

Product Specification of PPR Monolayer - Hot & Cold Water Piping System

A. Description

1. General

1.1 Product Identity

Definition

SERENEPLAST PP-R pipes and fittings are manufactured from high quality, Polypropylene Random Co-polymer (PP-R Type 3) resins. Its physical and chemical properties make SERENEPLAST a versatile piping system in a wide range of applications in different industries.

Its advantages over other thermoplastic pipes in potable water industries are its high impact strength and high pressure resistance at high temperatures during long-term internal hoop stress.

<u>Material</u>	: PP-R
<u>Density at 23°C</u>	: 0.9 g/cm ³
<u>Pipe Length</u>	: Standard: 4 m; Optional: 3-6 m on demands
<u>Pipe Dimension</u>	: 20mm,, 250mm
<u>Pipe Series</u>	: SDR6, SDR7.4, SDR11
<u>Connection</u>	: Fusion Welding
<u>Color Range</u>	: White, Green, Blue, Cappuccino, Grey, Black
<u>Standards</u>	: DIN 8077/8078, EN ISO 15874, DIN 16962, DIN 2999.
<u>Certifications</u>	: SKZ - SGR- RUSSIA , AENOR- SPAIN , TSE- TURKEY . * In Alphabetical Order by Country Names

1.2 Field of Use

The performance requirements for piping system conforming to ISO 15874 are specified for four different application classes and are shown in table.

Application class	System conditions			Typical field of application
	Service conditions	T _{max} - Time	T _{mat} - Time	
1	60°C- 49 years	80 °C- 1 year	95 °C - 100 h	Hot water supply (60 °C)
2	70°C- 49 years	80 °C- 1 year	95 °C - 100 h	Hot water supply (70 °C)
4	20°C- 2.5 years	70 °C- 2.5 years	100 °C- 100 h	Underfloor heating and low temperature radiators
	40°C- 20 years			
	60°C- 25 years			
5	20°C- 14 years	90 °C- 1 year	100 °C- 100 h	High temperature radiators
	60°C- 25 years			
	80°C- 10 years			

Each application class shall be combined with a design pressure, pD, of 4 bar, 6 bar, 8 bar or 10 bar, as applicable. All systems which satisfy the conditions specified in table shall also be suitable for the conveyance of cold water for a period of 50 years at a temperature of 20°C and a design pressure of 10 bar.

All heating installations shall only use water or treated water as the transfer fluid.

Application Classes of SERENEPLAST PP-R Monolayer Products

- SERENEPLAST SDR6 / PN20 Monolayer Pipes: Class 1/10 bar, Class 2/8bar, Class 4/10 bar, Class 5/6 bar
- SERENEPLAST SDR7.4 / PN16 Monolayer Pipes: Class 1/8 bar, Class 2/6bar, Class 4/10 bar, Class 5/6 bar
- SERENEPLAST SDR11 / PN10 Monolayer Pipes: Class 1/6 bar, Class 2/4bar, Class 4/6 bar

1.3 Service Life

Under normal working pressures and conditions, the average service life of SERENEPLAST PPR pipes is projected to be 50 years or more.

Examples

SERENEPLAST PP-R SDR 11 cold water pipe, transporting water at a temperature of 20°C is projected to last more than **100** years under normal operating conditions with an operating pressure of **12.5** bar.

SERENEPLAST PP-R SDR 6 hot water pipe, transporting water at a temperature of 70°C is projected to last more than **50** years under normal operating conditions with an operating pressure of **8.5** bar.

1.4 Hygiene & Health Concerns

Health is a major consideration in the production of SERENEPLAST pipes and fittings. Connection of pipes does not require additives such as cement solvent, fluxes or solder. To ensure the safety of SERENEPLAST pipes and fittings

for usage relating to human contact and consumption with potable water, the following standards are strictly adhered to:

Standards	Requirements	Reported by
DIN 1988-2	Drinking Water Supply Systems, Materials, Components, Appliances, Design and Installation	-
DVGW-W270	Enhancement of Microbial Growth on Materials to Come into Contact with Drinking water Test pursuant to DVGW Technical Standard W 270	Hygiene Institut-GERMANY
KTW	Test Certificate based on KTW recommendations for Materials in Contact with Drinking Water	Hygiene Institut-GERMANY
SGR	Report No. 1204-0761 DA of the Child Health Science Center .2012 laboratory and the expert report dated 11.04.2012 of 12-04-621.	SGR-RUSSIA
CERTIF	Evaluation of the influence of plastic pipes on water intended for human consumption due to migration	CERTIF-PORTUGAL
Regulation	Humanitarian regulations on water for consumption purposes according to No. 25730 Turkey Regulation	Istanbul Halk Saglik-TURKEY

1.5 UV Resistance

SERENEPLAST products are produced with UV stabilizers. However, like all other piping systems including metal pipe works, SERENEPLAST products should not be exposed to direct sunlight without insulation or protection against sunlight or UV radiation.

For applications where constant UV exposure is expected, SERENEPLAST UV pipes should be used. For prolonged lifespan, a protective paint in black or a jacket is recommended.

1.6 Fire Classifications

SERENEPLAST pipes and fittings comply with and are classified under the requirements of the following fire classifications:

- Class B2 according to DIN 4102
- Class E according to EN13501-1+A1

Under such classifications, it is normally inflammable and is capable of resisting, for a short period, a small flame attack without substantial flame spread.

In case of a fire outbreak of temperatures above 800°C, under ideal conditions and with sufficient oxygen, only carbon dioxide and water vapor are produced as the raw material of Polypropylene Random Copolymer is of a hydrocarbon chain. Toxic fumes or dioxin will not be emitted.

1.7 Sound Insulations

Compared with metal pipes, SERENEPLAST products do not need further insulation to reduce decibel levels when water flows at relatively high speeds. While metals transmit noises quicker and louder, plastics dampen noises. Hence "whistling" and noises resulting from water hammer effect are largely reduced to none.

2. Product Definition

2.1 Sizes of Product – Monolayer Pipes

SDR6 / PN20			SDR7.4 / PN16			SDR11 / PN 10		
D x s (mm)	D (mm)	s (mm)	D x s (mm)	D (mm)	s (mm)	D x s (mm)	D (mm)	s (mm)
20 x 3.4	20 -0+0,3	3.4 -0+0,5	20 x 2.8	20 -0+0,3	2.8 -0+0,4	20 x 2.0	20 -0+0,3	2.0 -0+0,3
25 x 4.2	25 -0+0,3	4.2 -0+0,6	25 x 3.5	25 -0+0,3	2.5 -0+0,5	25 x 2.3	25 -0+0,3	2.3 -0+0,4
32 x 5.4	32 -0+0,3	5.4 -0+0,7	32 x 4.4	32 -0+0,3	4.4 -0+0,6	32 x 2.9	32 -0+0,3	2.9 -0+0,4
40 x 6.7	40 -0+0,4	6.7 -0+0,8	40 x 5.5	40 -0+0,4	5.5 -0+0,7	40 x 3.7	40 -0+0,4	3.7 -0+0,5
50 x 8.3	50 -0+0,5	8.3 -0+1,0	50 x 6.9	50 -0+0,5	6.9 -0+0,8	50 x 4.6	50 -0+0,5	4.6 -0+0,6
63 x 10.5	63 -0+0,6	10.5 -0+1,2	63 x 8.6	63 -0+0,6	8.6 -0+1,0	63 x 5.8	63 -0+0,6	5.8 -0+0,7
75 x 12.5	75 -0+0,7	12.5 -0+1,4	75 x 10.3	75 -0+0,7	10.3 -0+1,2	75 x 6.8	75 -0+0,7	6.8 -0+0,8
90 x 15.0	90 -0+0,9	15.0 -0+1,6	90 x 12.3	90 -0+0,9	12.3 -0+1,4	90 x 8.2	90 -0+0,9	8.2 -0+1,0
110 x 18.3	110 -0+1,0	18.3 -0+2,0	110 x 15.1	110 -0+1,0	15.1 -0+1,7	110 x 10.0	110 -0+1,0	10.0 -0+1,1
125 x 20.8	125 -0+1,2	20.8 -0+2,3	125 x 17.1	125 -0+1,2	17.1 -0+2,0	125 x 11.4	125 -0+1,2	11.4 -0+1,3
160 x 26.6	160 -0+1,5	26.6 -0+2,9	160 x 21.9	160 -0+1,5	21.9 -0+2,4	160 x 14.6	160 -0+1,5	14.6 -0+1,7
200 x 33.2	200 -0+1,8	33.2 -0+3,6	200 x 27.4	200 -0+1,8	27.4 -0+3,0	200 x 18.2	200 -0+1,8	18.2 -0+2,1
-	-	-	250 x 34.2	250 -0+2,1	34.2 -0+3,6	250 x 22.7	250 -0+2,1	22.7 -0+2,5

2.2 Sizes of Product – Fittings

Name	Diameter Range (mm)	Name	Diameter Range (mm)
Socket	20-160	Adaptor Female	20-32
Reducer	20-160	Hex. Adaptor Male	32-75
Elbow 90°	20-160	Adaptor with Nut	20-25
Elbow 45°	20-160	Elbow Male	20-32
Elbow 90° Female	20-32	Elbow Female	20-32
Elbow 45° Female	20-32	Wall Connection Elbow	20-25
T Part	20-160	Elbow with Nut	20-25
Reducer T Part	20-110	Double Elbow	20-25
End Cap	20-160	Double Elbow-Adjustable	20-25
Threaded Cap	20-32	Double Elbow-Short	20
Long Threaded Cap	20	T Part Male	20-32
Cross	20-40	T Part Female	20-32
Bracket	20-32	Union Male	20-63
Double Bracket	20-25	Union Female	20-63
Double Bracket with Dowel	20-25	PP Union	20-90
Pipe Bridge	20-32	Stop Valve	20-32
V Pipe Bridge with Socket	20-32	Chromium Valve	20-32
C Pipe Bridge with Socket	20-25	Chromium Valve-Concealed	20-32
Flange Adaptor	20-160	Ball Valve	20-32
Adaptor Male	20-32	PP Ball Valve	20-90
Hex. Adaptor Male	32-75		

2.3 Sizes of Product – Accessories

Name	Description	Name	Description
Classic Welding Set	1500W 110Volt / 220Volt	Welding Adaptors	20m-160mm
Maxi Welding Set	2000W 110Volt / 220Volt	Foil Shave for Stabi Super	20mm-110mm
Desktop Welding Set	1200W	Foil Shave for Stabi Centro	20mm-90mm

2.4 Delivery Status of Products

PPR Monolayer			
DN	m / Bag		
	SDR6	SDR7.4	SDR11
20	100	100	100
25	100	100	100
32	40	40	40
40	40	40	40
50	20	20	20
63	20	20	20
75	12	12	12
90	12	12	12
110	8	8	8
125	4	4	4
160	4	4	4
200	1	1	1
250	-	1	1

2.5 Physical and Chemical Properties of Product

- **Density at 23°C:** 0,9 g/cm³ (ISO 1183)
- **Melt Flow Rate (resin):**
- **0.3 g/10 min** (MFR 230/2.16) (ISO 1133)
- **Expansion Coefficient:** 150.10⁻⁶ m.m⁻¹. K⁻¹ (DIN 53752)
- **Thermal Conductivity:** 0.24 W. m⁻¹. K⁻¹ (DIN 52612)
- **Modulus of Elasticity:** 900 Mpa (ISO 527)

2.6 Quality Assurance

2.6.1 Raw Material Control

Testing the incoming resin is the first step in the quality control program. Resins are checked for contamination, melt flow rate (MFI), DSC, OIT and density. This ensures that incoming materials conform to specified requirements according to EN, ISO, DIN and ASTM standard.

2.6.2 Process Control

The quality control standards require inspections to be carried out on all finished products and tests to be performed on samples from every production batch. All results recorded in our systems are used for product development and optimization of the manufacturing process. Finished products are only accepted if all tests and inspections conform to the prescribed procedures and specifications.

2.6.3 Finished Product Control

In the end of production, label, packaging, writing type, import-export and shipping control are examined. Finished products are only released to stock when all tests and inspections pass to the prescribed procedures and specifications.

2.7 Marking

SERENEPLAST pipes come with one marking line and the printings on the pipe contain all data required in the standards.

2.7.1 Marking of PN20 / SDR 6 Monolayer Pipes

SP SERENEPLAST PP-R HOT & COLD WATER PIPE SDR 6/S2.5 PN20 20X3,4 -A-TS EN ISO 15874-2 DIN 8077/8078 GERMANY STANDARD CLASS 1/10,2/8,4/10,5/6 bar < Production Date & Time > Machine No - Batch No - Supervisor's initials < Certification Logos >

2.7.2 Marking of PN16 / SDR 7.4 Monolayer Pipes

SP SERENEPLAST PP-R HOT & COLD WATER PIPE SDR 7,4/S3,2 PN16 20X2,8 -A-TS EN ISO 15874-2 DIN 8077/8078 GERMANY STANDARD CLASS 1/8,2/6,4/10,5/6 bar < Production Date & Time > Machine No - Batch No - Supervisor's initials < Certification Logos >

2.7.3 Marking of PN10 / SDR 11 Monolayer Pipes

SP SERENEPLAST PP-R HOT & COLD WATER PIPE SDR 11/S5 PN10 25X2,3 -A-TS EN ISO 15874-2 DIN 8077/8078 GERMANY STANDARD CLASS 1/6,2/4,4/6 bar < Production Date & Time > Machine No - Batch No - Supervisor's initials < Certification Logos >

2.8 Standard Compliance

ISO 15874-1	Plastic piping systems for hot and cold water installations - Polypropylene (PP)
ISO 15874-2	Plastic piping systems for hot and cold water installations - Polypropylene (PP) - Part 2: Pipes
ISO 15874-3	Plastic piping systems for hot and cold water installations - Polypropylene (PP) - Part 3: Fittings
DIN 8077	Polypropylene (PP) pipes - PP-H, PP-B, PP-R, PP-RCT - Dimensions
DIN 8078	Polypropylene (PP) pipes - PP-H, PP-B, PP-R, PP-RCT - General Quality Requirements and Testing
DIN 16962	Pipe Joints and Elements for Polypropylene Pressure Pipes
DIN 16928	Pipe Joints, Elements for Pipes, Laying - General Conditions
DIN 1988	Drinking Water Supply Systems, Materials, Components, Appliances, Design and Installation
DIN 2999	Threads for Pipes and Fittings
DVGW W 542	Composite Pipes for Drinking Water Installations - Quality Requirements and Testing
DVGW W 270	Reproduction of Microorganisms on Materials for Drinking Water Applications
KTW	Requirements Plastics Used for Drinking Water
DVS 2207	Welding of Thermoplastic Materials
DVS 2208	Machines and Instruments for Welding of Thermoplastic Materials

