

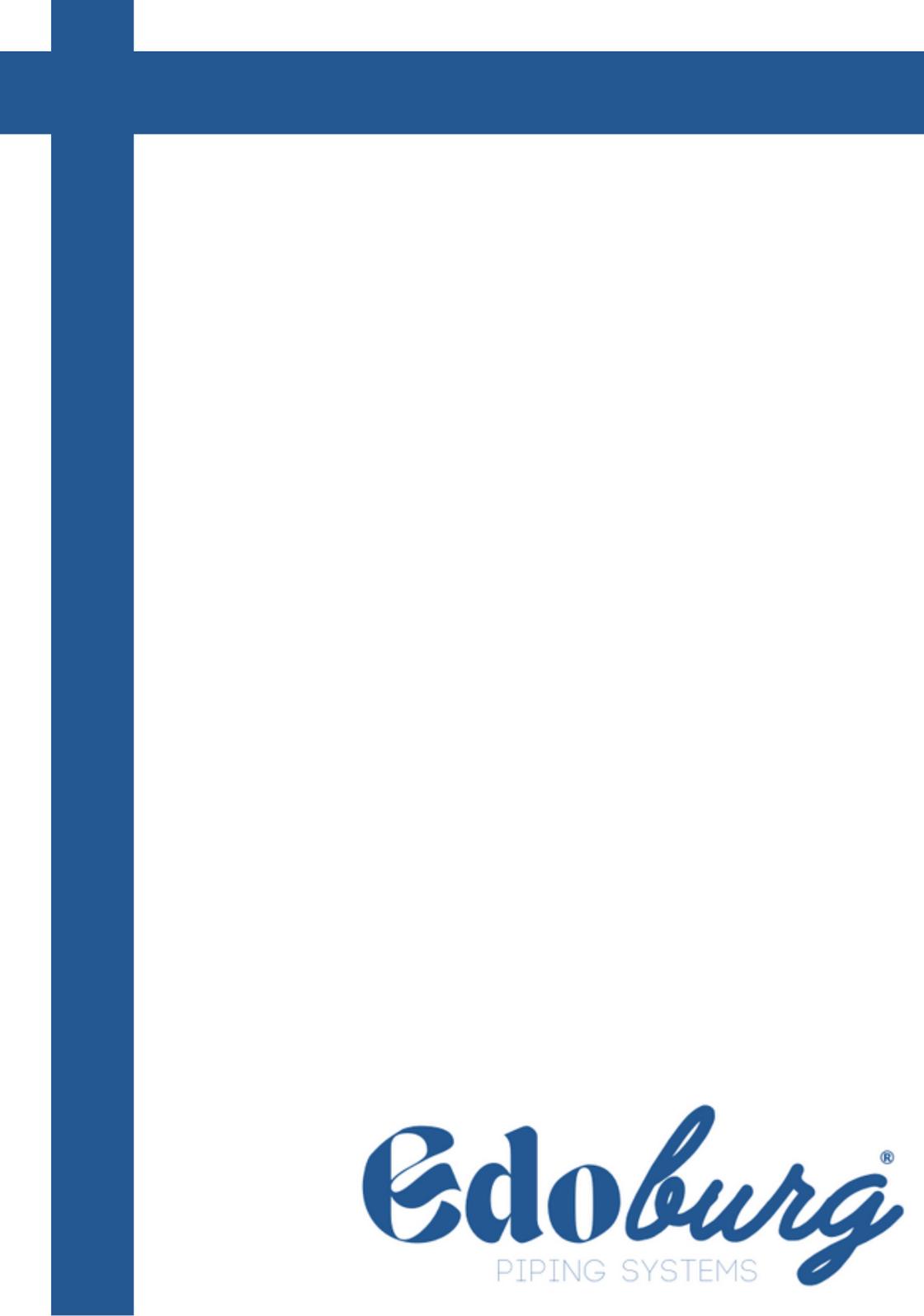


Edoburg®



PP-R  
Piping System

Precision & Seamless Solutions



**Edoburg**<sup>®</sup>  
PIPING SYSTEMS

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# About Edoburg

**Edoburg**, an ISO 9001 certified company, specialises in supplying high-quality piping systems that consistently meet stringent international standards, ensuring unparalleled performance of the piping systems. Our experienced team, equipped with extensive technical knowledge, coupled with our efficient operations and fast turnaround time, enables us to provide top-tier supply of piping products tailored to your needs.

## Our Mission

Edoburg's mission is to supply high-quality piping systems worldwide, offering a complete solution that meets international standards to ensure superior performance in every project.

## Product Range

Our stellar lineup of pipes, ready for every project:

- PEX Pipe: PEX-A, PEX-B, PEX-A EVOH, PEX-B EVOH
- PPR Pipe
- PERT Pipe
- HDPE Pipe
- MDPE Pipe
- PVC-C Pipe: Portable water, Reclaim water, Industrial
- PVC-U Pipe: Drainage, Portable water, Reclaim water, Industrial
- PVC-O
- Composite Pipe: PEX-AL-PEX, HDPE-AL-HDPE
- PVC Electrical Conduit
- PVC Hose

## Complete Solution Concept

Our wide range of products represent our complete solution concept.

With our products intended for diverse sectors, we offer individual and comprehensive system solutions. Focusing on the needs of projects and entire system.

We provide high standards of products in the market at all times. We always stand by our piping systems and reliable service network.

As a global pipe supplying company that stands out with successful operations ever since our incorporation, we act as a solution point to meet all your needs based on our technical knowledge, specialization and reliability.

## Quality Assurance

We are committed to excellence in every aspect of our operations. The products we supply comply with the international standards and certifications, ensuring reliability, durability, and safety in every application. With Edoburg, you can trust that you're receiving top-notch piping solutions that meet your specifications and exceed your expectations.

## Our Presence in the World

Our warehousing are strategically located in various places in **India**, **Vietnam** and **China**, to ensure efficient distribution of the products. We ensure fast deliveries with our modern logistics partners deployed at our local distribution hubs which are strategically located near the ports to ease the export of products. Edoburg Piping Systems exports its products all over the world.

## Our Market Segments

Based on our experience and high-quality standard of products in the sector, Edoburg Piping Systems supports its clients with a complete piping solutions for every project requirement.

- Chemical and Petrochemical
- Water and Wastewater
- Mining and Mineral Processing
- Power Generation
- Marine and Offshore
- Building and Construction
- Manufacturing Industries
- Agriculture
- Pharmaceuticals
- Infrastructure

# About Plastics

Plastics are polymers created by the chemical conversion of natural products or synthesized from organic materials. The primary components that make up the building blocks of plastics are long chains of carbon (C) and hydrogen (H) known as monomers.

The raw materials used for the production of plastics are natural compounds such as cellulose, coal, oil and natural gas. In the plastics industry, around 6 % of the petroleum products that come out from refineries is used.

Plastics fall into three main categories on the basis of their internal structure and the resulting mechanical characteristics: thermoplastics, thermosetting plastics and elastomers.

## Advantages of Plastics

Thermoplastics obviously demonstrate different characteristics than those of the metals traditionally used for piping.

Metal	Plastic
<b>High density</b> <ul style="list-style-type: none"> <li>Crane is needed for transport.</li> <li>Requires wide spacing for fixings.</li> <li>High anchoring forces, fixing required.</li> </ul>	<b>Low density</b> <ul style="list-style-type: none"> <li>Can be carried by hand up to d110.</li> <li>Requires minimal spacing for fixings.</li> <li>Simple and economical.</li> </ul>
<b>Thermal conductivity</b> <ul style="list-style-type: none"> <li>Insulation is needed to limit heat loss.</li> <li>Formation may result in corrosion.</li> </ul>	<b>Low thermal conductivity</b> <ul style="list-style-type: none"> <li>Limited heat loss.</li> <li>Low levels of condensation and resistance to corrosion.</li> </ul>
<b>Corrosion Behaviors</b> <ul style="list-style-type: none"> <li>Galvanic corrosion can occur.</li> <li>Corrosion reduces internal diameter.</li> <li>Reduced diameter causes pressure losses.</li> </ul>	<b>High Corrosion Resistance</b> <ul style="list-style-type: none"> <li>Galvanic Corrosion Free.</li> <li>Prevents corrosion and diameter reduction.</li> <li>No pressure losses.</li> </ul>
<b>Chemical resistance</b> <ul style="list-style-type: none"> <li>Low Resistance to Acids.</li> <li>Damage from Incrustation.</li> </ul>	<b>High chemical resistance</b> <ul style="list-style-type: none"> <li>A minimum of 25-years of life with correct jointing methods.</li> <li>Incrustation free.</li> </ul>

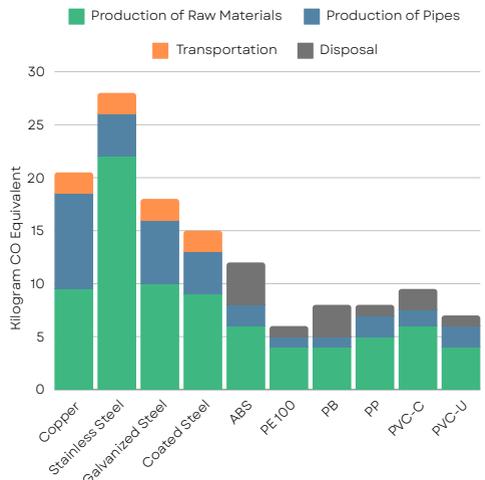
Thermoplastics in turn can be split into two main categories as partially-regulated (semi-crystalline) and irregular (amorphous) molecular structures.

- Semicrystalline thermoplastics, which have a partially ordered molecular structure: this category includes the polyolefins (polypropylene, polyethylene, polybutylene) and fluoropolymers (PP, PE, etc.)
- Amorphous thermoplastics, which have no crystalline regions and no packed molecular structure: this category includes the vinyl chlorides (PVC-U, PVC-C, etc.) and styrenes (ABS, polystyrene, etc.)

Semicrystalline materials are more suitable for hot welding, while amorphous thermoplastics are ideal for cementing or cold welding (solvent cementing).

## Carbon Footprint of Plastics Vs Metal

It is the total of all greenhouse gases emitted to the atmosphere during the entire lifetime including the processes for extracting a product having carbon footprint from under the ground, refining, producing, using and disposing of that product.





# PP-R Piping System

PP-R Piping Systems is a lightweight piping system made of PP-R copolymer material, with high mechanical strength and resistance to corrosion.

It is made from the latest scientific formula with high-quality polypropylene random copolymer, it's non-toxic, ensuring people safe drinking water, can be applied in both residential and commercial buildings.

## Applications

### Application ranges

- Distribution for cool and hot water.
- Pipes to connect kinds of low temperature heating system.
- Pipes for heating and cooling settings in solar energy system.
- Chilled water piping for air conditioners.

### Application areas

- Residential apartments, condominiums and public housing.
- Commercial shopping centers and office buildings.
- Industrial plants dealing with chemicals, food processing and hospitals.
- Schools, laboratories and chemical sewerage.
- Hotels and resorts.

## Advantages



Corrosion-resistant



Light in weight



Hygienic and non-toxic



Outstanding heat and sound insulation property



Smooth inner wall



Safe homogeneous connections

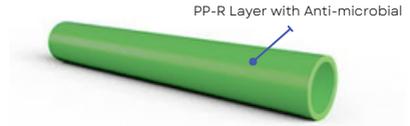


A lifetime up to 50 years under normal conditions

## Range of PP-R Pipes Edoburg Supply

### Standard PP-R Pipe (Single-Layer)

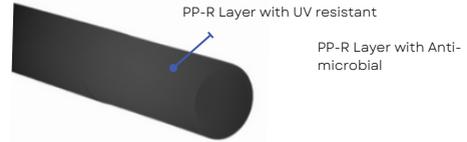
- Single layer of PP-R with anti-microbial inner layer.



**Standard UV PP-R Pipe**

### Standard UV PP-R Pipe (Single-Layer)

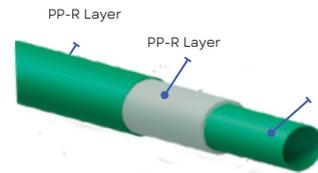
- Single layer of PP-R with anti-microbial inner layer.
- An outer layer of UV stabilising compound.



**Standard UV PP-R Pipe**

### Multi-Layer PP-R Pipe (Triple-Layer)

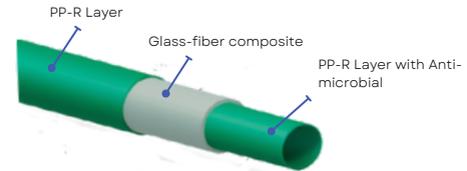
- Three-layer structure with all layer consists of PP-R.
- The inner layer of PP-R is antimicrobial.
- Low linear expansion coefficient.
- Upgraded temperature resistance.



**Multi-Layer PP-R Pipe (Triple Layer)**

### Glass Fiber Reinforced ML PP-R Pipe

- Three-layer structure with outer layer consists of PP-R and middle layer consists of reinforced glass fiber composite.
- The inner layer of PP-R is antimicrobial.
- Low linear expansion coefficient.
- Composite PP-R pipe has the advantages of three layers of materials with glass fiber reinforcement in middle which is much needed in industrial use.
- Upgraded temperature resistance.



**Fiber Composite PP-R Pipe**

## Technical data

### Working Temperature

- -5°C to 95°C or 23°F to 203°F

### Pipe Standard

- DIN 8077
- DIN 8078
- IS 15801
- BS 6920-1

### Fitting Standard

- DIN 16962

### Certifications



Food Grade



Industrial Supply



Chemical Resistant



Hot & Cold Water



Residential Plumbing

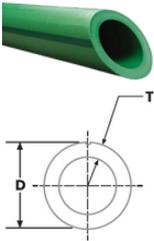


Air Supply

# PP-R Pipe Range

## Standard PP-R Pipe (Single-Layer)

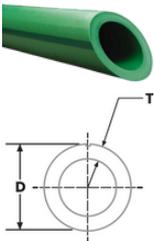
### PN10 / SDR11 / S5 Standard PP-R Pipe



Code	Size (mm) (DxT)	Length (m)	Package	Color
MLSS-20	20x2.0	3m & 6m	75	White / Green
MLSS-25	25x2.3	3m & 6m	50	White / Green
MLSS-32	32x2.9	3m & 6m	30	White / Green
MLSS-40	40x3.7	3m & 6m	15	White / Green
MLSS-50	50x4.6	3m & 6m	10	White / Green
MLSS-63	63x5.8	3m & 6m	7	White / Green
MLSS-75	75x6.8	3m & 6m	5	White / Green
MLSS-90	90x8.2	3m & 6m	5	White / Green
MLSS-110	110x10.	3m & 6m	3	White / Green
MLSS-125*	125x11.4	3m & 6m	3	White / Green
MLSS-160*	160x14.6	3m & 6m	1	White / Green
MLSS-200*	200x18.4	3m & 6m	1	White / Green
MLSS-250*	250x22.7	3m & 6m	1	White / Green
MLSS-315*	315x28.6	3m & 6m	1	White / Green

\* On special order only.

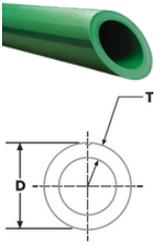
### PN20 / SDR6 / S2.5 Standard PP-R Pipe



Code	Size (mm) (DxT)	Length (m)	Package	Color
MLS25-20	20x3.4	3m & 6m	75	White / Green
MLS25-25	25x4.2	3m & 6m	50	White / Green
MLS25-32	32x5.4	3m & 6m	30	White / Green
MLS25-40	40x6.7	3m & 6m	15	White / Green
MLS25-50	50x8.3	3m & 6m	10	White / Green
MLS25-63	63x10.5	3m & 6m	7	White / Green
MLS25-75	75x12.5	3m & 6m	5	White / Green
MLS25-90	90x15	3m & 6m	5	White / Green
MLS25-110	110x18.3	3m & 6m	3	White / Green
MLS25-125*	125x20.8	3m & 6m	3	White / Green
MLS25-160*	160x26.6	3m & 6m	1	White / Green

\* On special order only.

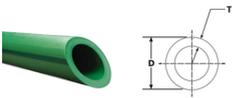
## PN16 / SDR7.4 / S3.2 Standard PP-R Pipe



Code	Size (mm) (DxT)	Length (m)	Package	Color
MLS32-20	20x2.8	3m & 6m	75	White / Green
MLS32-25	25x3.5	3m & 6m	50	White / Green
MLS32-32	32x4.4	3m & 6m	30	White / Green
MLS32-40	40x5.5	3m & 6m	15	White / Green
MLS32-50	50x6.9	3m & 6m	10	White / Green
MLS32-63	63x8.6	3m & 6m	7	White / Green
MLS32-75	75x10.3	3m & 6m	5	White / Green
MLS32-90	90x12.3	3m & 6m	5	White / Green
MLS32-110	110x15.1	3m & 6m	3	White / Green
MLS32-125*	125x16.9	3m & 6m	3	White / Green
MLS32-160*	160x21.9	3m & 6m	1	White / Green

\* On special order only.

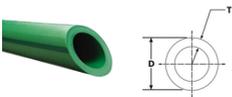
## PN25 / SDR5 / S2 Standard PP-R Pipe\*



Code	Size (mm) (DxT)	Length (m)	Package	Color
MLS2-20	20x4.0	3m & 6m	75	White / Green
MLS2-25	25x5.0	3m & 6m	50	White / Green
MLS2-32	32x6.4	3m & 6m	30	White / Green
MLS2-40	40x8.0	3m & 6m	15	White / Green
MLS2-50	50x10.0	3m & 6m	10	White / Green
MLS2-63	63x12.6	3m & 6m	7	White / Green

\* On special order only.

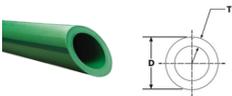
## PN06 / SDR17.5 / S8.25 Standard PP-R Pipe\*



Code	Size (mm) (DxT)	Length (m)	Package	Color
MLS825-200	200x11.4	3m & 6m	1	White / Green
MLS825-250	250x14.2	3m & 6m	1	White / Green
MLS825-315	315x17.9	3m & 6m	1	White / Green

\* On special order only.

## PN04 / SDR26 / S12.5 Standard PP-R Pipe\*

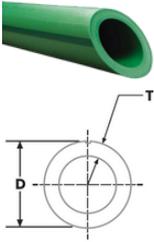


Code	Size (mm) (DxT)	Length (m)	Package	Color
MLS125-200	200x7.70	3m & 6m	1	White / Green
MLS125-250	250x8.60	3m & 6m	1	White / Green
MLS125-315	315x12.10	3m & 6m	1	White / Green

\* On special order only.

# Standard UV PP-R Pipe (Single-Layer)

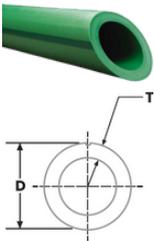
## PN10 / SDR11 / S5 Standard UV PP-R Pipe



Code	Size (mm) (DxT)	Length (m)	Package	Color
MLUS5-20	20x2.0	3m & 6m	75	Black
MLUS5-25	25x2.3	3m & 6m	50	Black
MLUS5-32	32x2.9	3m & 6m	30	Black
MLUS5-40	40x3.7	3m & 6m	15	Black
MLUS5-50	50x4.6	3m & 6m	10	Black
MLUS5-63	63x5.8	3m & 6m	7	Black
MLUS5-75	75x6.8	3m & 6m	5	Black
MLUS5-90	90x8.2	3m & 6m	5	Black
MLUS5-110	110x10.	3m & 6m	3	Black
MLUS5-125*	125x11.4	3m & 6m	3	Black
MLUS5-160*	160x14.6	3m & 6m	1	Black
MLUS5-200*	200x18.4	3m & 6m	1	Black
MLUS5-250*	250x22.7	3m & 6m	1	Black
MLUS5-315*	315x28.6	3m & 6m	1	Black

\* On special order only.

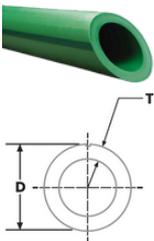
## PN20 / SDR6 / S2.5 Standard UV PP-R Pipe



Code	Size (mm) (DxT)	Length (m)	Package	Color
MLUS25-20	20x3.4	3m & 6m	75	Black
MLUS25-25	25x4.2	3m & 6m	50	Black
MLUS25-32	32x5.4	3m & 6m	30	Black
MLUS25-40	40x6.7	3m & 6m	15	Black
MLUS25-50	50x8.3	3m & 6m	10	Black
MLUS25-63	63x10.5	3m & 6m	7	Black
MLUS25-75	75x12.5	3m & 6m	5	Black
MLUS25-90	90x15	3m & 6m	5	Black
MLUS25-110	110x18.3	3m & 6m	3	Black
MLUS25-125*	125x20.8	3m & 6m	3	Black
MLUS25-160*	160x26.6	3m & 6m	1	Black

\* On special order only.

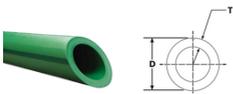
## PN16 / SDR7.4 / S3.2 Standard UV PP-R Pipe



Code	Size (mm) (DxT)	Length (m)	Package	Color
MLUS32-20	20x2.8	3m & 6m	75	Black
MLUS32-25	25x3.5	3m & 6m	50	Black
MLUS32-32	32x4.4	3m & 6m	30	Black
MLUS32-40	40x5.5	3m & 6m	15	Black
MLUS32-50	50x6.9	3m & 6m	10	Black
MLUS32-63	63x8.6	3m & 6m	7	Black
MLUS32-75	75x10.3	3m & 6m	5	Black
MLUS32-90	90x12.3	3m & 6m	5	Black
MLUS32-110	110x15.1	3m & 6m	3	Black
MLUS32-125*	125x16.9	3m & 6m	3	Black
MLUS32-160*	160x21.9	3m & 6m	1	Black

\* On special order only.

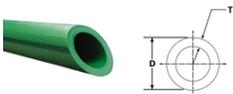
## PN25 / SDR5 / S2 Standard UV PP-R Pipe\*



Code	Size (mm) (DxT)	Length (m)	Package	Color
MLUS2-20	20x4.0	3m & 6m	75	Black
MLUS2-25	25x5.0	3m & 6m	50	Black
MLUS2-32	32x6.4	3m & 6m	30	Black
MLUS2-40	40x8.0	3m & 6m	15	Black
MLUS2-50	50x10.0	3m & 6m	10	Black
MLUS2-63	63x12.6	3m & 6m	7	Black

\* On special order only.

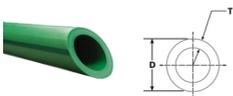
## PN06 / SDR17.5 / S8.25 Standard UV PP-R Pipe\*



Code	Size (mm) (DxT)	Length (m)	Package	Color
MLUS825-200	200x11.4	3m & 6m	1	Black
MLUS825-250	250x14.2	3m & 6m	1	Black
MLUS825-315	315x17.9	3m & 6m	1	Black

\* On special order only.

## PN04 / SDR26 / S12.5 Standard UV PP-R Pipe\*

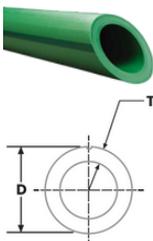


Code	Size (mm) (DxT)	Length (m)	Package	Color
MLUS125-200	200x7.70	3m & 6m	1	Black
MLUS125-250	250x8.60	3m & 6m	1	Black
MLUS125-315	315x12.10	3m & 6m	1	Black

\* On special order only.

# Multi-Layer PP-R Pipe (Triple-Layer)

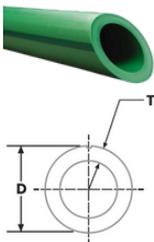
## PN16 / SDR7.4 / S3.2 Triple Layer PP-R Pipe



Code	Size (mm) (DxT)	Length (m)	Package	Color
TLS32-20	20x2.8	3m & 6m	75	Green / White / Blue
TLS32-25	25x3.5	3m & 6m	50	Green / White / Blue
TLS32-32	32x4.4	3m & 6m	30	Green / White / Blue
TLS32-40	40x5.5	3m & 6m	15	Green / White / Blue
TLS32-50	50x6.9	3m & 6m	10	Green / White / Blue
TLS32-63	63x8.6	3m & 6m	7	Green / White / Blue
TLS32-75	75x10.3	3m & 6m	5	Green / White / Blue
TLS32-90	90x12.3	3m & 6m	5	Green / White / Blue
TLS32-110	110x15.1	3m & 6m	3	Green / White / Blue
TLS32-125*	125x16.9	3m & 6m	3	Green / White / Blue
TLS32-160*	160x21.9	3m & 6m	1	Green / White / Blue

\* On special order only.

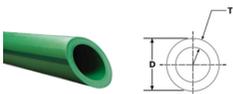
## PN20 / SDR6 / S2.5 Triple Layer PP-R Pipe



Code	Size (mm) (DxT)	Length (m)	Package	Color
TLS25-20	20x3.4	3m & 6m	75	Green / White / Blue
TLS25-25	25x4.2	3m & 6m	50	Green / White / Blue
TLS25-32	32x5.4	3m & 6m	30	Green / White / Blue
TLS25-40	40x6.7	3m & 6m	15	Green / White / Blue
TLS25-50	50x8.3	3m & 6m	10	Green / White / Blue
TLS25-63	63x10.5	3m & 6m	7	Green / White / Blue
TLS25-75	75x12.5	3m & 6m	5	Green / White / Blue
TLS25-90	90x15	3m & 6m	5	Green / White / Blue
TLS25-110	110x18.3	3m & 6m	3	Green / White / Blue
TLS25-125*	125x20.8	3m & 6m	3	Green / White / Blue
TLS25-160*	160x26.6	3m & 6m	1	Green / White / Blue

\* On special order only.

## PN25 / SDR5 / S2 Triple Layer PP-R Pipe\*

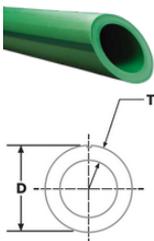


Code	Size (mm) (DxT)	Length (m)	Package	Color
TLS2-20	20x4.0	3m & 6m	75	Green / White / Blue
TLS2-25	25x5.0	3m & 6m	50	Green / White / Blue
TLS2-32	32x6.4	3m & 6m	30	Green / White / Blue
TLS2-40	40x8.0	3m & 6m	15	Green / White / Blue
TLS2-50	50x10.0	3m & 6m	10	Green / White / Blue
TLS2-63	63x12.6	3m & 6m	7	Green / White / Blue

\* On special order only.

# Glass Fiber Reinforced ML PP-R Pipe

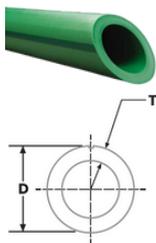
## PN12.5 / SDR11 / S5 Triple Layer - Glass Fiber Composite PP-R Pipe



Code	Size (mm) (DxT)	Length (m)	Package	Color
TFLS5-50	50x4.6	3m & 6m	15	Green / Blue
TFLS5-63	63x5.8	3m & 6m	7	Green / Blue
TFLS5-75	75x6.8	3m & 6m	5	Green / Blue
TFLS5-90	90x8.2	3m & 6m	5	Green / Blue
TFLS5-110	110x10.	3m & 6m	3	Green / Blue
TFLS5-125*	125x11.4	3m & 6m	3	Green / Blue
TFLS5-160*	160x14.6	3m & 6m	1	Green / Blue
TFLS5-200*	200x18.4	3m & 6m	1	Green / Blue
TFLS5-250*	250x22.7	3m & 6m	1	Green / Blue
TFLS5-315*	315x28.6	3m & 6m	1	Green / Blue

\* On special order only.

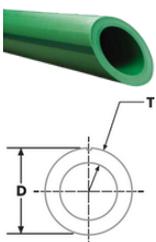
### PN20 / SDR6 / S2.5 Triple Layer - Glass Fiber Composite PP-R Pipe



Code	Size (mm) (DxT)	Length (m)	Package	Color
TFLS25-32	32x5.4	3m & 6m	30	Green / Blue
TFLS25-40	40x6.7	3m & 6m	15	Green / Blue
TFLS25-50	50x8.3	3m & 6m	10	Green / Blue
TFLS25-63	63x10.5	3m & 6m	7	Green / Blue
TFLS25-75	75x12.5	3m & 6m	5	Green / Blue
TFLS25-90	90x15	3m & 6m	5	Green / Blue
TFLS25-110	110x18.3	3m & 6m	3	Green / Blue
TFLS25-125*	125x20.8	3m & 6m	3	Green / Blue
TFLS25-160*	160x26.6	3m & 6m	1	Green / Blue

\* On special order only.

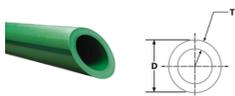
### PN16 / SDR7.4 / S3.2 Triple Layer - Glass Fiber Composite PP-R Pipe



Code	Size (mm) (DxT)	Length (m)	Package	Color
TFLS32-32	32x4.4	3m & 6m	30	Green / Blue
TFLS32-40	40x5.5	3m & 6m	15	Green / Blue
TFLS32-50	50x6.9	3m & 6m	10	Green / Blue
TFLS32-63	63x8.6	3m & 6m	7	Green / Blue
TFLS32-75	75x10.3	3m & 6m	5	Green / Blue
TFLS32-90	90x12.3	3m & 6m	5	Green / Blue
TFLS32-110	110x15.1	3m & 6m	3	Green / Blue
TFLS32-125*	125x16.9	3m & 6m	3	Green / Blue
TFLS32-160*	160x21.9	3m & 6m	1	Green / Blue

\* On special order only.

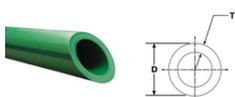
### PN06 / SDR17.5 / S8.25 Triple Layer - Glass Fiber Composite PP-R Pipe\*



Code	Size (mm) (DxT)	Length (m)	Package	Color
MLS825-200	200x11.4	3m & 6m	1	Green / Blue
MLS825-250	250x14.2	3m & 6m	1	Green / Blue
MLS825-315	315x17.9	3m & 6m	1	Green / Blue

\* On special order only.

### PN08 / SDR14 / S6.5 Triple Layer - Glass Fiber Composite PP-R Pipe\*



Code	Size (mm) (DxT)	Length (m)	Package	Color
MLS65-160	160x11.5	3m & 6m	1	Green / Blue

\* On special order only.

# All the PP-R pipe types are also available in coil form of 30m.

# PP-R Fittings Range

All the PP-R fittings are in PN25.

## Coupler



Code	Size	Package (pcs/crtn)
EB001	20mm	480
EB002	25mm	270
EB003	32mm	150
EB004	40mm	90
EB005	50mm	60
EB006	63mm	70
EB007	75mm	64
EB008	90mm	30
EB009	110mm	20
EB010	125mm	12
EB011	160mm	12

## Equal Tee



Code	Size	Package (pcs/crtn)
EC001	20mm	210
EC002	25mm	120
EC003	32mm	60
EC004	40mm	40
EC005	50mm	24
EC006	63mm	36
EC007	75mm	20
EC008	90mm	14
EC009	110mm	5
EC010	125mm	4
EC011	160mm	3

## Elbow 90



Code	Size	Package (pcs/crtn)
EE001	20mm	300
EE002	25mm	180
EE003	32mm	90
EE004	40mm	45
EE005	50mm	30
EE006	63mm	42
EE007	75mm	24
EE008	90mm	18
EE009	110mm	8
EE010	125mm	4
EE011	160mm	3

## Elbow 45



Code	Size	Package (pcs/crtn)
EB101	20mm	300
EB102	25mm	210
EB103	32mm	100
EB104	40mm	60
EB105	50mm	30
EB106	63mm	54
EB107	75mm	32
EB108	90mm	18
EB109	110mm	10
EB110	125mm	8
EB111	160mm	4

## End Cap



Code	Size	Package (pcs/crtn)
ED001	20mm	750
ED002	25mm	450
ED003	32mm	240
ED004	40mm	150
ED005	50mm	90
ED006	63mm	105
ED007	75mm	70
ED008	90mm	45
ED009	110mm	30
ED010	125mm	20
ED011	160mm	16

## Flange Core



Code	Size	Package (pcs/crtn)
EK001	32mm	180
EK002	40mm	120
EK003	50mm	90
EK004	63mm	140
EK005	75mm	105
EK006	90mm	63
EK007	110mm	36
EK008	125mm	20
EK009	160mm	15
Butt Fusion		
EK010	200mm	4
EK011	250mm	4
EK012	315mm	2

## Four-way Tee / Cross



Code	Size	Package (pcs/crtn)
EF001	20mm	150
EF002	25mm	90
EF003	32mm	50
EF004	40mm	30

## Tank Nipple



Code	Size	Package (pcs/crtn)
EB301	32mm/1"	75
EB302	40mm/1-1/4"	40
EB303	50mm/1-1/2"	30
EB304	63mm/2"	20

## Cross Over Bend



Code	Size
EJ101	20mm
EJ102	25mm

PP-R fittings are available in white, blue and green color.

## Reducer Tee

Code	Size (mm)	Package (pcs/crtn)
EC101	25x20x25	150
EC102	32x20x32	90
EC103	32x25x32	60
EC104	40x20x40	60
EC105	40x25x40	60
EC106	40x32x40	48
EC107	50x20x50	36
EC108	50x25x50	36
EC109	50x32x50	30
EC110	50x40x50	30
EC111	63x25x63	48
EC112	63x32x63	48
EC113	63x40x63	42
EC114	63x50x63	36
EC115	75x25x75	24
EC116	75x32x75	24
EC117	75x40x75	24
EC118	75x50x75	18
EC119	75x63x75	18
EC120	90x32x90	18
EC121	90x40x90	18
EC122	90x50x90	18
EC123	90x63x90	18
EC124	90x75x90	14
EC125	110x32x110	8
EC126	110x40x110	8
EC127	110x50x110	8
EC128	110x63x110	8
EC129	110x75x110	8
EC130	110x90x110	8
EC131	125x63x125	4
EC132	125x75x125	4
EC133	125x90x125	4
EC134	125x110x125	4
EC135	160x63x160	3
EC136	160x75x160	3
EC137	160x90x160	3
EC138	160x110x160	3



## Reducer

Code	Size (mm)	Package (pcs/crtn)
EB101	25x20	300
EB102	32x20	180
EB103	32x25	160
EB104	40x20	120
EB105	40x25	120
EB106	40x32	90
EB107	50x20	108
EB108	50x25	108
EB109	50x32	108
EB110	50x40	72
EB111	63x32	120
EB112	63x40	84
EB113	63x50	84
EB114	75x40	60
EB115	75x50	60
EB116	75x63	48
EB117	90x50	45
EB118	90x63	45
EB119	90x75	30
EB120	110x63	25
EB121	110x75	25
EB122	110x90	15
EB123	125x110	12
EB124	160x90	12
EB125	160x110	12
EB126	160x125	12
EB127	200x160	8
EB128	250x200	5
EB129	315x250	2



## Weld Saddle (Plain)

Code	Size (mm)	Package (pcs/crtn)
EL201	40x20	160
EL202	50x20	160
EL203	63x25	150
EL204	63x32	150
EL205	75x32	150
EL206	75x25	150
EL207	90x32	150
EL208	90x25	150
EL209	110x32	150
EL210	110x25	150
EL211	125x32	150
EL212	125x40	120
EL213	160x25	150
EL214	160x32	150
EL215	160x40	75
EL216	160x50	45
EL217	160x63	20
EL218	160x75	20
EL219	200x25	150
EL220	200x32	150
EL221	200x63	30
EL222	200x75	30
EL223	200x90	16
EL224	200x110	16
EL225	250x25	150
EL226	250x32	150
EL227	250x63	30
EL228	250x75	30
EL229	250x90	16
EL230	250x110	16
EL231	315x25	150
EL232	315x32	150
EL233	315x63	30
EL234	315x75	30
EL235	315x90	16
EL236	315x110	16



## Weld Saddle (Female Thread) (Brass)

Code	Size	Package (pcs/crtn)
EB801	40x1/2"	160
EB802	50x1/2"	160
EB803	63x1/2"	150
EB804	63x3/4"	150
EB805	75x1/2"	150
EB806	75x3/4"	150
EB807	90x1/2"	150
EB808	90x3/4"	150
EB809	110x1/2"	150
EB810	110x3/4"	150
EB811	125x1/2"	150
EB812	125x3/4"	150
EB813	160x1/2"	150
EB814	160x3/4"	150
EB815	200x1/2"	150
EB816	200x3/4"	150
EB817	250x1/2"	150
EB818	250x3/4"	150
EB819	315x1/2"	150
EB820	315x3/4"	150



## Flange

Code	Size	Package (pcs/crtn)
EK101	32mm	48
EK102	40mm	30
EK103	50mm	24
EK104	63mm	50
EK105	75mm	44
EK106	90mm	32
EK107	110mm	20
EK108	125mm	16
EK109	160mm	7



## Reducer Elbow

Code	Size	Package (pcs/crtn)
EE601	25x20	210
EE602	32x20	100
EE603	32x25	120
EE604	40x32	60
EE605	40x25	60
EE606	40x20	60
EE607	50x40	30
EE608	50x32	30
EE609	50x25	30



PP-R fittings are available in white, blue and green color.

## Union



Code	Size	Package (pcs/ortn)
EI001	20mm	150
EI002	25mm	90
EI003	32mm	60
EI004	40mm	36
EI005	50mm	20
EI006	63mm	12

## Ball Valve



Code	Size	Package (pcs/ortn)
EH101	20mm	60
EH102	25mm	50
EH103	32mm	30
EH104	40mm	15
EH105	50mm	12
EH106	63mm	6
EH107	75mm	5

## Male Thread Tee (Brass)



Code	Size	Package (pcs/ortn)
EC301	20x1/2"	90
EC302	25x1/2"	60
EC303	25x3/4"	60
EC304	32x1/2"	60
EC305	32x3/4"	45
EC306	32x1"	30

## Female Thread Tee (Brass)



Code	Size	Package (pcs/ortn)
EC201	20x1/2"	90
EC202	25x1/2"	75
EC203	25x3/4"	75
EC204	32x1/2"	60
EC205	32x3/4"	60
EC206	32x1"	30
EC207	40x1-1/4"	20

## Male Thread Coupler (Brass)



Code	Size	Package (pcs/ortn)
EB301	20x1/2"	180
EB302	20x3/4"	120
EB303	25x1/2"	140
EB304	25x3/4"	120
EB305	32x1/2"	105
EB306	32x3/4"	105
EB307	32x1"	60
EB308	40x1-1/4"	30
EB309	50x1-1/2"	30
EB310	63x2"	16
EB311	75x2-1/2"	12
EB312	90x3"	4
EB313	110x4"	3

## Female Thread Coupler (Brass)



Code	Size	Package (pcs/ortn)
EB201	20x1/2"	180
EB202	20x3/4"	140
EB203	25x1/2"	160
EB204	25x3/4"	140
EB205	32x1/2"	120
EB206	32x3/4"	120
EB207	32x1"	75
EB208	40x1-1/4"	40
EB209	50x1-1/2"	30
EB210	63x2"	16
EB211	75x2-1/2"	12
EB212	90x3"	4
EB213	110x4"	3

## Male Thread Union (Brass)



Code	Size	Package (pcs/ortn)
EK101	20x1/2"	105
EK102	25x3/4"	75
EK103	32x1"	60
EK104	40x1-1/4"	30
EK105	50x1-1/2"	16
EK106	63x2"	12

## Female Thread Union (Brass)



Code	Size	Package (pcs/ortn)
EI101	20x1/2"	105
EI102	25x3/4"	90
EI103	32x1"	60
EI104	40x1-1/4"	30
EI105	50x1-1/2"	24
EI106	63x2"	18

## Brass Union



Code	Size	Package (pcs/ortn)
EI301	20mm	105
EI302	25mm	90
EI303	32mm	60
EI304	40mm	30
EI305	50mm	24
EI306	63mm	15

## Male Thread Elbow (Brass)



Code	Size	Package (pcs/ortn)
EE401	20x1/2"	120
EE402	25x1/2"	100
EE403	25x3/4"	75
EE404	32x1/2"	60
EE405	32x3/4"	60
EE406	32x1"	40

## Female Thread Elbow (Brass)



Code	Size	Package (pcs/ortn)
EE201	20x1/2"	150
EE202	25x1/2"	120
EE203	25x3/4"	75
EE204	32x1/2"	75
EE205	32x3/4"	75
EE206	32x1"	40
EE207	40x1-1/4"	20
EE208	50x1-1/2"	10

## Sandwich Flang



Code	Size	Package (pcs/ortn)
EK201	160mm	5
EK202	200mm	5
EK203	250mm	5
EK204	315mm	5

## Stop Valve



Code	Size	Package (pcs/ortn)
EH001	20mm	60
EH002	25mm	40
EH003	32mm	30
EH004	40mm	24
EH005	50mm	15
EH006	63mm	10

## Bypass Bend



Code	Size	Package (pcs/ortn)
EJ001	20mm	60
EJ002	25mm	40
EJ003	32mm	30

PP-R fittings are available in white, blue and green color.

## Long Pipe Plug



Code	Size	Package (pcs/ortn)
ED201	1/2"	150
ED202	3/4"	150

## Plug



Code	Size	Package (pcs/ortn)
ED101	1/2"	900
ED102	3/4"	600
ED103	1"	300

## Clamp



Code	Size	Package (pcs/ortn)
EG001	20mm	600
EG002	25mm	420
EG003	32mm	300
EG004	40mm	300
EG005	50mm	200
EG006	63mm	100

PP-R fittings are available in white, blue and green color.



# Tools

## Welding Saddle Die

Code	Size
EB901	40x20mm / 1/2"
EB902	50x20mm / 1/2"
EB903	63x25/32mm / 1/2"/3/4"
EB904	75x25/32mm / 1/2"/3/4"
EB905	90x25/32mm / 1/2"/3/4"
EB906	110x25/32mm / 1/2"/3/4"
EB907	125x32mm / 1/2"/3/4"
EB908	125x40mm
EB909	160x32mm
EB910	160x40/50mm
EB911	160x63/75mm
EB912	200x63/75/90/110mm
EB913	250x63/75/90/110mm
EB914	315x63/75/90/110mm
EB915	200x25/32mm / 1/2"/3/4"
EB916	250x25/32mm / 1/2"/3/4"
EB917	315x25/32mm / 1/2"/3/4"



## Pipe Cutter



Code	Size	Package (pcs/ortn)
EM006	20-40mm	12
EM007	20-63mm	12

## Repair Set



Code	Size
EZ001	9mm
EZ002	11mm

## Welding Machine



Code	Size	Package (pcs/ortn)
EL112	20-63mm	5
EL113	75-110mm	4
EL114	160mm	1
<b>Welding Die Only</b>		
EL106	125mm	1

## Welding Device (Hydraulic Pump)



Code	Size	Package (pcs/ortn)
EB30	160mm	1

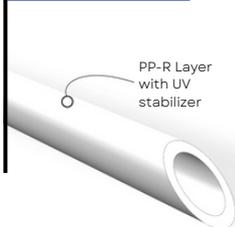


# Technical Properties

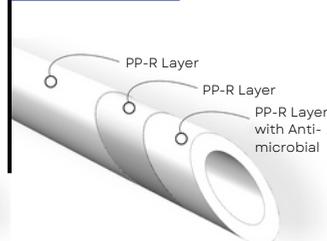
## Technical Characteristics

Pipe Structure	Standard PP-R Pipes - Single Layer Standard UV PP-R Pipes - Single Layer Multi-Layer PP-R Pipe - Triple Layer Glass Fiber Reinforced Composite PP-R Pipes (Triple-Layer)
Diameters (mm)	d20, d25, d32, d40, d50, d63, d75, d90, d110, d125, d160, d200, d250, d315
Pipe Classes	Standard PP-R Pipes: PN10 (SDR11), PN16 (SDR7.4), PN20 (SDR6), PN25 (SDR5), PN06 (SDR17.5), PN04 (SDR26) Standard UV PP-R Pipes: PN10 (SDR11), PN16 (SDR7.4), PN20 (SDR6), PN25 (SDR5), PN06 (SDR17.5), PN04 (SDR26) Multi-Layer PP-R Pipe - Triple Layer: PN16 (SDR7.4), PN20 (SDR6), PN25 (SDR6) Glass Fiber Reinforced Composite PP-R Pipes: PN12.5 (SDR11), PN20 (SDR7.4), PN16 (SDR9), PN08 (SDR14), PN06 (SDR17.5)
Pipe Length	3m / 10 foot, 6m / 20 foot (Also in coil form in 30m or 100 foot.
Joining Methods	Socket Fusion Welding, Butt-Welding, Electrofusion Welding, Mechanical Connection, Flange Connection
Color	White, Blue, Green and Black
Chemical Resistance	Resistant to organic and inorganic chemical environments for pH values between 2 and 12
Installation Temperature	Minimum: +5oC Maximum: +40oC
Operating Temperature	Standard PP-R Pipes: -5°C - +95°C Standard UV PP-R Pipes: -5°C - +95°C Multi-Layer PP-R Pipe - Triple Layer: -5°C - +95°C Glass Fiber Reinforced Composite PP-R Pipes: -5°C - +95°C
Standards	DIN 8077-78, IS 15801, BS 6920-1
Thermal Expansion Coefficient	Standard PP-R Pipes: 0.15 mm/moK Standard UV PP-R Pipes: 0.15 mm/moK Multi-Layer PP-R Pipe - Triple Layer: 0.035 mm/moK Glass Fiber Reinforced Composite PP-R Pipes: 0.035 mm/moK
Thermal Conductivity Coefficient	0.24 W/moK
Approvals and Certificates	UK: <b>WRAS</b> , India: <b>ISI, BIS</b>

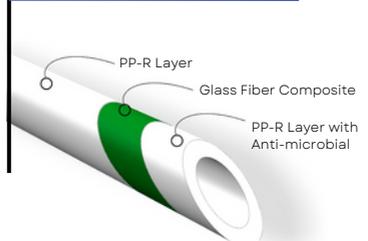
Standard UV PP-R Pipes



Multi-Layer PP-R Pipe



Glass Fiber Reinforced Composite Pipes



According to DIN 8077 Standard:

Maximum Operating Pressures according to DIN 8077 with safety factor of 1,5						
Operating Temperature(°C)	Service Life (year)	PP-R			PP-RCT	
		SDR 11 (S5)	SDR 7.4 (S3.2)	SDR 6 (S2.5)	SDR9 (S4)	SDR7.4 (S3.2)
10 °C*	1	17,6	27,8	35	24	30,2
	5	16,7	26,3	33,2	23,2	29,3
	10	16,1	25,6	32,1	22,9	28,9
	25	15,6	24,8	31,1	22,5	28,4
	50	15,2	24,1	30,3	22,2	28
20 °C*	1	15	23,8	30	20,9	26,3
	5	14,1	22,3	28,2	20,2	25,4
	10	13,7	21,8	27,3	19,9	25,1
	25	13,3	21	26,5	19,6	24,6
	50	12,9	20,4	25,8	19,3	24,3
30 °C	1	12,8	20,2	25,5	18,1	22,7
	5	12	18,9	23,9	17,4	22
	10	11,6	18,4	23,1	17,2	21,7
	25	11,2	17,8	22,3	16,9	21,2
	50	10,9	17,3	21,8	16,6	20,9
40 °C	1	10,8	17,2	21,5	15,5	19,6
	5	10,1	16	20,2	15	18,9
	10	9,8	15,6	19,7	14,7	18,6
	25	9,4	15	18,8	14,4	18,2
	50	9,2	14,5	18,3	14,2	17,9
50 °C	1	9,2	14,5	18,3	13,3	16,7
	5	8,5	13,5	17	12,8	16,1
	10	8,3	13,1	16,4	12,6	15,8
	25	8	12,6	15,9	12,3	15,5
	50	7,8	12,3	15,4	12,1	15,2
60 °C	1	7,8	12,3	15,4	11,2	14,2
	5	7,2	11,3	14,3	10,8	13,6
	10	6,9	11	13,8	10,6	13,4
	25	6,7	10,6	13,3	10,4	13,1
	50	6,4	10,3	12,8	10,2	12,8
70 °C	1	6,5	10,3	13	9,4	11,9
	5	6	9,5	11,9	9,1	11,4
	10	5,8	9,3	11,7	8,9	11,2
	25	5,1	8	10,1	8,7	10,9
	50	4,3	6,8	8,5	8,5	10,7
80 °C	1	5,4	8,6	10,9	7,9	9,9
	5	4,8	7,6	9,6	7,5	9,5
	10	4	6,4	8	7,4	9,3
	25	3,2	5,2	6,3	7,2	9,1
95 °C	1	3,8	6,1	7,7	5,9	7,4
	5	2,5	4,1	5,1	5,6	7,1
	10	2,2	3,4	4,3	5,5	6,9

\* Cold water applications.



Permissible Working Pressure

Temp °c	PN10 / SDR 11		PN16 / 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 Details

PPR	PN10 / SDR 11 / S5		PN16 / SDR 7.4 / S3.2		PN20 / SDR 6 / S2.5	
	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
125mm	10.1	3.9	9.1	5.53	8.3	6.47
160mm	13.45	6.38	10.61	9	13.3	10.6
200mm	16.3	9.95	14.5	14.1	-	-
250mm	20.3	15.5	18.1	22.1	-	-
315mm	25.7	24.6	-	-	-	-

Fusion Welding Details

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
200	Butt Fusion			
250	Butt Fusion			
315	Butt Fusion			

TYPICAL PROPERTIES	Method	Value	Unit
<b>PHYSICAL</b>			
Melt Flow Rate	ASTM D 1238		
(230°C / 2016 kg)		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 <sup>3</sup>
<b>MECHANICAL</b>			
Tensile Strength @ Yield	ASTM D 638	270	Kg/cm <sup>2</sup>
Flexual Modulus (23°C)	ASTM D 790	8500	Kg/cm <sup>2</sup>
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 liner 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 <sup>14</sup>	Ohm



**Chemical Resistance Details**

**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, environment. 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	-
Aluminium chloride		A	A	-
Aluminium fluoride		A	A	-
Aluminium 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	-
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	-	-
Boric acid		A	-	-

Environment	Conc.%	TEMP°C		
		20°	60°	100°
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	-
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	-

Environment	Conc. %	TEMP °C		
		20*	60*	100*
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	B	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	-
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-HNO3	(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	-	-
Hydrogen sulfid		A	A	-
Hydroquinone		A	A	-
Inks		A	A	-
Iodine tincture		A	-	-
Isoctane	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 (aqueous solution)	2	A	A	-
			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	-

Environment	Conc. %	TEMP °C		
		20*	60*	100*
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)	-
Nitric acid	10		A	
50-50 HNO3HCl	(a)	B	D	
			(80°C)	-
50-50 HNO3-H2SO4	(a)	C	D	
			(80°C)	-
Nitrobenzene	100	A	A	
Oleic acid		A	B	
Oleum		-	-	
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 (boiling point 100 - 140 C)	100	C	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	
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	

Environment	Conc.%	TEMP°C		
		20°	60°	100°
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	-
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	-

Environment	Conc.%	TEMP°C		
		20°	60°	100°
Sugars and syrups		A	A	-
Sulfamic acid		A	A(80°C)	-
Sulfates of Calcium & Magnesium		A	A	-
Sulfates of Potassium & Sodium		A	A	-
Sulfur		C	-	D
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 H2SO4/HNO3	(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	C	-
Trichloroethylene	100	A	A(80°C)	-
Turpentine	100	C	C	C
Urea		A	A	-
Urine		A	A	-
Water (distilled, soft, hard and vapour)		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	-



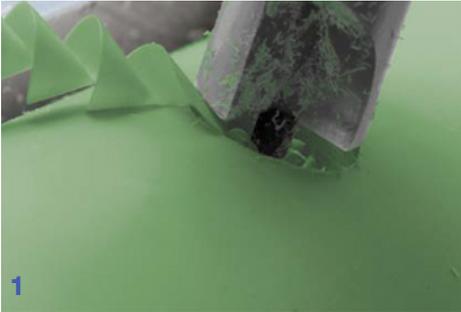
# PP-R Pipes Installation Instructions

## Installation of PP-R Saddle Fittings

Saddle welds in PP-R pipes are both the outer surface of the tube and the wall thickness of the tube to create a strong, waterproof and reliable joint.

### Advantage

Adds additional tees on distribution pipelines (without the hassle of having to cut out parts of existing pipelines and add expensive fittings such as tees, couplings and reducers. Ideal for adding more access points to the main pipeline. Addition of sensors or manometers. Cost-effective and simple way to manufacture geothermal manifolds.



1. Drilling a hole under the pipe saddle fitting.



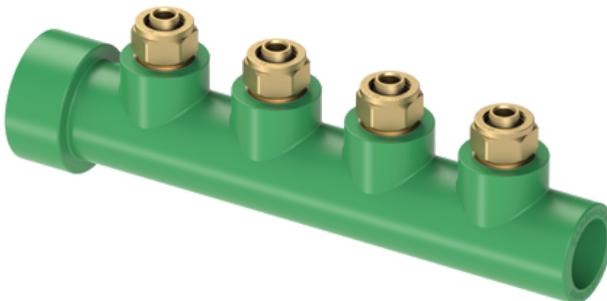
2. Processing the hole - removing the burrs made when drilling.



3. Welding the pipe saddle fitting by heating up the weld in saddle and use proper die.

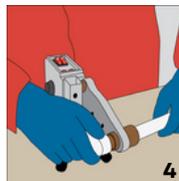
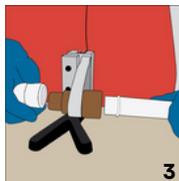
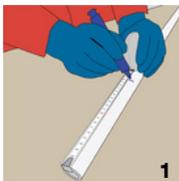


4. Ready connection. (Available in 40mm to 315mm)



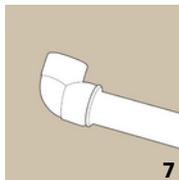
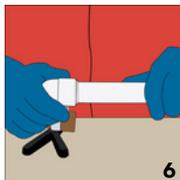
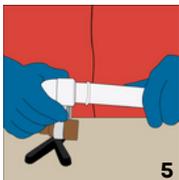
## Installation of PP-R Piping Systems

Make sure that pipes, fittings and welding machine are clean. Before operating the socket fusion machine, make sure that the working area is safe. To avoid the rotation and movement of parts, welding plates should be be appropriately placed into the welding machine. Connect the welding machine to 220 Volts standard socket. Adjust the temperature as 260°C (500 °F). Push the power button. Heating will take 1 to 3 minutes. When the temperature reaches 260°C (500°F), thermostat light will switch off automatically.



Pipes and fittings should be heated at the same time. Heating times vary depending upon the diameters of pipes. If you do not follow the times indicated in the table, this will cause reduction in the welding quality. If you heat them for too much time, it will cause the pipe to tighten so much and the fitting to expand extremely, resulting in loose connection.

After heating, take out the pipes and fittings from the welding mould carefully.



Push the pipe into the fitting at straight angle without rotating it, and joint it quickly.

After jointing it, wait for the cooling process by following the cooling times indicated.

After cooling, the connection will be ready for use.

**Do not perform welding operation in ambient temperatures below 5°C. As PP-R material is fragile in cold weather conditions, treat the pipes with more attention in those conditions.**

### Test Instructions

Upon completion of the pipe installation, the installation should be absolutely tested according to the following testing method. After making the controls, the installation should be switched off.

#### Testing Method

1. All valves in the installation are switched off.
2. During the supply of water into the installation, the main valve is switched on, but it should not be switched on too much. To protect the installation against strong pressure impacts, the air of the installation is carefully released at the highest and the farthest point of the line.
3. Fill the installation with water slowly until water comes out at such point.
4. The valves of each area of the installation to be tested are switched on and separately tested.

#### Starting the Test

Pressure test is carried out in two steps.

Step 1: Testing is conducted for 30 minutes by 1.5 times more of the highest operating pressure prescribed in the entire piping installation within the building. During this period of time, the installation is observed in terms of pressure drop and leakage in the minute 10 and 20. If there is pressure drop but not leakage, then water is re-supplied and restored to the testing pressure.

Step 2: Pressure is applied for 2 hours by 1.5 fold of the highest operating pressure prescribed in the entire piping installation within the building. There should not be any pressure drop at the end of such 2 hours.

Diameter [mm]	Welding Depth [mm]	Heating Time [mm]	Welding Time [s]	Cooling Time [m]
20	14	5	4	2
25	15	7	4	2
32	16,5	8	5	3
40	18	12	6	4
50	20	18	7	4
63	24	24	8	6
75	28	30	8	6
90	29	40	8	8
110	32,5	50	10	8
125	40	70	10	8
160	45	90	12	10

The lines not to be used in the testing should be switched off and each area should be separately tested. If, at the end of the testing, the installation will not be used, it should be absolutely discharged. In terms of freezing, no water should be available in the line not to be used.

## Thermal Expansions

Linear expansion of pipes depends upon the difference between the operating temperature and installation temperature:

$$\Delta T = T_{\text{Operating Temperature}} - T_{\text{Installation Temperature}}$$

Therefore, thermal expansion values of cold water applications could be neglected. For hot water applications, the expansions should be calculated due to the linear expansion depending upon the temperature of the material, and the clamp distances should be adjusted based on the tables.

It should be taken into account that the critical parameter is thermal expansion coefficient.

- Linear expansion coefficient of Mono Layer PP-R pipes is 0.150 mm/m<sup>°K</sup>.
- Linear expansion coefficient of Triple Layer PP-R pipes is 0.030 mm/m<sup>°K</sup>.
- Linear expansion coefficient of Fiberglass Reinforced PP-R pipes is 0.035 mm/m<sup>°K</sup>.

Total linear expansion of PP-R system is calculated according to the following formula:

$$\Delta L = L_o \times \alpha \times \Delta T$$

$\Delta L$ : Linear Expansion (mm)

$L_o$ : Pipe Installation Length (m)

$\alpha$ : Linear coefficient of thermal expansion

$\Delta T$ : Temperature Difference Between Operating and Installation Temperature  
(°K, °C or °F)

For example, 2 m-long Fiber Reinforced PP-R pipe operates at 65°C and installed at 25°C, rectilinear expansion is calculated as follows:

$$\Delta L = L_o \times \alpha \times \Delta T$$

$$\Delta L = 2 \times 0,035 \times 40$$

$$\Delta L = 2.8 \text{ mm}$$

Briefly, if a 2 meter long system is made with Glass Fiber Reinforced PP-R product and is exposed to 40°C temperature difference, the system demonstrates 2.8 mm thermal expansion.

The following tables indicate the example expansion calculations with different temperature differences of products with different thermal expansion coefficients.

		Thermal Expansion of Standard PP-R Pipes [mm] $\alpha = 0.150 \text{ mm/m}^\circ\text{K}$							
		Temperature Differences ( $^\circ\text{C}$ )							
Pipe Length (m)		10°C	20°C	30°C	40°C	50°C	60°C	70°C	80°C
1,0		1,5	3,0	4,5	6,0	7,5	9,0	10,5	12,0
2,0		3,0	6,0	9,0	12,0	15,0	18,0	21,0	24,0
3,0		4,5	9,0	13,5	18,0	22,5	27,0	31,5	36,0
4,0		6,0	12,0	18,0	24,0	30,0	36,0	42,0	48,0
5,0		7,5	15,0	22,5	30,0	37,5	45,0	52,5	60,0
6,0		9,0	18,0	27,0	36,0	45,0	54,0	63,0	72,0
7,0		10,5	21,0	31,5	42,0	52,5	63,0	73,5	84,0
8,0		12,0	24,0	36,0	48,0	60,0	72,0	84,0	96,0
9,0		13,5	27,0	40,5	54,0	67,5	81,0	94,5	108,0
10,0		15,0	30,0	45,0	60,0	75,0	90,0	105,0	120,0

		Thermal Expansion of Triple Layer (All layer PP-R) PP-R Pipes [mm] $\alpha = 0.035 \text{ mm/m}^\circ\text{K}$							
		Temperature Differences ( $^\circ\text{C}$ )							
Pipe Length (m)		10°C	20°C	30°C	40°C	50°C	60°C	70°C	80°C
1,0		0,4	0,7	1,1	1,4	1,8	2,1	2,5	2,8
2,0		0,7	1,4	2,1	2,8	3,5	4,2	4,9	5,6
3,0		1,1	2,1	3,2	4,2	5,3	6,3	7,4	8,4
4,0		1,4	2,8	4,2	5,6	7,0	8,4	9,8	11,2
5,0		1,8	3,5	5,3	7,0	8,8	10,5	12,3	14,0
6,0		2,1	4,2	6,3	8,4	10,5	12,6	14,7	16,8
7,0		2,5	4,9	7,4	9,8	12,3	14,7	17,2	19,6
8,0		2,8	5,6	8,4	11,2	14,0	16,8	19,6	22,4
9,0		3,2	6,3	9,5	12,6	15,8	18,9	22,1	25,2
10,0		3,5	7,0	10,5	14,0	17,5	21,0	24,5	28,0

		Thermal Expansion of Glass Fiber Reinforced (Faser) PP-R Pipes [mm] $\alpha = 0.035 \text{ mm/m}^\circ\text{K}$							
		Temperature Differences ( $^\circ\text{C}$ )							
Pipe Length (m)		10°C	20°C	30°C	40°C	50°C	60°C	70°C	80°C
1,0		0,4	0,7	1,1	1,4	1,8	2,1	2,5	2,8
2,0		0,7	1,4	2,1	2,8	3,5	4,2	4,9	5,6
3,0		1,1	2,1	3,2	4,2	5,3	6,3	7,4	8,4
4,0		1,4	2,8	4,2	5,6	7,0	8,4	9,8	11,2
5,0		1,8	3,5	5,3	7,0	8,8	10,5	12,3	14,0
6,0		2,1	4,2	6,3	8,4	10,5	12,6	14,7	16,8
7,0		2,5	4,9	7,4	9,8	12,3	14,7	17,2	19,6
8,0		2,8	5,6	8,4	11,2	14,0	16,8	19,6	22,4
9,0		3,2	6,3	9,5	12,6	15,8	18,9	22,1	25,2
10,0		3,5	7,0	10,5	14,0	17,5	21,0	24,5	28,0

## Thermal Elongation Compensation

All piping systems need adequate gap for thermal expansion. The necessary gaps should be created on the system through thermal expansion compensation so that no extra tension is created on the system due to temperature differences and the system is not damaged. In the vertical lines (riser), thermal expansion compensation is not required. However, in the horizontal lines, thermal expansion compensations should be included into the system by using the following calculations and designs.

### Free Expansion

Fixed Points (FP) blocks the undesired movements of the system. These fixed points are created by using fasteners. Fixed points should be more resistant and stable than sliding points (SP). It is not recommended to use fixed points at bending areas.

Thermal expansion compensation can be calculated according to the following formula by taking the free movements into consideration:

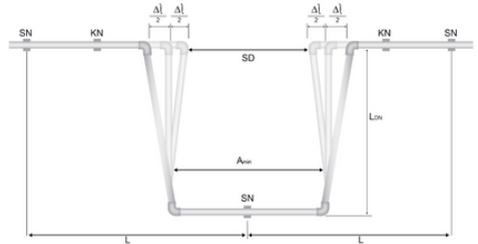
$$A_{min} = 2 \times \Delta L + SD$$

- A<sub>min</sub>; Minimum thermal expansion compensation width (mm)
- SD; Safety gap (150 mm)
- ΔL; Total elongation of the system from fixed point (mm)

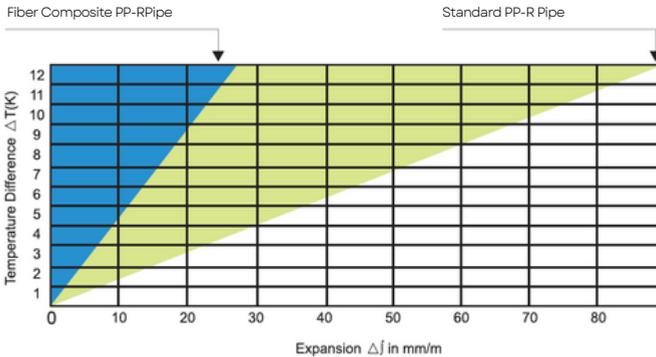
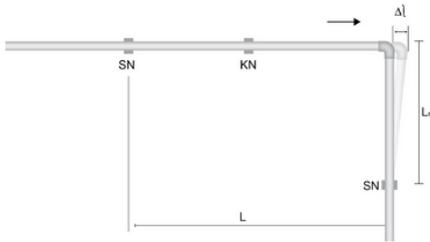
The adjustments of thermal expansion compensation are generally calculated as uniaxial (along the pipe). To avoid any additional stress in the system, PP-R pipes should freely expand in the axial direction.

Safety gap specified as 150 mm should be increased if there are temperature difference fluctuations in the system.

If the system is biaxial (horizontal and vertical) and longer than 5 m, thermal expansions should be calculated and the following expansion cycles should be used.



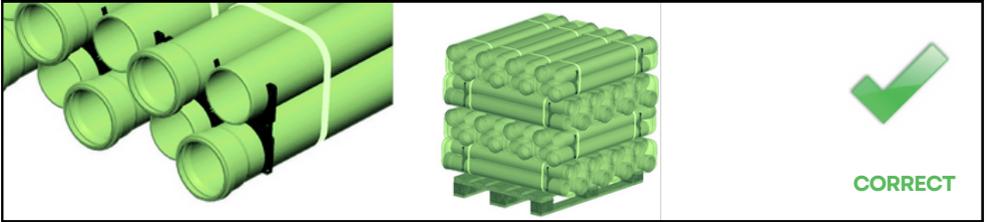
- SF; Fixed Point
- SP; Sliding Point
- LDN; Length of free bending part (mm)
- d; External diameter of pipe (mm)
- L; Length of pipe
- ΔL; Total thermal expansion (or contraction) (mm)
- L; Pipe Length (m)
- K; Material constant (K=30)



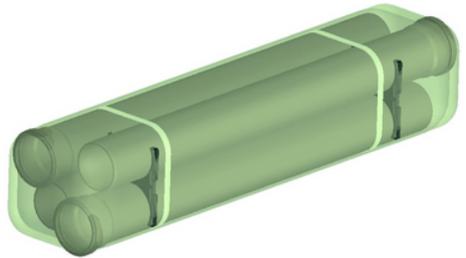
# Packaging, Storage and Transportation

## Packaging

Our pipes and fittings are packed as ready for transport in a customer-friendly way. Packing ensures safety, efficient storage and easy transport.

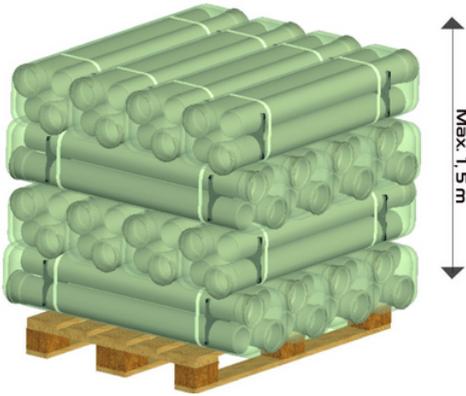


Short parts with the length of 150, 250 and 500 mm are packed in carton boxes like connection parts.



Pipes are packed by plastic clamps to hold them together. Stretch film is applied to protect pipes from pipes dust and stains.

## Storage

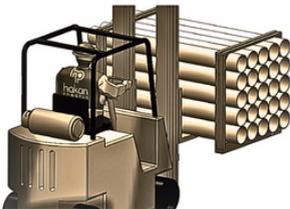
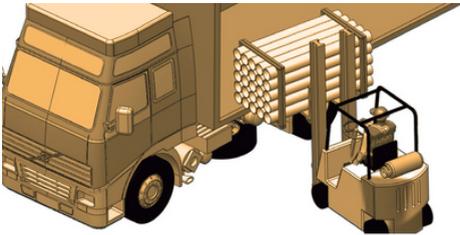


Method of storage should not cause any outflow and should not damage the pipes. As long as they are stored properly, no permanent deformations or damages will occur on the pipes and fittings. Pipes should not be stacked above 1,5 m. Pipes should be safe against sliding.



Pipes and fittings packed in carton boxes should be protected against moisture. Carton boxes should be sealed and stored in a dry area.

## Transportation



Pipes should be carefully transported to prevent any damages. Avoid sudden and hard pressures on pipes and fittings that might cause freezing in cold weather conditions. Ensure that pipes are not slided and dropped on the floor. Loading and unloading and packing of pipes in a block should be carried out by means of forklifts having flat threads and extensions.

# Notes

A series of horizontal dashed lines for writing notes.

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**Edoburg Piping Systems LLP**  
Reg. Office: 320, Vikas Kunj  
Vikasपुरi, Delhi 110018 IN

+1 201 616 0164  
+91 962 585 8500  
[hello@edoburg.com](mailto:hello@edoburg.com)