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**EXTREMELY EFFICIENT FOR  
EXTREME TEMPERATURE**

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**GREENFIT**  
**THERMEX PLUS+**

**PP-R Plumbing Systems**

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## Greenfit Thermex Plus PP-R System

Greenfit Thermex Plus pipes & fittings are manufactured using polypropylene random co-polymer (PP-R). PP-R is commonly used in drinking water installations, hot water and radiator heating systems and many kind of industrial liquid transportation systems.

The traditional line of monolayer Greenfit PP-R pipes has been enlarged by introducing new Greenfit Thermex Plus system. It conforms to the requirement given in DIN 8077 & 8078, EN ISO 15874 and IS 15801 standards.

Greenfit Thermex Plus pipe has higher stiffness & lower thermal expansion (3 times lower than conventional monolayer PP-R pipes).


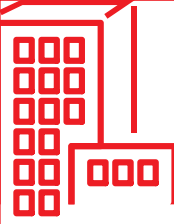
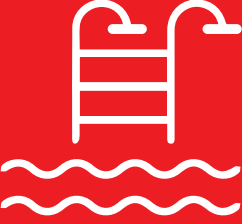


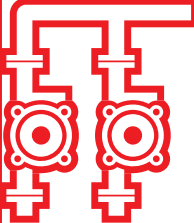
## Triple Layer Advantages

Greenfit Thermex Plus is designed for distribution of water in extreme temperatures (up to 70°C), compressed air system & and air conditioning. It is also recommended for distribution in residential, commercial, Industrial & public community buildings.

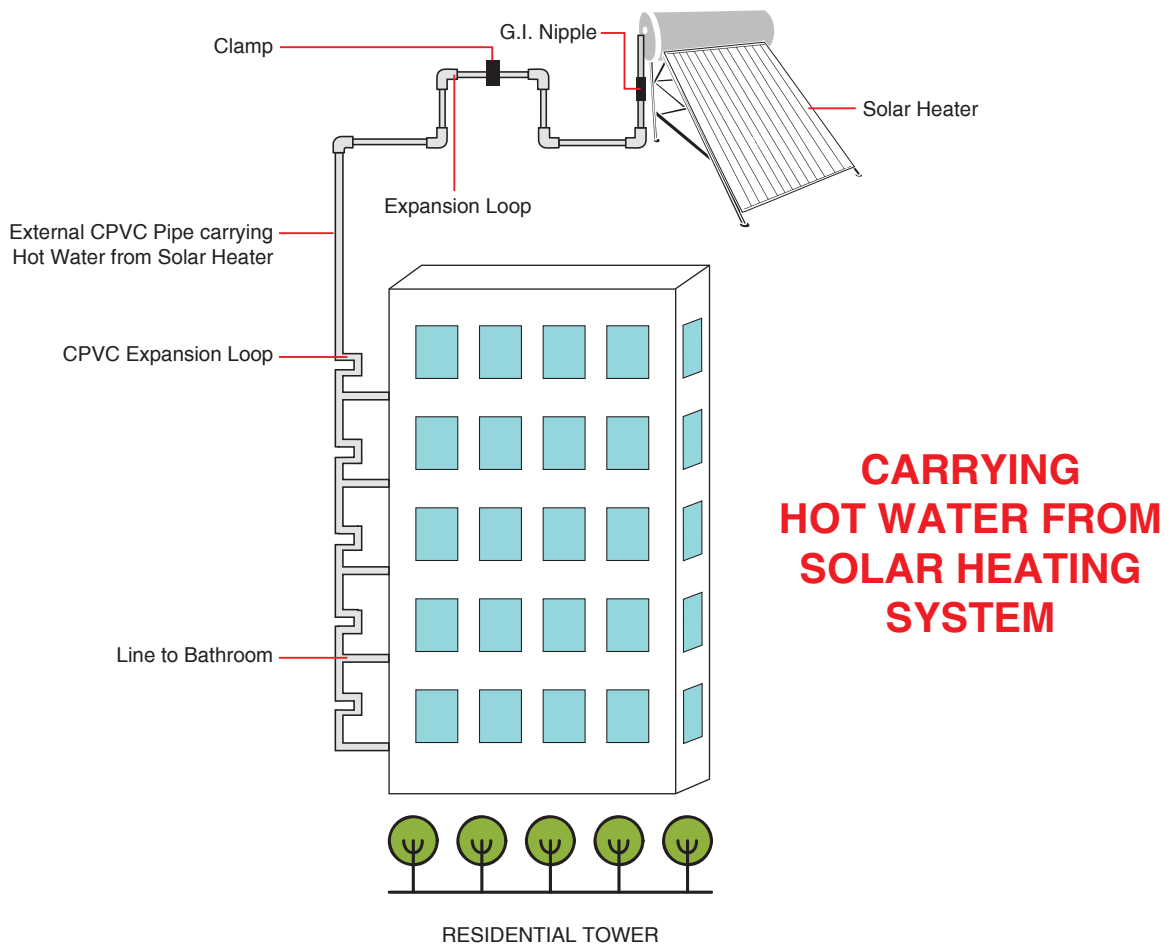
The composition of layers in a nutshell is PP-R/PP-R + GF/PP-R.



## Applications

 <p>Indoor and outdoor installations of hot &amp; cold water plumbing lines.</p>	 <p>Water distribution within buildings, such as mains, risers and manifolds, etc.</p>	 <p>Swimming pool networks.</p>
 <p>Hot pipe network such as water boilers, geysers &amp; radiator connections.</p>	 <p>Compressed air systems for factories &amp; workshops.</p>	 <p>Aggressive fluids distribution networks.</p>

Please note that while connecting Thermex Plus pipe to these appliances use metal pipe of at least 2 feet in between appliance & Thermex Plus pipe.



## Product Range & Specification

Greenfit Thermex Plus PP-R pipes are manufactured in the sizes 20, 25, 32, 40, 50, 63, 75, 90, 110, 160 & 200mm according to IS 15801 standards which is equivalent to European & Deutsches standard for manufacturing PP-R pipes.

Pipes				
Size (mm)	Working Pressure (Kg/cm <sup>2</sup> )	Standard	Colour	End Connection
20 - 160	10, 16 & 20	IS: 15801	Single layer pipes - Green Triple layer pipe - Outer layer in Green Inner layer in white Thermex - Black	Poly-fusion welding joint

Fittings				
Size (mm)	Working Pressure (Kg/cm <sup>2</sup> )	Standard	Colour	End Connection
20 - 160	20 & 25	DIN:16962	Green	<ul style="list-style-type: none"> <li>• Socket ends suitable for fusion welding.</li> <li>• For transition joints, fittings with threaded metal inserts</li> </ul>

Depending on estimated combination of pressure and temperature, the pipes are produced in various pressure rating and with different wall thickness.

Recommended pipe applications according to pressure rating are,

PN 10 (S5) Thermex Plus pipe – Comprehensively for cold water and floor heating.

PN 16 (S3.2) Thermex Plus pipe – Comprehensively for hot water & cold water.

PN 20 (S2.5) Thermex Plus pipe – Comprehensively for hot water & central heating.

## Dimensions

Nominal Size (Outside Diameter)	Wall Thickness		
	SDR 11 (PN 10)	SDR 7.4 (PN 16)	SDR 6 (PN 20)
(mm)	(mm)	(mm)	(mm)
20	1.90	2.80	3.40
25	2.30	3.50	4.20
32	2.90	4.40	5.40
40	3.70	5.50	6.70
50	4.60	6.90	8.30
63	5.80	8.60	10.50
75	6.80	10.30	12.50
90	8.20	12.30	15.00
110	10.00	15.10	18.30
160	14.60	21.90	26.60

Operating conditions according to EN ISO 15874 (Pressure, Temperature & Service Life)

In terms of pressure and temperature for pipes & fittings, the operating conditions are set forth in EN 15874 is taken as basic conditions.

According to EN 15874 water supply & heating system are classified in the following way:

Application class	Design temp. $T_D$	Time at $T_D$	Maximum design temperature	Time at $T_{max.}$	Emergency temperature	Time at $T_{malfunction}$	Scope of application
	°C	Years	°C	Years	°C	Hours	
1	60	49	80	1	95	100	Hot water supply at 60°C
2	70	49	80	1	95	100	Hot water supply at 60°C
4	20 40 60	2.5 20 25	70	2.5	100	100	Under floor heating & radiators at low temp.
5	20 60 80	14 25 10	90	1	100	100	Radiators at high temperature

$T_D$  - design temperature defined by application. |  $T_{max.}$  - maximum design temperature & its time limited exposure by application.  
|  $T_{malfunction}$  - malfunction temperature arising under emergencies due to trouble in control system.

Maximum operating pressure corresponding to the application class is calculated and assigned for each Greenfit Thermex Plus pipe series S and SDR type.

Application	Permissible (bar)	Pipe type
Cold tap water $T = 20^\circ\text{C}$	According to pipe application	SDR 6, SDR 7.4 & SDR 11 PN 20, PN 16 & PN 10
Hot tap water Application class 1 $T_d/T_{max} = 60/80^\circ\text{C}$	10	SDR 6/S2.5 PN 20
	8	SDR 7.4/S3.2 PN 16
Hot tap water Application class 2 $T_d/T_{max} = 70/80^\circ\text{C}$	10	SDR 6/S2.5 PN 20
	8	SDR 7.4/S3.2 PN 16
Floor heating, low temperature radiator heating Application class 4 $T_d/T_{max} = 60/80^\circ\text{C}$	10	SDR 6/S2.5 & SDR 7.4/S3.2 PN 20 & PN 16
Radiator heating Application class 5 $T_d/T_{max} = 80/90^\circ\text{C}$	6	SDR 6/S2.5 & SDR 7.4/S3.2 PN 20 & PN 16



## Properties of Greenfit Thermex Plus System

### Technical Properties

Pipe structure	Multi-Layer : Glass Fiber Reinforced Composite Pipes
Diameters (mm)	20, 25, 32, 40, 50, 63, 75, 90, 110, 160, 200
Pressure class	PN 20 SDR 6/S2.5 & PN 16 SDR 7.4/S3.2
Pipe length (meter)	3.0 & 6.0
Density	0.90 gram/ cm <sup>3</sup>
Colour	White or Green external & internal layer, middle layer of GF+PP-R in natural colour.
Joining method	Socket fusion, Butt-weld connection, flange connection & electrofusion welding
Chemical Resistance	Resistant to organic & inorganic chemical environments for p'H values between 2 & 12.
Installation Temperature	Minimum + 5°C & Maximum +40°C
Operating temperature	Minimum + 5°C & Maximum +95°C
Thermal Expansion Coefficient	For standard monolayer PP-R pipes 0.15mm/m °C For Greenfit Thermex Plus PP-R pipes 0.4mm/m °C
Thermal Conductivity	0.24W/m °C

### Advantages & Benefits



No health risks due to chemically inert PP-R material



High chemical resistance



Resistant to corrosion



Low thermal conductivity



Low density



Resistant to scale buildup



Environment friendly products



Dampening of flow vibrations & noises



High mechanical strength



Homogeneous joint



High operation durability



Recommended uses in seismic area

## Identification of pipes

### Greenfit Thermex Plus Marking



Pipes are marked during the manufacturing process to enable future tracing. All elements are marked in the following way:

**Pipes:** Prince Pipes Greenfit Thermex Plus, 3 Layer PP-R pipe UV stabilized and Antimicrobial Nominal pressure rating PN, Diameter x wall thickness, length & batch number which includes date of production shift & machine number on which pipes are produced. Pipes are packed with standard package in oven sack bag. Each package is marked with type of pipe, PN pressure rating, Greenfit Thermex Plus pipes pressure rating & its equivalent SDR & Series number.

**Fittings:** For Greenfit Thermex Plus system we recommend normal PP-R fittings having nominal pressure rating of PN 25 & diameter as engraved on fitting itself during manufacturing. Batch number is mentioned on package of each package.

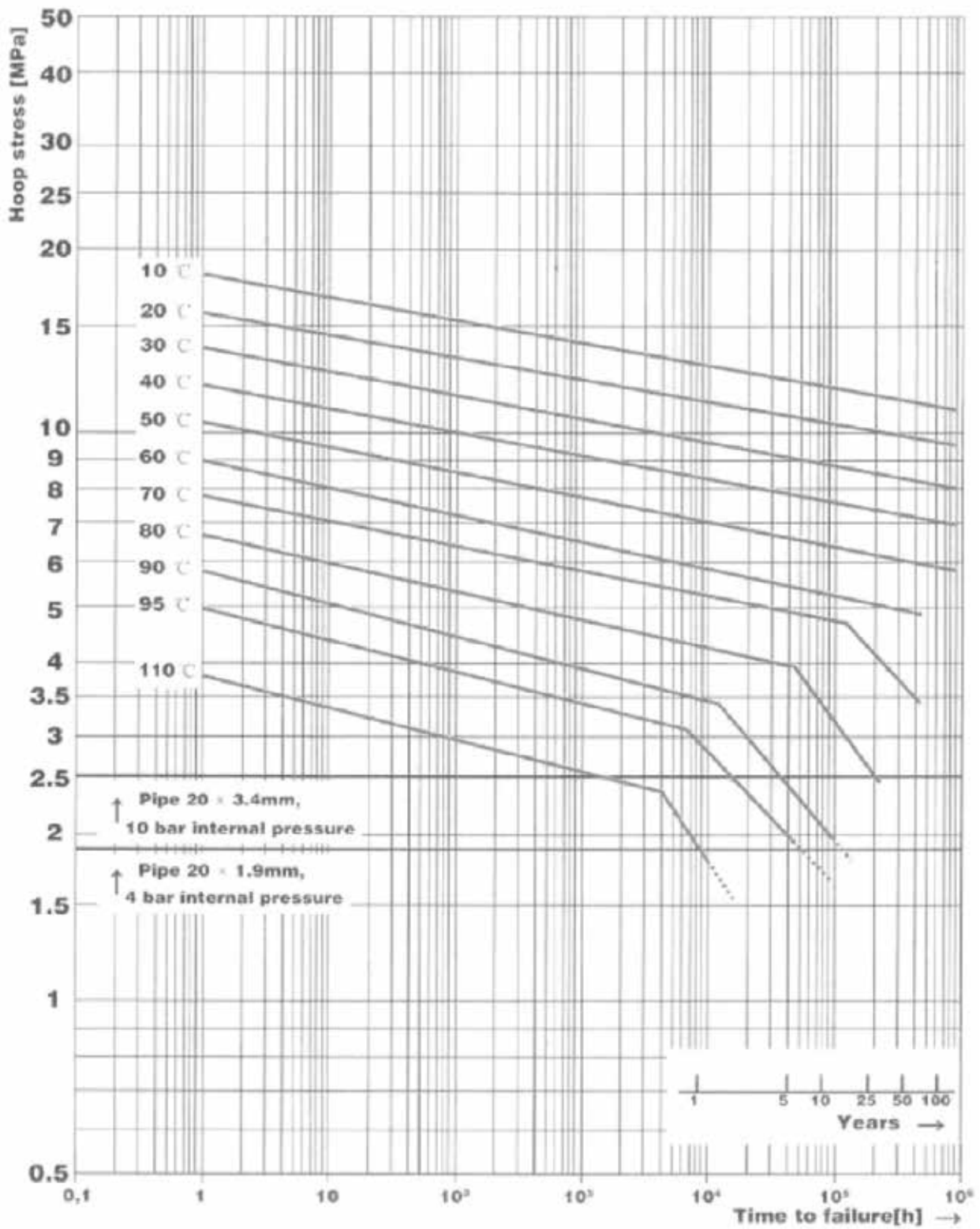
PN	10	16	20
SDR	11	7.4	6
S Series	5	3.2	2

## Basic Parameters of Internal Water Distribution Systems

A short-term overheating to higher temperature levels (70°C) is expected for hygienic reasons (extermination of pathogenic mycobacteria and bacteria Legionella pneumophila). Greenfit Thermex Plus System can be used for all internal water distribution systems (i.e. cold drinking water, cold industrial water, hot water, circulation systems). The plastic piping system is expected to have a 50 years service life under the condition that the material and piping have been selected correctly and the system properly installed. The pressure class depends on the hot water heating system and its proper regulation and should therefore be specified by the relevant project designer.

***When installing plastic piping system behind a boiler or a water tank, we recommend to install 1.5 - 2 m of metal piping as protection against overheating the piping system.***

## Long Term Performance Curve



## Calculation example for service life within the system

Suppose Thermex Plus installation operating at maximum operating temperature of 80°C with maximum operating pressure of 2.2 Kg/cm<sup>2</sup> (0.22 Mpa) for 7 months in a year at safety factor of 1.5.

Calculate hoop stress using formula,

$$\sigma = S_f \times P \times \frac{(d-s)}{2s} = 1.5 \times 0.22 \times \frac{(20-3.4)}{2 \times 3.4}$$
$$\sigma = 0.8 \text{ Mpa}$$

Minimum service of the installation at continuous heating operation from long term performance curve with respect to 80°C temperature isotherm is about 216000 hours which is 25 years.

The resulting expected service life corrected to the yearly heating period then would be as below:

$$25 \text{ years} \times \frac{12 \text{ months}}{12 \text{ months}} = 43 \text{ years}$$

If the results received in above procedures are not satisfactory, then following modifications should be applied:

- 1) To decrease maximum operating pressure and make new calculations for service life expectancy. Service life expectancy value will be further extended.
- 2) To decrease maximum operating fluid temperature and make new calculations for relevant heating system and accordingly for new service life expectancy. With this service life expectancy will be extended significantly.

## Important note

Refer chemical resistance chart before using Greenfit Thermex Plus system for transportation of fluids.

## Caution

Chlorine dioxide is used as disinfectant in the drinking water. The chemical reactivity of chlorine dioxide, and thus the disinfecting effect, is about three times higher than in the case of chlorine. However, materials in the drinking water system are affected due to the high oxidation potential of chlorine dioxide. Pipe and pipe joining materials can be damaged by the high oxidation potential. Piping components are also at risk of being damaged, regardless of whether these components are made of plastic or metal.

Therefore, Prince does not recommend using chlorine dioxide with our Greenfit Thermex Plus PP-R system & components without prior review.

## Fittings



MOULDED FITTINGS  
Coupler



MOULDED FITTINGS  
Elbow 90°



MOULDED FITTINGS  
Elbow 45°



MOULDED FITTINGS  
Equal Tee



MOULDED FITTINGS  
Plain Union



MOULDED FITTINGS  
End Plug



MOULDED FITTINGS  
End Plug (Extended)



MOULDED FITTINGS  
End Cap



MOULDED FITTINGS  
Pipe Clamp



MOULDED FITTINGS  
Ball Valve



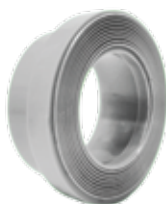
MOULDED FITTINGS  
Cross Over (Moulded)



MOULDED FITTINGS  
Cross Over



MOULDED FITTINGS  
Four Way Tee



MOULDED FITTINGS  
Stub End



MOULDED FITTINGS  
Flange Core



MOULDED FITTINGS  
Flange



MOULDED FITTINGS  
Tank Connector



MOULDED FITTINGS  
Tank Connector (Short)



MOULDED FITTINGS  
Reducer



MOULDED FITTINGS  
Reducing Elbow

# Fittings



**MOULDED FITTINGS**  
Reducing Tee



**MOULDED FITTINGS**  
Saddle (Plain)



**BRASS INSERTS FITTINGS**  
Male Threaded  
Adaptor



**BRASS INSERTS FITTINGS**  
Male Threaded  
Elbow



**BRASS INSERTS FITTINGS**  
Male Threaded Tee



**BRASS INSERTS FITTINGS**  
Male Threaded  
Union



**BRASS INSERTS FITTINGS**  
Female Threaded  
Adaptor



**BRASS INSERTS FITTINGS**  
Female Threaded  
Elbow



**BRASS INSERTS FITTINGS**  
Female Threaded  
Elbow with Support



**BRASS INSERTS FITTINGS**  
Female Threaded  
Tee



**BRASS INSERTS FITTINGS**  
Female Threaded  
Union



**ACCESSORIES FITTINGS**  
Die Set HSN



**ACCESSORIES FITTINGS**  
Repair Section



**ACCESSORIES FITTINGS**  
Repair Bar



**ACCESSORIES FITTINGS**  
Welding Device



**ACCESSORIES FITTINGS**  
Large Diameter  
Welding Device



**ACCESSORIES FITTINGS**  
Cutter

## PRINCE PIPES PP-R FAMILY

**GREENFIT**<sup>®</sup>

PP-R Plumbing & Industrial  
Piping Systems

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**BLUE GREENFIT**<sup>®</sup>

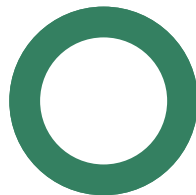
PP-R Industrial Piping Systems

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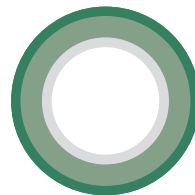
**GREENFIT  
THERMEX PLUS+**

PP-R Plumbing Systems

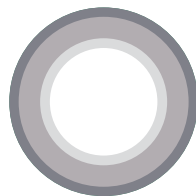
## AVAILABLE PP-R VARIANTS



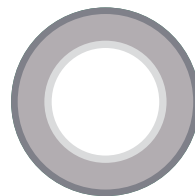
Monolayer



Triple Layer



Thermex



Thermex Plus

## **PRINCE PIPES AND FITTINGS LIMITED**

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