

SHK[®]
PPR / PPR - FR
Pipes & Fittings

Industrial Piping Solutions

Under One Roof



SHK Polymers Industries

www.shreeharikrishna.net

Company Profile

SHK Polymers Industries, a unit of Shree Harikrishna Group of Companies, the company growth with the leadership of an experienced management team, well qualified in their fields and efficiently serving in the industrial sectors with their good & quick services since long time.

SHK Polymers Industries, an ISO-9001-2008 certified company, as one of the leading thermo processing and manufacturing company, established in the year of 2013. Our SHK brand Polyolefin Pipe product range includes complete range of Polypropylene Random Copolymer (PPR-C) Triple Layer Pipes & Fittings for Hot & Cold water connection of Domestic, PPR-FR Thermal Composite Pipes & Fittings for Industrial Application and PPR-FR Composite Pneumatic Pipes & Fittings for Compresure Air Line Industries. Our products are manufactured of the best quality of raw material procured from the most reliable sources available in the world.



Infrastructure

We have with us well developed infrastructure facilities that include advanced technology based machinery and a specialized research & development unit. We have two dedicated production units out of which one is dedicated for PPR-C Triple Layer Pipes, PPR-FR Composite Pipes, PPR-FR Pneumatic Pipes, HDPE Pipes and Duct Pipes. This helps us to achieve voluminous and qualitative production. Our plant is equipped with the most sophisticated & advance machineries to manufacture the products confirming to the standards laid down by Indian and international standards requirements and well equipped with in-house Testing & Quality Assurance Facilities.

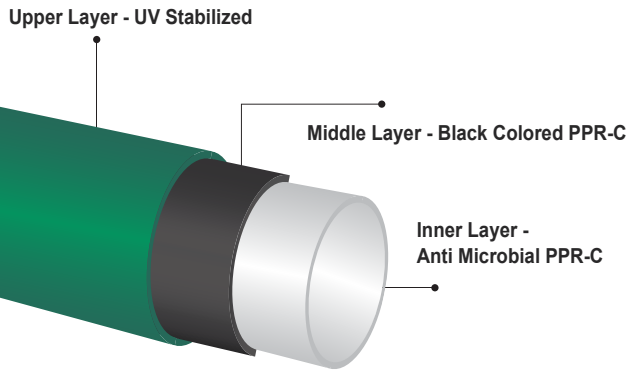
Quality Certificates



9001 - 2008 Certified Company



CML/7200068512



UV Stabilized PPR-C Top layer:

1. UV Stabilizers contains various chemical properties, which gives the protection against UV light by various chemical mechanisms.
2. Colors like Black, Green already have good resistance to UV rays, but addition of UV stabilizers further enhance the light and thermal stability of product.
3. thermal stability of product.
4. UV stabilizers impart long term durability and enhance life of the product.
It helps to maintain the properties of polymers.

Black Colored PPR-C Middle layer

Middle layer gives very good resistance to UV rays.

Anti-microbial PPR-C Inner Layer

Anti-Microbial layer prevents the growth of bacteria/microbes/algae etc and preserves the pipes from them. This anti-Microbial additive is very low migrating which makes it last for the entire life of product. This Anti-Microbial Layer is stable upto 270 degree Celcius temperature.

Properties

- Extremely long life, 50 years of service life
- Taste and odour neutral
- Good Chemical Resistance & Physically neutral
- No need for insulation for concealed piping networks
- Resistance to High Temperature (95 C)
- Convenient & Reliable Installation
- No Reaction with Salts & Acids
- Leak Proof & Frost Proof
- Unique and un-rivalled jointing technique with security for lifetime
- Low Laying Time & Cost
- Smooth Inner Surface
- Recyclable - Prevents Environmental Hazards
- Total Hygenic & Food Graded

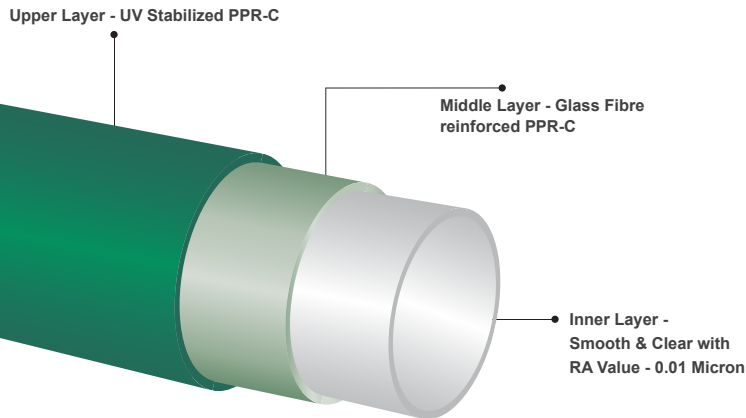


Fields of Application

- Hot and Cold water supplying pipes
- Portable water pipe networks for cold and hot water installation i.e. in
- Residential Buildings, Hospitals, Hotels, Office And School Buildings, Ship Buildings etc.
- R.O. Water, DM Water and Pharmaceutical plants for clean water
- Transport of Liquid Food due to its Hygienic behaviour
- Pipe networks for rainwater utilization systems.
Pipes for Agriculture use & Horticulture use.



The raw material of SHK pipes and fittings is Polypropylene Random Copolymer (PP-R). Our R&D Department developed PPR-FR (Fibre Reinforcement) Quality product with middle sandwich FR Layer and improved resistency & strength. The complete range of products have been further improved with exclusive SHK accessories, which have been designed to meet all possible needs.



Fields of Application

- Industrial systems like conveying, aggressive fluids like acid, alkaline solutions, Effluent and Sewage Disposal. Leak proof joints.
- Chilled water circuit for refrigeration units
- Cooling water circuit for cooling tower unit
- Radiator heating pipes, Room heating system, Under floor heating pipes



Properties

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SHK Flame Retardant Pipes

Thermoplastic Polyolefin being organic compound burns or decompose on exposure to fire generates toxic fumes & smoke, but Flame Retardant or Fire resistant compounds help mitigate fire danger. In order for fire to occur its three basic elements (fuel, heat, and oxygen) must exist. The science of flame retardance uses chemical reactions to moderate one or more of these attributes.

A variety of flame retardant additives can be deployed in thermoplastic polymers depending on the requirements of individual end-use applications. During combustion, flame retardant additives react with the burning polymer in the vapor phase disrupting, at a molecular level, the production of free radicals and shuts down the combustion process. This mechanism is commonly used with halogenated flame retardant systems.

Application

- Compressed Air
- Instrument Air
- Vacuum Air
- Nitrogen Air

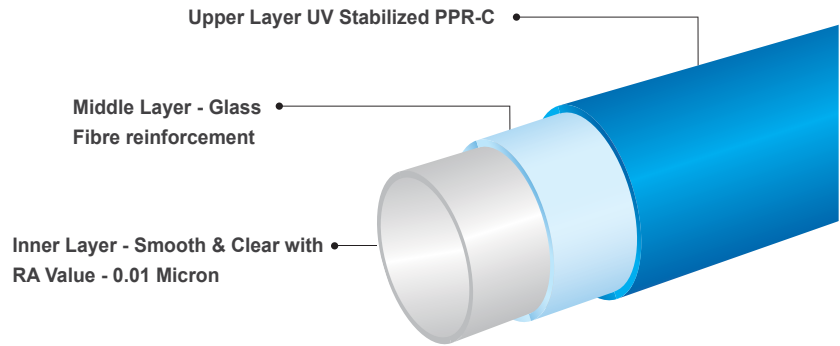


combat these conditions through one of several mechanisms that moderate one or more of the elements (fuel, heat, or oxygen) necessary for burning to take place. Even with flame retardant treatment, no plastic can be rendered entirely fire proof. Under flashover conditions all plastics, even those that are inherently fire resistant, will at some point combust.

Improving Product Safety With Flame Retardant Plastics

Using flame retardant technologies to reduce fire hazards is a basic element of product safety. The objective of flame retardant systems is to delay ignition and/or fire spread.

**Most Energy Saving Pipes
for All Air Applications**



First Time In India

**PPR Flame Retardant Pipes
with full range (V0, V1, V2 Ratings)**

- | | |
|---|---|
| With RA Value 0.01 Micron -
gives negligible friction loss in the pipeline | C Value 150 -
gives smoother and higher flow in the pipeline |
|---|---|

Flame Retardant Compounds Help Mitigate Fire Danger

- Increase plastic's ignition resistance
- Reduce the speed of flame spread
- Reduce heat release
- Reduce smoke & fume generation

When exposed to heat or flame, plastics undergo pyrolysis, which results in thermal degradation of the resin's physical properties (softening and melting) and releases gases that are potentially volatile. Flame retardant plastics attempt to



Raw Material Polypropylene Random Copolymer

SHK Pipes and fittings are produced from Polypropylene Random Copolymer Type 3 as raw material having low melt flow rate, high molecular weight and good flexibility.

This raw material is recommended for the production of pressure pipes including potable water transfer lines, hot and cold water transfer lines, floor heating and also for chemical industry application. Good long term pressure resistance and easy processing and installation technique give cold and hot water systems made of PP-R pipes an advantage as an alternative to the traditional systems.

Polypropylene Random Copolymer Type 3 corresponds to German DIN standards.

(a) DIN 8077 Pipe Dimensions

(b) DIN 8078 Pipes General Quality Requirements and Testing

As per IS : 15801 & DIN 8077 : 1999-07 Wall Thickness and Mass Corresponding to Different Pipe Sizes

D	SDR 11/PN10		SDR 7.4 / PN 16		SDR 6 / PN 20	
	Outer diameter of pipe (mm)	S Thickness in mm	Mass in kg/m	S Thickness in mm	Mass in kg/m	S Thickness in mm
20	1.9	0.107	2.8	0.148	3.4	0.172
25	2.3	0.164	3.5	0.230	4.2	0.266
32	2.9	0.261	4.4	0.370	5.4	0.434
40	3.7	0.412	5.5	0.575	6.7	0.671
50	4.6	0.638	6.9	0.896	8.3	1.040
63	5.8	1.01	8.6	1.410	10.5	1.650
75	6.8	1.41	10.3	2.010	12.5	2.340
90	8.2	2.03	12.3	2.870	15	3.360
110	10	3.01	15.1	4.300	18.3	5.010
160	14.6	6.38	21.9	9.040	26.6	10.60

Thermal Properties

Properties	Test Method	Unit	Value
Thermal Conductivity at 23 C	DIN 52612	W/m ^{0k}	0.23
Specific heat at 23 C	Calorimeter	Kj/kg ^{0k}	1.73
Coefficient of linear thermal expansion	DIN 53752	K ⁻¹	1.5 x 10 ⁻⁴
Under weight deformation temperature 1.8 N/mm ²	ISO 306	°C	44
0.45 N/ mm ²	ISO 3146	°C	42
VICAT softening point	0.095	°C	130

Mechanical Properties

Properties		Test Method	Unit	Value
Tensile Stress at Yield (50mm / minute)		ISO 527-1,2	MPa	24
Tensile Stress at Yield (50mm / minute)		ISO 527-1,2	%	10
Tensile modules (secant)		ISO 527-1,2	MPa	850
Flexural Modulus		ASTM D 790	MPa	850
Tear Strength		ISO 527	MPa	40
Elongation at tear		ISO 527	%	800
Shore D Hardness		DIN 53 505	-	65
Pipe Friction Factor		-	-	0.007
CHARPY Impact Strength	23°C	ISO 179/leA	KJ/m ²	22
	0°C	ISO 179/leA	KJ/m ²	4.0
	-30°C	ISO 179/leA	KJ/m ²	2.5
CHARPY Impact Strength (unnotched)	23°C	ISO 179/leA	KJ/m ²	No failure
	0°C	ISO 179/leA	KJ/m ²	No failure
	-30°C	ISO 179/leA	KJ/m ²	43

Physical Properties

Properties	Test Method	Unit	Value
Density	ASTM D792	G/CM ³	0.91
Melt Flow Index	-	-	-
MFi 190 C / 5 kg	ASTM D1238	G/10 MINUTES	0.4
MFi 230 C / 2.16 kg	ISO R 1133	G/10 MINUTES	0.2
MFi 230 C / 5 kg	DIN 53 735	G/10 MINUTES	0.6

Support Distance Chart for PPR-C Triple Layer Pipes

Outside Diameter of pipe (mm)	Temperature In Degree - Support in Cms					
	20	30	40	50	60	80
20	80	75	70	70	65	60
25	85	85	85	80	75	70
32	100	95	95	90	85	75
40	110	110	105	100	95	85
50	125	120	115	110	105	90
63	140	135	130	125	120	105
75	155	150	145	135	130	115
90	170	165	160	155	150	145
110	190	185	180	175	160	165
160	200	200	200	195	180	175

Allowable Working pressure for PP-R

Temperature in C	Years of Service	SDR 11 / PN 10	SDR 7.4 / PN 16	SDR 6 / PN 20
10	1	17.6	27.8	35.0
	5	16.6	26.4	33.2
	10	16.1	25.5	32.1
	25	15.6	24.7	31.1
	50	15.2	24.0	30.3
	100	14.8	23.4	29.5
20	1	15.0	23.8	30.0
	5	14.1	22.3	28.1
	10	13.7	21.7	27.3
	25	13.3	21.1	26.5
	50	12.9	20.4	25.7
	100	12.5	19.8	24.9
30	1	12.8	20.2	25.5
	5	12.0	19.0	23.9
	10	11.6	18.3	23.1
	25	11.2	17.7	22.3
	50	10.9	17.3	21.8
	100	10.6	16.9	21.2
40	1	10.8	17.1	21.5
	5	10.1	16.0	20.2
	10	9.8	15.6	19.6
	25	9.4	15.0	18.8
	50	9.2	14.5	18.3
	100	8.9	14.1	17.8
50	1	9.2	14.5	18.3
	5	8.5	13.5	17.0
	10	8.2	13.1	16.5
	25	8.0	12.6	15.9
	50	7.7	12.2	15.4
	100	7.4	11.8	14.9

Temperature in C	Years of Service	SDR 11 / PN 10	SDR 7.4 / PN 16	SDR 6 / PN 20
60	1	7.7	12.2	15.4
	5	7.2	11.4	14.3
	10	6.9	11.0	13.8
	25	6.7	10.5	13.3
	50	6.4	10.1	12.7
	100	6.5	10.3	13.0
70	5	6.0	9.5	11.9
	10	5.9	9.3	11.7
	25	5.1	8.0	10.1
	50	4.3	6.7	8.5
	100	5.5	8.6	10.9
	5	4.8	7.6	9.6
80	10	4.0	6.3	8.0
	25	3.2	5.1	6.4
	100	3.9	6.1	7.7
95	5	2.5	4.0	5.0
	10	2.1	3.4	4.2

As per DIN 8077:1999-07 allowable working pressure for PP-R pipes with SF = 1.5



Thermal Expansion

A pipe line which is subjected to a variation of temperatures changes its length if it is free to do so. These changes in length are proportional to the unit linear coefficient of thermal expansion.

Pipe lin Length (Mtr)	Temperature Difference (-T) 0C							
0.1	0.15	0.30	0.45	0.60	0.75	0.90	1.05	1.20
0.2	0.30	0.60	0.90	1.20	1.50	1.80	2.10	2.40
0.3	0.45	0.90	1.35	4.80	2.25	2.70	3.15	3.60
0.4	0.60	1.20	1.80	2.25	3.00	3.60	4.20	4.80
0.5	0.75	1.50	2.25	3.00	3.75	4.50	5.25	6.00
0.6	0.90	1.80	2.70	3.60	4.50	5.40	6.30	7.20
0.7	1.05	2.10	3.15	4.20	5.25	6.30	7.35	8.40
0.8	1.20	2.40	3.60	4.80	6.00	7.20	8.40	9.60
0.9	1.35	2.70	4.05	5.40	6.75	8.10	9.45	10.80
1.0	1.50	3.00	4.50	6.00	7.50	9.00	10.50	12.00
2.0	3.00	6.00	9.00	12.00	15.00	18.00	21.00	24.00
3.0	4.50	9.00	13.50	18.00	22.50	27.00	31.50	36.00
4.0	6.00	12.00	18.00	24.00	30.00	36.00	42.00	48.00
5.0	7.50	15.00	22.50	30.00	37.50	45.00	52.50	60.00
6.0	9.00	18.00	27.00	36.00	45.00	54.00	63.00	72.00
7.0	10.50	21.00	31.50	42.00	52.50	63.00	73.50	84.00
8.0	12.00	24.00	36.00	48.00	60.00	72.00	84.00	96.00
9.0	13.50	27.00	40.50	54.00	67.50	81.00	94.50	108.00
10.0	15.00	30.00	45.00	60.00	75.00	90.00	105.00	120.00



PPR-C vs Other Products – Comparison Table

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

Product Specification



AQUA PPR-C TRIPLE LAYER PIPE

Type	Size
PN – 10 Pipes	32 mm to 160 mm
PN – 16 Pipes	20 mm to 160 mm
PN – 20 Pipes	20 mm to 160 mm

THERMO PPR-FR COMPOSITE PIPE - GREEN

Type	Size
PN – 10 Pipes	32 mm to 160 mm
PN – 16 Pipes	20 mm to 160 mm
PN – 20 Pipes	20 mm to 160 mm



PNEUMATO PPR-FR COMPOSITE PNEUMATIC PIPE - BLUE



Type	Size
PN – 10 Pipes	50 mm to 160 mm
PN – 16 Pipes	20 mm to 160 mm
PN – 20 Pipes	20 mm to 160 mm

PPR-C Green Fittings

Socket

Size : 20 mm to 160 mm



Elbow 90 degree

Size : 20 mm to 160 mm



Elbow 45 degree

Size : 20 mm to 160 mm



Tee

Size : 20 mm to 160 mm



End Cap

Size : 20 mm to 160 mm



Flange Core/Stubend

Size : 20 mm to 160 mm



Reducer

Size : 20 mm to 160 mm



Reducer Tee

Size : 20 mm to 160 mm



PPR-Flange

Size : 20 mm to 160 mm



M/S Powder Coated Flange

Size : 20 mm to 160 mm



Reducing Elbow

Size : 20 mm to 50 mm



Union

Size : 20 mm to 63 mm



Long Bend

Size : 20 mm to 63 mm



F T Saddle

Size : 20 mm to 160 mm



Saddle

Size : 20 mm to 160 mm



Wall Clamp

Size : 20 mm to 50 mm



PPR-C Green Fittings

F T Socket

Size : 20 mm to 110 mm



M T Socket

Size : 20 mm to 110 mm



F T Union

Size : 20 mm to 63 mm



M T Union

Size : 20 mm to 63 mm



F T Elbow

Size : 20 mm to 50 mm



M T Elbow

Size : 20 mm to 50 mm



F T Tee

Size : 20 mm to 50 mm



M T Tee

Size : 20 mm to 50 mm



Get Valve

Size : 20 mm to 63 mm



Plastic Body Ball Valve

Size : 20 mm to 110 mm



Double Union PPR Ball Valve

Size : 20 mm to 63 mm



Double Union Brass Ball Valve

Size : 20 mm to 63 mm



Cross Tee

Size : 20 mm to 50 mm



Tank Connector

Size : 20 mm to 63 mm



Long Plug

Size : 20 mm



Pneumatic Blue Fittings

Socket

Size : 20 mm to 160 mm



Elbow 90 degree

Size : 20 mm to 160 mm



Elbow 45 degree

Size : 20 mm to 160 mm



Tee

Size : 20 mm to 160 mm



End Cap

Size : 20 mm to 160 mm



Flange Core/Stubend

Size : 20 mm to 160 mm



Reducer

Size : 20 mm to 160 mm



Reducer Tee

Size : 20 mm to 160 mm



Flange

Size : 20 mm to 160 mm



Saddle

Size : 20 mm to 160 mm



FT Weld Saddle

Size : 20 mm to 160 mm



Double Union Brass Ball Valve

Size : 20 mm to 63 mm



F T Socket

Size : 20 mm to 110 mm



M T Socket

Size : 20 mm to 110 mm



F T Union

Size : 20 mm to 63 mm



M T Union

Size : 20 mm to 63 mm



F T Elbow

Size : 20 mm to 50 mm



M T Elbow

Size : 20 mm to 50 mm



F T Tee

Size : 20 mm to 50 mm



M T Tee

Size : 20 mm to 50 mm



Long Bend

Size : 20 mm to 63 mm



Welding Process



Cutting

- Cut the pipe at right angle to its axis using burr-free cutter
- Ensure that pipe is free from burrs or cutting chips
- Clean the pipe & fitting perfectly before welding.
- Mark welding depth at the end of pipe



Heating

- Mount the suitable Dies (Socket and Punch) on heating element of welding machine according to the diameter of pipe and fitting to be welded
- Connect the welding machine to 220 Volts A.C. power supply
- Select 260 C temperature on the welding machine hermostat
- Wait for reaching the required working temperature
- Insert the pipe and the fitting in the Dies (i.e. Socket and Punch respectively) by exerting light pressure
- Heat both pipe & fitting as per the size and time given in the following table



Welding

- After heating, quickly insert pipe into the fitting by exerting light pressure
- Any misalignment should be corrected immediately after insertion to avoid any stress in the weld. This type of connection ensures perfect sealing even under the hard working conditions.



Note :

1. Avoid air draughts during welding to avoid stress in the welds.
2. During site welding, keep the welding set at a right angle to the pipe and fitting in order to avoid partial welding.

Pipe Dia. (mm)	Welding Depth (mm)	Heating Time (Sec)	Welding Time (Sec)	Cooling Time (Min)
20	14.50	6	4	2
25	16.00	7	4	2
32	18.00	8	6	4
40	20.50	12	6	4
50	23.50	18	6	4
63	27.50	24	8	6
75	30.00	30	8	6
90	33.00	40	8	6
110	37.00	52	10	8



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