

IS: 15801: 2008



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# EUROAQUA®

PPR & PP-RCT PLUMBING TECHNOLOGY

## Globally Accepted 100% Leak Proof Technology Piping Systems



**PPR & PP-RCT PLUMBING TECHNOLOGY**

Transportation of Water | Air | Strong Chemicals ,  
Used in Food | Sugar | Leather | Paper Industries  
And in Infrastructure .

DIN 8077 / 8078 PIPES  
DIN 16962 FITTINGS  
ISO 9001 : 2015 CERTIFIED COMPANY

EUROAQUA®  
**Airguard**  
PNEUMATIC PIPING



**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.

During the year 2015, the Company had a vision to expand and broaden *its* base and launched a new range of products related to plumbing under the Brand Name "**PLUMTEK**," which includes a Complete Range of **ABS TAPS, FAUCETS & VALVES**. Presently the product has been well established in Domestic & International markets and the brand "**PLUMTEK**" has been well registered in the Market.

**SAKKTHI POLYMERS** is delivering the products with highest quality standards to give its customers "**The Zero Defect Products**". The company has got a well-equipped Laboratory for testing inward raw materials and finished products with high quality QC Department. From the inspiration we got from the '**MAKE IN INDIA**' Concept, we promise that in the coming years, the Company has big plans to launch many New Products under the Brand Name "**PLUMTEK**" to achieve the magical figures.

Let us work together for achieving the greater growth for mutual benefits.



**ADVANCED PIPING SYSTEM**

**What is PPR :** (POLYPROPYLENE RANDOM CO-POLYMER) PPR is a thermoplastic polyolefin which is processed into pipes & fittings with superior chemical & physical properties. PPR, PPR-C, PP-RC, PPR Pipe-These are all Same Materials.

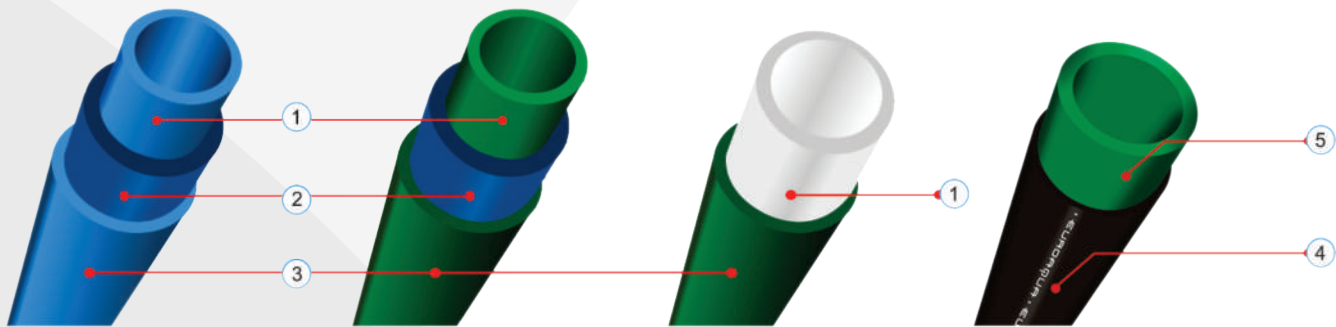
**Why We need PPR :** They are the best high carriers of pressure portable water (both Hot and Cold) in domestic as well as in industrial applications (chemicals & compressed air lines) in terms of excellent quality & price.

**When we need PPR :** When long term performance under adverse conditions without deviation in the standards are required, high ESCR is needed.

**Where we need PPR :** Areas of Advanced Piping / hot water / Water tight systems / corrosion resistance / No encrustation tendency/ Noise dampening plastic material / Long term pressure resistance applications / Chemical resistance / no leakage during its lifetime.

**PPR-FRP PIPES**

**PPR-2 LAYER PIPES**



① Anti-Microbial PPR Layer ② Glass Fiber Compound-FRP ③ UV Stabilized PP-R+FR Layer ④ Strong UV Stabilized Black PPR Layer ⑤ PPR - Layer Pipes

**PRECAUTIONS**

**TRANSPORT & HANDLING :** The products should be handled with normal care. Pipes and fittings with imperfections should not be installed.

**EXPOSURE TO UV RAYS :** It is recommended to do some protective outer layer /outer coating and avoid direct sun light exposures

**BENDING :** Large bends can be obtained by cold forming. If the bend radius is 8 times shorter than the dia of the pipe, it is recommended to heat up the part concerned by means of a hot air blower.

**THREADED JOINTS :** To ensure tightness, Teflon or similar products can be used.

**WELDING :** Only chemically similar materials are supposed to be welded. Thus Polyethylene and Polypropylene should not be welded. For the same material, the products can be welded as they have approximately the same fusion index.

**SUPPORT :** The PPR pipes are not self-contained so it is necessary to support them at specific distances.

**PIPE CUTTING :** Cutting should be carried out by using tools which ensure a clean cut free from burns and perpendicular to the axis.

**LOW TEMPERATURES :** At temperatures below - 5 deg C, following precautions should be taken :

- Pay attention when cutting the pipe.
- Avoid impact and excessive strains.
- Check the cut made.
- Not to make elbows with very narrow radius.

In the presence of cold draughts, welding must be carried out in protected areas, to avoid quick cooling of the surfaces.



EUROAQUA & AIRGUARD PPR PIPES are made up superior raw materials via special techniques. The products belong to green environment protect construction material, which is popular internationally. Inner and outer product layer is very smooth, with small resistance, soft color, and beautiful sculpture. As its weight is only 1/8<sup>th</sup> of the metal pipe, it is convenient to transport and install. The heat guide coefficient is only 1/200<sup>th</sup> of the metal pipe. It is good for hot water pipeline's temperature holding.

THERMOKING PPR - FRP COMPOSITE Pipes also available

**S8.3 SDR17.5 PN06 \***



Code	Specification	Pcs/Bundles
EA506	63x3.6	10
EA507	75x4.3	5
EA508	90x5.2	5
EA509	110x6.3	3
EA510	125X7.2	3
EA511	* 160x9.2	1

**S5 SDR11 PN10**



Code	Specification	Pcs/Bundles
EA001	20x2.0	75
EA002	25x2.3	50
EA003	32x2.9	30
EA004	40x3.7	20
EA005	50x4.6	15
EA006	63x5.8	10
EA007	75x6.8	5
EA008	90x8.2	5
EA009	110x10.0	3
EA010	125X11.4	3
EA011	160x14.6	1

**S4 SDR9 PN12.5 \***



Code	Specification	Pcs/Bundles
EA101	20x2.3	75
EA102	25x2.8	50
EA103	32x3.6	30
EA104	40x4.5	20
EA105	50x5.6	15
EA106	63x7.1	10
EA107	75x8.4	5
EA108	90x10.1	5
EA109	110x12.3	3
EA110	125X13.9	3
EA111	160x17.9	1

**S3.2 SDR7.4 PN16**



Code	Specification	Pcs/Bundles
EA201	20x2.8	75
EA202	25x3.5	50
EA203	32x4.4	30
EA204	40x5.5	20
EA205	50x6.9	15
EA206	63x8.6	10
EA207	75x10.3	5
EA208	90x12.3	5
EA209	110x15.1	3
EA210	125x19.0	3
EA211	160x21.9	1

**S2.5 SDR6 PN20**



Code	Specification	Pcs/Bundles
EA301	20x3.4	75
EA302	25x4.2	50
EA303	32x5.4	30
EA304	40x6.7	20
EA305	50x8.3	15
EA306	63x10.5	10
EA307	75x12.5	5
EA308	90x15.0	5
EA309	110x18.3	3
EA310	* 125X20.9	3
EA311	* 160x26.6	1

**S2 SDR5 PN25 \***



Code	Specification	Pcs/Bundles
EA401	20x4.00	75
EA402	25x5.00	50
EA403	32x6.40	30
EA404	40x8.00	20
EA405	50x10.00	15
EA406	63x12.60	10
EA407	75x15.00	5
EA408	90x18.00	5
EA409	110x22.00	3
EA410	125x25.00	3
EA411	160x32.00	1

★ Special request only

specification : size(mm) x wall thickness(mm)

colors : different colors available



## Advantages & Main Features

EUROAQUA & AIRGUARD PPR ADVANCED PIPING TECHNOLOGY is a new high technology system of pipes and fittings suitable for water supplies in buildings, chemicals & compressed air supply in industries.

### It has many important features including

#### Resistance to Abrasion and Corrosion

- No corrosion by acid and alkaline fluids with pH values between 1 and 14.
- High chemical resistance.
- Excellent ESCR - Longer life.
- High abrasion resistance => high flow velocities possible.

#### High Internal Pressure Resistance

- Minimum 50 years lifetime.

#### No Negative Influence on Water Quality

- Compliance with the international standards like FDA on the use of plastic materials for the transportation of drinking water.
- Since UV treated, it prevents UV passage - prevents growth of bacteria & algae.

#### Very Smooth Surface of Pipes and Fittings

- No limestone or other deposits (non polar nature) and no bacterial & fungal growth.
- Head loss/ pressure drop reduced to a minimum/negligible.

#### Welding Capacity

- 100% homogeneous connections, guaranteeing leak-tight (minimum 50 years), long lasting system.
- Fast and easy installation.
- Very good for concealed and above false roof piping applications.

#### Threaded Insert Fittings

- All threaded inserts are brass (min. 58% Cu) with Chromium plated.
- Watertight assemblies with other metal elements in the installation.

#### Silence / Sound Absorption

- Considerable noise reduction in comparison to metal.

#### Low Specific Weight

- Easy transport and handling.
- Lowest density as compared to conventional metal pipes (1/8<sup>th</sup> times of metal pipe).

#### Reduced Condensation

- Low heat conductivity reduces the condensation of water on the outer surface of cold water pipes.

#### Fitness for use in seismic Areas

- Flexibility and toughness of the PPR pipes are best suited to be used in seismic prone areas.
- The pipe is not prone to any damages.



**COUPLER**

CODE	SPEC	PCS/CTN
EB001	20mm	1600
EB002	25mm	1000
EB003	32mm	560
EB004	40mm	360
EB005	50mm	200
EB006	63mm	100
EB007	75mm	60
EB008	90mm	40
EB009	110mm	24
EB011	125mm	20
EB010	160mm	14



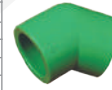
**EQUAL TEE**

CODE	SPEC	PCS/CTN
EC001	20mm	800
EC002	25mm	480
EC003	32mm	230
EC004	40mm	120
EC005	50mm	70
EC006	63mm	40
EC007	75mm	30
EC008	90mm	18
EC009	110mm	9
EC011	125mm	6
EC010	160mm	4



**ELBOW 90°**

CODE	SPEC	PCS/CTN
EE001	20mm	1000
EE002	25mm	650
EE003	32mm	300
EE004	40mm	150
EE005	50mm	100
EE006	63mm	60
EE007	75mm	30
EE008	90mm	20
EE009	110mm	12
EE011	125mm	10
EE010	160mm	5

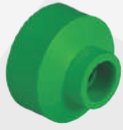


**ELBOW 45°**

CODE	SPEC	PCS/CTN
EE101	20mm	1500
EE102	25mm	750
EE103	32mm	380
EE104	40mm	300
EE105	50mm	150
EE106	63mm	70
EE107	75mm	40
EE108	90mm	22
EE109	110mm	15
EE111	125mm	10
EE110	160mm	7

**REDUCER**

CODE	SPEC	PCS/CTN
EB101	25/20mm	1200
EB102	32/20mm	720
EB103	32/25mm	660
EB104	40/20mm	600
EB105	40/25mm	560
EB106	40/32mm	360
EB107	50/20mm	300
EB108	50/25mm	300
EB109	50/32mm	300
EB110	50/40mm	200
EB113	63/32mm	150
EB114	63/40mm	120
EB115	63/50mm	100
EB118	75/40mm	90
EB119	75/50mm	70
EB120	75/63mm	60
EB122	90/50mm	60
EB124	90/63mm	50
EB125	90/75mm	40
EB128	110/63mm	39
EB129	110/75mm	39
EB130	110/90mm	39
EB133	125/110mm	30
EB131	160/110mm	20
EB132	160/90mm	20



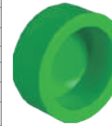
**REDUCER TEE**

CODE	SPEC	PCS/CTN
EC101	25/20/25mm	540
EC102	32/20/32mm	280
EC103	32/25/32mm	250
EC104	40/20/40mm	200
EC105	40/25/40mm	150
EC106	40/32/40mm	130
EC107	50/20/50mm	120
EC108	50/25/50mm	100
EC109	50/32/50mm	80
EC110	50/40/50mm	80
EC112	63/25/63mm	72
EC113	63/32/63mm	72
EC114	63/40/63mm	72
EC115	63/50/63mm	52
EC117	75/25/75mm	40
EC118	75/32/75mm	40
EC119	75/40/75mm	40
EC120	75/50/75mm	32
EC121	75/63/75mm	32
EC122	90/32/90mm	24
EC123	90/40/90mm	24
EC124	90/50/90mm	24
EC125	90/63/90mm	16
EC126	90/75/90mm	16
EC127A	110/32/110mm	14
EC127	110/40/110mm	14
EC128	110/50/110mm	14
EC129	110/63/110mm	12
EC130	110/75/110mm	12
EC131	110/90/110mm	12
EC131A	125/63/125mm	12
EC131B	125/75/125mm	12
EC131C	125/90/125mm	12
EC131D	125/100/125mm	12
EC132A	160/63/160mm	5
EC132B	160/75/160mm	5
EC132C	160/90/160mm	5
EC132	160/110/160mm	5



**REDUCER ELBOW**

CODE	SPEC	PCS/CTN
EE601	25/20/25mm	900
EE602	32/20mm	500
EE603	32/25mm	480
EE604	40/32mm	200
EE604A	40/25mm	200
EE604B	40/20mm	200
EE605	50/40mm	60
EE605A	50/32mm	60
EE605B	50/25mm	60



**END CAP**

CODE	SPEC	PCS/CTN
ED001	20mm	2700
ED002	25mm	1500
ED003	32mm	800
ED004	40mm	520
ED005	50mm	250
ED006	63mm	150
ED007	75mm	100
ED008	90mm	60
ED009	110mm	36
ED011	125mm	25
ED010	160mm	20

**FOUR WAY TEE/ CROSS**

CODE	SPEC	PCS/CTN
EF001	20mm	540
EF002	25mm	360
EF003	32mm	180
EF004	40mm	90



**CLAMP**

CODE	SPEC	PCS/CTN
EG001	20mm	2200
EG002	25mm	1800
EG003	32mm	1100
EG004	40mm	700
EG005	50mm	600
EG006	63mm	500



**BYE-PASS BEND**

CODE	SPEC	PCS/CTN
EJ001	20mm	300
EJ002	25mm	180
EJ003	32mm	80



**FLANGE RINGS ABS**

CODE	SPEC	PCS/CTN
EK203	32mm	100
EK204	40mm	75
EK205	50mm	60
EK206	63mm	60
EK207	75mm	45
EK208	90mm	40
EK209	110mm	36
EK211	125mm	20
EK210	160mm	15



**FLANGE CORE**

CODE	SPEC	PCS/CTN
EK003	32mm	500
EK004	40mm	350
EK005	50mm	300
EK006	63mm	200
EK007	75mm	120
EK008	90mm	80
EK009	110mm	50
EK011	125mm	25
EK010	160mm	22



**FLANGE RINGS PPR**

CODE	SPEC	PCS/CTN
EK103	32mm	100
EK104	40mm	75
EK105	50mm	60
EK106	63mm	60
EK107	75mm	45
EK108	90mm	40
EK109	110mm	36
EK111	125mm	20
EK110	160mm	15



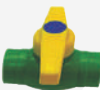
**PLUG**

CODE	SPEC	PCS/CTN
ED101	1/2"	3000
ED102	3/4"	2000
ED103	1"	1000



**PLASTIC BALL VALVE**

CODE	SPEC	PCS/CTN
EH101	20mm	280
EH102	25mm	200
EH103	32mm	120
EH104	40mm	90
EH105	50mm	50
EH106	63mm	24



**LONG PIPE PLUG**

CODE	SPEC	PCS/CTN
ED201	1/2"	900
ED202	3/4"	600
ED203	1"	400

**EXPANSION JOINT**

CODE	SPEC	PCS/CTN
EM001	20mm	400
EM002	25mm	200
EM003	32mm	240



**TANK NIPPLE**

CODE	SPEC	PCS/CTN
EB 303	32mm / 1"	300
EB 304	40mm / 1-1/4"	300
EB 305	50mm / 1-1/2"	200
EB 306	63mm / 2"	100

**HOLE REPAIR BAR & TOOL**

CODE	SPEC	PCS/CTN
EZ001	9MM	
EZ002	11MM	



**PRESSURE TESTER**

CODE	SPEC	PCS/CTN
EP001		1



**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

**CONCEALED STOP VALVE**



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



**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"	150
EB308	40x1-1/4"	60
EB309	50x1-1/2"	50
EB310	63x2"	40
EB311	75x2-1/2"	24
EB312	90x3"	14
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"	150
EB208	40x1-1/4"	80
EB209	50x1-1/2"	50
EB210	63x2"	40
EB211	75x2-1/2"	24
EB212	90x3"	14
EB213	110x4"	6

**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"	120
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"	30



**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
EB813	125x1/2"	225
EB814	125x3/4"	225
EB811	160x1/2"	225
EB812	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	150
EI303	32mm	100
EI304	40mm	80
EI305	50mm	50
EI306	63mm	20

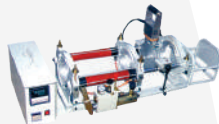
**WELDING DEVICE**



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
EL211	125x40mm	80
EL207	160x32mm	100
EL208	160x40mm	70
EL209	160x63mm	70

\* Different designs available to choose.



## HYGIENIC AND NON TOXIC

All raw materials used in the production of the **EUROAQUA & AIRGUARD** PPR PLUMBING TECHNOLOGY are non-toxic, eco friendly, food grade in accordance with current International Standards. [EXOVA - Body Cote ]

## ENERGY SAVING

Low heat conductivity of PPR leads to 10-20% energy saving. Heat preservation and energy saving greatly minimizes heat losses during hot water flow. The heat conduction Coefficient is 1/200 of metal pipes.

Material (Normally used for Hot Water)	Thermal Conductivity at 20°C ( ) in W/mK
EUROAQUA PP-R PLUMBING TECHNOLOGY	0.1 to 0.24
Iron	45 to 60
Steel	45 to 60
Copper	300 to 400
Aluminium	200 to 250

## TYPES OF PPR & PP-RCT PIPES

- 1) **PPR Mono layer**
- 2) **PPR Double layer with strong black outer UV stabilized**
- 3) **THRMOKING Pipe series**
  - a) PPR-FRP-PPR Three layer with glass fiber reinforcement middle layer
  - b) PPR | FRP | PPR-FR Middle layer with glass fiber reinforcement and outer layer with fire retardant material
- 4) **FIRE SAFE**  
PPR – FR Red in colour can be used for fire safety Piping
- 5) **PPR- Pipes Colours**  
All These pipes are available in  
**EUROAQUA** – Green colour,  
**AIRGUARD** – Blue colour  
and also in all PP-RCT ranges .

## FIELDS OF APPLICATION

- Industrial systems like conveying compressed air pressure, aggressive fluids like acid and alkaline solutions, effluent, sewage disposal and leak Proof Joints
- Water purifying / Pharmaceutical plants for clean water.
- Chilled water circuit for refrigeration units and chillers.
- Lines for conveying liquid food products - Food Grade.
- Hot and Cold water supplying pipes.
- Portable water pipe networks for cold and hot water installations i.e., in residential buildings, hospitals, hotels, office and school buildings, ship buildings etc.
- Sanitary lines.
- Radiator heating pipes, Room heating system, Under floor heating pipes.
- Pipe networks for rainwater utilization systems.
- Pipes for Agriculture use & Horticulture use.



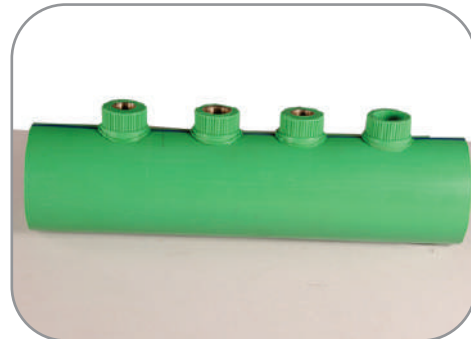
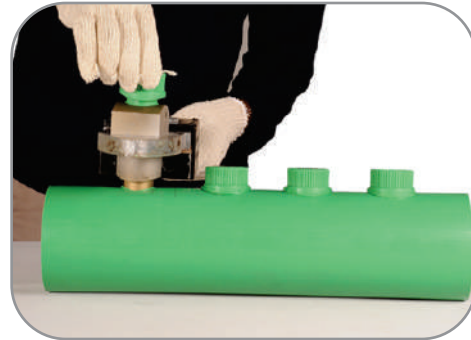


**EUROAQUA / AIRGUARD PPR Weld-in-Saddle** is the innovative and easy method for industrial installations. This is to avoid use of many Reducer / Tees and cost saving also gives better appearance to the installation. For pipes, the sizes are available from 40 mm to 160 mm.

**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**

**ADVANTAGE OF WELD - IN SADDLE**

- Easy & good installation
- Cost & time savings
- Good line appearance

**USES**

- Substitution for reducing tees
- Making branches in main line and Risers
- Sensor fixers like temperature and pressure gauge etc.

**INSULATION FOR CHILLING WATER**

**GI PIPE**



**METAL PIPE**

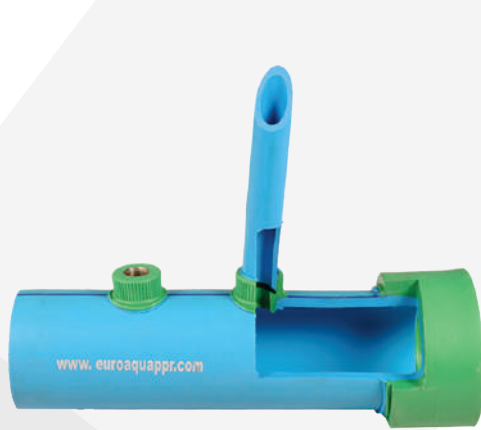


**PPR-C PIPES**



**THERMOKING PPR-FR COMPOSITE PIPES**

**EUROAQUA & AIRGUARD THERMOKING PPR - FRP COMPOSITE** Pipes are specially designed for various industrial needs. It is basically with innovative composite technology of plastic with extremely low thermal coefficient fibre reinforcement. It will control the linear thermal expansion to about 70%, so that PPR pipe line sagging is controlled.



**ADVANTAGE**

- Low thermal conductivity. It requires very thin insulation or no insulation when using chilled water & hot water/chemical applications.
- High resistance to corrosion, acids & chlorides.
- Very good chemical resistance
- High heat stability
- High impact strength
- High Environmental Stress Cracking Ratio (ESCR)
- Very good welding property which ensure leak proof joints, energy savings
- Smooth inner surface, less friction, no noise
- Thermal expansion is controlled by 70%, line sagging is controlled
- Hygienic and Non-Toxic Food Grade

**APPLICATIONS**

- Compressed air lines for Hot and Cold air
- Chilled water application & air conditioning
- Transportation of chemicals & aggressive fluids
- Effluent treatment plants (ETP)
- Ship buildings and swimming pools
- Pharmaceuticals, food grade applications
- Solar heaters, under floor heating
- Vaccum Pipelines
- R.O. Water Pipeline.



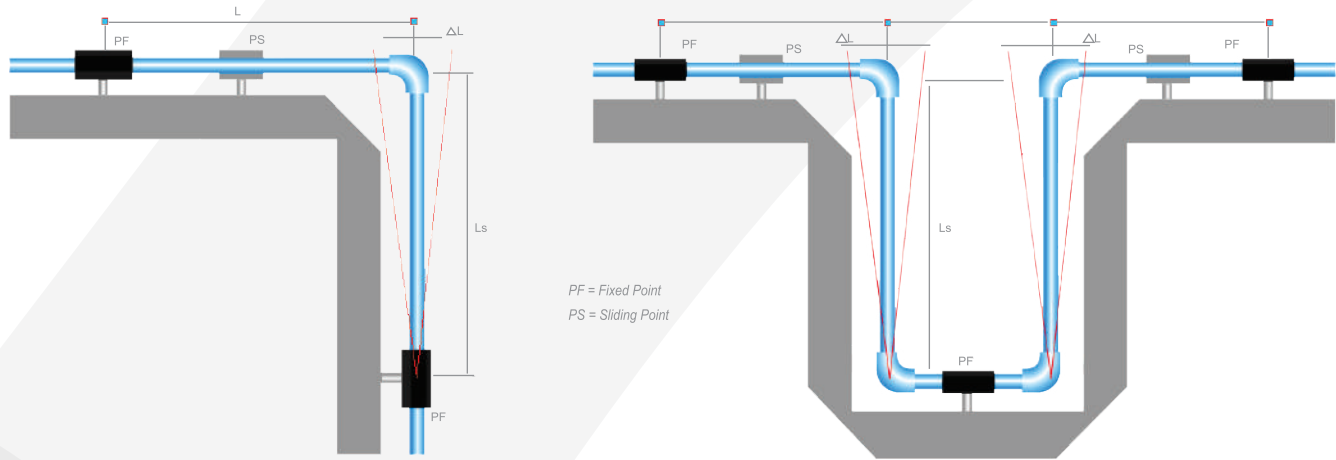
**SUPPORT INTERVALS**

Temperature	Pipe Diameter (m/m)									
	20	25	32	40	50	63	75	90	110	160
<b>Support Intervals (cm)</b>										
0	120	140	160	180	205	230	245	260	290	340
20	90	105	120	135	155	175	185	195	215	270
30	90	105	120	135	155	175	185	195	210	245
40	85	95	110	125	145	165	175	185	200	265
50	85	95	110	125	145	165	175	185	190	205
60	80	90	105	120	135	155	165	175	180	195
70	70	80	95	110	130	145	155	165	170	185



**LINEAR EXPANSION**

The following schemes demonstrate some important cases :



Linear expansion depends on the temperature variation the pipes are exposed to. Cold water pipes have low linear expansion and hence can be neglected. But in case of hot water and heating installations, the linear expansion must be considered and the installations must be planned and performed accordingly.

**CALCULATION OF LINEAR EXPANSION**

Calculation example : Linear Expansion

Given & Required Values

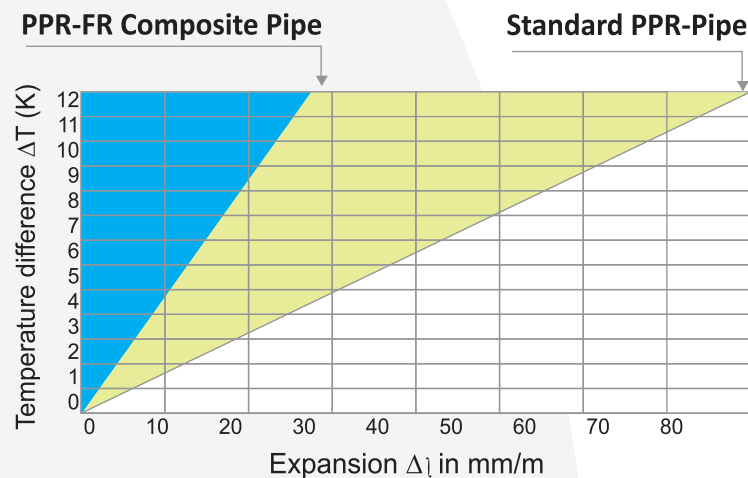
Symbol	Meaning	Value	Measuring Unit
$\Delta$	Linear Expansion	?	mm
$\alpha_1$	Coefficient of Linear expansion Euroquappr stable composite pipe	0.03	mm/mk
$\alpha_2$	Coefficient of Linear expansion Euroquappr Faster composite pipe	0.035	mm/mk
$\alpha_3$	Linear expansion coefficient	0.15	mm/mk
L	Pipe length	25	m
$T_w$	Working temperature	60	°C
$T_M$	Installation temperature	20	°C
$\Delta T$	Temperature Difference between working and installation temperature ( $\Delta T = T_w - T_M$ )	40	K

The Linear expansion  $\Delta l$  is calculated according to the following formula:  $\Delta l = \alpha \times L \times \Delta T$

Material : EUROAQUA® - PPR-FRP Composite Pipe ( $\alpha = 0.03\text{mm/mk}$ )

$\Delta l = 0.03 \text{ mm/mk} \times 25.0 \text{ m} \times 40\text{k}$        $\Delta l = 30.0\text{mm}$

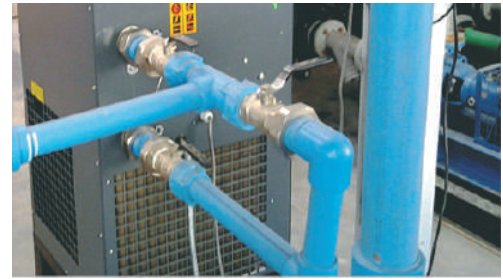
**Length expansion comparison : Faster Composite - to Standard PPR-Pipe**



PERMISSIBLE WORKING PRESSURE

Temperature	Service Life	EUROAQUA & AIRGUARD	EUROAQUA & AIRGUARD
		PPR - FR SDR 11	PPR - FR SDR 7.4
0°C	1	27.8	43.2
	5	26.2	40.7
	10	25.6	39.7
	25	24.7	38.3
	50	24.1	37.4
	100	23.5	36.4
10°C	1	25.7	39.9
	5	24.2	37.5
	10	23.6	36.6
	25	22.8	35.3
	50	22.2	34.4
	100	21.6	33.5
20°C	1	23.8	36.8
	5	22.3	34.6
	10	21.7	33.7
	25	21	32.5
	50	20.4	31.7
	100	19.9	30.9
30°C	1	20.2	31.3
	5	18.9	29.4
	10	18.4	28.6
	25	17.8	27.5
	50	17.3	26.8
	100	16.8	26
40°C	1	17.1	26.6
	5	16	24.9
	10	15.6	24.1
	25	15	23.2
	50	14.6	22.6
	100	14.1	21.9
50°C	1	14.5	22.5
	5	13.5	21
	10	13.1	20.4
	25	12.6	19.6
	50	12.2	19
	100	11.9	18.4
60°C	1	12.2	a
	5	11.4	17.7
	10	11	17.1
	25	10.6	16.4
	50	10.3	15.9
	100	10.3	16
70°C	1	10.3	16
	5	9.6	14.8
	10	9.2	14.3
	25	8	12.5
	50	9.2	10.5
	100	9.4	14.6
75°C	1	8.7	13.5
	5	8	12.5
	10	8	12.5
	25	6.4	10
	50	5.4	8.4
	100	5.4	8.4
80°C	1	8.6	13.4
	5	7.7	11.9
	10	6.5	10
	25	5.2	8
	50	5.2	8
	100	7.2	11.2
90°C	1	7.2	11.2
	5	5.1	7.8
	10	4.3	6.6
	25	4.3	6.6
	50	5.2	9.5
	100	4.5	6.6

INDUSTRIAL PIPING



PN = Normal Pressure  
 $\frac{\text{Outside Dia (OD)}}{\text{Wall thickness}}$

SDR = Standard Diameter Ratio =

$$S = \frac{\text{SDR} - 1}{2} \quad (S = \text{Pipe Index as per ISO:4065})$$



## STANDARD FOR PIPE FITTINGS

STANDARDS	FIELDS
DIN 1998	Drinking water line installation.
DIN 2999	Whitworth pipe threads for tubes and fittings.
DIN 4109	Sound insulation in building constructions.
DIN 8077	Polypropylene (pp)pipes dimensions.
DIN 8078	Polypropylene (pp)pipes general quality requirements and testing.
DIN 16962	Polypropylene (pp)pipes Fittings.
DIN 16928	Pipe connections and components - pipes of thermoplastic materials; pipe joints, element for pipe, laying; general directions.
DIN 16928 (6-9)	Pipe joints and elements for polypropylene (pp) pressure pipelines, types 1 and 2; injection molded elbows for socket - welding, dimension.
DIN 16925.5	Pipe joints and elements for polypropylene (pp) for pipes under, - part 5; General quality
DIN 2207.11	Welding regulations for plastic pipes.
DVS 2203	Test of thermoplastic pipe fitting for weld.
DVS 2208.1	Machines and devices for welding thermoplastic pipes.
EN ISO 15874 (1-7)	Plastic piping systems for hot and cold water installations polypropylene(pp).
IS 15801 : 2008/BIS	BUREAU OF INDIAN STANDARDS - ISI

## TESTING

We have well equipped in house testing facility for the control of quality by

1. Testing of Incoming Raw Materials & additional.
2. Inspection and Testing during production as per standards.
3. Final inspection and dispatch.
4. Periodical calibration of Testing Equipments.



## PP-R vs OTHER PRODUCTS

PROPERTIES	PP-R	GI	COPPER	PE	CPVC	ALUMINIUM
Service Life (YEARS)	50 YEARS PLUS	2-5 YEARS	10- 25 YEARS	20 - 30 YEARS	20 - 30 YEARS	20 - 30 YEARS
Temperature Resistance	Very Good	Excellent	Excellent	Good	Good	Poor
Food Grade	Excellent, Hygienic	Non - Hygienic	Non - Hygienic	Good	Non - Hygienic	Non - Hygienic
Heat Loss	Negligible - Very	Very High	Very High	Moderate	Moderate	High
Chemical Resistance	Excellent	Very Weak	Weak	Good	Good	Weak
Maximum Safe Working Temp 'C'	100	High	High	80	80	High
Easiness in Repair / Maintenance	Easy/Nil	Huge Cost	Huge Cost	Expensive	Expensive	Very Expensive
Corrosion/Abrasion Resistance	Excellent	Very Low	Very Low	Good	Moderate	Good
Friction Factor	Very Low	high	high	Low	Low	Moderate
Reliability	Very Good	Poor	Ok / Expensive	Average	Average	Moderate
Joint Reliability/Leak Proof (Max:100, Min:0)	100	0 - 50	0 - 50	0 - 80	0 - 80	0 - 50
Jointing Method	Simple Heat Fusion	Conventional	Conventional	Butt fusion	Special Solvent Chemical	O-Ring
Jointing Skill	Very Simple & Can Be done by Unskilled Labour	Needs Skilled Labour	Needs Skilled Labour	Needs Skilled Labour	Needs Special Attention & Skilled Labour	Needs Special Attention & Skilled Labour
Jointing Time	Few Seconds	Few Hrs	Few Hrs	Few Minutes	Few Minutes	Few Minutes
Jointing Life Commissioning	Immediate	24 Hours	24 Hours	Few Hrs	24 Hours	Immediate
Easiness in Fittings	Very Easy	Difficult	Difficult	Easy	Easy	Ok
Laying (Easiest = 100 & Hardest = 0)	100	0 - 50	0 - 50	0 - 80	0 - 80	0 - 50
Electrical Conductivity	Nil	More	More	Nil	Nil	More



## Indoor Hot & Cold water Plumbing Pipe & Fittings Pipe Selection Chart

The table lists the permissible working pressure for pipes with different pressure class under specific temperature and work life. Under normal work pressure and condition, the life of EUROAQUA PPR - Pipe System can reach 50 years at least.

Temp °C	PN10 / SDR 11		PW16 / SDR 7.4		PN20 / SDR 6		PN25 / SDR 5	
	Mpa	Kg/ Cm <sup>2</sup>	Mpa	Kg/ Cm <sup>2</sup>	Mpa	Kg/ Cm <sup>2</sup>	Mpa	Kg/ Cm <sup>2</sup>
10	1.91	19.10	3.02	30.20	3.80	38.00	4.78	47.80
20	1.63	16.30	2.58	25.80	3.24	32.00	4.09	40.90
30	1.37	13.70	2.17	21.70	2.73	27.30	3.44	34.40
40	1.15	11.50	1.84	18.40	2.30	23.00	2.90	29.00
50	0.98	9.80	1.55	15.50	1.95	19.50	2.46	24.60
60	0.82	8.20	1.28	12.80	1.62	16.20	2.04	20.40
70	0.62	6.20	0.98	9.80	1.23	12.30	1.55	15.50
80	0.39	3.90	0.65	6.50	0.77	7.70	0.98	9.80
95	0.27	2.70	0.41	4.10	0.52	5.20	0.65	6.50

## WATER CONTENT & WEIGHT / MTR DETAIL

PPR PN 10/SDR 11/S5			PPRPN10/SDR7.4/S3.2		PPRPN 20/SDR 6/S2.5	
Dimension	Lit/m	Kg/mtr	Lit/m	Kg/mtr	Lit/m	Kg/mtr
20MM	0.21	0.107	0.16	0.148	0.14	0.172
25MM	0.32	0.164	0.25	0.23	0.22	0.266
32MM	0.53	0.261	0.43	0.37	0.35	0.434
40MM	0.83	0.412	0.65	0.575	0.56	0.671
50MM	1.31	0.638	1.03	0.896	0.87	1.04
63MM	2.08	1.01	1.65	1.41	1.38	1.65
75MM	2.96	1.41	2.33	2.01	1.96	2.36
90MM	4.24	2.03	3.35	2.87	2.83	3.36
110MM	6.33	3.01	5.11	4.3	4.23	5.01
160MM	13.45	6.38	10.61	9		

## FUSION WELDING DATA

Dimension MM	Welding Depth mm	Heating Time sec	Welding Time sec	Cooling Time min
20	14	5	4	3
25	15	7	4	3
32	17	9	6	5
40	18	13	6	5
50	20	19	6	5
63	25	26	9	7
75	27	32	9	8
90	30	42	9	9
110	34	54	10	9
160	42	65	12	140

## THERMAL CONDUCTIVITY

Material	(W/m k)
PPR	0.24
HDPE	0.45
Concrete	0.80
Steel/Gi	50.2
Copper	400
Aluminium	250

## ENERGY / HEAT LOSS %

Material	(W/m k)
PPR	1
HDPE	1.6
Concrete	3.3
Steel/Gi	200
Copper	1600
Aluminium	1000



## Manufacturers Best Report of PPR Raw Material

TYPICAL PROPERTIES	Method	Value	Unit
<b>Physical</b>			
Melt flow rate	ASTM D 1238		
(230°C/2016Kg)		0.3	g/10 min
(190°C/ 5.0 Kg)		0.5	g/10 min
(230°C/ 5.0 Kg)		1.3	g/10 min
Density	ASTM D 1505	0.9	g/ cm 3
<b>Mechanical</b>			
Tensile strength @ Yield	ASTM D 638	270	Kg/cm2
Flexural Modulus (23°C)	ASTM D 790	8500	Kg/cm2
Tensile Elongation @ Yld	ASTM D 638	10	%
<b>Impact</b>			
Notched izod impact (23°C)	ASTM D 256	23	Kg-cm/cm
<b>Thermal</b>			
Vicat Softening Point	ASTM D1525	123	°C
Thermal Conductivity	ASTM C 177	0.24	
<b>Note : Unit : W/m/K</b>			
Melting Temperature	DSC	141	°C
<b>Note : ISO 11357-3; heating rate : 10 K/min, 2nd heating</b>			
CLTE, Flow (23°C to 80°C)	ISO 11359 - 1, 2	0.00015	Cm/cm/°C
<b>Note : Coefficient of linear thermal expansion</b>			
Heat deflection temperature at 0.46	ASTM D 648	83	°C
<b>Electrical</b>			
Specific Surface resistivity	ASTM D 257/EC 93	>10 ^14	Ohm

## DETERMINATION OF THE LONG-TERM HYDROSTATIC STRENGTH

### ISC1980:2003-evaluation of Hostalen. WW H5416 K from LyondellBasell Industries

The ISO 9080-evaluation of the pipe grade gives the following strength values at 20, 70 °C and 50 years ;

T	Time	LPL	LTHS
20°C	50 yrs	11.38 MPa	12.72 MPa
70°C	50 yrs	3.21 MPa	3.57 MPa

By its LPL value of 11.38 Mpa at 20°C and 50 years the PPR pipe grade hostalen PP H5416 K from LyondellBasell Industries. Has a minimum required strength (MRS) of 11.2 Mpa and is thereby designated PPR 112 according to ISO 12162:2009.

**- Thanks to LYONDELL BASELL, GERMANY**

### Control Point testing according to DIN 8078 of Topilene R 200P from Hyosung Corporation. (KOREA)

A summary of the requirements for PPR pipes and the results obtained are given in the table below:

Characteristic	Requirement [DIN from 1996-04]	Result
Creep Strength	20°C 16.0 Mpa 21h	>1 h Pass
	95°C 3.5 Mpa 21 000 h	>1 000 h Pass
	110°C 1.9 Mpa 28 760 h	>8 760 h Pass

The test date obtained for the Topilene R200P pipes are in conformity with the requirements regarding creep strength according to DIN 8078:1996-04, paragraph 4.4

**- Thanks to HYOSUNG CORPORATION, KOREA**

### Resistance to Internal Pressure

#### Borouge Pte Ltd. (U.A.E)

Summary of the resistance to internal pressure according to ISO 15874-2:2013 and DIN 8078:2008 are presented below.

#### Resistance to internal pressure of PPR RA 140E

T	Requirement		Testing Time to Burst	Result
	Hoop Stress	Time to Burst		
20°C	16.0 MPa	>1 h	505 h	Pass
95°C	4.3 MPa	>22 h	979 h	Pass
95°C	3.8 MPa	>165 h	2123 h	Pass
95°C	3.5 MPa	>1000 h	1953 h	Pass
110°C	1.9 MPa	>8760 h	10409 h	Pass

**- Thanks to BOROUGE Pte. Ltd. U.A.E.**



## CHEMICAL RESISTANCE

### Rating System

This chart rates the chemical resistance of EUROAQUA & AIRGUARD according to the following code:

Note: The user is advised to make his or her own tests to determine the suitability of polypropylene in the particular environment.

#### A = Negligible effect

Should be suitable for all applications where these environmental conditions exist.

#### B = Limited absorption or attack

Should be suitable for most applications, but the user is advised to make his or her own tests to determine the suitability of Polypropylene in the particular environment.

#### C = Extensive absorption and/ or rapid permeation

Should be suitable for applications where only intermittent service is involved, or where the swelling produced has no detrimental effect on the part. The user should make his or her own tests to determine the suitability of Polypropylene in the particular environment.

#### D = Extensive attack

The specimen dissolves or disintegrates.  
Polypropylene is not recommended.

Environment	Conc. %	TEMP., °C		
		20°	60°	100°
Acetic acid (glacial)	97	A	B	-
			(80°C)	
Acetic acid	50	A	A	-
			(80°C)	
Acetic acid	40	A	-	-
Acetic acid	10	A	A	-
Acetone	100	A	A	-
Acetophenone	100	B	B	-
Acriflavine	2	A	A	-
(2% solution in H <sub>2</sub> O)				(80°C)
Acrylic emulsions		A	A	-
Aluminum chloride		A	A	-
Aluminum fluoride		A	A	-
Aluminum sulfate		A	A	-
Alums (all types)		A	A	-
Ammonia (aqueous)	30	A	-	-
Ammonia gas (dry)		A	A	-
Ammonium carbonate	Satd.	A	A	-
Ammonium chloride	Satd.	A	A	-
Ammonium fluoride	20	A	A	-
Ammonium hydroxide	10	A	A	-
Ammonium metaphosphate	Satd.	A	A	-
Ammonium nitrate	Satd.	A	A	-
Ammonium persulfate	Satd.	A	A	-
Ammonium sulfate	Satd.	A	A	-
Ammonium sulfide	Satd.	A	A	-
Ammonium thiocyanate	Satd.	A	A	-
Amyl acetate	100	B	C	-
Amyl alcohol	100	A	B	-
Amyl chloride	100	C	C	-
Aniline	100	A	A	-
Anisole	100	B	B	-
Antimony chloride		A	A	-
Aviation fuel (115/145 octane)	100	B	C	-
Aviation turbine fuel	100	B	C	-

Environment	Conc. %	TEMP., °C		
		20°	60°	100°
Barium carbonate	Satd.	A	A	-
Barium chloride	Satd.	A	A	-
Barium hydroxide		A	A	-
Barium sulfate	Satd.	A	A	-
Barium sulfide	Satd.	A	A	-
Beer		A	A	-
Benzene	100	B	C	C
Benzoic acid	A	A	-	-
Benzyl alcohol		A	A	-
			(80°C)	
Bismuth carbonate	Satd.	A	A	-
Borax		A	A	-
Boric acid		A	A	-
Brine	Satd.	A	A	-
Bromine liquid	100	D	-	-
Bromine water	(a)	C	-	-
Butyl acetate	100	C	C	-
Butyl alcohol	100	A	A	-
Calcium carbonate	Satd.	A	A	-
Calcium chlorate	Satd.	A	A	-
Calcium chloride	50	A	A	-
Calcium hydroxide		A	A	-
Calcium hypochlorite bleach	20(a)	A	B	-
Calcium nitrate		A	A	-
Calcium phosphate	50	A	-	-
Calcium sulfate		A	A	-
Calcium sulfite		A	A	-
Carbon dioxide (dry)		A	A	-
Carbon dioxide (wet)		A	A	-
Carbon disulfide	100	B	C	-
Carbon monoxide		A	A	-
Carbon tetrachloride	100	C	C	C
Carbonic acid		A	A	-
Castor oil		A	-	-
Cetyl alcohol	100	A	-	-
Chlorine (gas)	100	D	D	-
Chlorobenzene	100	C	C	-





Environment	Conc. %	TEMP., °C		
		20°	60°	100°
Chloroform	100	C	D	D
Chlorosulfonic acid	100	D	D	D
Chrome alum		A	A	-
Chromic acid	80(a)	A	-	-
Chromic acid	50(a)	A	A	-
Chromic acid	10(a)	A	A	-
Chromic/sulfuric acid		D	D	-
Cider		A	A	-
Citric acid	10	A	A	-
Cooper chloride	Satd.	A	A	-
Copper cyanide	Satd.	A	A	-
Copper fluoride	Satd.	A	A	-
Copper nitrate	Satd.	A	A	-
Copper sulfate	Satd.	A	A	-
Cottonseed oil		A	A	-
Cuprous chloride	Satd.	A	A	-
Cyclohexanol	100	A	B	-
Cyclohexanone	100	B	C	-
Decalin	100	C	C	C
Detergents	2	A	A	A
Developers (photographic)		A	A	-
Dibutyl phthalate	100	A	B	D
Dichloroethylene	100	A	-	-
Diethanolamine	100	A	A	-
Diisooctyl phthalate	100	A	A	-
Emulsifiers		A	A	-
Ethanolamine	100	A	A	-
Ethyl acetate	100	B	B	-
Ethyl alcohol	96	A	A	-
			(80°C)	
Ethyl chloride	100	C	C	-
Ethylene dichloride	100	B	-	-
Ethylene glycol		A	A	-
Ethylene oxide	100	B	-	-
			(10°C)	
Ethyl ether	100	B	-	-
Fatty acids (C6)	100	A	A	-
Ferric chloride	Satd.	A	A	-
Ferric nitrate	Satd.	A	A	-
Ferric sulfate	Satd.	A	A	-
Ferrous chloride	Satd.	A	A	-
Ferrous sulfate	Satd.	A	A	-
Fluorosilicic acid		A	A	-
Formaldehyde	40	A	A	-
Formic acid	100	A	-	-
Formic acid	10	A	A	-
Fructose		A	A	-
Fruit juices		A	A	-
Furfural	100	C	C	-
Gas liquor		C	-	-
Gasoline	100	B	C	C
Gearbox oil	100	A	B	-
Gelatin		A	A	-
Glucose	20	A	A	-
Glycerin	100	A	A	A
Glycol		A	A	-
Hexane	100	A	B	-

Environment	Conc. %	TEMP., °C		
		20°	60°	100°
Hydrobromic acid	50(a)	A	A	-
Hydrochloric acid	30(a)	A	B	D
Hydrochloric acid	20	A	A	-
			(80°C)	
Hydrochloric acid	10	A	A	B
			(80°C)	
Hydrochloric acid	2	A	A	A
50-50 HCl-HNO <sub>3</sub>	(a)	B	D	-
			(80°C)	
Hydrofluoric acid	40	A	-	-
Hydrofluoric acid	60(a)	A	A	-
			(40°C)	
Hydrogen chloride gas (dry)	100	A	A	-
Hydrogen peroxide	30	A	-	D
Hydrogen peroxide	10	A	B	-
Hydrogen peroxide	3	A	-	-
Hydroquinone		A	A	-
Inks		A	A	-
Iodine tincture		A	-	-
Isooctane	100	C	C	-
Isopropyl alcohol	100	A	A	-
Ketones		A	-	-
Lactic acid	20	A	A	-
Lanolin	100	A	A	-
Lead acetate	Satd.	A	A	-
Linseed oil	100	A	A	-
Lubricating oil	100	A	B	-
Magenta dye	2	A	A	-
(aqueous solution)			Some staining	
Magnesium carbonate	Satd.	A	A	-
Magnesium chloride	Satd.	A	A	-
Magnesium hydroxide	Satd.	A	A	-
Magnesium nitrate	Satd.	A	A	-
Magnesium sulfate	Satd.	A	A	-
Magnesium sulfite	Satd.	A	A	-
Meat juices		A	A	-
Mercuric chloride	40	A	A	-
Mercuric cyanide	Satd.	A	A	-
Mercurous nitrate	Satd.	A	A	-
Mercury	100	A	A	-
Methyl alcohol	100	A	A	-
Methylene chloride	100	A	-	-
Methyl ethyl ketone	100	A	B	-
Milk and its products		A	A	A
Mineral oil	100	A	B	-
Molasses		A	A	-
Motor oil	100	A	B	-
Naphthalene	100	A	A	A
Nickel chloride	Satd.	A	A	-
Nickel nitrate	Satd.	A	A	-
Nickel sulfate	Satd.	A	A	-
Nitric acid	fuming	D	D	D
Nitric acid	70(a)	C	D	-
Nitric acid	60	A	D	-
			(80°C)	



Environment	Conc. %	TEMP., °C		
		20°	60°	100°
Nitric acid	10	A	A	A
50-50 HNO <sub>3</sub> HCl	(a)	B	D	-
			(80°C)	
50-50 HNO <sub>3</sub> -H <sub>2</sub> SO <sub>4</sub>	(a)	C	D	-
			(80°C)	
Nitrobenzene	100	A	A	-
Oleic acid		A	B	-
Oleum		-	-	D
Olive oil	100	A	A	-
Oxalic acid (aqueous)	50	A	B	-
Paraffin	100	A	B	-
Paraffin wax	100	A	A	-
Petrol	100	B	C	-
Petroleum ether	100	C	C	-
(boiling point 100 - 140 C)				
Phenol	100	A	A	-
Phosphoric acid	95	A	A	-
Plating solutions, brass		A	A	-
Plating solutions, cadmium		A	A	-
Plating solutions, chromium		A	A	-
Plating solutions, copper		A	A	-
Plating solutions, gold		A	A	-
Plating solutions, Indium		A	A	-
Plating solutions, lead		A	A	-
Plating solutions, nickel		A	A	-
Plating solutions, rhodium		A	A	-
Plating solutions, silver		A	A	-
Plating solutions, tin		A	A	-
Plating solutions, zinc		A	A	-
Potassium bicarbonate	Satd.	A	A	-
Potassium borate	1	A	A	-
Potassium bromate	10	A	A	-
Potassium bromide	Satd.	A	A	-
Potassium carbonate	Satd.	A	A	-
Potassium chlorate	Satd.	A	A	-
Potassium chloride	Satd.	A	A	-
Potassium chromate	40	A	A	-
Potassium cyanide	Satd.	A	A	-
Potassium dichromate	40	A	A	-
Potassium ferri-/ferrocyanide		A	A	-
Potassium fluoride		A	A	-
Potassium hydroxide	50	A	A	-
Potassium hydroxide	10	A	A	A
Potassium nitrate	Satd.	A	A	-
Potassium perborate	Satd.	A	A	-
Potassium perchlorate	10	A	A	-
Potassium permanganate	20	A	A	-
Potassium sulfate		A	A	-
Potassium sulfide		A	A	-
Potassium sulfite		A	A	-
Propyl alcohol	100	A	A	-
Pyridine	100	A	-	-
Silicone oil	100	A	A	-
Soap solution (concentrated)		A	A	-
Sodium acetate		A	A	-
Sodium bicarbonate	Satd.	A	A	-
Sodium bisulfate	Satd.	A	A	-
Sodium bisulfite	Satd.	A	A	-

Environment	Conc. %	TEMP., °C		
		20°	60°	100°
Sodium borate		A	A	-
Sodium bromide oil solution		A	A	-
Sodium carbonate	Satd.	A	A	-
Sodium chlorate	Satd.	A	A	-
Sodium chloride	Satd.	A	A	A
Sodium chlorite	2	A	A (80°C)	-
Sodium chlorite	5	A (80°C)	A	-
Sodium chlorite	10	A (80°C)	A	-
Sodium chlorite	20	A (80°C)	A	-
Sodium cyanide	Satd.	A	A	-
Sodium dichromate	Satd.	A	A	-
Sodium ferricyanide	Satd.	A	A	-
Sodium ferrocyanide	Satd.	A	A	-
Sodium fluoride	Satd.	A	A	-
Sodium hydroxide	50	A	A	-
Sodium hydroxide	10	A	A	A
Sodium hypochlorite	20	A	B	B
Sodium nitrate		A	A	-
Sodium nitrite		A	A	-
Sodium silicate		A	A	-
Sodium sulfate	Satd.	A	A	-
Sodium sulfide	25	A	A	-
Sodium sulfite	Satd.	A	A	-
Stannic chloride	Satd.	A	A	-
Stannous chloride	Satd.	A	A	-
Starch		A	A	-
Sugars and syrups		A	A	-
Sulfamic acid		A	A (80°C)	-
Sulfates of Calcium & Magnesium		A	A	-
Sulfates of Potassium & Sodium		A	A	-
Sulfur		A	A	-
Sulfuric acid	98(a)	C	-	D
Sulfuric acid	60	A	B (80°C)	-
Sulfuric acid	50	A	B	-
Sulfuric acid	10	A	A	A
50-50 H <sub>2</sub> SO <sub>4</sub> /HNO <sub>3</sub>	(a)	C	D (80°C)	-
Tallow		A	A	-
Tannic acid	10	A	A	-
Tartaric acid		A	A	-
Tetrahydrofuran	100	C	C	C
Tetralin	100	C	C	C
Toluene	100	C	C	-
Transformer oil	100	A	C	-
Trichloroacetic acid	10	A	A	-
Trichloroethylene	100	A	A (80°C)	-
Turpentine	100	C	C	C
Urea		A	A	-
Urine		A	A	-
Water (distilled, soft, hard and vapor)		A	A	A
Wet chlorine gas		-	D (80°C)	-
Whiskey		A	A	A
White Paraffin	100	A	B (80°C)	-
White spirit	100	B	C	-
Wines		A	A	-
Xylene	100	C	C	C
Yeast		A	A	-
Zinc chloride	Satd.	A	A	-
Zinc oxide		A	A	-
Zinc sulfate	Satd.	A	A	-

(a) May produce cracking in material under stress



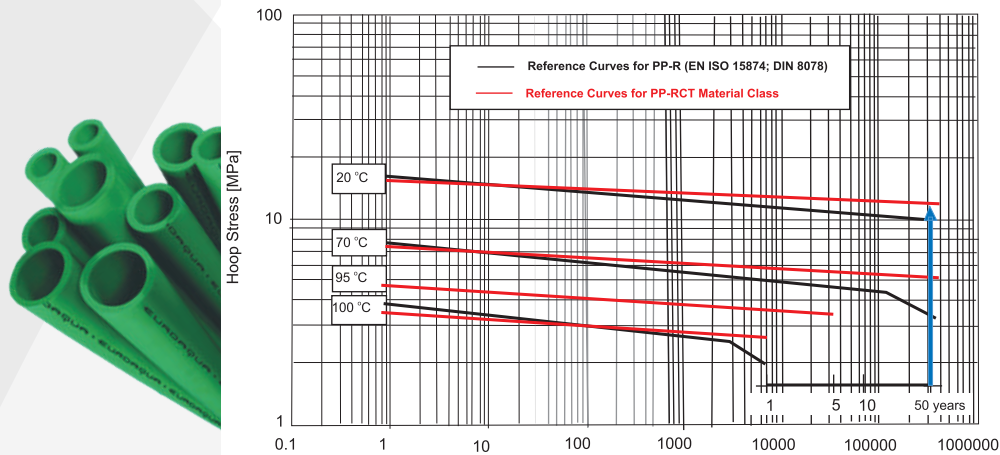
**About PP-RCT**

We proudly announce that M/s SAKKTHI POLYMERS is the Largest Manufacturer of PPR- Pipes & Fittings in the Brand Name of EUROAQUA & AIRGUARD. We have achieved one more milestone that First company in South Asia to Launch PP-RCT ( Polypropylene Random Crystalline Temperature ) with virgin Raw Material from Austria.

When compare with Regular PPR – PIPES & FITTINGS PP-RCT has got unique Advantage of working at Highest working pressure with minimum wall thickness of the Pipe. By giving the biggest advantage of Cost Effectiveness and Pressure with standing capacity.

PP-RCT can be used for Transportation of Water with Highest Pressure and can be used for Construction Industry/ High Rise Buildings/ Industries for Pneumatic Application / Chemical Transportation / Food Industries / Textile Industries / Pharma Industries etc.

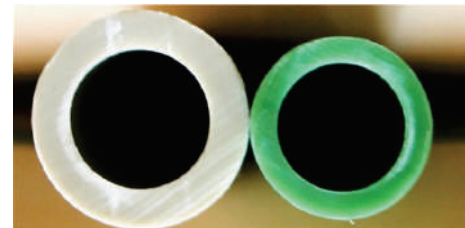
**Comparison of PPR and PP-RCT long term Hydrostatic Pressure Performance Curves**



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

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 (116 psi)	
	PP-R	PP-RCT	PP-R	PP-RCT
Application class 1	S 3.2	S 4	S 2.5	S 3.2
60°C hot water supply	SDR 7.4	SDR 9	SDR 6	SDR 7.4
Application class 2	S 2.5	S 4	S 2	S 3.2
70°C hot water supply	SDR 6	SDR 9	SDR 5	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 [Years]	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	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
	50	32.4	38.5	25.7	30.6	20.4	24.3	16.2	19.3
40	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
	50	23.1	28.4	18.3	22.6	14.5	17.9	11.5	14.2
60	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
	50	16.2	20.4	12.9	16.2	10.2	12.8	8.1	10.2
70	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
	50	10.7	17.0	8.5	13.5	6.7	10.7	5.3	8.5
80	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.

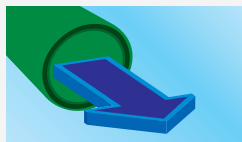
**Advantages and Main Features of EUROAQUA PP-RCT PIPES**

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**

PPR PIPE

PP-RCT PIPE

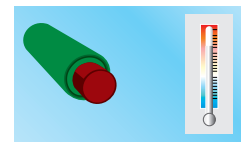


- *Reduced Wall Thickness leads a Higher Flow.*
- *Rate for Same and Higher Pressure Load.*
- *37% Higher flow rate when compared to normal PP-R Pipes.*

**Higher Stability**

PPR PIPE

PP-RCT PIPE

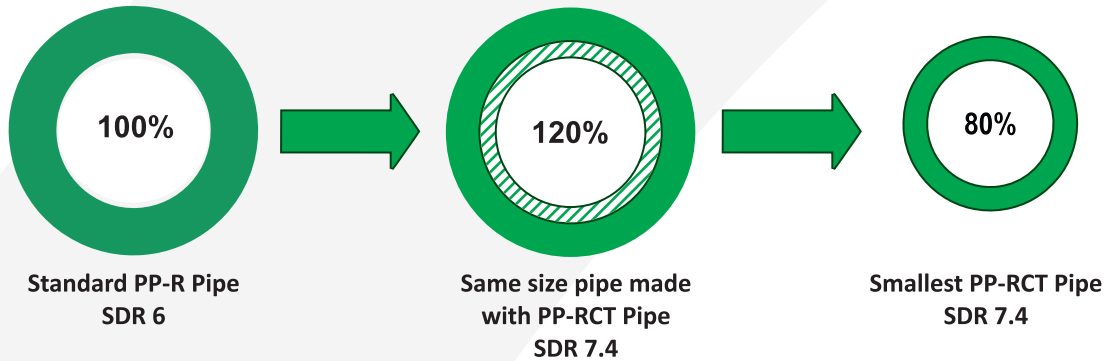


- *PP-RCT Pipes are Working in Maximum Temperature at Higher Pressure Resistance up to 110°C.*



**Reduced Costs**

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



- PP-RCT Pipes have 18% Reduced Wall Thickness when compared to 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 PP-R pipes.
- This will help us to Reduce Pipe System Costs, Pipe Insulation Costs & Labor Costs
- Example: ? 75 mm SDR 6 PP-R Pipes can be Replaced with ? 63mm 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 PP-R Pipes.
- EUROAQUA PP-RCT Pipes reduce the cost and provide efficient plumbing lines.
- EUROAQUA PP-RCT Pipes are easy to exchange with existing PP-R Pipe Lines.
- EUROAQUA PP-RCT Pipes will perform best with High temperature radiators at high temperatures.



**PP-RCT Pipe Series**



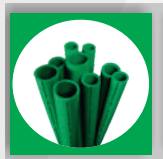
**EUROAQUA PP-RCT PIPE - S 8 / SDR 17 / PN10**

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



**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

**PP-RCT Composite Pipe Series**

**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

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



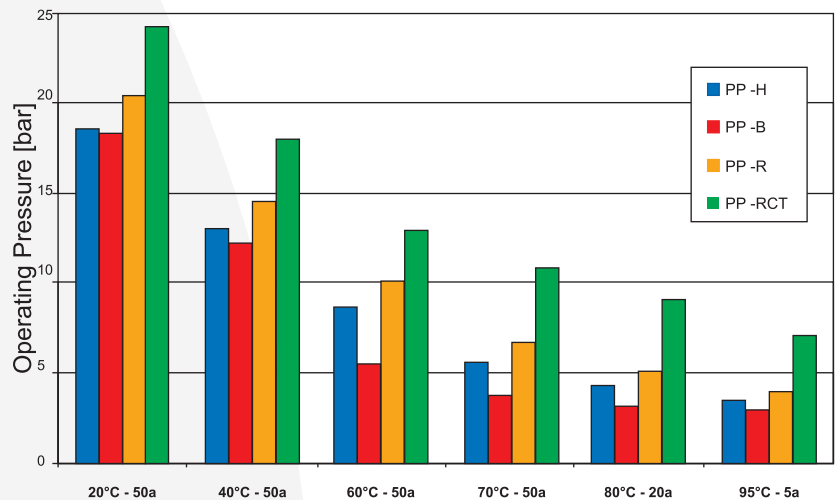
Code	Specification	Pcs/ Bundle
ERCT504	40x3.7 mm	20
ERCT505	50x4.6 mm	15
ERCT506	63x5.8 mm	10
ERCT507	75x6.8 mm	5
ERCT508	90x8.2 mm	5
ERCT509	110x10.0 mm	3
ERCT510	125x14.4 mm	1
ERCT511	160x14.6 mm	1

**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

**Comparison of permissible Operating Pressures for SDR 7.4 PP-RCT Pipe**





“ Together We Can Do Wonders ”

1<sup>st</sup> Company

in South Asia to Introduce  
PP-RCT Technology

No More Worries of Leakage.  
100% Leak Proof Technology for Industrial Piping Systems



When it comes to **Perfection**  
you can always **Trust**



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