THERM INDUSTRY CO.

شـــركـــة أي تـــوب ثـــيـــرم

PP-R

Technical Manual

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ABOUT US

Welcome to I Top Therm, the leading manufacturer of high-quality piping systems that meet the highest global standards. Since our establishment, we have been committed to providing innovative and reliable piping solutions to meet the needs of various residential, industrial, and infrastructure projects.

We specialize in producing:

PPR water pipes, made of polypropylene, known for their high resistance to heat and pressure, making them ideal for hot and cold water systems.

PVC drainage pipes, offering exceptional performance due to their durability and ease of installation, making them the perfect choice for drainage and sewage systems.

High-density HDPE pipes, used in fire-fighting, irrigation, and drainage systems, known for their high strength, corrosion resistance, and chemical resistance.

At I Top Therm, we place quality and innovation at the core of our work, utilizing the latest technologies and premium raw materials to ensure our products meet the highest safety and efficiency standards. We are your partners in construction and development, always striving to be the first choice for our customers across local and international markets.

Explore this catalog to discover our outstanding range of products, designed to deliver optimal performance and reliability.

من نحن

نرحب بكم في I Top Therm ، المصنع الرائد في تصنيع أنظمة المواسير عالية الجودة وفق أعلى المعايير العالمية. منذ تأسيسنا، التزمنا بتقديم حلول مبتكرة وموثوقة في قطاع الأنابيب، لتلبية احتياجات مختلف المشاريع السكنية والصناعية والبنية التحتية. نحن متخصصون في إنتاج: • مواسير المياه PPR المصنوعة من مادة البولي بروبلين، والتي تتميز بمقاومتها العالية للحرارة والضغط، مما يجعلها مثالية لأنظمة المياه الساخنة والباردة.

• مواسير الصرف الصحي PVC التي توفر أداءً فائقًا بفضل متانتها وسهولة تركيبها، مما يجعلها خيارًا مثاليًا لأنظمة الصرف والتصريف.

• مواسير HDPE عالية الكثافة، المستخدمة في أنظمة مكافحة الحريق والري والصرف، والتي تتميز بقوة تحملها العالية ومقاومتها للتآكل والمواد الكيميائية. في I Top Therm، نضع الجودة والابتكار في صميم عملنا، ونعتمد على أحدث التقنيات والمواد الخام الممتازة لضمان تقديم منتجات تلبي أعلى معايير السلامة والكفاءة. نحن شركاؤكم في البناء والتطوير، ونسعى دائمًا لأن نكون الخيار الأول لعملائنا في جميع أنحاء الأسواق المحلية والدولية. اكتشفوا في هذا الكتالوج مجموعة منتجاتنا المتميزة، التي تم تصميمها لتوفر الأداء الأمثل والموثوقية

Our Expertise

We specialize in the production of :

- PPR Water Pipes – Made from premium polypropylene, offering exceptional resistance to heat and pressure, making them ideal for hot and cold water systems.
- PVC Drainage Pipes – Engineered for durability and easy installation, providing outstanding performance for drainage and sewage applications.
- HDPE Pipes – High-density polyethylene pipes used in fire-fighting, irrigation, and drainage systems, known for their strength, corrosion resistance, and chemical durability.

خبراتنا

نحن متخصصون في إنتاج:

- مواسير المياه PPR – مصنوعة من مادة البولي بروبلين الممتازة، وتتميز بمقاومة عالية للحرارة والضغط، مما يجعلها مثالية لأنظمة المياه الساخنة والباردة.
-
- مواسير الصرف الصحي PVC – مصممة للمتانة وسهولة التركيب، مما يوفر أداءً متميزًا لأنظمة الصرف والتصريف.
-
- مواسير HDPE – أنابيب البولي إيثيلين عالي الكثافة، المستخدمة في أنظمة مكافحة الحريق والري والصرف، وتتميز بالقوة العالية ومقاومة التآكل والمواد الكيميائية.

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Our Vision

To be the global first choice in high-quality pipe and fitting solutions, committed to innovation, quality, and sustainability.

Our Mission

To deliver innovative and safe products that meet the highest international standards, with a focus on fulfilling our customers' needs and promoting sustainability through the use of cutting-edge
technologies and our exceptional workforce

رؤيتنا

أن نكون الخيار الأول عالميًا في حلول الأنابيب والوصلات عالية الجودة، ملتزمين بالابتكار، والجودة، والاستدامة.

مهمتنا

تقديم منتجات مبتكرة وآمنة تلبي أعلى المعايير الدولية، مع التركيز على تلبية احتياجات عملائنا وتعزيز الاستدامة من خلال استخدام أحدث التقنيات والاعتماد على كادرنا الاستثنائي.

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I TOP PP-R Systems

"

I TOP Three-Layer Technology

The I TOP three-layer technology guarantees an operational lifespan of over 50 years at temperatures up to 70°C, ensuring low maintenance and complete water tightness in PP-R pipe and fitting networks.

"

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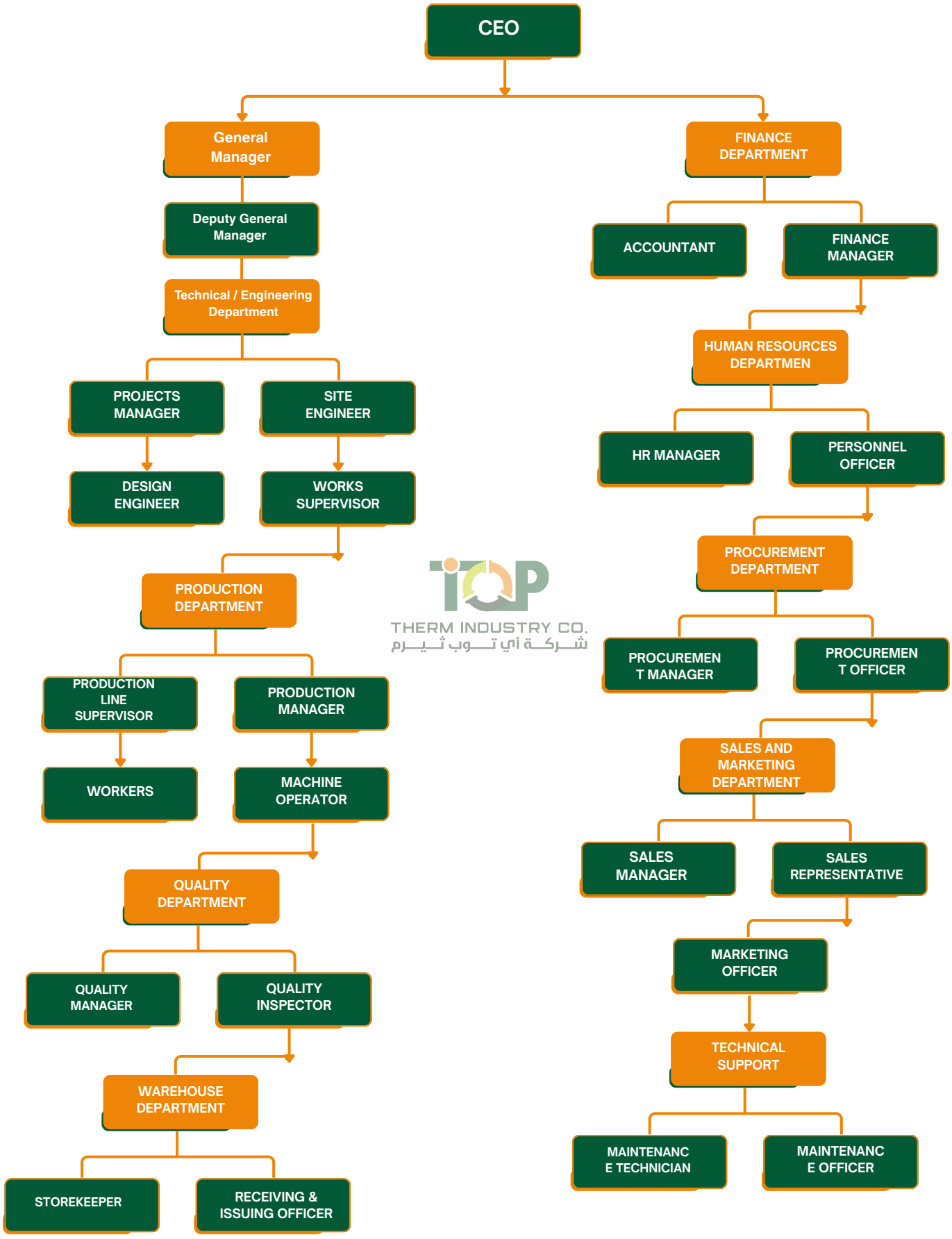
COMPANY ORGANIZATIONAL CHART



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Introduction

I TOP offers an extensive range of polypropylene random copolymer (PP-R) pipes and fittings, engineered for use in both hot and cold water distribution networks, suitable for installation inside and outside buildings. These piping systems are specifically designed to endure long-term pressure at elevated temperatures of up to 70°C. With a projected service life exceeding 50 years, I TOP products ensure durability and reliability in demanding applications.
To meet the evolving market demand for more advanced and long-lasting piping solutions, I TOP manufactures a comprehensive selection of PP-R pipes tailored to modern construction and infrastructure needs.

WHY ITOP PP-R

The primary advantages which make **I TOP PP-R** Piping Systems preferred over traditional ones are:-

Material Properties	Advantages
Lightweight	Easy to handle, transport and install. Saves Labour cost.
Better Corrosion Resistance	No scaling, can withstand higher 'pH' values.
Nontoxic, Hygienic 'Green product'	Safe for drinking water. No harmful effect to humans & ecology.
High Vicat Softening Temperature	Ensures thermal stability for hot water application.
UV resistant	Three layer pipes are suitable for outdoor installations, exposed to direct sunlight.
Good Thermal Insulation	Ensures lower heat losses & saves energy up to 15%
Good Chemical Resistance	Suitable for most of the industrial liquids.
Better Impact Strength	Higher stiffness than the standard pipes.
Heat Fusion Welding (no use of solvent)	Results in a homogeneous plastic system ensuring leak proof joint. Safe and reliable to use for concealed and exterior installations. Saves considerable jointing time.
Better Noise Insulation	Reduces water hammer sound.
Bacteriologically Neutral	Can be used underground. Also the fluid inside remains free from bacterial growth.
Very Less Coefficient of Friction	Low-pressure drop. Extremely high flow properties. Reduces pumping cost.
Resilience	Suitable for use in seismic areas.
Good Abrasion Resistance	Allow higher flow velocities of fluid up to 5 m/sec.
High Volume Resistivity	Poor conductor of electricity. No effect of stray currents.
Long life	Can exceed 50 years when operating under rated temperature and pressure conditions.
Linear Expansion	75% less linear expansion than standard pipes.

All the above advantages make ITOP PP-R piping system the most cost-effective solution compared to any other plumbing system.

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COMPARISON BETWEEN DIFFERENT PIPING SYSTEMS

Property	Copper	CPVC	Galvanised Iron	HDPE	I TOP PP-R
Type of joint	Soldering	Solvent welding	Threaded	Butt fusion	Poly-fusion welding. For transition joints, fittings with threaded metal inserts, are also available.
Installation	Time consuming & requires skill.	Easy to install, saves time & labour.	Tedious & time consuming.	Needs skilled abour.	Easy to install, saves time & labour.
Corrosion resistance	Not resistant	Free from corrosion.	Not resistant	Good	Free from corrosion.
Chemical resistance	Poor	Resistant to most of the chemicals.	Not resistant	Good	Excellent chemical resistance even at higher temperatures.
Scale formation	Common	No scaling	Very common	Inert to impurities in water	No scaling
Suitability in cold areas - sub- zero temperatures	Not suitable, Pipe bursts.	Impact strength considerably reduces at lower temperature & hence not suitable.	Not suitable. Pipe bursts.	Not suitable, Pipe cracks.	Most suitable due to typical elastic nature and good impact strength.
Insulation requirements	Essential	Not required	Essential	Required	Insulation is necessary at sub zero temperature.
Impact strength	Less	Less (brittle nature)	Excellent	Average	High impact strength.
Life span under rated pressure & temperature	20 - 30 years	30 - 40 years	5 -15 years	20-30 years	Can exceed 50 years.
Behavior in Fire	Resistant but de-shapes or punctures.	High percentage of chlorine and toxic gases are generated which are harmful.	Resistant	Not resistant	Melts like all other plastics, but no generation of any toxic gases.

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Product range preview and System characteristics

I TOP offers a complete range of polypropylene random copolymers (PP-R) pipes and fittings with the following characteristics:

Pipes						
Type	Size (mm)	Working Pressure (Kg/cm2)	Class	Standard	Colour	End Connection
I TOP PP-R	20 to 160	10, 16 & 20	SDR 11 (PN 10), SDR 7.4 (PN 16), SDR 6 (PN 20)	IS: 15801	• Single layer pipes - Green, • Triple layer pipe - Outer layer in green, inner layer in white • Thermex Pipe - Outer layer in green, middel layer in light grey, inner layer in white	Poly-fusion welding joint

Fittings					
Type	Size (mm)	Working Pressure (Kg/cm2)	Standard	Colour	End Connection
I TOP PP-R	20 to 160	20 & 25	DIN:16962	Green	• Socket ends suitable for poly-fusion welding. • For transition joints, fittings with threaded metal inserts.

I TOP manufactures a wide range of PP-R pipes using single-layer extrusion, three-layer extrusion, and co-extrusion technologies.

• Mono layer PP-R pipes

I TOP PP-R monolayer pipes are made of polypropylene random copolymer (PP-R) material, designed to meet the requirements of ISO 15874 and DIN 8077/8078 standards. The unique molecular structure, combined with a specialized stabilization package, ensures that I TOP PP-R pipe systems can withstand high temperature and pressure for over 50 years.

• Multilayer PP-R pipes

I TOP multilayer glass-reinforced PP-R pipes are manufactured using 3-layer technology and are described as follows:

- Outer Layer: Made of polypropylene random copolymer (PP-R), ensuring flawless and reliable welding of pipes and fittings.
- Middle Layer: Composed of glass fiber-reinforced polypropylene (PP-R/GF), offering high strength and improved dimensional stability. The perfect bonding between glass fiber and PP-R material reduces thermal expansion caused by fluid temperature variations inside the pipes. Additionally, it enhances impact resistance at low temperatures.
- Inner Layer: Made of PP-R, specially designed to enhance the long-term performance of the pipe throughout its operational life, particularly at elevated temperatures. The smooth inner surface prevents sedimentation, allowing for high flow rates

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The I TOP three-layer technology ensures an operational life of more than 50 years at temperatures up to 70°C, with low maintenance and complete water tightness in PP-R pipe and fitting networks

- ## UV resistant PP-R pipes

I TOP UV-resistant monolayer and multilayer pipes are manufactured using co-extrusion technology. The co-extruded UV-resistant layer (black in color) is made of UV-stabilized PP-R, ensuring protection against UV rays while also maintaining reliable welding of pipes and fittings.

- ## Fittings

I TOP fittings are made of PP-R Type 3 and comply with ISO 15874 and DIN 8077/8078 standards. The unique molecular architecture, combined with a specialized stabilization package, ensures that I TOP PP-R fittings can withstand high temperatures and pressure for more than 50 years.

Technical Specifications

- ## Raw Materials Specifications

I TOP products are manufactured using the highest quality raw materials available from internationally renowned suppliers. The physical properties of the raw materials are inspected and approved by independent international and national laboratories. Additionally, I TOP conducts rigorous testing in its advanced laboratory to ensure compliance with the following specified requirements.

Mechanical and Thermal properties

Typical values

Properties	Unit (Si)	Values	Test methods
Polymer properties			
Colour	-	**Natural**	-
Meltflow rate(MFR)	g/10 min		ISO 1133
at 190 °C and 5 kg at		**0.50**	
230 °C and 2.16 kg	g/10 min	**0.30**	
Density	kg/m³	**898**	ISO 1183
Mechanical properties			
Tensiletest			ISO 527
stress at yield	MPa	**27 32**	
stress at break	MPa	**>50**	
strain at break	%		
Flexuraltest			ASTM D 790
Flexural modulus	MPa	**900**	
Izodimpactnotched			ISO 180/4A
at 23 °C	kJ/m²	**15**	
at 0 °C	kJ/m²	**-**	
at -20 °C	kJ/m²	**-**	
Charpyimpactnotched			ISO 179
at 23 °C	kJ/m²	**25**	
at 0 °C	kJ/m²	**-**	
at -20 °C	kJ/m²	**-**	
Charpy impactunnotched			ISO 179
at 23 °C	kJ/m²	**>60**	
Thermal properties			

• Chemical Resistance

The outstanding chemical resistance of I TOP PP-R systems to a variety of chemicals and solvents, allows their use in a wide range of applications. I TOP PP-R systems offer better resistance to corrosive acids, alkaline solutions, solvents, fuels, alcohol and salts than traditional piping systems. In broad terms, I TOP PP-R systems do not rust, pit, corrode or lose wall thickness through chemical or electrical reaction with the surrounding en- vironmental factors. Additionally, I TOP PP-R systems do not support the growth of, nor are affected by, algae, bacteria or fungi. Nevertheless, special care is required in some applications where effluents contain harmful chemicals such as oxidisers, cracking agents and certain solvents. The degree of resistance to a specific chemical will depend on the concentration, temperature, length and type of exposure (i.e. intermittent or continuous) and working pressure, each of which may affect the long- term life of any system. The chemical resistance list provided in Section VIII: Appendix shall be used as a guide for evaluating the suitability of our products with the chemical agent is intended to be carried inside the pipe.

• Sustainability

production of I TOP PP-R systems, I TOP focuses on sustainable and environmentally friendly operations, reducing resource consumption during the production process. The polypropylene PP-R material can be fully recycled, and the waste generated from production can be reused.
Compared to other materials, the energy consumption required to produce I TOP PP-R systems is much lower. Additionally, the process does not produce any materials harmful to the environment, making it environmentally excellent in performance."

• Quality Assurance

"I TOP PP-R systems provide the highest levels of quality, and our goal is to exceed the requirements of national and international standards. This is achieved through highly controlled manufacturing processes and the implementation of a state-of-the-art quality control system that covers raw materials, pipes and fittings, packaging, storage, supply chain, and post-sales support. Our pipes and fittings are produced using the latest generation of machinery operated by skilled professionals, supported by an ongoing research and development program. Deviations in product quality are avoided through stringent quality control checks carried out in our in-house quality control laboratory. This commitment to high-quality assurance is further evidenced by the accreditation of the ISO 9001:2015 Quality Management System and the compliance of all I TOP products with the appropriate Saudi (SASO), German (DIN), and International (ISO, EN) standards

• Lifetime - long term temperature and pressure resistance

Long-term performance curve shows the behavior of a pipe line depending on pressure and operating temperature. It establishes the average life expectancy of a pipe line as a function of hoop stress acting on the pipe walls. Hoop stress is in proportion with the pressure according to the following formula:

$$H = \frac{(d-s)}{2s}$$

$$\delta = Sf \times p \times H$$

WHERE:

δ = hoop stress (MPa)
S_f = Safety factor
p = Internal pressure (MPa)
d = Outside diameter of pipe (mm)
s = Wall thickness of pipe (mm)

If we extrapolate the hoop stress from the long term performance curve and apply the formula using

1.5 safety factor, the

admissible operating pressures are obtained as given in the tables.

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ADMISSIBLE OPERATING PRESSURE

Temperature °C	Service Life in Years	Pipe Series according to DIN 8077/8078		
		SDR 11 - PN 10	SDR 7.4 - PN 16	SDR 6 - PN 20
		Safety-factor 1.5		
		Nominal pressure for PP-R pipes (kgs/cm2)		
10°C	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°C	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°C	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°C	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

Temperature °C	Service Life in Years	Pipe Series according to DIN 8077/8078		
		SDR 11 - PN 10	SDR 7.4 - PN 16	SDR 6 - PN 20
		Safety-factor 1.5		
		Nominal pressure for PP-R pipes (kgs/cm2)		
50°C	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
60°C	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
70°C	1	6.5	10.3	13.0
	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
80°C	1	5.5	8.6	10.9
	5	4.8	7.6	9.6
	10	4.0	6.3	8.0
	25	3.2	5.1	6.4
95°C	1	3.9	6.1	7.7
	5	2.5	4.0	5.0
	(10)*	(2.1)*	(3.4)*	(4.2)*

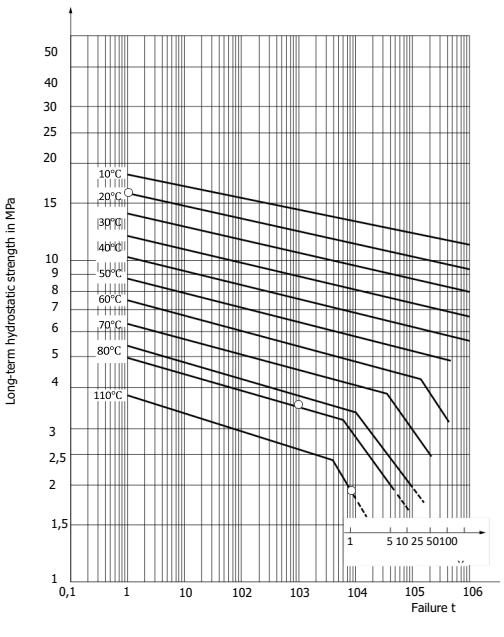
Explanations :

= Recommended application - cold water installation

= Recommended application - hot water installation

= Recommended application - central heating installatio

LONG TERM PERFORMANCE



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• THERMAL EXPANSION

A pipe line which is subjected to a variation of temperatures changes its length if it is free to do so, This change in length is proportional to the linear coefficient of thermal expansion of the material of pipeline. The linear expansion or contraction caused by the change in ambient temperature gradient can easily be calculated using the following formula.

WHERE :

DL = Expansion(+) or contraction(-) in length,(mm) L = Initial pipe length, (Meter)
s = Coefficient of thermal expansion (for PP-R = 0.15 mm/m°C)

EXAMPLE: for 5 meter PP-R line operating between 25 to 55°C
DT = (55-25)=30°C
DL = 0.15 X 5 X 30 = 22.5 mm

The expansion and contraction adjustment of GREENFIT PP-R pipeline is generally made in longitudinal direction only. Enough space shall be provided and proper type of supports shall be used to allow the free movement of pipe in axial directions.
Once the change in length of pipeline on account of thermal expansion/contraction has been calculated, a correct planning of pipelines is necessary to ensure that its effect do not cause deformation of the piping itself. GREENFIT PP-R systems make it possible to easy and convenient compensation for change in length using the suitable provision of following:

- Fixed & Sliding supports.
- Free flexible pipe segment (Expansion Arm).
- Free flexible pipe loop (Compensation Loop).

• PRESSURE LOSS

1. Distributed pressure loss related to pipe roughness, dimensions, physical properties and velocity of the liquids. 2. Local loss related to elbows, tees, valves and fittings which cause a remarkable variation in the liquid flow.

1. DISTRIBUTED PRESSURE LOSS

The GREENFIT PP-R pipe has extremely smooth inner surfaces compared to metal pipes. Therefore, pressure loss is quiet low.

2. LOCAL PRESSURE LOSS

In pipeline, local pressure loss takes place due to presence of fittings which can be calculated using following formula

$$R = \frac{(r)\, V2\, \sigma}{2\, g}$$

WHERE: R = Total local pressure loss in (mm)

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WHERE: R = Total local pressure loss in (mm)

r = Local resistance coefficient value as given in following table

V = Mean velocity of fluid in (m/s)

g = Acceleration of gravity = 9.81 (m/s2)

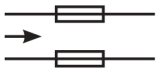
σ = Specific gravity of water = 1000 (kq/m3)

Local resistance coefficient "r" for PRINCE GREENFIT PP-R plumbing fittings.

Note:

1. These are reference values and they vary according to water temperature.

2. As fitting diameter increases, the value of 'r' decreases.

Name of PP-R Fitting	Symbol for PP-R Fitting	Coefficient Value (r)
Coupler		0.25
Reducer: Single stage reducer Double stage reducer Three stage reducer Four stage reducer		 0.50 0.60 0.70 0.85
Elbow 90° Elbow 45°		1.2 0.5
Tee		1.8
Male / Female Threaded Tee		1.8
Reducing Tee		3.0
Male / Female Threaded Adaptor Reducing Male / Female Adaptor Male / Female Threaded adaptor		0.5 0.8
Reducing Threaded Elbow adaptor Valve		1.4 1.6
20 25 32		9.5 8.5 7.6
Union		8.3

• Standard dimension ratio

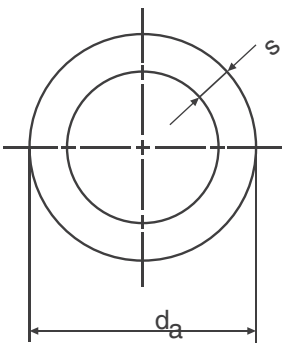
SDR is ratio used for the classification of plastic pipes, which describes the ratio between a pipe's outer diameter and its wall thickness.

SDR = (2*S) + 1 S = pipe series number

SDR~da/s s = wall thickness
da = outer diameter

The SDR ratio together with the hydrostatic strength of the pipe material determine the pressure resistance. The following correlation applies:

- The thicker the wall, in relation to the pipe diameter, the lower the SDR ratio
- The lower the SDR ratio, the higher the resistance of a pipe to pressure.



• Pipe series number

The nominal pipe series number is a dimensionless index, which is used for the calculation of the wall thickness of pipes. The following equation is used for the calculation of the pipe series number S:

$$S=(SDR-1)/2$$

Example: I TOP SDR6 PP-R pipe has a S number of 2.5

• Nominal Pressure (PN)

The nominal pressure indicates a reference value that is representative for a pipe system and can be found in plastic pipe standards (for example, DIN 8077-1974/1989). The maximum working pressure of 20 bar, 16 bar, 10 bar refers only to a service life of 50 years at a working temperature of 20°C. However, at elevated temperatures the maximum operating pressure is lower (see section 3.3.2).

• Applicable Standards

Various standards such as EN, ISO, DIN, guidelines, SASO are followed during the production monitoring of the I TOP PP-R system. Regular monitoring checks and controls of the fabricated materials and production processes support I TOP to maintain and guarantee high quality of our products. Applicable standards for I TOP PP-R systems are presented on the below table

Standards	
BS 6920	Suitability of non-metallic materials and products for use in contact with water intended for human consumption with regard to their effect on the quality of the water - Specification
BS EN 14084, 14332	This standard Foodstuffs. Determination of trace elements. Determination of lead, cadmium, zinc, copper and iron by atomic absorption spectrometry (AAS) after microwave digestion is classified in these ICS categories:
SASO 509	Synthetic Detergents – Method of test for Household Synthetic Detergents Power
ISO 1133	Plastics piping systems for hot and cold-water installations — Polypropylene (PP).
ISO 1183	Plastics — Methods for determining the density of non-cellular plastics —
ISO 527	Plastics — Determination of tensile properties
DIN 8077	Polypropylene (PP) pipes - PP-H, PP-B, PP-R Dimensions
DIN 8078	Polypropylene (PP) pipes - PP-H, PP-B, PP-R General quality requirements and testing
ASTM D 790	Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ISO 180/4A	Plastics — Determination of Izod impact strength
ISO 179	Plastics — Determination of Charpy impact properties
ISO 306	Plastics — Thermoplastic materials — Determination of Vicat softening temperature (VST)
ISO 15874	Plastics piping systems for hot and cold-water installations — Polypropylene (PP
ASO: OHSMS: 1 / 2020	Occupational Health & Safety Management System
ASO: QCMS: 1 / 2020	Quality Control Management System
ASO: CSAMS: 1 / 2020	Effective implementing of the quality customer satisfaction assurance management system

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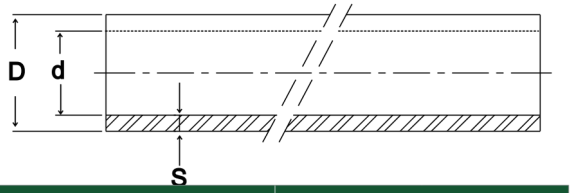
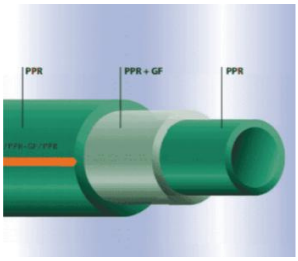
Product Range and dimensions

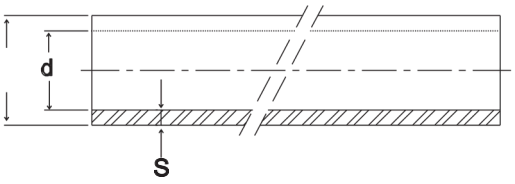
- PIPES DIMENSIONS



Nominal Bore		Outside Diameter	SDR 11 (PN-10)		SDR 7.4 (PN-16)		SDR 6 (PN-20)	
(mm)	(inch)	(mm)	d (mm)	s (mm)	d (mm)	s (mm)	d (mm)	s (mm)
20	1/2	20.00	16.20	1.90	14.40	2.80	13.20	3.40
25	3/4	25.00	20.40	2.30	18.00	3.50	16.60	4.20
32	1	32.00	26.20	2.90	23.20	4.40	21.20	5.40
40	1 1/4	40.00	32.60	3.70	29.00	5.50	26.60	6.70
50	1 1/2	50.00	40.80	4.60	36.20	6.90	33.40	8.30
63	2	63.00	51.40	5.80	45.80	8.60	42.00	10.50
75	2 1/2	75.00	61.40	6.80	54.40	10.30	50.00	12.50
90	3	90.00	73.60	8.20	65.40	12.30	60.00	15.00
110	4	110.0	90.00	10.0	79.80	15.10	73.40	18.30

- **MULTI LAYER PIPES DIMENSIONS**





Nominal Bore		Outside Diameter	SDR 7.4 (PN-20)		SDR 6 (PN-25)	
(mm)	(inch)	(mm)	d (mm)	s (mm)	d (mm)	s (mm)
20	1/2	20.00	14.40	2.80	13.20	3.40
25	3/4	25.00	18.00	3.50	16.60	4.20
32	1	32.00	23.20	4.40	21.20	5.40
40	1 1/4	40.00	29.00	5.50	26.60	6.70
50	1 1/2	50.00	36.20	6.90	33.40	8.30
63	2	63.00	45.80	8.60	42.00	10.50
75	2 1/2	75.00	54.40	10.30	50.00	12.50
90	3	90.00	65.40	12.30	60.00	15.00
110	4	110.0	79.80	15.10	73.40	18.30

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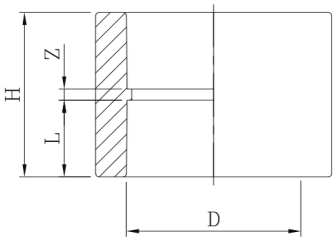
- **FITTINGS DIMENSIONS**

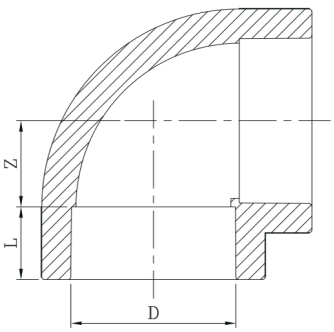
COUPLER

(mm)	ØD	L	Z	H
20	19.50	14.50	4.00	33.00
25	24.50	16.00	4.00	36.00
32	31.50	18.00	4.00	40.00
40	39.45	20.50	4.00	45.00
50	49.45	23.50	4.00	51.00
63	62.50	27.50	4.00	59.00
75	74.90	30.00	4.00	64.00
90	89.90	33.00	5.00	71.00
110	110.00	37.00	5.00	79.00



ELBOW 90°

(mm)	ØD	L	Z
20	19.50	14.50	11.00
25	24.50	16.00	13.50
32	31.50	18.00	17.00
40	39.45	20.50	21.00
50	49.45	23.50	26.50
63	62.50	27.50	32.50
75	74.90	30.00	41.00
90	89.90	33.00	48.50
110	110.00	37.00	58.00



REDUCING ELBOW 90°

Size (mm)	ØD1	ØD2	L1	L2	Z1	Z2
25 X 20	24.50	19.50	16.00	14.50	13.50	15.00
32 X 25	31.50	24.50	18.00	16.00	17.00	19.00
32 X 20	31.50	19.50	18.00	14.50	17.00	20.50
40 X 32	39.45	31.50	20.50	18.00	21.00	20.50
40 X 20	39.45	19.50	20.50	14.50	21.00	20.50
40 X 25	39.45	24.20	20.50	16.00	21.00	25.50
63 X 40	62.50	39.45	27.50	20.50	32.50	39.50

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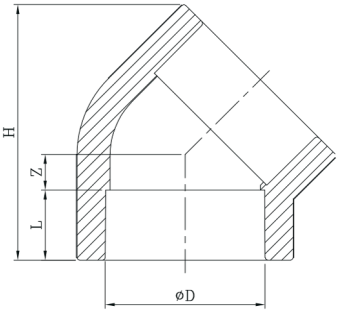
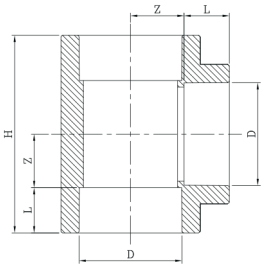
ELBOW 45°

(mm)	ØD	L	Z
20	19.50	14.50	5.00
25	24.50	16.00	6.00
32	31.50	18.00	7.50
40	39.45	20.50	9.50
50	49.45	23.50	11.50
63	62.50	27.50	14.00
75	74.90	30.00	38.50
90	89.90	33.00	46.00
110	110.00	37.00	56.00
			-



EQUAL TEE

(mm	ØD	L	Z	H
20	19.50	14.50	11.00	51.00
25	24.50	16.00	13.50	59.00
32	31.50	18.00	17.00	70.00
40	39.45	20.50	21.00	83.00
50	49.45	23.50	26.50	100.00
63	62.50	27.50	32.50	120.00
75	74.90	30.00	38.50	137.00
90	89.90	33.00	46.00	158.00
110	110.00	37.00	56.00	186.00



REDUCING TEE

Size (mm)	ØD1	ØD2	L1	L2	Z1	Z2	H
25 X 20	24.50	19.50	16.00	14.50	13.50	13.50	59.00
32 X 25	31.50	24.50	18.00	16.00	14.00	18.00	64.00
32 X 20	31.50	19.50	18.00	14.50	14.00	19.50	64.00

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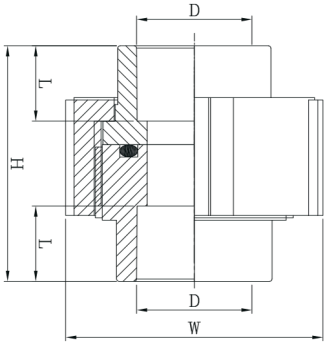
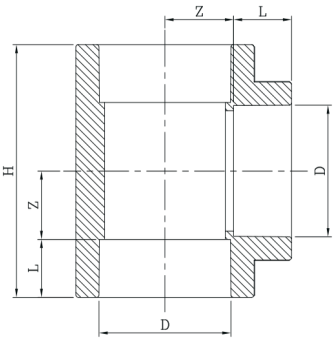
PLAIN UNION



Size (mm)	ØD	L	H	W
20	19.50	14.50	47.00	48.00
25	24.50	16.00	50.00	55.00
32	31.50	18.00	49.50	67.50
40	39.45	20.50	79.00	77.30
50	49.45	23.50	100.30	90.50
63	62.50	27.50	84.00	125.00

REDUCING TEE



Size (mm)	ØD	ØD	L1	L2	Z1	Z2	H
40 X 32	39.45	31.50	20.50	18.00	21.00	21.00	83.00
40 X 25	39.45	24.50	20.50	16.00	21.00	21.00	83.00
40 X 20	39.45	19.50	20.50	14.50	21.00	21.00	83.00
50 X 40	49.45	39.45	23.50	20.50	26.00	26.00	99.00
50 X 32	49.45	31.50	23.50	18.00	26.00	26.00	99.00
50 X 25	49.45	24.50	23.50	16.00	26.00	26.00	99.00
50 X 20	49.45	19.50	23.50	14.50	26.00	26.00	99.00
63 X 50	62.50	49.45	27.50	23.50	32.50	32.50	120.00
63 X 40	62.50	39.45	27.50	20.50	32.50	32.50	120.00
63 X 32	62.50	31.50	27.50	18.00	32.50	32.50	120.00
63 X 25	62.50	24.50	27.50	16.00	32.50	32.50	120.00
63 X 20	62.50	19.50	27.50	14.50	32.50	32.50	120.00
75 X 63	74.90	62.50	30.00	27.50	38.50	38.50	137.00
75 X 50	74.90	49.45	30.00	23.50	38.50	38.50	137.00
75 X 40	74.90	39.50	30.00	20.50	38.50	38.50	137.00
75 X 32	74.90	31.50	30.00	23.50	38.50	18.00	100.00
75 X 25	74.90	24.50	30.00	23.50	38.50	18.00	100.00
90 X 75	89.90	74.90	33.00	30.00	46.00	46.00	158.00
90 X 63	89.90	62.50	33.00	27.50	46.00	46.00	158.00
90 X 50	89.90	49.45	33.00	23.50	46.00	46.00	158.00
90 X 40	89.90	39.50	33.00	20.50	46.00	46.00	158.00
110 X 90	110.00	89.90	37.00	33.00	56.00	60.00	186.00
110 X 75	110.00	74.90	37.00	30.00	56.00	63.00	186.00
110 X 63	110.00	62.50	37.00	27.50	56.00	56.00	186.00
110 X 50	110.00	49.45	37.00	23.50	56.00	60.05	186.00
110 X40	110.00	39.45	37.00	20.50	56.00	63.05	186.00

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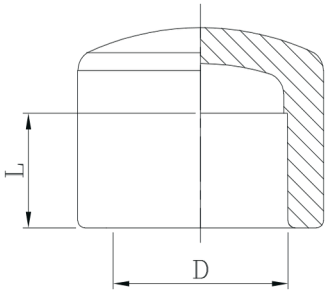
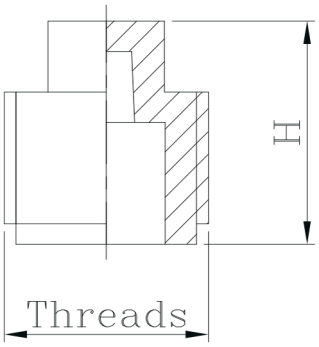
END CAP

(mm	ØD	L
20	19.50	14.50
25	24.50	16.00
32	31.50	18.00
40	39.45	20.50
50	49.45	23.50
63	62.50	27.50
75	74.90	30.00
90	89.90	33.00
110	110.00	37.00



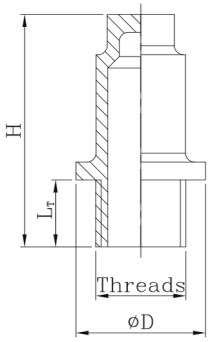
END PLUG

Size (mm)	Threads	H
20	1/2	22.50
25	3/4	25.00
32	1	28.00

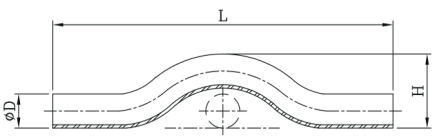


EXTENDED END PLUG

Size (mm)	ØD	Threads	LT	H
20	27.00	1/2	15.00	65.00
25	35.00	3/4	16.00	53.00



(FABRICATED)



Size (mm)	ØD	W	L
20	20.00	55.00	390.00
25	25.00	56.00	400.00
32	32.00	72.00	450.00

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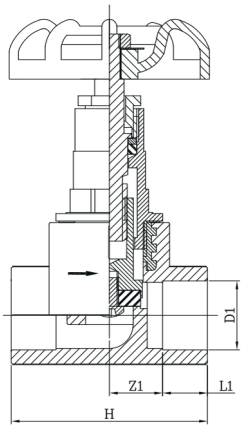
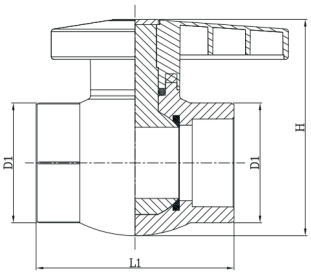
GATE VALVE



Size (mm)	ØD	L	LT
20	19.50	14.50	61.00
25	24.50	16.00	70.00
32	31.50	18.00	85.00
40	39.50	20.50	95.00
50	49.50	23.50	114.00
63	62.50	27.50	133.50

BALL VALVE

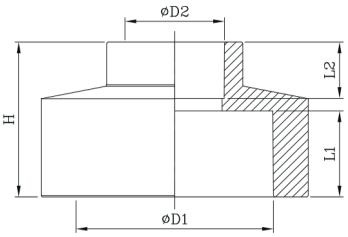
(HOT & COLD WATER)

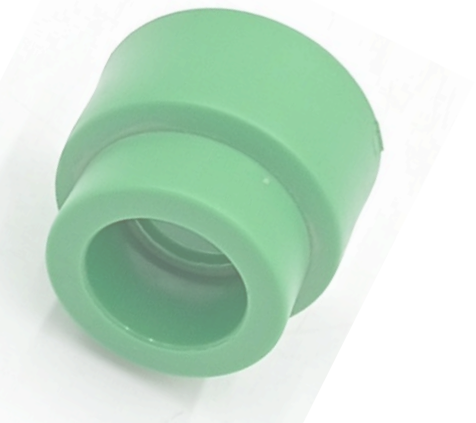


Size (mm)	ØD	L	H
20	19.50	73.04	62.24
25	24.50	77.60	74.26
32	31.50	87.64	86.42
40	39.45	103.72	98.36
50	49.45	123.92	116.86
63	62.50	149.36	139.10

REDUCER

Size (mm)	ØD1	ØD2	L1	L2	H
25 X 20	24.50	19.50	16.00	14.50	34.50
32 X 25	31.50	24.50	18.00	16.00	38.00
32 X 20	31.50	19.50	18.00	14.50	36.50
40 X 32	39.45	31.50	20.50	18.00	42.50
40 X 25	39.45	24.50	20.50	16.00	40.50
40 X 20	39.45	19.50	20.50	14.50	39.00
50 X 40	49.45	39.45	23.50	20.50	48.00
50 X 32	49.45	31.50	23.50	18.00	45.50
50 X 25	49.45	24.50	23.50	16.00	43.50
50 X 20	49.45	19.50	23.50	14.50	42.00
63 X 50	62.50	49.45	27.50	23.50	59.00
63 X 40	62.50	39.45	27.50	20.50	56.00
63 X 32	62.50	31.50	27.50	18.00	54.50
63 X 25	62.50	24.50	27.50	16.00	51.50
63 X 20	62.50	19.50	27.50	14.50	51.50
75 X 63	74.90	62.50	30.00	27.50	57.50
75 X 50	74.90	49.45	30.00	23.50	53.50
75 X 40	74.90	39.50	30.00	20.50	50.50
75 X 32	74.90	31.50	30.00	18.00	48.00
90 X 75	74.90	24.50	33.00	31.50	64.50
90 X 63	89.90	74.50	33.00	20.50	53.50
90 X 50	89.90	62.50	33.00	23.50	56.50
110 X 90	89.90	49.50	37.00	33.00	70.00
110 X 75	89.90	39.50	37.00	31.50	68.50
110 X 63	110.90	89.90	37.00	30.00	67.00





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BRASS INSERT FITTINGS DIMENSIONS

MALE THREADED ADAPTOR

Size (mm)	ØD	Threads (inch)	L	LT	H
20 X 20 (1/2")	19.50	1/2	14.50	15.00	54.50
25 X 25 (3/4")	24.50	3/4	16.00	17.00	58.00
32 X 32 (1")	31.50	1	18.00	19.00	62.00
40 X 40 (1 1/4")	39.45	1 1/4	20.50	22.00	72.00
50 X 50 (1 1/2")	49.45	1 1/2	23.50	22.00	75.00
63 X 63 (2")	62.50	2	27.50	26.30	88.30

Refer Figure - 1

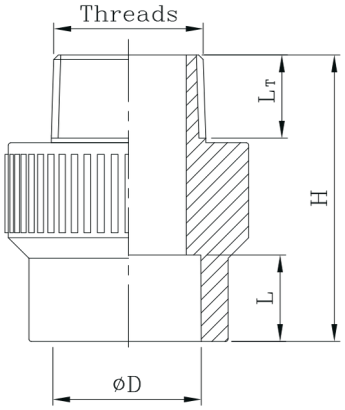

Figure - 1

REDUCING MALE THREADED ADAPTOR

Size (mm)	ØD	Threads (inch)	L	LT	H
20 X 25 (3/4")	19.50	3/4	14.50	17.00	58.00
25 X 20 (1/2")	24.50	1/2	16.00	15.00	56.00
32 X 20 (1/2")	31.50	1/2	18.00	15.00	58.00
32 X 25 (3/4")	31.50	3/4	18.00	17.00	60.00
40 X 50 (1 1/2")	39.45	1 1/2	20.50	22.00	72.00

Refer Figure - 1

Size (mm)	ØD	Threads (inch)	L	LT	H
40 X 32 (1")	39.50	1	20.50	19.00	66.50

Refer Figure - 2

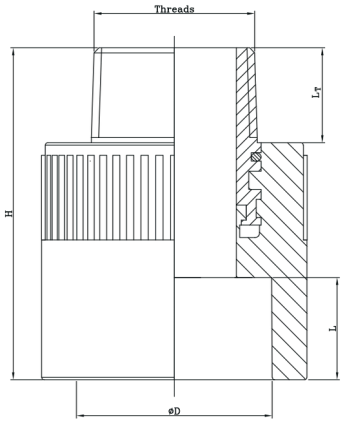

Figure - 2

FEMALE THREADED ADAPTOR

Size (mm)	ØD	Threads (inch)	L	LT	H
20 X 20 (1/2")	19.50	1/2	14.50	15.00	39.50
25 X 25 (3/4")	24.50	3/4	16.00	16.30	41.00
32 X 32 (1")	31.50	1	18.00	19.00	43.00
40 X 40 (1 1/4")	39.50	1 1/4	20.50	25.00	50.00
50 X 50 (1 1/2")	49.45	1 1/2	23.50	21.40	53.00
63 X 63 (2")	62.50	2	27.50	25.70	62.00

Refer Figure - 1

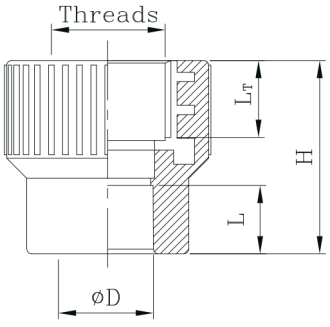

Figure - 1

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REDUCING FEMALE THREADED ADAPTOR

Size (mm)	ØD	Threads (inch)	L	LT	H
20 X 25 (3/4")	19.50	3/4	14.50	16.30	41.00
25 X 20 (1/2")	24.50	1/2	16.00	15.00	41.00
32 X 20 (1/2")	31.05	1/2	18.00	15.00	42.00
32 X 25 (3/4")	31.50	3/4	18.00	16.30	43.00

Refer Figure - 1

Size (mm)	ØD	Threads (inch)	L	LT	H
40 X 32 (1")	39.50	1	20.50	19.00	47.50

Refer Figure - 2

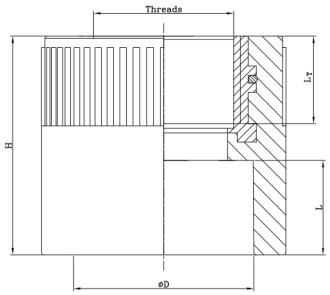
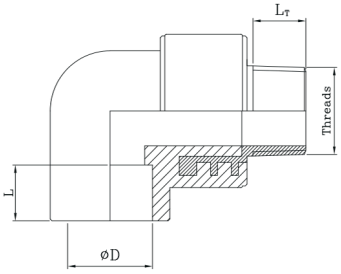


Figure - 2

MALE THREADED ELBOW

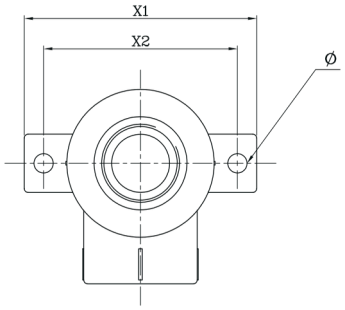
Size (mm)	ØD	Threads (inch)	L	LT
20 X 20 (1/2")	19.50	1/2	14.50	15.00
25 X 25 (3/4")	24.50	3/4	16.00	17.00
32 X 32 (1")	31.50	1	18.00	19.00
40 X 40 (1 1/4")	39.45	1 1/4	20.50	22.00



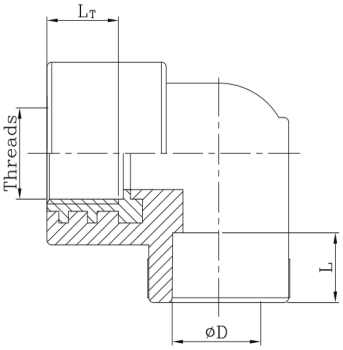
REDUCING MALE THREADED ELBOW

Size (mm)	ØD	Threads (inch)	L	LT
20 X 25 (3/4")	19.50	3/4	14.50	17.00
25 X 20 (1/2")	24.50	1/2	16.00	15.00
32 X 20 (1/2")	31.50	1/2	18.00	15.00
32 X 25 (3/4")	31.50	3/4	76.60	17.00

FEMALE THREADED ELBOW WITH SUPPORT



Size (mm)	ØD	Threads (inch)	L	LT	X1	X2	Ø
20 X 20 (1/2")	19.50	1/2	14.50	15.00	60.00	50.00	5.00



REDUCING FEMALE THREADED ELBOW WITH SUPPORT

Size (mm)	ØD	Threads (inch)	L	LT	X1	X2	Ø
25 X 20 (1/2")	24.50	1/2	16.00	15.00	64.00	54.00	5.00
25 X 25 (3/4")	24.50	3/4	16.00	16.30	64.00	54.00	5.00

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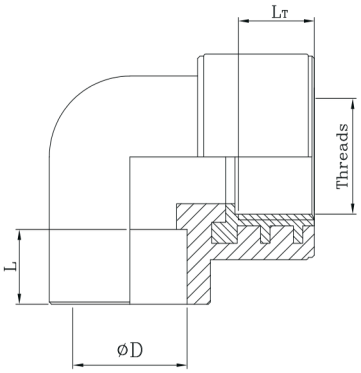
FEMALE THREADED ELBOW

Size (mm)	ØD	Threads (inch)	L	LT
20 X 20 (1/2")	19.50	1/2	14.50	15.00
25 X 25 (3/4")	24.50	3/4	16.00	16.30
32 X 32 (1")	31.50	1	18.00	19.00
40 X 40 (1 1/4")	39.45	1 1/4	20.50	21.40

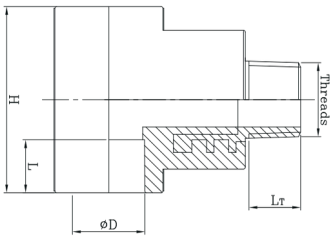


REDUCING FEMALE THREADED ELBOW

Size (mm)	ØD	Threads (inch)	L	LT
20 X 25 (3/4")	19.50	3/4	14.50	16.00
25 X 20 (1/2")	24.50	1/2	16.00	15.00
32 X 20 (1/2")	31.50	1/2	18.00	15.00
32 X 25 (3/4")	31.50	3/4	59.60	16.00

MALE THREADED TEE

Size (mm)	ØD	Threads (inch)	L	LT	H
20 X 20 (1/2")	19.50	1/2	14.50	15.00	51.00
25 X 25 (3/4")	24.50	3/4	16.00	17.00	59.00
32 X 32 (1")	31.50	1	18.00	19.00	70.00

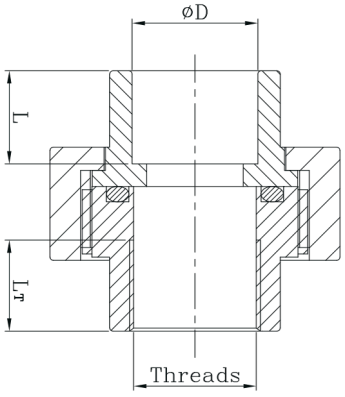


REDUCING MALE THREADED TEE

Size (mm)	ØD	Threads (inch)	L	LT	H
25 X 20 (1/2")	24.50	1/2	16.00	15.00	59.00
32 X 20 (1/2")	31.50	1/2	18.00	15.00	70.00
32 X 25 (3/4")	31.50	3/4	18.00	17.00	70.00

FEMALE THREADED UNION

Size (mm)	ØD	Threads (inch)	L	LT
20 X 20(1/2")	19.50	1/2"	14.50	15.00
25 X 25 (3/4")	24.50	3/4"	16.00	16.30
32 X 32 (1")	31.50	1"	18.00	19.00
40 X 40 (1 1/4")	39.45	1 1/4"	20.50	21.40
50 X 50 (1 1/2")	49.45	1 1/2"	23.50	21.40
63 X 63 (2")	62.50	2"	27.50	25.70



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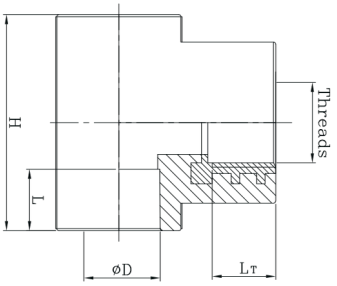
FEMALE THREADED TEE

Size (mm)	ØD	Threads (inch)	L	LT	H
20 X 20 (1/2")	19.50	1/2	14.50	15.00	51.00
25 X 25 (3/4")	24.50	3/4	16.00	16.30	59.00
32 X 32 (1")	31.50	1	18.00	19.00	70.00

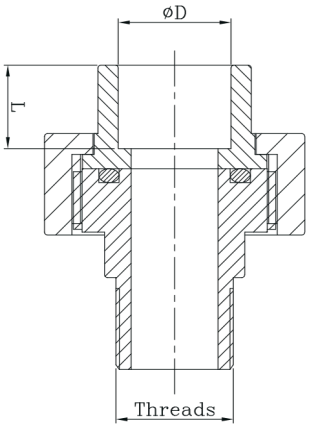


REDUCING FEMALE THREADED TEE

Size (mm)	ØD	Threads (inch)	L	LT	H
25 X 20 (1/2")	24.50	1/2	16.00	15.00	59.00
32 X 20 (1/2")	31.50	1/2	18.00	15.00	70.00
32 X 25 (3/4")	31.50	3/4	18.00	16.30	70.00

MALE THREADED UNION

Size (mm)	ØD	Threads (inch)	L
20 X 20 (1/2")	19.50	1/2"	14.50
25 X 25 (3/4")	24.50	3/4"	16.00
32 X 32 (1")	31.50	1"	18.00
40 X 40 (1 1/4")	39.50	1 1/4	20.50
50 X 50 (1 1/2")	49.50	1 1/2	23.50
63 X 63 (2")	62.50	2	27.50



• ACCESSORIES

DIE SET

Size (mm)
20
25
32
40
50
63

CUTTER

Size (mm)
20 - 40
50 - 90
75 - 110
160

WELDING DEVICE

Size (mm)
20 - 63
75 - 110

REPAIR SECTION

Size (mm)
7 X 11

REPAIR BAR

Size (mm)
7 X 11

LARGE DIAMETER WELDING DEVICE

Size (mm)
75 - 160
160