

**PP-RCT PIPES
& FITTINGS**

1st Company

*in South Asia to Introduce
PP-RCT Technology*

100% Leak Proof Technology for Industrial Piping Systems



SAKKTHI POLYMERS is an ISO 9001 2015 Certified Company which was started during the Year 1997 by Er. P. Mohan, M.D&CEO. He was graduated from Annamalai University and subsequently studied PLASTIC ENGINEERING at CIPET, Chennai and got a huge passion to work with Plastics.

SAKKTHI POLYMERS is situated at Sankari, a panchayat town in Salem, on the National Highway between Salem and Coimbatore. Firstly, we imported world's best raw materials and started manufacturing PPR Pipes & Fittings under the brand name EUROAQUA and AIRGUARD (India's Largest Manufacturer), which we later exported to 15 countries. Recently we started manufacturing PP RCT Pipes & Fittings by procuring raw materials from Borealis, Austria & Lyondell Basell, Germany. We say it with pride that we are the First Company in South Asia to introduce the same. We are the very first manufacturer of PPR-C Pipes and Fitting in South India and PP-RCT Pipes in South Asia.

Advanced Innovation in PPR Technology – PP-RCT

30 Years ago there was a new Plastic Pipe Technology introduced for Hot & Cold Water Pipe Systems, Heating Systems, Chemical & Compressed Air Line Systems and So on compared to conventional piping materials. Plastic materials are rapidly replacing Copper pipes and fittings in domestic plumbing and heating systems throughout the world.

Over the last 20 years pressure pipe systems made from Polypropylene Random Co-Polymers (PPR) have been widely adopted by the plumbing and heating industry in numerous countries around the world. However, while over the period systems, components have been progressively improved, the basic plastic used has remained essentially the same.

The introduction of pipe made from plastic resin PP-R (Polypropylene Random Co-Polymer) in India brought great relief to plumbers and end users towards economical and sustainable solution. Since then these pipes have been mainly used with advantages:

- Good long-term hydrostatic strength
- Good impact resistance
- Meet regulations for materials in contact with drinking water
- Good organoleptic properties (Taste & Odour)
- Good flexibility
- Economic system

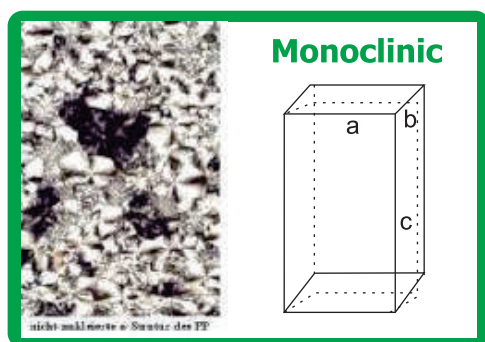
Considering the adoption of PPR pipes with above properties, there was a need to introduce improved material which has better internal pressure properties, whereby end user can have further economized piping system cost for same working conditions or facilitate to go for higher pressure and temperature application. Keeping this in view, new resin material Polypropylene with Random Crystallinity Temperature (PP-RCT) was introduced in 2008.

This powerful innovation in PPR Plumbing Technology was successfully introduced in the Plumbing World. PP-RCT introduction was possible due to Beta Nucleation Technology which can improve crystallization process.

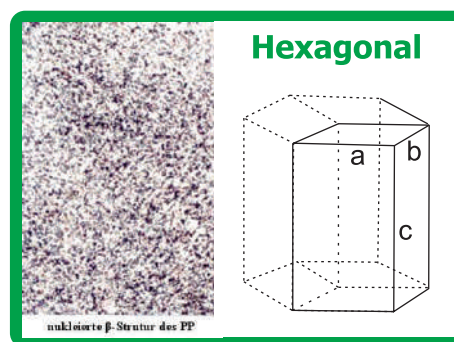
What is PP-RCT Structure and Advantages of PP-RCT Material?

PP-RCT is a Polypropylene-Random-Copolymer which possesses a unique morphology. In comparison to standard PP-R, which displays only the monoclinic form (α -form), the crystal structure of PP-RCT consists to a high degree of the Hexagonal form (β -form) and to some minor extent of the monoclinic form. This " β -nucleation" process enhances the crystalline structure which enables pipes produced from the material to operate at higher stresses at elevated temperatures. Pressure tests on pipes manufactured from PP-RCT materials demonstrates a 50 year strength at **70°C of 5 Mpa** compared to the 3.2 MPa for standard PPR materials. Offering more than a 50% improvement in long-term strength, PP-RCT enables designers to select thinner walled pipes and in some situations also smaller diameter pipes can be used. This results in higher pipe hydraulic capacity or the possibility to apply higher pressure than with standard PPR with PP-RCT (Polypropylene Random Crystallinity Temperature) is the newest generation and has better mechanical characteristics than PPR. The improved mechanical characteristics come from the crystalline structure of the resin giving the material the ability to operate at higher stresses at elevated temperatures.

Ultimately PP-RCT Pipes provide best Hydraulic Efficiency, Safety and reduces Cost.



PPR crystallizes in the monoclinic form (α - structure)



PP-RCT Crystallizes in the hexagonal form (β - structure)

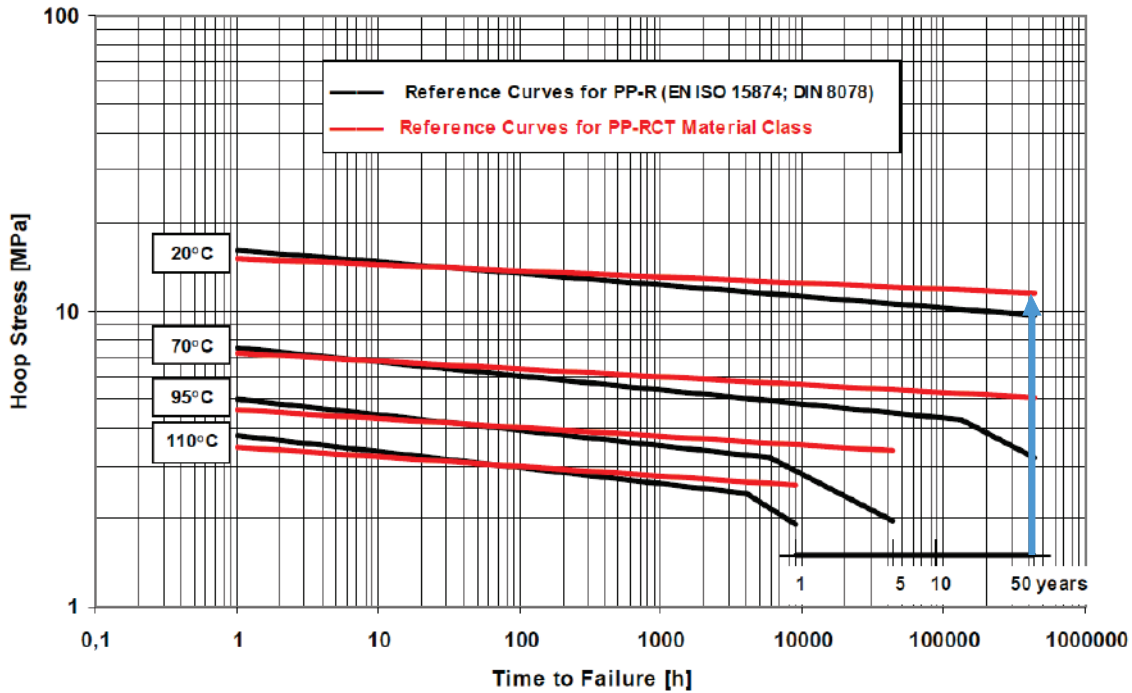
Long Term Hydraulic Pressure Performance of PP-RCT

One of the most important properties of a Polymer material used for Hot and Cold water pressure pipes its resistance to internal pressure at different temperatures. A standardized method to evaluate this behavior is described in ISO 9080.

When evaluated in accordance with EN ISO 15494:2015 Plastic Piping Systems for Industrial Application, the applicable PP-types shall have a minimum required strength, MRS as below table :

PP-type	MRS-value
PPR	≥ 8.0 Mpa
PP-RCT	≥ 11.2 Mpa

Comparison of PPR and PP-RCT long term Hydrostatic Pressure Performance Curves



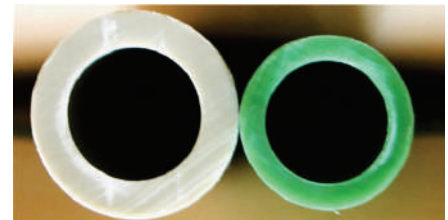
The long term performance of PP-RCT at higher temperature is superior compared to standard PPR material.

Classification of service Conditions according to the product standards for plastics piping systems for hot and cold water installations.

Application class	Design Temperature T_D °C	Time at T_D year	Maximum Design Temperature T_{max} °C	Time at T_{max} year	Malfunction Temperature T_{mal} °C	Time at T_{mal} h	Typical field of application
1	60	49	80	1	95	100	Hot water supply (60°C)
2	70	49	80	1	95	100	Hot water supply(70°C)

Based on Design Stress Values the comparison of PPR and PP-RCT is given below

	Operating pressure 8 bar (116 psi)		Operating pressure 10 bar (145 psi)	
	PP-R	PP-RCT	PP-R	PP-RCT
Application class 1 60°C hot water supply	S 3.2 SDR 7.4	S 4 SDR 9	S 2.5 SDR 6	S 3.2 SDR 7.4
Application class 2 70°C hot water supply	S 2.5 SDR 6	S 4 SDR 9	S 2 SDR 5	S 3.2 SDR 7.4



Another way of looking at the performance of a plastic pipe is to consider the permissible operating pressure for a given dimension at a specified temperature and service life. This is chosen in DIN 8077 which shows tables for the permissible operating pressures for PP pipes. A Comparison of the permissible operating pressures (including a safety factor of 1.5) for pipes of different dimensions made of PPR and PP-RCT is give below.

Design Principles: Permissible Operation Pressures (Safety Factor = 1.5)

Temp [°C]	Operating Time	S 2 SDR 5		S 2.5 SDR 6		S 3.2 SDR 7.4		S 4 SDR 9	
		PPR	PP-RCT	PPR	PP-RCT	PPR	PP-RCT	PPR	PP-RCT
20	[Years]								
	10	34.5	39.8	27.4	31.6	21.7	25.1	17.2	19.9
	25	33.3	39.1	26.4	31.0	21.0	24.6	16.6	19.6
40	50	32.4	38.5	25.7	30.6	20.4	24.3	16.2	19.3
	10	24.7	29.5	19.6	23.4	15.5	18.6	12.3	14.7
	25	23.7	28.9	18.8	22.9	15.0	18.2	11.9	14.4
60	50	23.1	28.4	18.3	22.6	14.5	17.9	11.5	14.2
	10	17.5	21.2	13.9	16.8	11.0	13.4	8.7	10.6
	25	16.7	20.7	13.3	16.5	10.5	13.1	8.4	10.4
70	50	16.2	20.4	12.9	16.2	10.2	12.8	8.1	10.2
	10	14.6	17.8	11.6	14.1	9.2	11.2	7.3	8.9
	25	12.7	17.4	10.0	13.8	8.0	10.9	6.3	8.7
80	50	10.7	17.0	8.5	13.5	6.7	10.7	5.3	8.5
	10	10.2	14.8	8.1	11.7	6.4	9.3	5.1	7.4
	25	8.1	14.4	6.5	11.4	5.1	9.1	4.1	7.2

This again demonstrates the better performance of the new material class in that pipes made of PP-RCT which can withstand much higher operating pressures than pipes of the same dimension made PPR.

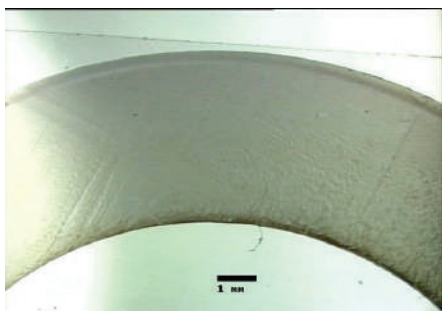
Improvement in Mechanical Properties:

Property		PPR	PP-RCT
MFR230/2,16	[g/10min]	0.3	0.3
Density	[kg/m ³]	905	905
Tensile Modulus	[Mpa]	900	900
Tensile Stress at Yield	[Mpa]	25	25
Charpy Impact Strength			
23°C, notched	[kJ/m ²]	20	40
0°C, notched	[kJ/m ²]	3.5	4
- 20°C, notched	[kJ/m ²]	2	2

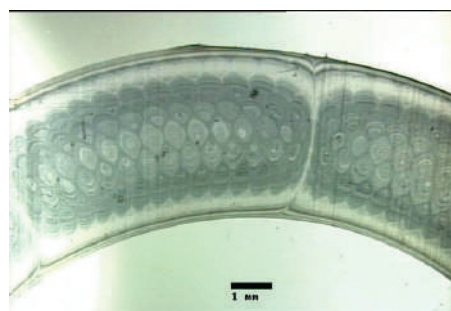
STANDARDS: DIN 8077 / 8078 - and EN ISO 15494:2015 Plastic Piping Systems for Industrial Application

EUROAQUA PP-RCT PIPES

Made from highest quality PP-RCT resin certified as per ISO 9080 which is compound offering better pigment and additive distribution, Long-term mechanical and organoleptic properties of compound approved (Raw material documentation and QA).

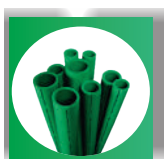


Compounded Material



Online compounded material

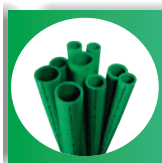
- In India, our EUROAQUA PPR-C Pipes are booming due to Superior Quality & Service and it's Highest & Largest Amount of requirements.
- Most of the biggest Industries have largest requirements of our EUROAQUA PPR Piping Systems.
- After years of our Research, we are introducing the PP-RCT Pipes very first in South Asia.
- Our EUROAQUA PP-RCT Pressure Pipes are very Safe and more Efficient.
- Our PP-RCT Pressure Pipes really suitable for the long period of Operations with Maximum Application of Temperature and Pressure.



EUROAQUA
PP-RCT PIPE -
S 8 / SDR 17 / PN10

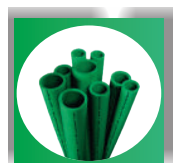
Code	Specification	Pcs/ Bundle
ERCT006	63x3.7 mm	10
ERCT007	75x4.4 mm	5
ERCT008	90x5.3 mm	5
ERCT009	110x6.5 mm	3
ERCT010	125x7.4 mm	1
ERCT011	160x9.4 mm	1

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EUROAQUA
PP-RCT PIPE -
S 5 / SDR 11 / PN16

Code	Specification	Pcs/ Bundle
ERCT101	20x2.3 mm	75
ERCT102	25x2.8 mm	50
ERCT103	32x2.9 mm	30
ERCT104	40x3.7 mm	20
ERCT105	50x4.6 mm	15
ERCT106	63x5.8 mm	10
ERCT107	75x6.8 mm	5
ERCT108	90x8.2 mm	5



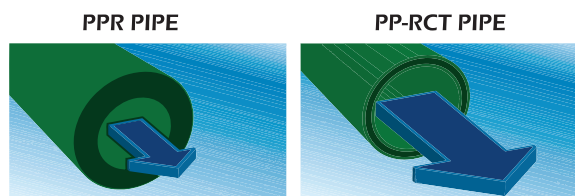
EUROAQUA
PP-RCT PIPE -
S 3.2 / SDR 7.4 / PN20

Code	Specification	Pcs/ Bundle
ERCT201	20x2.8 mm	75
ERCT202	25x3.5 mm	50
ERCT203	32x4.4 mm	30
ERCT204	40x5.5 mm	20
ERCT205	50x6.9 mm	15
ERCT206	63x8.6 mm	10
ERCT207	75x10.3 mm	5
ERCT208	90x12.3 mm	5
ERCT209	110x15.1 mm	3
ERCT210	125x17.1 mm	1
ERCT211	160x21.6 mm	1

Advantages and Main Features of EUROAQUA PP-RCT PIPES

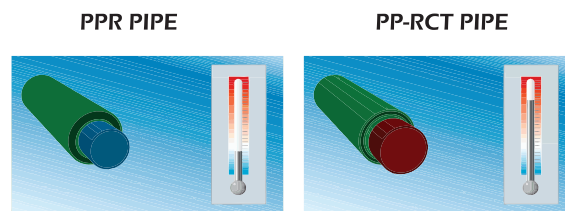
EUROAQUA PP-RCT Advanced Piping Technology is a New High Technology System of PP-RCT Pipes, that is suitable for liquid transportation, Chemical Lines, Compressed Air Lines & Systems using High Pressure.

Higher Flow Rate



- Reduced Wall Thickness leads a Higher Flow.
- Rate for Same and Higher Pressure Load.
- 37% Higher flow rate to compare Normal PP-R Pipes.

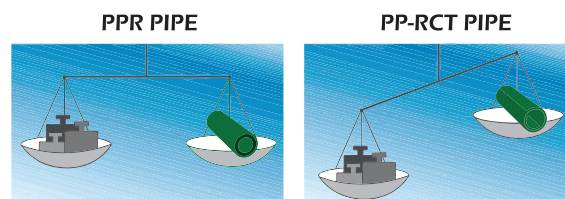
Higher Stability



- PP-RCT Pipes are Working in Maximum Temperature at Higher Pressure Resistance up to 110°C.

Lower Weight

- When the Wall Thickness of the PP-RCT Pipes get reduce, the Weight of the PP-RCT Pipes is also get reduce.
- Lower Weight is respectively reducing the Labor Requirements and increase of flow.



Higher Pressure Rate

- Reduced Wall Thickness leads a Higher Flow Rate for Same and Higher Pressure Load.

Resistance to Abrasion and Corrosion

- EUROAQUA PP-RCT Pipes are resistance to Abrasion and Corrosion.
- It has High Chemical Resistance & Excellent ESCR- Longer Life.
- It's High Abrasion Resistance made High flow Velocities Possible.



Maximum Working Temperature

- EUROAQUA PP-RCT Pipes are Working up to 110°C Temperature.

Bigger Pressure Resistance

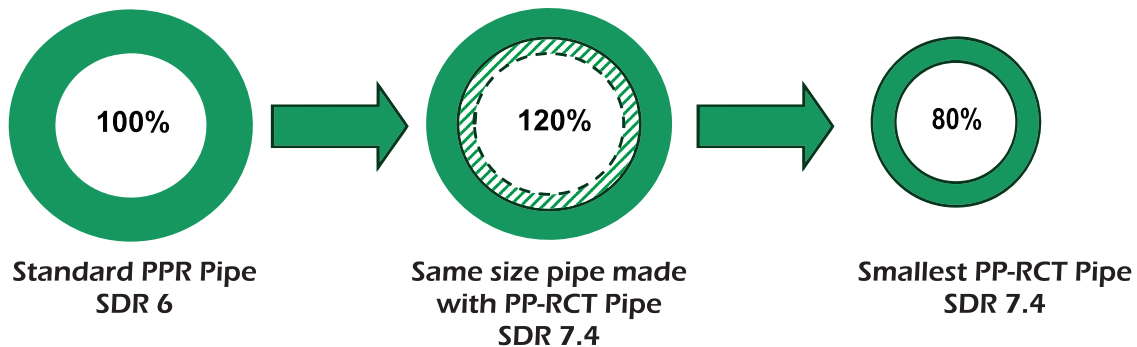
- EUROAQUA PP-RCT Pipes have high Internal Pressure Resistance which provide Minimum 50 Years Life Time.

Reduce Thermal Expansion

- EUROAQUA PP-RCT Pipes Reduce Thermal Expansion by up to 70%, It reduces the no of Expansion Loops, Elbow Offsets & Expansion Joints & Lower Cost for Installation.

Reduced Costs

“Reduced Systems Cost” : Maintain water flow using a higher percentage of smaller sized pipes



- PP-RCT Pipes have 18% Reduced Wall Thickness to compare PPR Pipes, this respectively increase the inside area of the pipe.
- So that we can replace a certain percentage of smaller size pipes with equivalent flow rates of larger Size of PPR pipes.
- This will help us to Reduce Pipe System Costs, Pipe Insulation Costs & Labor Costs.
- Example: $\phi 75$ mm SDR 6 PPR Pipes can be Replaced with $\phi 63$ mm SDR 7.4 PP-RCT Pipes.

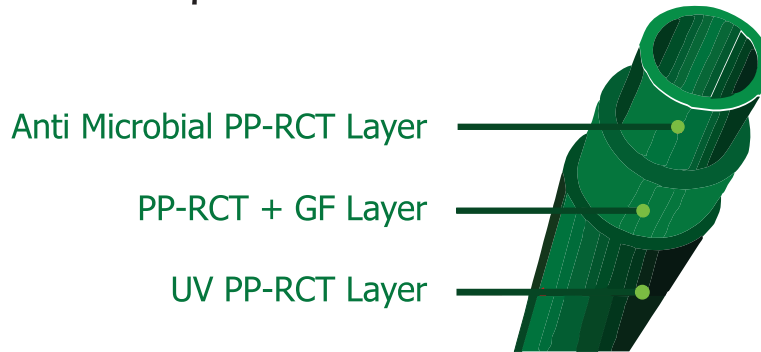
Benefits of EUROAQUA PP-RCT Pipes

- EUROAQUA PP-RCT Pipe Offers higher Hydraulic capacity with lesser outer diameter (or) the same outer diameter.
- Our EUROAQUA PP-RCT Pipe System requires a higher percentage of smaller pipes in any kind of installations.
- Easy to install with the same welding technology use for PPR Pipes.
- EUROAQUA PP-RCT Pipes reduce the cost and provide efficient plumbing lines.
- EUROAQUA PP-RCT Pipes are easy to exchange with existing PPR Pipe Lines.
- EUROAQUA PP-RCT Pipes are perform best with High temperature radiators with the higher temperature.



EUROAQUA PP-RCT Composite Pipe

- EUROAQUA PP-RCT Fibre Composite Pipes are consist of three layers such as PP-RCT inner & Outer layer and PP-RCT Glass Fiber Mixture of middle layer.
- This pipe is suitable for Cooling & Air Conditioning systems, Drinking water & Sanitary installations and Industrial Pipe line constructions.



Advantages of EUROAQUA PP-RCT Composite Pipe

- It has Lower Wall Thickness and Best Suitable to work with very higher pressure Load.
- It has greater flow rate from 14% up to 17% and to Compare normal PPR Composite Pipes, PP-RCT Pipes are working in maximum working temperatures .
- PP-RCT Composite Pipes have greater compression Strength, Longer Stress Times, Greater Stability in greater clamp distances, less linear expansion from heat.
- Due to reduce wall thickness respectively it has lower weight.

Linear Expansion

For Hot water and Heating Installation it is necessary to consider Linear Expansion and the installations must be Planned & performed accordingly.

For PP-RCT Fiber Composite Pipe the Linear Co-efficient of Thermal Expansion is calculated with the following Formula:

$$\Delta t = 0.35 \cdot 10^{-4} \text{ (K}^{-1}\text{)}$$

The Linear Expansion of a Pipe is calculated with the Following Formula:

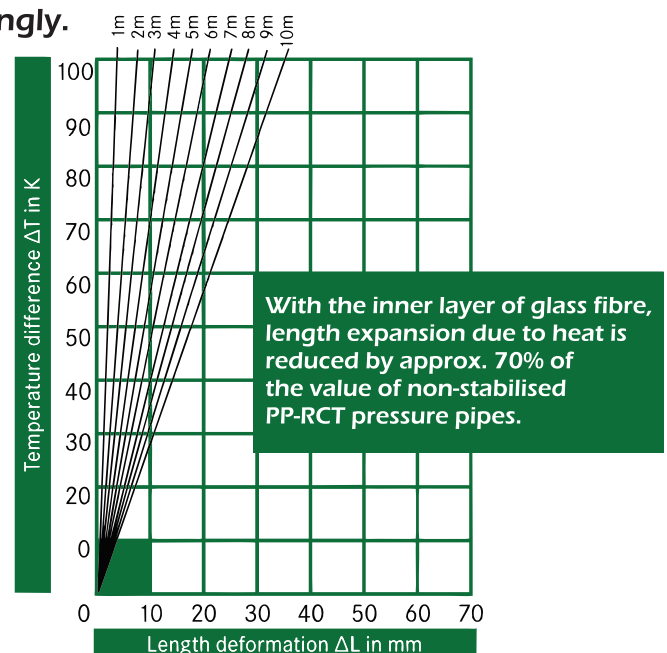
$$\Delta l = \epsilon t \cdot L \cdot \Delta t \text{ (mm)}$$

Δl = Linear expansion (in mm)

ϵt = Co-efficient of thermal expansion (in mm / m °C)

L = Pipe length (in m)

Δt = Temperature difference (in °K)



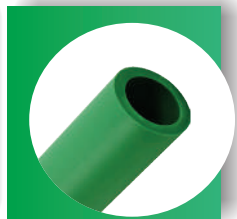
EUROAQUA PP-RCT COMPOSITE PIPE - S 8 / SDR 17 / PN12.5



Code	Specification	Pcs/ Bundle
ERCT406	63x3.7 mm	10
ERCT407	75x4.4 mm	5
ERCT408	90x5.3 mm	5
ERCT409	110x6.5 mm	3
ERCT410	125x7.4 mm	1
ERCT411	160x9.4 mm	1

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EUROAQUA PP-RCT COMPOSITE PIPE - S 5 / SDR 11 / PN16



Code	Specification	Pcs/ Bundle
ERCT504	40x3.7 mm	20
ERCT505	50x4.6 mm	15
ERCT506	63x5.8 mm	10
ERCT507	75x6.8 mm	5
ERCT508	90x8.2 mm	5
ERCT509	110x10.0 mm	3
ERCT510	125x14.4 mm	1
ERCT511	160x 4.6 mm	1

EUROAQUA PP-RCT COMPOSITE PIPE - S 4 / SDR 9 / PN20



Code	Specification	Pcs/ Bundle
ERCT603	32x3.6 mm	30
ERCT604	40x4.4 mm	20
ERCT605	50x5.6 mm	15
ERCT606	63x7.0 mm	10
ERCT607	75x8.3 mm	5
ERCT608	90x10.0 mm	5
ERCT609	110x12.2 mm	3
ERCT610	125x13.9 mm	1
ERCT611	160x17.8 mm	1

Table for the Determination of Temperature-Related Length Deformation for PP-RCT Fibre Composite Pipes (PP-RCT with Embedded PP-RCT Glass Fibre Layer).

Pipe Length	10	20	30	40	50	60	70	80	90	100
0.1 m	0.04	0.07	0.11	0.14	0.18	0.21	0.25	0.28	0.32	0.35
0.2 m	0.07	0.14	0.21	0.28	0.35	0.42	0.49	0.56	0.63	0.70
0.3 m	0.11	0.21	0.32	0.42	0.53	0.63	0.74	0.84	0.95	1.05
0.4 m	0.14	0.28	0.42	0.56	0.70	0.84	0.98	1.12	1.26	1.40
0.5 m	0.18	0.35	0.53	0.70	0.88	1.05	1.23	1.40	1.58	1.75
0.6 m	0.21	0.42	0.63	0.84	1.05	1.26	1.47	1.68	1.80	2.10
0.7 m	0.25	0.49	0.74	0.98	1.23	1.47	1.72	1.96	2.21	2.45
0.8 m	0.28	0.56	0.84	1.12	1.40	1.68	1.96	2.24	2.52	2.80
0.9 m	0.32	0.63	0.95	1.26	1.58	1.89	2.21	2.52	2.84	3.15
1.0 m	0.35	0.70	1.05	1.40	1.75	2.10	2.45	2.80	3.15	3.50
2.0 m	0.70	1.40	2.10	2.80	3.50	4.20	4.90	5.60	6.30	7.00
3.0 m	1.05	2.10	3.15	4.20	5.25	6.30	7.35	8.40	9.45	10.50
4.0 m	1.40	2.80	4.20	5.60	7.00	8.40	9.80	11.20	12.60	14.00
5.0 m	1.75	3.50	5.25	7.00	8.75	10.50	12.25	14.00	15.75	17.50
6.0 m	2.10	4.20	6.30	8.40	10.50	12.60	14.70	16.80	18.90	21.00
7.0 m	2.45	4.90	7.35	9.80	12.25	14.70	17.15	19.60	22.05	24.50
8.0 m	2.80	5.60	8.40	11.20	14.00	16.80	19.60	22.40	25.20	28.00
9.0 m	3.15	6.30	9.45	12.60	15.75	18.90	22.05	25.20	28.35	31.50
10.0 m	3.50	7.00	10.50	14.00	17.50	21.00	24.50	28.00	31.50	35.00

Length deformation ΔL in mm

Design Principles

As Per ISO 10508 Standard, For a Particular Application the required pipe series are calculated and chosen from the Design Stress & the Operation Pressure

Table for the Design Stress of PPR and PP-RCT

Operating Pressure	Class 1 (60°C)		Class 2 (70°C)		Class 4 (Under Floor Heating)		Class 5 (High Temperature Radiator)	
	PPR	PP-RCT	PPR	PP-RCT	PPR	PP-RCT	PPR	PP-RCT
4 bar	S 5	S 6.3	S 5	S 6.3	S 5	S 6.3	S 3.2	S 6.3
6 bar	S 5	S 5	S 3.2	S 5	S 5	S 5	S 3.2	S 4
8 bar	S 3.2	S 4	S 2.5	S 4	S 3.2	S 4	S 2.0	S 3.2
10 bar	S 2.5	S 3.2	S 2.0	S 3.2	S 3.2	S 3.2	--	S 2.5

$$\text{Pipes Series: } S = \frac{\text{SDR}-1}{2}$$

Application Classes

- Class 1 - Hot Water Supply 60°C (140°F)
- Class 2 - Hot Water Supply 70°C (158°F)
- Class 4 - Underfloor Heating and Low Temperature Radiators
- Class 5 - High Temperature Radiators

Design Principles: Permissible Operating Pressures (Safety factor = 1.5) DIN 8077 / 8078

Temp [°C]	Operating Time	S 2 SDR 5		S 2.5 SDR 6		S 3.2 SDR 7.4		S 4 SDR 9		S 5 SDR 11		S 8 SDR 17		S 12.5 SDR 26	
		PPR	PP-RCT	PPR	PP-RCT	PPR	PP-RCT	PPR	PP-RCT	PPR	PP-RCT	PPR	PP-RCT	PPR	PP-RCT
10	[Years]														
	1	44.1	47.9	35.1	38.0	27.8	30.2	22.1	24.0	17.5	19.0	11.1	12.0	7.0	7.5
	5	41.6	46.4	33.0	36.9	6.2	29.3	20.8	23.2	16.5	18.4	10.4	11.6	6.6	7.3
	10	40.5	45.8	32.2	36.4	25.6	28.9	20.3	22.9	16.1	18.2	10.1	11.5	6.4	7.2
	25	39.2	45.0	31.1	35.7	24.7	28.4	19.6	22.5	15.6	17.9	9.8	11.3	6.2	7.1
	50	38.2	44.4	30.3	35.3	24.1	28.0	19.1	22.2	15.2	17.7	9.6	11.1	6.0	7.0
20	100	37.2	43.8	29.6	34.8	23.5	27.6	18.6	21.9	14.8	17.4	9.3	11.0	5.9	6.9
	1	37.7	41.7	29.9	33.1	23.7	26.3	18.8	20.9	15.0	16.6	9.4	10.4	5.9	6.6
	5	35.4	40.4	28.1	32.0	22.3	25.4	17.7	20.2	14.1	16.0	8.9	10.1	5.6	6.4
	10	34.5	39.8	27.4	31.6	21.7	25.1	17.2	19.9	13.7	15.8	8.6	10.0	5.4	6.3
	25	33.3	39.1	26.4	31.0	21.0	24.6	16.6	19.6	13.2	15.5	8.3	9.8	5.2	6.1
	50	32.4	38.5	25.7	30.6	20.4	24.3	16.2	19.3	12.9	15.3	8.1	9.6	5.1	6.1
30	100	31.5	38.0	25.0	30.2	19.9	24.0	15.8	19.0	12.5	15.1	7.9	9.5	5.0	6.0
	1	32.0	36.1	25.4	28.7	20.2	22.7	16.0	18.1	12.7	14.3	8.0	9.0	5.0	5.7
	5	30.0	34.9	23.8	27.7	18.9	22.0	15.0	17.4	11.9	13.9	8.5	8.7	4.7	5.5
	10	29.2	34.4	23.2	27.3	18.4	21.7	14.6	17.2	11.6	13.6	7.3	8.6	4.6	5.4
	25	28.1	33.7	22.3	26.8	17.7	21.2	14.1	16.9	11.2	13.4	7.0	8.4	4.4	5.3
	50	27.4	33.2	21.7	26.4	17.2	20.9	13.7	16.5	10.9	13.2	6.8	8.3	4.3	5.2
40	100	26.6	32.7	21.1	26.0	16.8	20.6	13.3	16.4	10.6	13.0	6.6	8.2	4.2	5.1
	1	27.2	31.0	21.6	24.6	17.1	19.6	13.6	15.5	10.8	12.3	6.8	7.8	4.3	4.9
	5	25.4	29.9	20.2	23.8	16.0	18.9	12.7	15.0	10.1	11.9	6.3	7.5	4.0	4.7
	10	24.7	29.5	19.6	23.4	15.5	18.6	12.3	14.7	9.8	11.7	6.2	7.4	3.9	4.6
	25	23.7	28.9	18.8	22.9	15.0	18.2	11.9	14.4	9.4	11.5	5.9	7.2	3.7	4.5
	50	23.1	28.4	18.3	22.6	14.5	17.9	11.5	14.2	9.2	11.3	5.8	7.1	3.6	4.5
50	100	22.4	28.0	17.8	22.2	14.1	17.6	11.2	14.0	8.9	11.1	5.6	7.0	3.5	4.4
	1	23.0	26.5	18.2	21.0	14.5	16.7	11.5	13.3	9.1	10.5	5.7	6.6	3.6	4.2
	5	21.4	25.5	17.0	20.3	13.5	16.1	10.7	12.8	8.5	10.1	5.3	6.4	3.4	4.0
	10	20.8	25.1	16.5	19.9	13.1	15.8	10.4	12.6	8.2	10.0	5.2	6.3	3.3	3.9
	25	20.0	24.6	15.9	19.5	12.6	15.5	10.0	12.3	7.9	9.7	5.0	6.1	3.1	3.8
	50	19.4	24.2	15.4	19.2	12.2	15.2	9.7	12.1	7.7	9.6	4.8	6.0	3.0	3.8
60	100	18.8	23.8	14.9	18.9	11.8	15.0	9.4	11.9	7.5	9.4	4.7	5.9	2.9	3.7
	1	19.4	22.5	15.4	17.8	12.2	14.2	9.7	11.2	7.7	8.9	4.8	5.6	3.0	3.5
	5	18.8	21.6	14.3	17.1	11.3	13.6	9.0	10.8	7.1	8.6	4.5	5.4	2.8	3.4
	10	17.5	21.2	13.9	16.8	11.0	13.4	8.7	10.6	6.9	8.4	4.3	5.3	2.7	3.3
	25	16.7	20.7	13.3	16.5	10.5	13.1	8.4	10.4	6.6	8.2	4.2	5.2	2.6	3.2
	50	16.2	20.4	12.9	16.2	10.2	12.8	8.1	10.2	6.4	8.1	4.0	5.1	2.5	3.2
70	1	16.3	18.9	12.9	15.0	10.3	11.9	8.1	9.4	6.5	7.5	4.1	4.7	2.5	3.0
	5	15.1	18.1	12.0	14.4	9.5	11.4	7.5	9.1	6.0	7.2	3.8	4.5	2.4	2.8
	10	14.6	17.8	11.6	14.1	9.2	11.2	7.3	8.9	5.8	7.0	3.6	4.4	2.3	2.8
	25	12.7	17.4	10.0	13.8	8.0	10.9	6.3	8.7	5.0	6.9	3.1	4.3	2.0	2.7
	50	10.7	17.0	8.5	13.5	6.7	10.7	5.3	8.5	4.2	6.8	2.6	4.2	1.7	2.7
	80	1	13.7	15.8	10.8	12.5	8.6	9.9	6.8	7.9	5.4	6.2	3.4	3.9	2.1
5		12.1	15.1	9.6	12.0	7.6	9.5	6.0	7.5	4.8	6.0	3.0	3.7	1.9	2.3
10		10.2	14.8	8.1	11.7	6.4	9.3	5.1	7.4	4.0	5.9	2.5	3.7	1.6	2.3
25		8.1	14.4	6.5	11.4	5.1	9.1	4.1	7.2	3.2	5.7	2.0	3.6	1.2	2.2
95	1	9.6	11.8	7.6	9.4	6.1	7.4	4.8	5.9	3.8	4.7	2.4	2.9	1.5	1.8
	5	6.5	11.2	5.2	8.9	4.1	7.1	3.2	5.6	2.6	4.4	1.6	2.8	1.0	1.7

This again demonstrates the better performance of the new material class in that pipes made of PP-RCT can withstand much higher operating pressures than pipes of the same dimension made PPR.

BRASS BALL VALVE



CODE	SPEC	PCS/CTN
EH201	20mm	75
EH202	25mm	55
EH203	32mm	40
EH204	40mm	30
EH205	50mm	20
EH206	63mm	10

STOP VALVE



CODE	SPEC	PCS/CTN
EH001	20mm	120
EH002	25mm	80
EH003	32mm	60
EH004	40mm	40
EH005	50mm	50
EH006	63mm	20

DOUBLE UNION BALL VALVE



CODE	SPEC	PCS/CTN
EH301	20mm	75
EH302	25mm	55
EH303	32mm	40
EH304	40mm	30
EH305	50mm	25
EH306	63mm	12

CONCEALED VALVE



CODE	SPEC	PCS/CTN
EH401	20mm	70
EH402	25mm	70
EH403	32mm	60

MALE THREAD COUPLER



CODE	SPEC	PCS/CTN
EB301	20x1/2"	320
EB302	20x3/4"	200
EB303	25x1/2"	200
EB304	25x3/4"	200
EB305	32x1/2"	200
EB306	32x3/4"	200
EB307	32x1"	100
EB308	40x1-1/4"	64
EB309	50x1-1/2"	50
EB310	63x2"	24
EB311	75x2-1/2"	20
EB312	90x3"	15
EB313	110x4"	6

FEMALE THREAD COUPLER



CODE	SPEC	PCS/CTN
EB201	20x1/2"	320
EB202	20x3/4"	250
EB203	25x1/2"	250
EB204	25x3/4"	250
EB205	32x1/2"	250
EB206	32x3/4"	200
EB207	32x1"	100
EB208	40x1-1/4"	80
EB209	50x1-1/2"	50
EB210	63x2"	34
EB211	75x2-1/2"	20
EB212	90x3"	15
EB213	110x4"	6

CONCEALED STOP VALVE



CODE	SPEC	PCS/CTN
EH501	20mm	60
EH502	25mm	50
EH503	32mm	42

MALE THREAD ELBOW



CODE	SPEC	PCS/CTN
EE401	20x1/2"	300
EE402	25x1/2"	240
EE403	25x3/4"	200
EE404	32x1/2"	120
EE405	32x3/4"	130
EE406	32x1"	100

FEMALE THREAD ELBOW



CODE	SPEC	PCS/CTN
EE201	20x1/2"	320
EE202	25x1/2"	250
EE203	25x3/4"	200
EE204	32x1/2"	140
EE205	32x3/4"	120
EE206	32x1"	100
EE207	40x1-1/4"	50
EE208	50x1 1/2"	35

WELD SADDLE (FEMALE THREAD)



CODE	SPEC	PCS/CTN
Eb801	40x1/2"	225
EB802	50x1/2"	225
EB803	63x1/2"	225
EB804	63x3/4"	225
EB805	75x1/2"	225
EB806	75x3/4"	225
EB807	90x1/2"	225
EB808	90x3/4"	225
EB809	110x1/2"	225
EB810	110x3/4"	225
EB811	125x1/2"	225
EB812	125x3/4"	225
EB813	160x1/2"	225
EB814	160x3/4"	225
EB815	160x1/2"	225
EB816	160x3/4"	225

MALE THREAD TEE



CODE	SPEC	PCS/CTN
EC301	20x1/2"	225
EC302	25x1/2"	160
EC303	25x3/4"	120
EC304	32x1/2"	130
EC305	32x3/4"	100
EC306	32x1"	70

FEMALE THREAD TEE



CODE	SPEC	PCS/CTN
EC201	20x1/2"	250
EC202	25x1/2"	200
EC203	25x3/4"	160
EC204	32x1/2"	120
EC205	32x3/4"	120
EC206	32x1"	80
EC207	40x1-1/4"	40

PIPE CUTTER



CODE	SPEC	PCS/CTN
Em005	20-32mm	70
EM006	20-40mm	55
EM007	20-63mm	6

MALE THREAD UNION



CODE	SPEC	PCS/CTN
EI201	20x1/2"	200
EI202	25x3/4"	200
EI203	32x1"	100
EI204	40x1 1/4"	80
EI205	50x1-1/2"	50
EI206	63x2"	20

FEMALE THREAD UNION



CODE	SPEC	PCS/CTN
EI101	20x1/2"	240
EI102	25x3/4"	240
EI103	32x1"	150
EI104	40x1 1/4"	80
EI105	50x1-1/2"	60
EI106	63x2"	20

METAL UNION



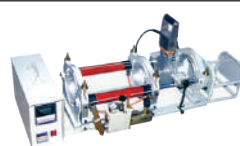
CODE	SPEC	PCS/CTN
EI301	20mm	200
EI302	25mm	200
EI303	32mm	100
EI304	40mm	80
EI305	50mm	50
EI306	63mm	20

WELDING DEVICE



CODE	SPEC	PCS/CTN
EL101	20-32mm	9
EL102	20-32mm ROUND	10
EL103	20-40mm	9
EL104	20-63mm	8
EL105	75-110mm	4
EL106	160mm	1

WELDING DEVICE (HYDRAULIC PUMP)



CODE	SPEC	PCS/CTN
EL005	90-160mm	1

WELDING SADDLE DIE



CODE	SPEC	PCS/CTN
EI201	40x20mm	100
EL202	50x20mm	100
EL203	63x32mm	80
EL204	75x32mm	80
EL205	90x32mm	80
EL206	110x32mm	80
EL210	125x32mm	80
EL207	160x32mm	100
EL208	160x40mm	70
EL209	160x63mm	70

* Different designs available to choose.

Joining of the PP-RCT System

- PP-RCT pipes and fittings are joined with the socket fusion welding process
- The method is identical to the procedure used for standard PP-R and is described in DVS 2207 Part 11
- Plumbers don't need to learn a new method or invest in new equipment

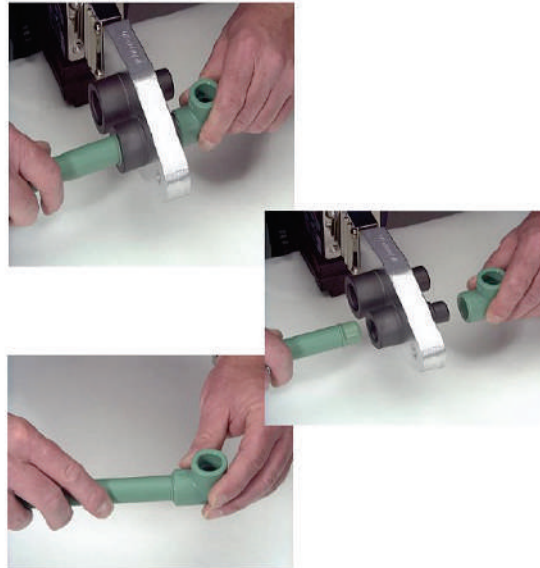
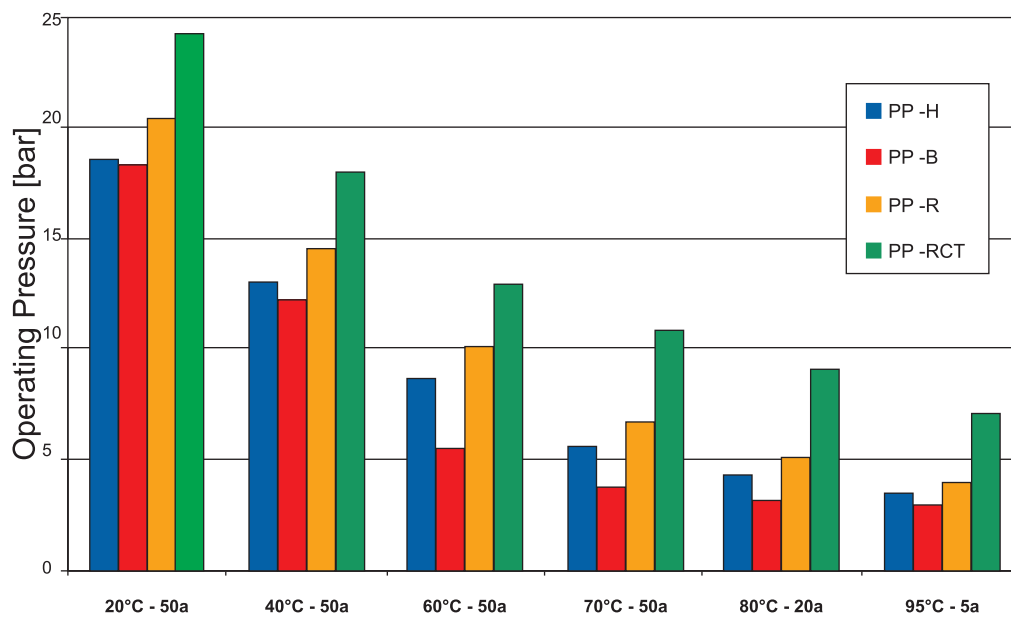


Table for the determination of Temperature-Related Length Deformation for PP-RCT Fibre Composite Pipes (PP-RCT with Embedded PP-RCT glass fibre layer).



WELD - IN SADDLE

EUROAQUA PP-RCT Weld-in-Saddle is the innovative and easy method of doing Industrial Installations. It avoids the usage of many Reducer's & Tees in the Pipe Installations. It reduces the cost and gives better appearance to the installation.

Advantages of Weld In Saddle

- It Provides good line appearances.
- It is best substitution of Reducing Tees.
- It provides better way for making branches in main line & Risers.
- It helps to fix sensors (Like temperature, pressure gauge, etc.,) easily.
- It save time & cost and make good & easy pipe installation possible.



DRILL WITH PROPER DIA AND MAKE CORRECT ID HOLE



HEAT UP THE WELD-IN SADDLE AND ID OF THE PIPE WITH PROPER DIE'S



FUSE WELD-IN SADDLE WITH PIPE PERMANENTLY



WELD-IN SADDLES AVAILABLE FROM 40MM to 160MM SIZE

Applications of EUROAQUA PP-RCT Pipes

Commercial Applications

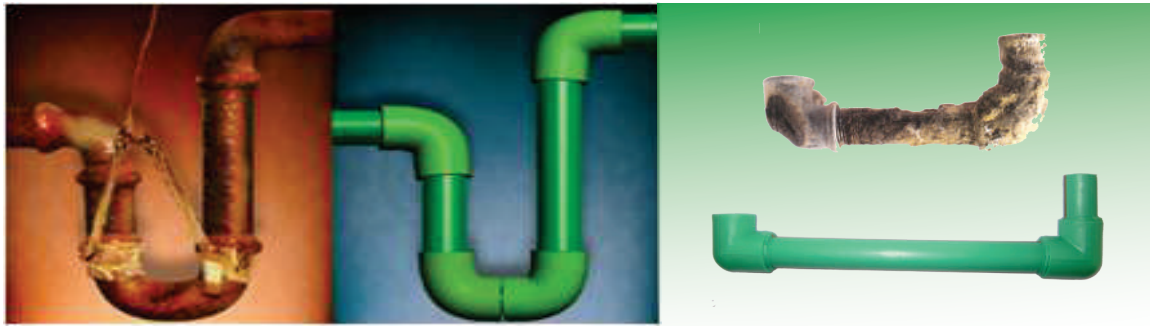
- | | | |
|---|--|--|
| <ul style="list-style-type: none"> ➤ Hot / Cold Portable Water Supply ➤ Cooling Tower Water Supply ➤ Return / Re-Circulation Lines ➤ Boiler / Hot Water Pipelines (Not for Steam) | <ul style="list-style-type: none"> ➤ Chilled Water Distribution ➤ Chilled Beams ➤ Propylene and Ethylene Glycol Distribution ➤ Hydronic Heating Distribution | <ul style="list-style-type: none"> ➤ Plant Water Distribution ➤ Chemical Process Piping ➤ Compressed Air ➤ Rain Water Applications ➤ Geothermal Interior Piping |
|---|--|--|

Faculties Utilizing EUROAQUA PP-RCT Pipes

- | | | |
|---|--|---|
| <ul style="list-style-type: none"> ➤ Libraries ➤ Schools ➤ Universities ➤ Hospitals ➤ Hotels | <ul style="list-style-type: none"> ➤ Industrial Plants ➤ Aggregate and Mining Plants ➤ Liquid Fertilizer Plants ➤ Pulp and Paper Plants ➤ Petrochemical | <ul style="list-style-type: none"> ➤ Natural Gas Plants ➤ Fuel Oil Power Plants ➤ Solar Plants ➤ Food and Beverage Plants ➤ Chemical Processing Plants |
|---|--|---|

Industrial Applications

- | | |
|---|---|
| <ul style="list-style-type: none"> ➤ Acid / Caustic Lines ➤ Acid Mining ➤ Acid Bath ➤ Organic / Inorganic Chemicals | <ul style="list-style-type: none"> ➤ Hazardous Waste ➤ Portable & Waste Water Applications ➤ Liquid Fertilizer ➤ Ultra Pure Water Lines ➤ Compressed Air |
|---|---|



CERTIFICATES

सेन्ट्रल इंस्टिट्यूट ऑफ प्लास्टिक्स
इंजीनियरिंग एण्ड टेक्नोलॉजी
(संस्थान पूर्व उर्जाक मंत्रालय, भारत सरकार)
चिप्ली, चेन्नै - 600 032.
फोन : 22254701-06 फैक्स : 91-44-22254707

**परीक्षण रिपोर्ट
TEST REPORT**

क्र.सं / SI. No. : **9740**
रिपोर्ट सं. / REPORT NO. : **51275**
Pages.....2.....Nos. Part A,B,C & D
दिनांक / Date : **10th August, 2016**

को जारी / Issued to :
**M/s.Sakthi Polymers,
Edappadi Main Road,
Kuppanoor (P.O),
Sankari - 637 301.**

संदर्भ / Ref. : Dtd.27.07.2016
परीक्षण मानक स्तर के अनुसार परीक्षण रिपोर्ट / TEST REPORT AS PER TEST STANDARD : Refer Part C

भाग - क / PART - A

प्रस्तुत नमूने का विवरण / PARTICULARS OF SAMPLE SUBMITTED

- अ) नमूने का नाम / a) Name of the Sample : (1) PP RCT Pipes - 63mm PN16 & PN 20
(2) PP - RCT Raw material
-as stated by the party
- आ) नमूने प्राप्त होने की तारीख / b) Date of Receipt of sample : 28.07.2016
- इ) ग्रेड/प्रकार/आकार/वर्ग / c) Grade / variety / type / size / class : Not applicable
- ई) घोषित मूल्य / d) Declared value, If any : Not applicable
- उ) कोड सं. / e) Code No. : Not applicable
- ऊ) बैच सं. एवं निर्माण तारीख / f) Batch No. and Date of Manufacture: Not applicable
- अक्ष) मात्रा / g) Quantity : (1) 1 mtr l x 20 nos (2) 3 kg
- एच) पैकेजिंग की शैली / h) Mode of Packing : Packed in woven sack
- जे) मोहर बंद या नहीं / i) Sealed or not : Not sealed
- जेड) कोई अन्य सूचना / j) Any other information : --

भाग - ख / PART - B

अनुपूरक सूचनाएँ / SUPPLEMENTARY INFORMATIONS

- अ) नमूने का निरीक्षण करने की प्रक्रिया / a) Reference to sampling procedure : Sampling not done by this lab
- आ) माप करने के लिए गए सहायक दस्तावेज एवं प्राप्त परिणाम / b) Supporting documents for the measurement taken and result derived : As given in Part C
- इ) संबंधित मानक अनुदेशों में निर्धारित के अनुसार परीक्षण शैली से कोई विचलन / c) Deviation from the test method as prescribed in relevant work instructions, if any : No deviation from the standard

7501 to 10,000 / AVP / 18.02.2016

1 of 2

सेन्ट्रल इंस्टिट्यूट ऑफ प्लास्टिक्स
इंजीनियरिंग एण्ड टेक्नोलॉजी
(संस्थान पूर्व उर्जाक मंत्रालय, भारत सरकार)
चिप्ली, चेन्नै - 600 032.
फोन : 22254701-06 फैक्स : 91-44-22254707

**परीक्षण रिपोर्ट
TEST REPORT**

क्र.सं / SI. No. : **9740**
रिपोर्ट सं. / REPORT NO. : **51275**
दिनांक / Date : **10.08.2016**

भाग - ग / PART - C

परीक्षण परिणाम / TEST RESULTS

Test Duration: 28.07.2016 to 10.08.2016

Sample details : PP-RCT Pipe
Dia : 63mm, PN 16

Standard : DIN-8077:2008-09, DIN 8078 :2008-09

Sl. No.	Clause	Property	Unit	Results obtained	Specified Requirements
1	5.4	Long term Hydrostatic strength test a) Test Temperature : 20°C Hoop stress : 15MPa Stressing period : 1 hr		Confirms	The pipes shall not leak or otherwise fail during the specified stressing period.
		b) Test Temperature : 95°C Hoop stress : 4.0 MPa Stressing period : 22 hrs		Confirms	

Sample details : PP-RCT Pipe
Dia - 63mm, PN 20

Sl. No.	Clause	Property	Unit	Results obtained	Specified Requirements
1	5.4	Long term Hydrostatic strength test a) Test Temperature : 20°C Hoop stress : 15MPa Stressing period : 1 hr		Confirms	The pipes shall not leak or otherwise fail during the specified stressing period.
		b) Test Temperature : 95°C Hoop stress : 4.0 MPa Stressing period : 22 hrs		Confirms	

Sample details : PP-RCT Raw material

Sl. No.	Property	Standard	Unit	Results obtained	Specified Requirements
1	Melt flow rate (MFR) @ 230°C/2.16 kg	ASTM D 1238	g/10min	0.26	--

PART - D

REMARKS - Nil

NOTE:

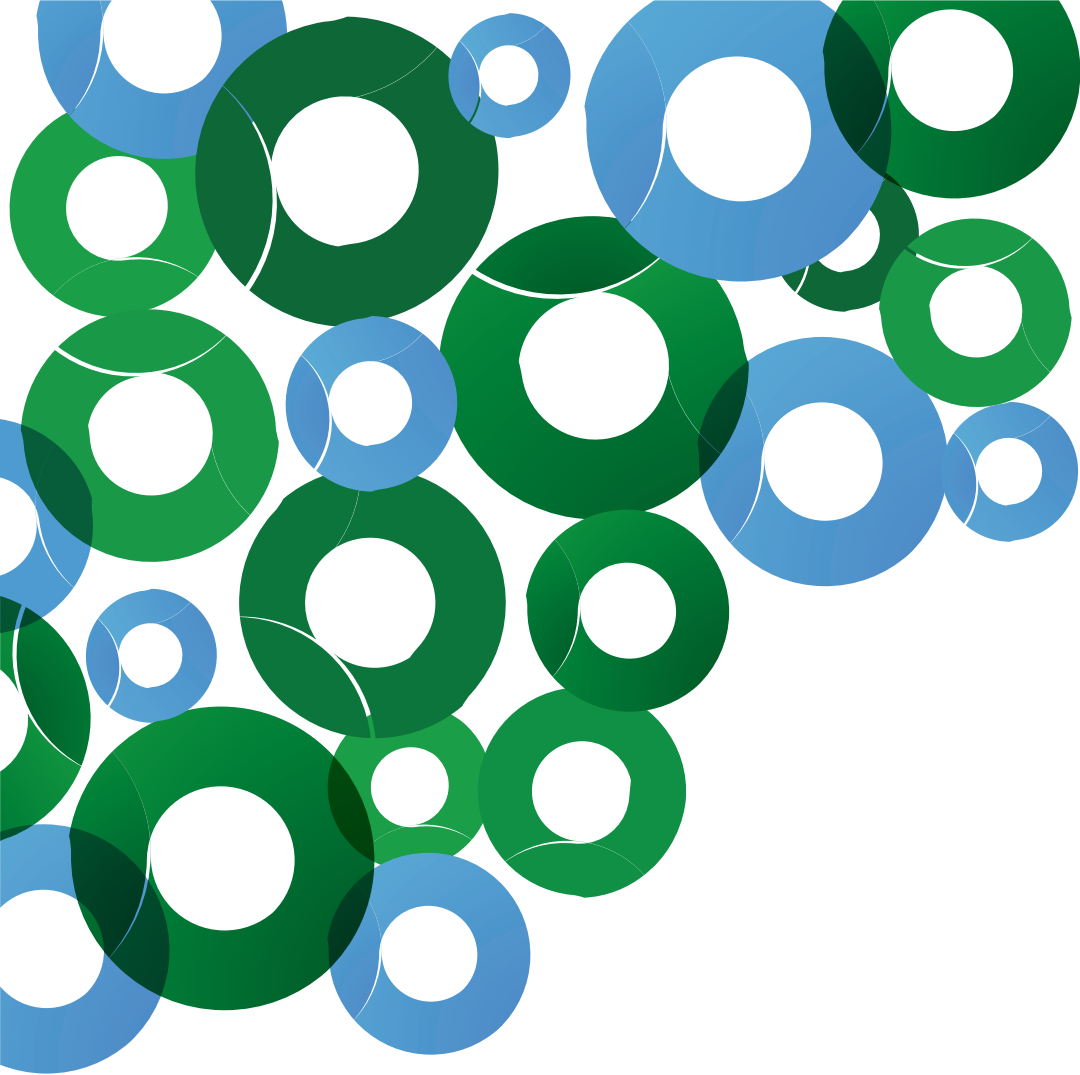
- The results related only to the items tested as supplied by the party.
- The test certificate shall not be reproduced in full except without the written approval of the laboratory.

7501 to 10,000 / AVP / 18.02.2016

AUTHORISED SIGNATORY

Horizontal lines for notes





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