactory assessment of the manufacturing facilities and associated quality procedures related to the range of the recognition.

This certificate will expire on: 21 Jun 2028

For BUREAU VERITAS,
At BV SHANGHAI, on 21 Oct 2024,
Hong Zhang

This certificate was created electronically and is valid without signature



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with. This certificate is issued within the scope of the General Conditions of Bureau Veritas Marine & Offshore available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against Bureau Veritas Marine & Offshore for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

The electronic version is available at: <http://www.veristarm.com/veristarnb/jsp/viewPublicPdfRecognition.jsp?id=zs1wxfcqya>

BV Mod. Ad.E 697 June 2017

This certificate consists of 2 page(s)

THE SCHEDULE OF RECOGNITION

1. RANGE OF THE RECOGNITION

The products listed in the table below are not required to be certified individually or per batch by Bureau Veritas Marine & Offshore. Their compliance with the approved type is solely certified by the manufacturer using its own format of document and marking to allow traceability to the approved type (HBV products as defined in NR320).

App. number	Validity date	Item designation	Trade name
75857/A0 BV	18 Oct 2029	THERMOSETTING MATERIAL PIPES AND FITTINGS - 2090H	PE100 Marine Plastic Pipes and Fittings
75858/A0 BV	18 Oct 2029	THERMOPLASTIC MATERIAL PIPES AND FITTINGS - 2080H	PVC-U Plastic pipe & fittings
75859/A0 BV	18 Oct 2029	THERMOPLASTIC MATERIAL PIPES AND FITTINGS - 2080H	PPR Pipes and Fittings
77043/A0 BV	18 Oct 2029	THERMOSETTING MATERIAL PIPES AND FITTINGS - 2090H	PE-RT Pipes and Fittings

2. LIMITATIONS

The certificates listed in the range of recognition are to be valid, as applicable.

Bureau Veritas Marine & Offshore is to be informed immediately of any modification to manufacturing facilities and associated quality procedures in order to agree on appropriate actions.

ERA CO.,LTD. has to apply for the periodical audits as agreed with Bureau Veritas Marine & Offshore.

3. PERIMETER OF CERTIFICATION

Quality system of following site(s) has been assessed:

ERA CO.,LTD. - TAIZHOU - CHINA

4. REMARKS

- Address: No.2 Daixi Road & No.555, Huangjiao Road, Dongcheng St.(as brunch factory)
Huangyan Economic Development Zone , Taizhou, Zhejiang,P.R.China
- Annual Audit: 1 time/every year

*** END OF CERTIFICATE ***



Certificate no.:
TAK00002E7

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Plastic Piping System, Thermoplastic

with type designation(s)

PPR Pipes and Fittings: PN10 and PN16

issued to

ERA CO., LTD.

Taizhou, China

is found to comply with

DNV class programme DNV-CP-0072 – Type approval – Thermoplastic piping systems

DNV rules for classification – Ships

Application:

External Pressure (EP): 3.0 bar. For use in piping systems for water and sea water up to 16 bar. Service temperature 0°C to 90°C. The piping system is not tested w.r.t. Fire Endurance. The piping system is tested to Low Flame Spread characteristics in accordance with ASTM D635-22.

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

Issued at **Hamburg** on **2024-11-01**

This Certificate is valid until **2029-10-31**.

DNV local unit: **Ningbo CMC**

Approval Engineer: **Gisle Hersvik**

for DNV



Digitally Signed By:
Martin Wenning
Location: DNV Hamburg,
Germany

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 USD 300 000.

Product description

PPR Pipes and Fittings

- Polypropylene piping systems made from PP-R (Polypropylene Random Copolymer).
- Nominal Internal Pressure rating (PN): 10 and 16 bar.
- Nominal External pressure rating (EP): 3 bar.

Pipes:

Nominal diameter, DN [mm]	Wall thickness, min. [mm]	
	Pipe Series, S	
	S5	S4
	Nominal Pressure, PN [bar]	
	10	16
20	2.3	2.8
25	2.8	2.8
32	2.9	3.6
40	3.7	4.5
50	4.6	5.6
63	5.8	7.1
75	6.8	8.4
90	8.2	10.1
110	10.0	12.3
125	11.4	14.0
140	12.7	15.7
160	14.6	17.9

Fittings:

Elbows, equal tees, reducing tees, equal coupling, plugs.

Joining techniques:

Socket heat fusion; DN20-DN160

Manufactured by

ERA CO., LTD., No. 555, Huangjiao Rode, Dongcheng Street, Huangyan Economic Development Zone, Taizhou, Zhejiang, P.R. China

DNV local station: Ningbo

Responsibility

The Company (stated on the front page of this Certificate) takes the responsibility that both design and production are in compliance with Rules, Standards and/or Regulations listed on page 1 of this certificate.

Application/Limitation

The plastic piping system is approved for application in systems as listed in "Table 1 – Fire endurance requirements matrix" of DNV-RU-SHIP, Pt.4 Ch.6 Sec.2 where "0" is specified. Appropriate footnotes are to be observed.

The approval covers application such hot and cold-water systems chilled and brine water systems, cooling systems (air condition), black and grey water systems, water-treatment fresh and wastewater, osmosis systems and evaporation, freshwater bunker lines, etc.

For installation in accordance with DNV Rules and Manufacturer's recommendations.
The DNV-RU-SHIP Pt.4 Ch.6 Sec.10 Para. 4 Joining of plastic pipes is to be observed.

Maximum service pressure: 16 bar. See below tables.
Service temperature range: 0°C to 90°C

Long-term permissible service pressure at lower and elevated temperatures

Non-essential services

Temperature		0°C	20°C	40°C	60°C	80°C	90°C
Maximum allowable working pressure [bar]	PN10 / S5	10.0	10.0	6.9	4.9	2.4	1.6
	PN16 / S4	16.0	16.0	11.3	7.7	3.9	3.6

Notes:

Reference ISO 15494, SF1.6/25years

ISO 15494: 2015: Plastics piping systems for industrial applications, Polybutene (PB), polyethylene (PE), polyethylene of raised temperature resistance (PE-RT), crosslinked polyethylene (PE-X), polypropylene (PP), Metric series for specifications for components and the system.

Essential services

Temperature		0°C	20°C	40°C	60°C	80°C	90°C
Maximum allowable working pressure [bar]	PN10 / S5	6.4	6.4	4.4	3.1	1.5	-
	PN16 / S4	10.2	10.2	7.2	4.9	2.5	2.3

Notes:

Reference ISO 15494 and DNV-CP-0072, SF2.5/25years

ISO 15494: 2015: Plastics piping systems for industrial applications, Polybutene (PB), polyethylene (PE), polyethylene of raised temperature resistance (PE-RT), crosslinked polyethylene (PE-X), polypropylene (PP), Metric series for specifications for components and the system.

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 in accordance with ASTM D635-22, Classification: HB.

Smoke Generation & Toxicity

The piping system is not tested with respect to capability of producing excessive quantities of smoke and toxic products in fire as defined in IMO FTP Code, Annex 2 - 2.2.

Electrical conductivity

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

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.

Bulkhead and Deck Penetration

Pipe penetration through watertight bulkheads or decks as well as through fire divisions shall be type approved unless the 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-RU-SHIP, 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

1. Assessment Report from DNV Ningbo of 2024-08-24.
2. Assessment documents, incl. ISO 9001 Certificate.
3. "DETERMINATION OF THE LONG-TERM HYDROSTATIC STRENGTH", Report No. BODYCOTE/P-06/119.
 - o SEM-evaluation according to ISO 9080:2003 of the PP-R pipe grade Topilene R200P Grey from Hyosung Corporation [50 years, MRS = 8 MPa]
4. "The Test Reports for Marine Plastic Pipes and Fittings (Type: PPR)". File No.: ERA-DNV-2403, Aug., 2024, incl.:

- ERA's Test Reports for Short-term Internal Pressure, Long-term Internal Pressure, External Pressure, External Load, Temperature Limits, Impact Resistance, Fatigue, Aging and Fluid Absorption.
 - SGS Test Report No. AJFS2211008997FF of 2023-08-28 [ASTM D635-18: HB, - mm/min]
 - SGS Test Report No. AJFS2408009206FF of 2024-08-16 [ASTM D635-22: HB, - mm/min]
5. "Application documents for Marine Plastic Pipes and Fittings". File No.: ERA-DNV-2301, Rev No.: 0, Dec., 2023.
 6. "The test program for Marine Plastic Pipes and Fittings". File No.: ERA/TP-DNV-01, Rev No.: A3, June, 2024.
 7. Application for Type Approval of 2023-12-26.

Tests carried out

Type Testing carried out in accordance with **Type Approval documentation**.

Marking of product

The product is to be marked with the *manufacturer's name and address*: **ERA Co., Ltd., China**, *brand name*: **PPR** / *type designation, diameter, pressure rating, temperature rating, serial number, production date and product standard*.

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 Type Approval Certificate.

Periodical assessment

The scope of the Periodical Assessment is to verify that the conditions stipulated for the Type Approval is complied with and that no alterations are made to the product design or choice of materials.

Periodical assessments (for Certificate Retention / Certificate Renewal) shall be performed according to DNV-CP-0338.

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



Type Approval Certificate

This is to certify that the undernoted product(s) has/have been tested with satisfactory results in accordance with the relevant requirements of the Lloyd's Register Type Approval System.

Manufacturer	ERA CO., LTD.
Address	No.2 Daixi Road, Huangyan Economic Development Zone, Taizhou, 318020, China
Place of Production	ERA CO., LTD. No.2 Daixi Road, Huangyan Economic Development Zone, Taizhou, 318020, China
Place of Production	ERA CO., LTD. No.555, Huangjiao Road, Dongcheng Street, Huangyan District, Taizhou, China
Type	Plastic Pipes
Description	Thermoplastics Pipes and Fittings, include 45°&90° Elbow, Equal coupling, Equal tee, Reducing tee, Flange and Plug
Trade Name	ERA
Application	Marine and offshore piping systems for sea water, fresh water, sanitary/drains/scuppers and non-essential services in locations listed in Part 5, Chapter 12, Table 12.5.1 of Lloyd's Register's Rules and Regulations for the Classification of Ships where a "0" is indicated.
Specified Standard	LR Rules and Regulations for the Classification of Ships, July 2024 IMO Resolution A.753(18), as amended by IMO Resolution MSC.313(88)

Jun Hua Rong

Engineering Piping - Senior Specialist to
Lloyd's Register Classification Society (China)
Co., Ltd.

12th Floor, Chong Hing Finance Centre, No. 288
Nanjing West Road, Shanghai, 200003, China

Lloyd's Register Group Limited, its affiliates and subsidiaries and their respective officers, employees or agents are, individually and collectively, referred to in this clause as 'Lloyd's Register'. Lloyd's Register assumes no responsibility and shall not be liable to any person for any loss, damage or expense caused by reliance on the information or advice in this document or howsoever provided, unless that person has signed a contract with the relevant Lloyd's Register entity for the provision of this information or advice and in that case any responsibility or liability is exclusively on the terms and conditions set out in that contract.



Type Approval Certificate

ISO 1167-2:2006
ISO 9969:2007
ISO 75-1/2:2004
ISO 62:2008
ASTM D635

Ratings

PE-RT	
Nominal Diameter (mm):	DN20~DN160
Nominal Pipe Thickness (mm):	2.8~17.9
Nominal Pressure Rating (bar):	10/16
External Pressure Rating (bar):	3
Working Temperature Range (°C):	-40~95
PE100	
Nominal Diameter (mm):	DN20~DN630
Nominal Pipe Thickness (mm):	2.3~57.2
Nominal Pressure Rating (bar):	10/16
External Pressure Rating (bar):	3
Working Temperature Range (°C):	-40~60
PPR	
Nominal Diameter (mm):	DN20~DN160
Nominal Pipe Thickness (mm):	2.3~17.9
Nominal Pressure Rating (bar):	10/16
External Pressure Rating (bar):	3
Working Temperature Range (°C):	0~90
PVC-U	
Nominal Diameter (mm):	DN20~DN200
Nominal Pipe Thickness (mm):	2.0~11.9
Nominal Pressure Rating (bar):	10/16
External Pressure Rating (bar):	3



Type Approval Certificate

Working Temperature Range(°C): 0~60

Additional Tests

Low-Flame spread test conducted according to ASTM D635.

Other Conditions

1. Plastic pipes and fittings intended for application in Class I, Class II and Class III systems for which there are Rule requirements, are to be manufactured in accordance with Chapter 14 of LR Rules for Materials and to be manufactured and tested in accordance with Part 5, Chapter 12, Section 5 of the Rules and Regulations for the Classification of Ships.
2. Suitable pipes and fittings are to be selected and installed in accordance with the manufacture's instructions. The temperature-pressure reduction is to the manufacture's recommendation.
3. The use of plastics pipes may be restricted by statutory requirements of the National Authority of the country in which the ship is to be registered.
4. No fire endurance test, smoke generation test, toxicity test and electrical conductivity test are conducted.

This certificate is not valid for equipment, the design, ratings or operating parameters of which have been varied from the specimen tested. The manufacturer should notify Lloyd's Register Classification Society (China) Co., Ltd. of any modification or changes to the equipment in order to obtain a valid Certificate.

The Design Appraisal Document with reference number STS/TA/JRZ/PRJ11100424852/O-002645D and its supplementary Type Approval Terms and Conditions form part of this Certificate.



TYPE APPROVAL CERTIFICATE
No. MAC009124WS

This is to certify that the product identified below satisfies the requirements of the standard quoted under "Reference standard"

<i>Description</i>	Plastic pipes and fittings
<i>Type</i>	PE-RT, PE100, PPR, PVC-U
<i>Applicant</i>	ERA CO., LTD. No.2 Daixi Road, Huangyan Economic Development Zone, Taizhou, Zhejiang, P.R.China
<i>Manufacturer</i>	ERA CO., LTD.
<i>Place of manufacture</i>	No.2 Daixi Road, Huangyan Economic Development Zone, Taizhou, Zhejiang, P.R.China, No.555, Huangjiao Rode,Dongcheng Street, Huangyan District Taizhou, Zhejiang, P.R.China
<i>Reference standards</i>	Rules for the Type Approval of Plastic Pipes
<i>Reference documents</i>	RINA TYPE APPROVAL SYSTEM

Issued in **SHANGHAI** on **May 20, 2024.** This Certificate is valid until **May 19, 2029**

Qiang Sun

RINA Services S.p.A.

This certificate consists of this page and 1 enclosure



TYPE APPROVAL CERTIFICATE

No. MAC009124WS

Enclosure - Page 1 of 2

PE-RT, PE100, PPR, PVC-U

Manufacturer's Documents

Documentations of product drawings(pipe and fittings)--RINA drawing SHMC27798, SHMC27800, SHMC29731/32, test program--RINA drawing SHMC29670, and water supply pipe connection procedure--RINA drawing SHMC27806 have been reviewed.

Asbestos free declaration has been reviewed on RINA drawing SHMC-28122.

Test Reports

Internal pressure test, External pressure test, Deformation test of external loading characteristics by parallel-plate loading, Axial tensile strength test, Minimum/Maximum operating temperature report, Impact resistance test, Aging test, Fatigue test, Fluid absorption test and Surface flame spread characteristics test has been reviewed with RINA drawing SHMC29344-29346, SHMC29662-29669, SHMC29671.

Fire endurance test and electrical conductivity test have not been carried out.

The product is not tested with respect to capability of producing excessive quantities of smoke and toxic products in fire as defined in IMO FTP Code, Annex 2-2.2.

Product Description

Product Name	Marine Plastic Pipe and Fittings			
Product model	PE-RT	PE100	PPR	PVC-U
Specifications (mm)	DN20-160	DN20-1000	DN16-160	DN20-200
Nominal Pressure (MPa)	PN1.0, PN1.6	PN1.0, PN1.6	PN1.0, PN1.6	PN1.0, PN1.6
Operating Temperature (°C)	-40~95	-40~60	0~90	0~60

Application/Limitation

This plastic pipe can be used in piping systems including ballast system, cooling water system, bilge water system and other secondary systems, where fire endurance are not required according to the RINA Rules and IMO Resolution A.753(18) Guidelines for the Application of Plastic Pipes on Ships, as Amended by Resolution MSC.313(88) and MSC.399(95).

This plastic pipe is not used in the spaces which have a fire endurance level(L1/L2/L1W/L2W/L3).

The product is not intended for use in areas that require electrical conductivity.



RINA Services S.p.A.
Via Corsica, 12 - 16128 Genova
Tel +39 010 53851
Fax +39 010 5351000

TYPE APPROVAL CERTIFICATE

No. **MAC009124WS**

Enclosure - Page 2 of 2

PE-RT, PE100, PPR, PVC-U

Acceptance conditions

Pipes and fittings, installation, jointing and bonding procedures are to in accordance with manufacture's instruction/ recommendations and Pt C, Ch 1, App 3, Para 3 of RINA Rules.

When the piping pierces watertight or fire bulkhead or decks, suitable means shall be provided to maintain the integrity of the bulkhead or deck in case of failure of the pipes.

The workshop tests and testing after installation on board are to be carried out in accordance with Pt C, Ch 1, App 3, Para 4.2 & 4.3 of RINA Rules.

Marking of product

The pipes and fittings marking shall at least include the following information:

- Pressure rating
- Temperature rating
- The design standards that the pipe or fitting is manufactured in accordance with
- The material of which the pipe or fitting is made
- Product and manufacturer name
- Conductive or non-conductive

SHANGHAI May 20, 2024





NIPPON KAIJI KYOKAI

Certificate

OF

APPROVAL

Certificate No.
TA241276E(N)

Item : Plastic Pipe and Fittings
Product name : PE100, PE-RT, PP-R
Applicant : ERA CO.,LTD.
No. 2, Daixi Road, Huangyan Economic Development
Zone, Taizhou City, Zhejiang, China
Manufacturers : See Annex.
Specifications : See Annex.
Testing standard : Chap.6, Part 6 of "*Guidance for The Approval and Type
Approval of Materials and Equipment for Marine Use*"
Condition for use : See Annex.

THIS IS TO CERTIFY that the above type of products has been approved by
Nippon Kaiji Kyokai with type approval No. NKPP076 as complying with the relevant
requirements of the Society's *Rules for the Survey and Construction of Steel Ships*.

This certificate is valid until 5 November 2029.

Issued at Tokyo on 6 November 2024.

NIPPON KAIJI KYOKAI


M. Irisawa
General Manager

Material and Equipment Department



1. Manufacturers

ERA CO.,LTD.

No. 2, Daixi Road, Huangyan Economic Development Zone,
Taizhou City, Zhejiang, China

ERA CO.,LTD.

No.555, Huangjiao Road, Dongcheng Street, Huangyan District,
Taizhou City, Zhejiang, China2. Specifications

Type		PE100	PE-RT	PP-R
Nominal Diameter (mm)		20 - 630	20 - 160	20 - 160
Material		PE100	PE-RT II	PP-R
Working Temperature (°C)		-40 ~ 60	-40 ~ 95	0 ~ 90
Nominal Pressure	Internal (MPa)	1.0 / 1.6	1.0 / 1.6	1.0 / 1.6
	External (MPa)	0.3	0.3	0.3
Category		N/A	N/A	N/A
Fire Endurance		N/A	N/A	N/A

3. Condition for use

3.1. On Plastic Pipes, the followings are to be marked.

- (1) Trade name and/or product name
- (2) NK's approval, such as "NK-Approved"
- (3) Nominal pressure
- (4) The design standards to be applied
- (5) Material of which pipe or fitting is made

3.2. Particulars, manufacturing method and material of Plastic Pipes are to be same as those in the original approval tests. Any alternation to the above items is to be informed to the Society for approval. Our surveyor reserves the right to access to the manufacturing facilities and may require further test and/or examination where deemed.



3.3. Plastic Pipes are to be tested after manufacture in accordance with the requirement of “1.7.1 Shop Tests, Annex 12.1.6 PLASTIC PIPES of Part D, Rules for the Survey and Construction of Steel Ships”.

3.4. The installation of the piping system is to be carried out in accordance with “Annex 12.1.6 PLASTIC PIPES of Part D, Rules for the Survey and Construction of Steel Ships”.

3.5. Plastic Pipes are to be subject to the periodical examination at interval of five years after the date of approval.

4. Bonding procedure quality testing

The adequacy of the method for connecting pipes has been confirmed by the bonding procedure qualification testing.



Work Order – WO00T2502133
Product Design Assessment (PDA)
Product: Thermoplastic Pipe, Fittings and Joints
Model: PE100, PPR, PE-RT
PDA No. 24-00T2502133-PDA

Attention: Ms. Xiulin Jin, ERA CO.,LTD. (485162)

The documents shown in the attached list are reviewed in accordance with the applicable requirements indicated in the PDA along with the service restrictions and comments.

We recommend that you monitor the ABS Rules, Guides and other standards used in the Assessment. These Rules, Guides and standards often change on an annual basis, and you must comply with the new Rules, Guides and standards in order for the product to be used on an ABS classed vessel or facility contracted under the new Rules, Guides or specifications.

Additionally, we acknowledge the PDA request form warranting that the materials used in the product(s) are free from asbestos.

For any clarifications, contact Mr. Ke-Wei Shen at 86-21-23270936 or (kshen@eagle.org).

Very truly yours,

Bin-Hong Wang
Director of Engineering

Electronically Signed by: Xiao-Wei Xu

Documents List

Drawing No	Rev. No.	TITLE	Status
ERA/TP-ABS-01	A3	ABS Test program - Rev A3	Approved
BODYCOTE/P-04_//86	-	BODYCOTE_P-04_86-PE100 DETERMINATION OF THE LONG-TERM HYDROSTATIC STRENGTH	Reviewed
BODYCOTE/P06/119	-	BODYCOTE_P06_119_PPR DETERMINATION OF THE LONG-TERM HYDROSTATIC STRENGTH	Reviewed
CGMB 12	1	CGMB 12 Plastic piping system connection process procedure Rev 1	Reviewed
ELEMENT P-1908-v1	1	ELEMENT TEST REPORT P-1908-v1-PE-RT DETERMINATION OF THE LONG-TERM HYDROSTATIC STRENGTH	Reviewed
ERA-JSS-01	1	ERA-JSS-01-Calculations for determine the Internal and external pressure Rev 1	Filed by ABS for Reference only

ERA-TP-2401	-	ERA-TP-2401-ABS test Reports (PE100)	Reviewed
ERA-TP-2403	-	ERA-TP-2403-ABS test Reports (PPR)	Reviewed
NA	-	Information of the resin type materials	Filed by ABS for Reference only
2213110294	-	PE100 Fatigue test report No. 2213110294	Reviewed
AJFS2211009005FF	-	PE100 Low Flame-spread report ASTM D635 No. AJFS2211009005FF	Reviewed
2413100876	-	PE-RT Fatigue test report No. 2413100876	Reviewed
AJFS2401000484FF	-	PE-RT Low Flame-spread report ASTM D635 No. AJFS2401000484FF	Reviewed
2213110305	-	PPR Fatigue test report No. 2213110305	Reviewed
AJFS2211008997FF	-	PPR Low Flame-spread report ASTM D635 No. AJFS2211008997FF	Reviewed
ERA-PE-202300 A1	A1	Product drawing PE (ERA-PE-202300 A1)	Approved
ERA-PERT-202300 A1	A1	Product drawing PE-RT (ERA-PERT-202300 A1)	Approved
ERA-PPR-202300 A1	A1	Product drawing PPR (ERA-PPR-202300 A1)	Approved
GYPG2023101501A	-	GYPG2023101501A-Bonding Procedure Quality Testing Report PE100	Reviewed
GYPG2023101501B	-	GYPG2023101501B-Bonding Procedure Quality Testing Report PE-RT(1)	Reviewed
GYPG2023101501C	-	GYPG2023101501C-Bonding Procedure Quality Testing Report PPR(1)	Reviewed
Correspondence	-	Fee Confirmation and PDA Request Form	Document Retained

Electronic copies of the documents, appropriately stamped, are available in the ABS MyFreedom™ Client Portal.
Include: PDA Certificate



CERTIFICATE NUMBER 24-00T2502133-PDA
EFFECTIVE DATE 20-Dec-2024
EXPIRATION DATE 19-Dec-2029
ABS TECHNICAL OFFICE CN Shanghai ESD

CERTIFICATE OF

Product Design Assessment

This is to certify that a representative of this Bureau did, at the request of

ERA CO.,LTD.

located at

**NO.2 DAIXI ROAD, HUANGYAN ECONOMIC DEVELOPMENT ZONE
TAIZHOU, China, 318020**

assess design plans and data for the below listed product. This assessment is a representation by the Bureau as to the degree of compliance the design exhibits with applicable sections of the Rules. This assessment does not waive unit certification or classification procedures required by ABS Rules for products to be installed in ABS classed vessels or facilities. This certificate, by itself, does not reflect that the product is Type Approved. The scope and limitations of this assessment are detailed on the pages attached to this certificate.

Product Thermoplastic Pipe, Fittings and Joints

Model PE100, PPR, PE-RT

Endorsement:

Tier: 2 - PDA Issued

This Product Design Assessment (PDA) Certificate remains valid until 19/Dec/2029 or until the Rules and/or Standards used in the assessment are revised or until there is a design modification warranting design reassessment (whichever occurs first).

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or previous to the effective date of the ABS Rules and standards applied at the time of PDA issuance. Use of the Product for non-ABS units is subject to agreement between the manufacturer and intended client.

American Bureau of Shipping

Xiao-Wei Xu, Managing Principal Engineer

NOTE: This certificate evidences compliance with one or more of the Rules, Guides, standards or other criteria of ABS or a statutory, industrial or manufacturer's standards. It is issued solely for the use of ABS, its committees, its clients or other authorized entities. Any significant changes to the aforementioned product without approval from ABS will result in this certificate becoming null and void. This certificate is governed by ABS Rules 1-1-A3/5.9 Terms and Conditions of the Request for Product Type Approval and Agreement

ERA CO.,LTD.

NO.2 DAIXI ROAD, HUANGYAN ECONOMIC DEVELOPMENT ZONE ,
TAIZHOU ZHEJIANG
China 318020
Telephone: 0576-81122180
Fax: 0576-84277383
Email: marine@era.com.cn
Web:

Tier: 2 - PDA Issued

Product: Thermoplastic Pipe, Fittings and Joints
Model: PE100, PPR, PE-RT
Endorsements:

Intended Service:

Ballast system, bilge system, venting system and non-essential systems for water and air, such as hot and cold water systems, chilled and brine water systems, cooling systems (air condition), black and grey water system, water treatment and waste water, osmosis system and evaporation.

Description:

The pipes are produced with PE, PPR or PE-RT resin and forming after extruding.

Rating:

1. PE100:

Normal Diameter: DN20 to DN630.

Service Temperature: -40 degree C to 60 degree C.

Nominal Pressure: PN1.6 Mpa, PN1.0 Mpa.

External pressure: 3 bar.

2. PE-RT:

Normal Diameter: DN20 to DN160.

Service Temperature: -40 degree C to 70 degree C.

Nominal Pressure: PN1.6 Mpa, PN1.0 Mpa.

External pressure: 3 bar.

3. PPR:

Normal Diameter: DN20 to DN160.

Service Temperature: 0 degree C to 70 degree C.

Nominal Pressure: PN1.6 Mpa, PN1.0 Mpa.

External pressure: 3 bar.

4. PE100, PPR and PE-RT Pipe dimension are declared by manufacture's drawings.

Service Restriction:

1. Unit Certification is not required for this product. If the manufacturer or purchaser request an ABS Certificate for compliance with a specification or standard, the specification or standard, including inspection standards and tolerances, must be clearly defined;
2. The pipes may only be used in the systems and locations where level "0" (no fire endurance test required) are indicated in 4-6-3/Table 1 of MVR;
3. These pipes are not to be installed in hazardous areas;
4. The plastic pipes are not to be used in deep tanks.
5. Other service restrictions are to be in accordance with the manufacturer's recommendation.

Comments:

1. The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product;
2. Plastic pipes are to be permanently marked with identification in accordance with a recognized standard. Identification is to include pressure ratings, the design standard that the pipe or fitting is manufactured in accordance with, the material with which the pipe or fitting is made, and the date of fabrication in accordance with 4-6-3/5.17 of MVR.
3. Each length of pipe is to be tested to a hydrostatic pressure not less than 1.5 times of design pressure;
4. The installation of the piping systems is to be carried out by qualified personnel in accordance with the manufacturer's specifications and instructions. Each particular application and installation is to be specifically ABS approved in conjunction with the relevant piping system;
5. Product must be installed in accordance with manufacturer's guidelines and the plastic pipe bonding procedure qualification is to be in accordance with 4-6-3/11 of MVR;

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Notes/Drawing/Documentation:

Test report No. BODYCOTE/P-04/86- PE100 DETERMINATION OF THE LONG-TERM HYDROSTATIC STRENGTH dated 03 Sep 2004 carried out by Bodycote Polymer AB.
Test report No. AJFS2211009005FF- PE100 Low Flame-spread report ASTM D635 dated 28 Aug 2023 carried out by SGS-CSTC Standards Technical Services Co., Ltd. Anji Branch.
Test report No. 2213110305-PPR Fatigue test report dated 16 Jan 2023 carried out by Zhejiang Fangyuan Test Group Co., Ltd.
Test report No. AJFS2211008997FF-PPR Low Flame-spread report ASTM D635 dated 28 Aug 2023 carried out by SGS-CSTC Standards Technical Services Co., Ltd. Anji Branch.
Test report No. ERA-TP-2403-ABS test Reports (PPR) dated 09 Mar 2024 witnessed by ABS attending Surveyor.
Test report No. ERA-TP-2402-ABS test Reports (PE-RT) dated 09 Mar 2024 witnessed by ABS attending Surveyor.
Test report No. BODYCOTE/P06/119-PPR DETERMINATION OF THE LONG-TERM HYDROSTATIC STRENGTH carried out by Bodycote Polymer AB.
Test report No. AJFS2401000484FF- PE-RT Low Flame-spread report ASTM D635 dated 19 Jan 2024 carried out by SGS-CSTC Standards Technical Services Co., Ltd. Anji Branch.
Test report No. 2213110294- PE100 Fatigue test report 16 Jan 2023 carried out by Zhejiang Fangyuan Test Group Co., Ltd.
Test report No. ELEMENT P-1908-v1 -PE-RT DETERMINATION OF THE LONG-TERM HYDROSTATIC STRENGTH carried out by ELEMENT.
Test report No. 2413100876-PE-RT Fatigue test report dated 31 Jan 2024 carried out by Zhejiang Fangyuan Test Group Co., Ltd.
Test report No. ERA-TP-2401-ABS test Reports (PE100) dated 09 Mar 2024 witnessed by ABS attending Surveyor.
Test report No. GYPG2023101501A-Bonding Procedure Quality Testing Report PE100 dated 18 Oct 2023 carried out by Zhejiang Fangyuan Test Group Co., Ltd.
Test report No. GYPG2023101501B-Bonding Procedure Quality Testing Report PE-RT dated 18 Oct 2023 carried out by Zhejiang Fangyuan Test Group Co., Ltd.
Test report No. GYPG2023101501B-Bonding Procedure Quality Testing Report PE-RT dated 18 Oct 2023
GYPG2023101501C-Bonding Procedure Quality Testing Report PPR.
Drawing No. ERA-JSS-01, ERA-JSS-01-Calculations for determine the Internal and external pressure Rev 1.
Drawing No. NA, Information of the resin type materials.
Drawing No. CGMB 12, CGMB 12 Plastic piping system connection process procedure Rev 1
Drawing No. ERA-PERT-202300 A1, Product drawing PE-RT (ERA-PERT-202300 A1).
Drawing No. ERA-PE-202300 A1, Product drawing PE (ERA-PE-202300 A1).
Drawing No. ERA/TP-ABS-01, ABS Test program Rev A3
Drawing No. ERA-PPR-202300 A1, Product drawing PPR (ERA-PPR-202300 A1).

Terms of Validity:

This Product Design Assessment (PDA) Certificate remains valid until 19/Dec/2029 or until the Rules and/or Standards used in the assessment are revised or until there is a design modification warranting design reassessment (whichever occurs first).

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or previous to the effective date of the ABS Rules and standards applied at the time of PDA issuance. Use of the Product for non-ABS units is subject to agreement between the manufacturer and intended client.

STANDARDS

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ABS Rules:

ABS Rules for Building and Classing Marine Vessels, Jul 2024: 1A-1-4/7.7, 1A-1-A3, 1A-1-A4, 4-6-3.

ABS Rules for Building and Classing Mobile Offshore Drilling Units, Jul 2024: 1B-1-4/9.7, 1B-1-A2, 1B-1-A3, 4-2-2/7.

National:

NA

International:

IMO A.753(18) adopted on 22 November 1993 as amended by IMO Res. MSC.313(88) (Adopted on 26 November 2010) and IMO Res. MSC.399(95) (Adopted on 5 June 2015).

Government:

NA

EUMED:

NA

OTHERS:

NA