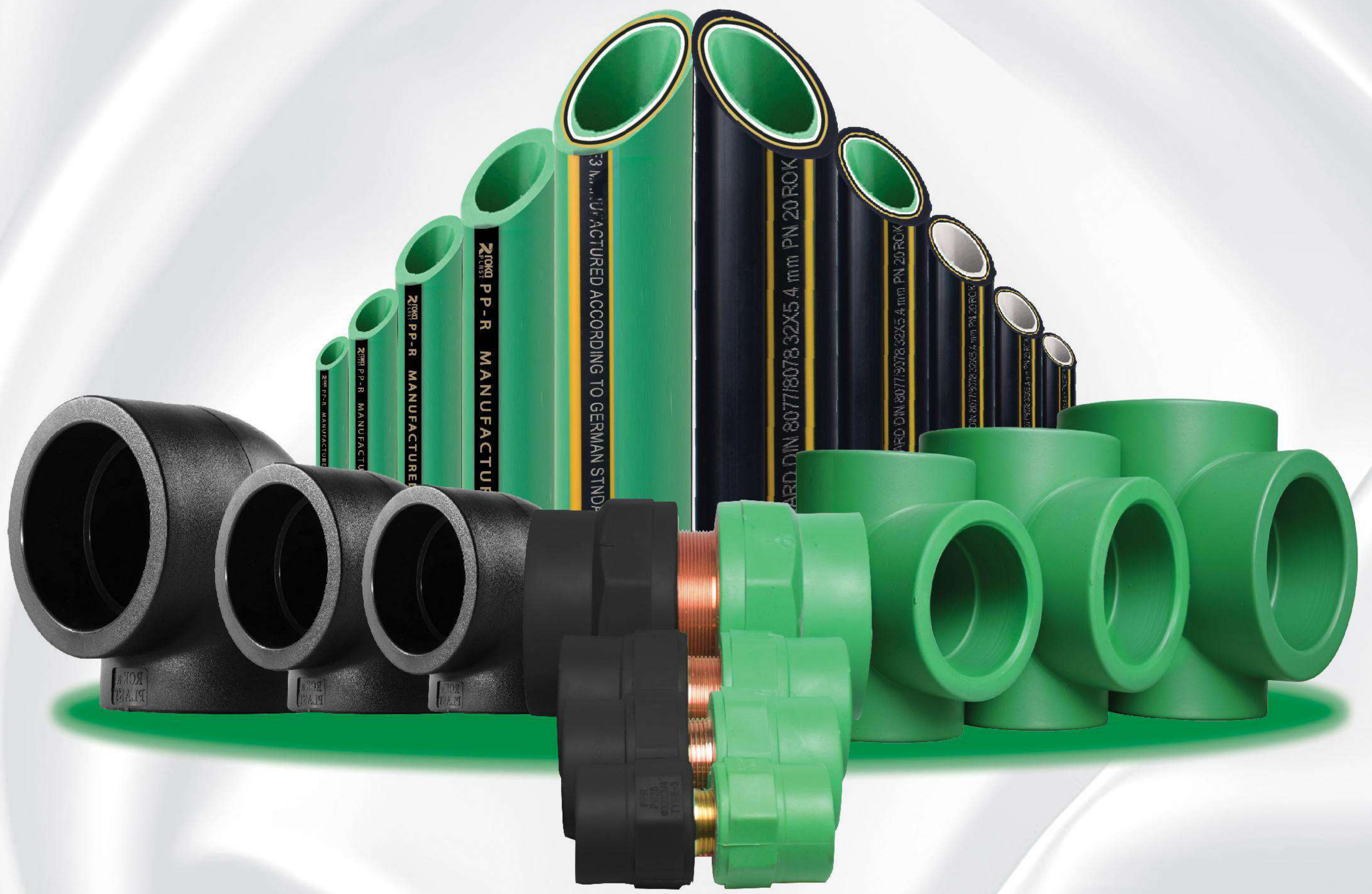


ROKA PLAST



Roka Plast

For Plastic Industries

Catalogue

Water Supply System

R ROKA PLAST



مركز
تكنولوجيا
البلاستيك



Introduction

ROKAPLAST for Plastic Industries Corporate was established at 2015 to produce all types of Supply water, sanitary products and related accessories.

By constantly Improving our products to the needs of the market, and developing the relevant know-how, **ROKAPLAST** has covered Egypt region by distributing our products in 19 governances.

Becoming a leading developer of benchmark quality in PP-R and UPVC products, we manufacture an economically innovative product range of PP-R and UPVC Pipes and Fittings for Supply water and drainage.

Applied raw material technologies optimizes the material characteristics for the protection of the environment, hygiene, health and well-being packing for the most precious commodity.

Our promise is to over estimation for all customers and Distributors by offering them the highest quality products & a wide range of supported services with lowest price in the same category.

Our outstanding customer relations skills ensures efficient delivery, where in turn reflects in customer loyalty.

As an **Egyptian Corporate ROKAPLAST** strive to support and invest in our fellow citizens employees, the roots that flourish the success of any productive country.

At **ROKAPLAST** we believe, in team work, in progress in a better future and in honest open communication. Career opportunities are constantly open for those dedicated to build a strong infrastructure, while contributing to the economic growth and future stability of our country and the next generation.

Sincere Regards,
ROKAPLAST Team

Vision:

Pioneering the plastics, metals industry and modern systems.

Mission:

our mission is providing the best customer service and technical support for technicians and develop products to meet international standards in the field of plastic, metal industries and modern systems using the latest technologies in all fields.

Innovation through young professional, distinct and harmonious team to build a bright future and contribute to uphold Made in Egypt in the local and regional market.

Values:

- Commitment.
- Innovation.
- Integration.
- Harmony.

PP-R Pipes & Fittings



ROKA
PLAST

Application Standard

ROKAPLAST PPR Pipes and fittings are manufactured according to the German, International and Egyptian Standards.

German Standards:

DIN 8077	Dimension of Pipes.
DIN 8078	General quality and testing of fittings and Pipes.
DIN 16962	Part 5 General qualities and testing of fittings.
DIN 16962	Part 2,4,6,7,8,9,10,13 Dimension of Fittings.
DIN 1988	Technical rules for drinking water installations.

International Standards:

ISO 15874	Plastic Pipe System for hot and cold Water installations.
Part 1	General
Part 2	Pipes
Part 3	Fittings

Egyptian Standards :

ES 37032002 / 1- Poly Propylene Pipes (dimensions and tests)

Marking

1- Pipes :

Color: green with one Black line.

Trade mark 

International Standards ISO 9001 / 2015 German STD DIN 8077 – 8078

Type of resin PP-R type 3

Class pipe acc. (SDR & S) & PN (16 - 20)

Size

Time and Date of Production.

2 – Fittings :

Color: green

Trade mark 

International Standards ISO 9001 / 2015 German STD DIN 8077 – 8078

Type of resin PP-R type 3

Class Fitting acc. (SDR & S) & PN (25)

Size

General Characteristics

Scope and field of application

The polymer type used for **ROKAPLAST** pipes system is thermoplastic propylene random copolymers PP-R (type3)

Hygienic suitability :

According to DIN 1988 T2 and the law for food commodity the PP-R materials which is directly in contact with potable water are commodity good.

The effect on the domestic water :

The increasing use of PP-R in the field of food packing confirms the hygienic qualities of the materials this makes **ROKAPLAST** the optimal packing for one of our most precious commodity goods for portable water. The domestic supply system should influence the water on its way up to the taps as little as possible. Choosing the right domestic water pipes system and its materials is of decisive importance **ROKA** plast pipes system are suitable for all different qualities of potable water.

Easy to install:

It's flexible, light, easy to cut and easy to be fused for installation.

Smooth:

The smooth internal surface of PP-R products reduces frictional losses and prevents fouling and scaling on long term, this maintains a greater capacity for a given diameter than with conventional products.

U.V Resistance:

PP-R pipes and fittings should not be installed (without protection) when subjected to UV radiation.

ROKAPLAST pipes and fittings have UV stabilizer to bridge transport and installation times.

Maximum storage time in the open air is 6 months.

Environmental Effect:

ROKAPLAST pipes system is physiologically, environmentally and microbiologically harmless.

Durability:

ROKAPLAST pipes system has extrapolated durability more than 50 years' peak temperature of 100 arising from short disruptions are un problematic.

Brass:

Nontoxic brass.

Have the highest fixation power in the PP-R Product cause it has the largest types of fixations (fixations teeth, slots & knurl)

PP-R Properties

General Properties

ROKAPLAST Pipes system stops corrosion with no effect on the flow rate.

ROKAPLAST Pipes system have no danger of algae development installation.

ROKAPLAST Pipes system offers a unique and unrivalled connection process : material by fusion.

ROKAPLAST Pipes system connection can be Hydraulic pressure tested or put in to operation directly after their fusion there are no waiting times .

flow rate increased due the large inner diameter .

<i>Typical Value</i>	<i>Test Method</i>	<i>Main Value</i>	<i>Unit</i>
physical properties			
Density 23 °c	ISO 11 83	0.895	g / cm 2
Vicat softening Temperature (0.98N)	ISO 306	130	°C
Rheology			
Melt Mass Flow Rate MFR(230°C/2.16kg)	ISO 1133	0.3	g /10 min
Mechanical Properties			
Tensile modules (1mm / min)	ISO 527 - 1.2	900	Mpa
Tensile Stress yied (50mm / min)	ISO 527 - 1.2	27	Mpa
Tensile Strain yied (50mm / min)	ISO 527 - 1.2	13	%
Charpy impact strength at -23 °c	ISO 1791/eU	N.B	KJ/m2
Charpy impact strength at -20 °c	ISO 1791/eU	30	KJ/m2
Charpy impact strength Notched at -20°C	ISO 1791/eU	38	KJ/m2
Charpy impact strength Notched at -20 °c	ISO 1791/eU	2	KJ/m2
Thermal Properties			
Heat deflection (Temperature 0.45 Mpa (HTD/B)	ISO 75 - 1.2	88	°C
Mean coefficient of linear (Thermal Expansion 0:110 °c)	DIN 53752	1.5 x	K ⁻¹
Thermal conductivity	DIN 52612 -1	0.23	K ⁻¹ M ⁻¹
Electrical Properties			
Surface resistance	DIN 53482	> 10 ¹³	Ohm.cm

Product features

Scope

ROKAPLAST products offer a superior German-quality piping system that could be equally installed in the residential and the industrial field:

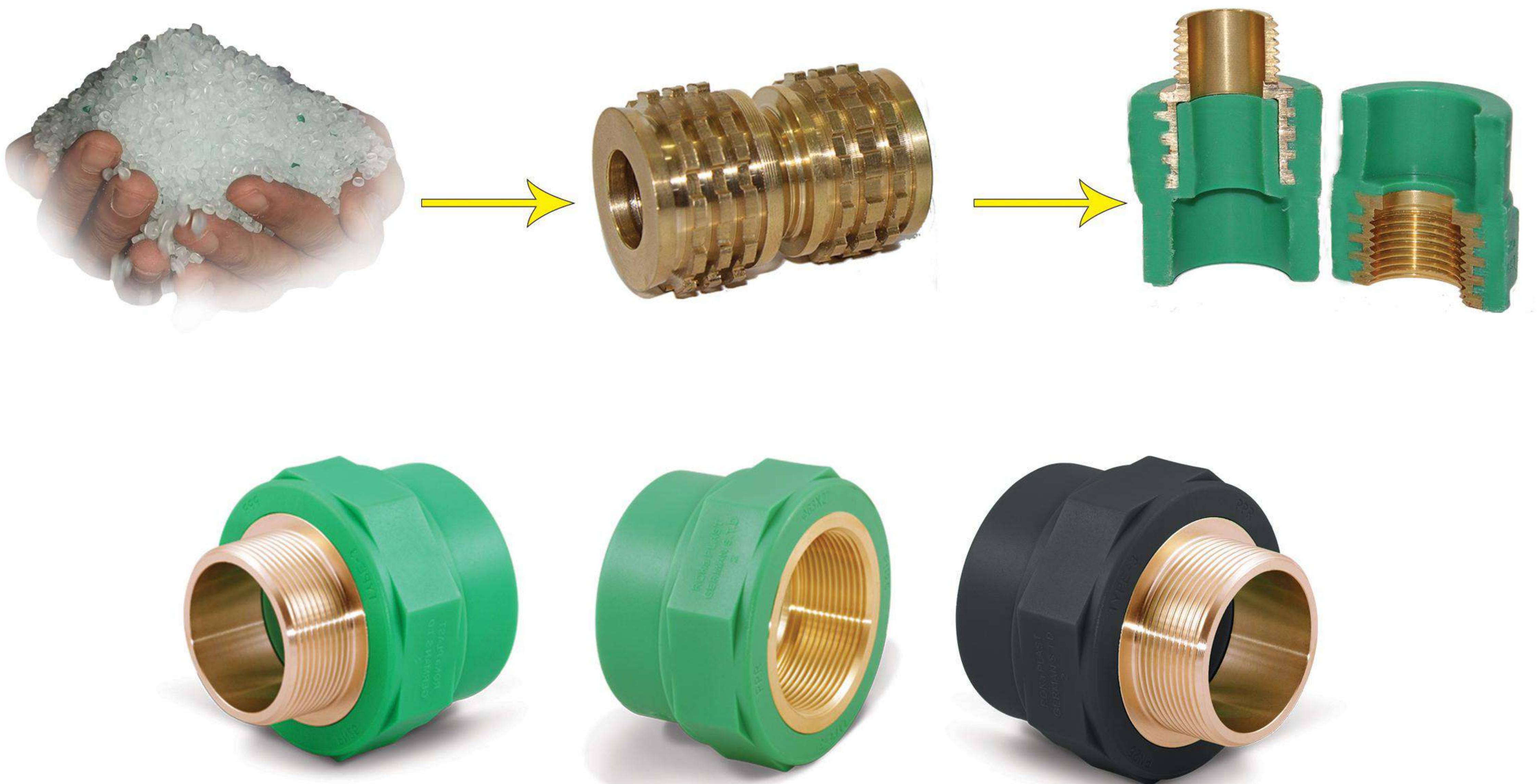
- Sanitary applications.
- Heating & air-conditioning systems.
- Compressed air installations.
- Watering systems for greenhouses and gardens.
- Transporting liquid material. • Vacuum installations.
- In the chemical industry for the flow of various fluids

ROKAPLAST is an excellent choice for piping of clean hot & cold water. (Fig. A)

ROKAPLAST is certified by the European Water Authority (DVGW) under standard DIN 50930 -6

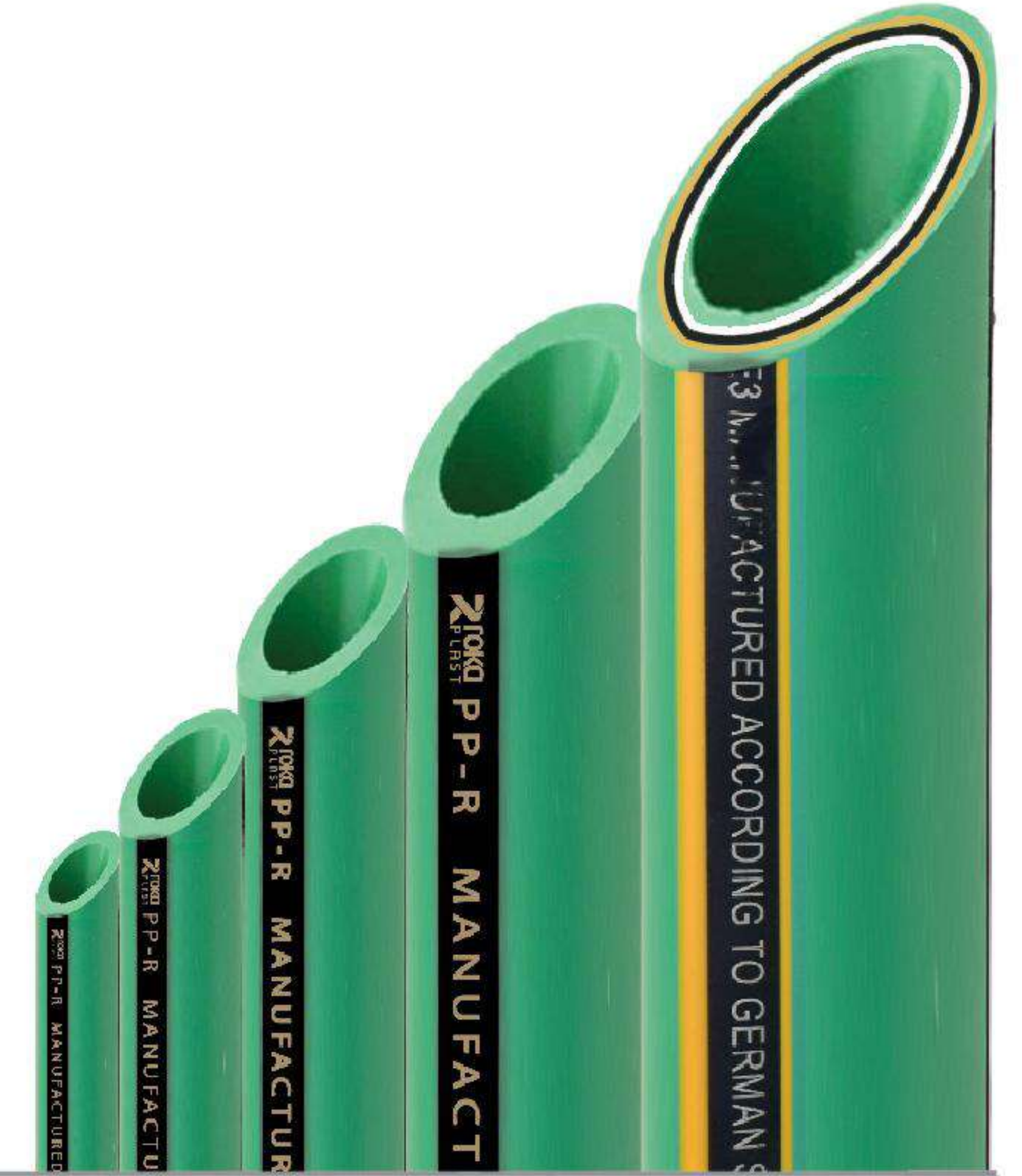
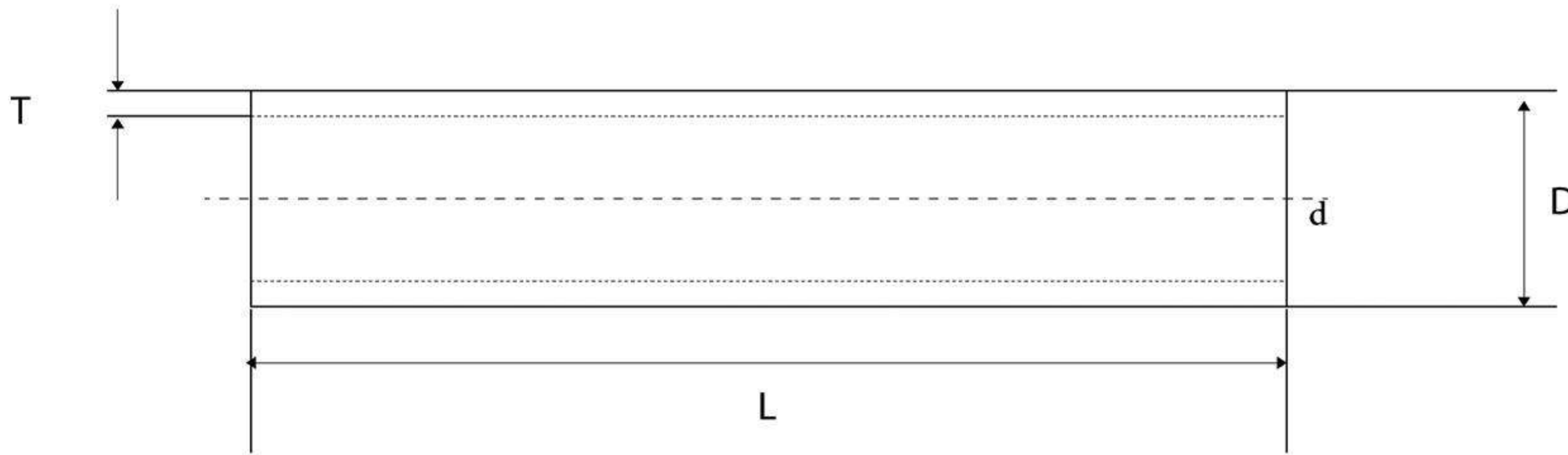
ROKAPLAST uses stops corrosion the best unique thread design and makes the strongest correlation feature between PP-R & copper.

Unlike other products, this correlation gets more and more stronger once the temperature increases, these features reflect on lifetime durable products.



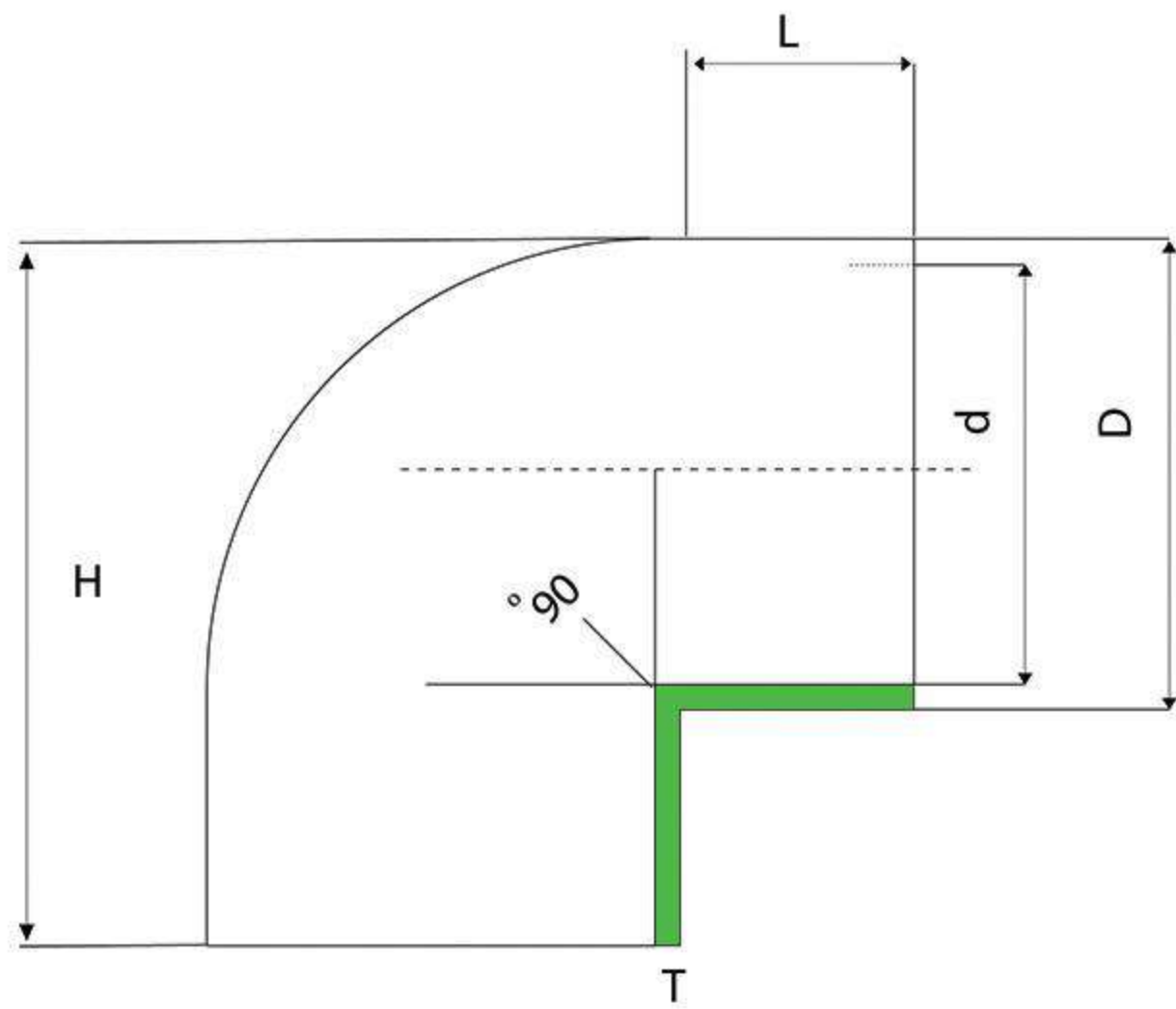
PP-R Pipes Dimensions

PP-R Pipes Dimensions . To Din 8077



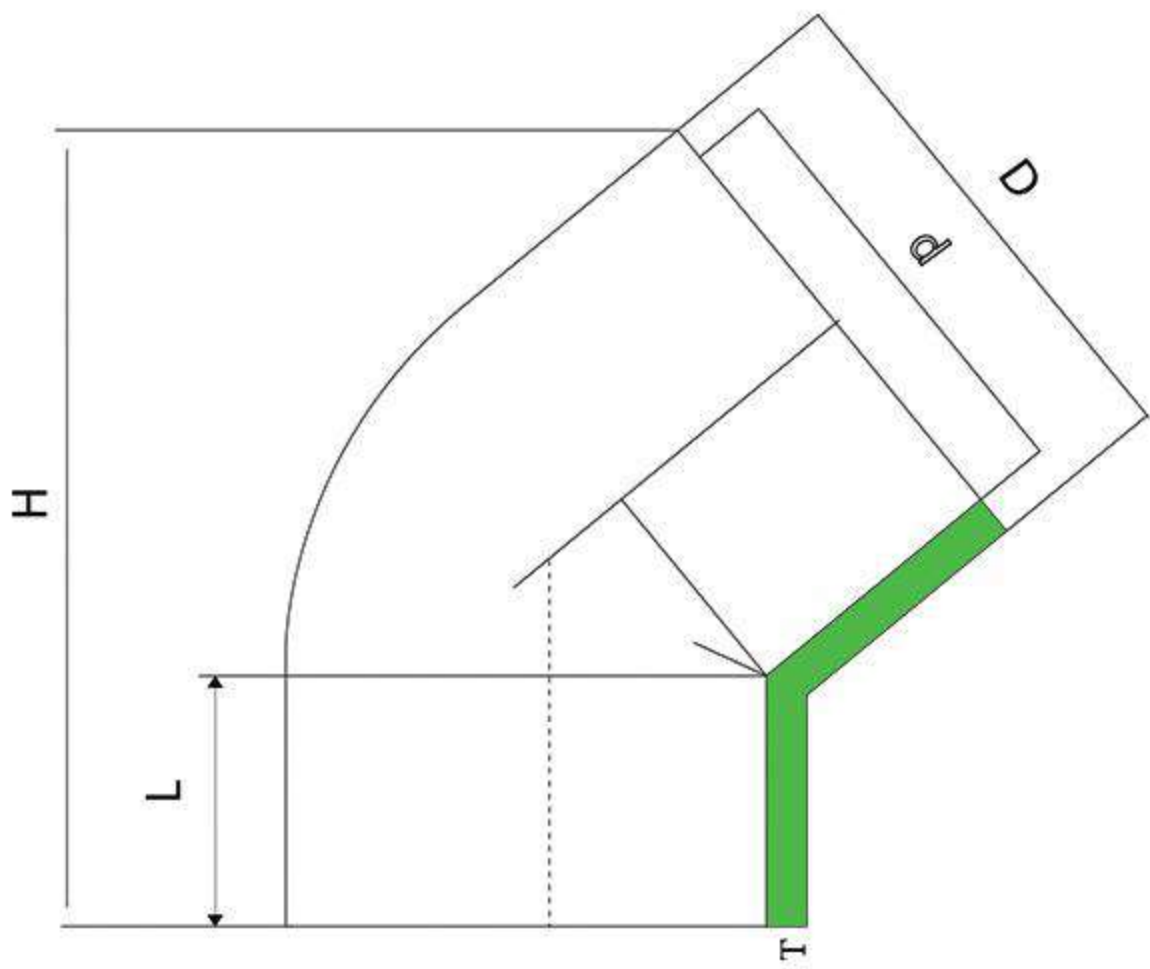
		Pipe series (S)															
		20		16		12.5		8.3		5		3.2		2.5		2	
		Pressure Rating															
d		PN 2.5		PN3.2		PN 4		PN 6		PN 10		PN 16		PN 20		PN 25	
		Standard dimension ratio (SDR)16															
		41		33		26		17.6		11		7.4		6		5	
	S	mass in kg/m	S	mass in kg/m	S	mass in kg/m	S	mass in kg/m	S	mass in kg/m	S	mass in kg/m	S	mass in kg/m	S	mass in kg/m	
10	-	-	-	-	-	-	-	-	-	-	-	-	1.8	0.046	2.0	0.050	
12	-	-	-	-	-	-	-	-	-	-	1.8	0.057	2.0	0.062	2.4	0.071	
16	-	-	-	-	-	-	-	-	-	-	2.2	0.095	2.7	0.110	3.3	0.128	
20	-	-	-	-	-	-	-	-	1.9	0.107	2.8	0.148	3.4	0.172	4.1	0.198	
25	-	-	-	-	-	-	-	-	2.3	0.164	3.5	0.230	4.2	0.266	5.1	0.307	
32	-	-	-	-	-	-	1.8	0.172	2.9	0.261	4.4	0.370	5.4	0.434	6.5	0.498	
40	-	-	-	-	1.8	0.217	2.3	0.273	3.7	0.412	5.5	0.575	6.7	0.671	8.1	0.775	
50	-	-	1.8	0.274	2.0	0.301	2.9	0.422	4.6	0.638	6.9	0.896	8.3	1.04	10.1	1.21	
63	1.8	0.349	2.0	0.382	2.5	0.474	3.6	0.659	5.8	1.01	8.6	1.41	10.5	1.85	12.7	1.91	
75	1.9	0.438	2.3	0.528	2.9	0.647	4.3	0.935	6.8	1.41	10.3	2.01	12.5	2.34	15.1	2.70	
90	2.2	0.616	2.8	0.758	3.5	0.936	5.1	1.33	8.2	2.03	12.3	2.87	15	3.36	18.1	3.88	
110	2.7	0.903	3.4	1.12	4.2	1.37	6.3	1.99	10.0	3.01	15.1	4.30	18.3	5.01	22.1	5.78	
125	3.1	1.18	3.9	1.45	4.8	1.76	7.1	2.55	11.4	3.91	17.1	5.35	20.8	6.47	25.1	7.46	
140	3.5	1.48	4.3	1.80	5.4	2.23	8.0	3.2	12.7	4.87	19.2	6.95	23.3	8.12	28.1	9.35	
160	4.0	1.91	4.9	2.32	6.2	2.92	9.1	4.17	14.6	4.87	21.9	9.04	26.6	10.6	32.1	12.2	

Elbow90



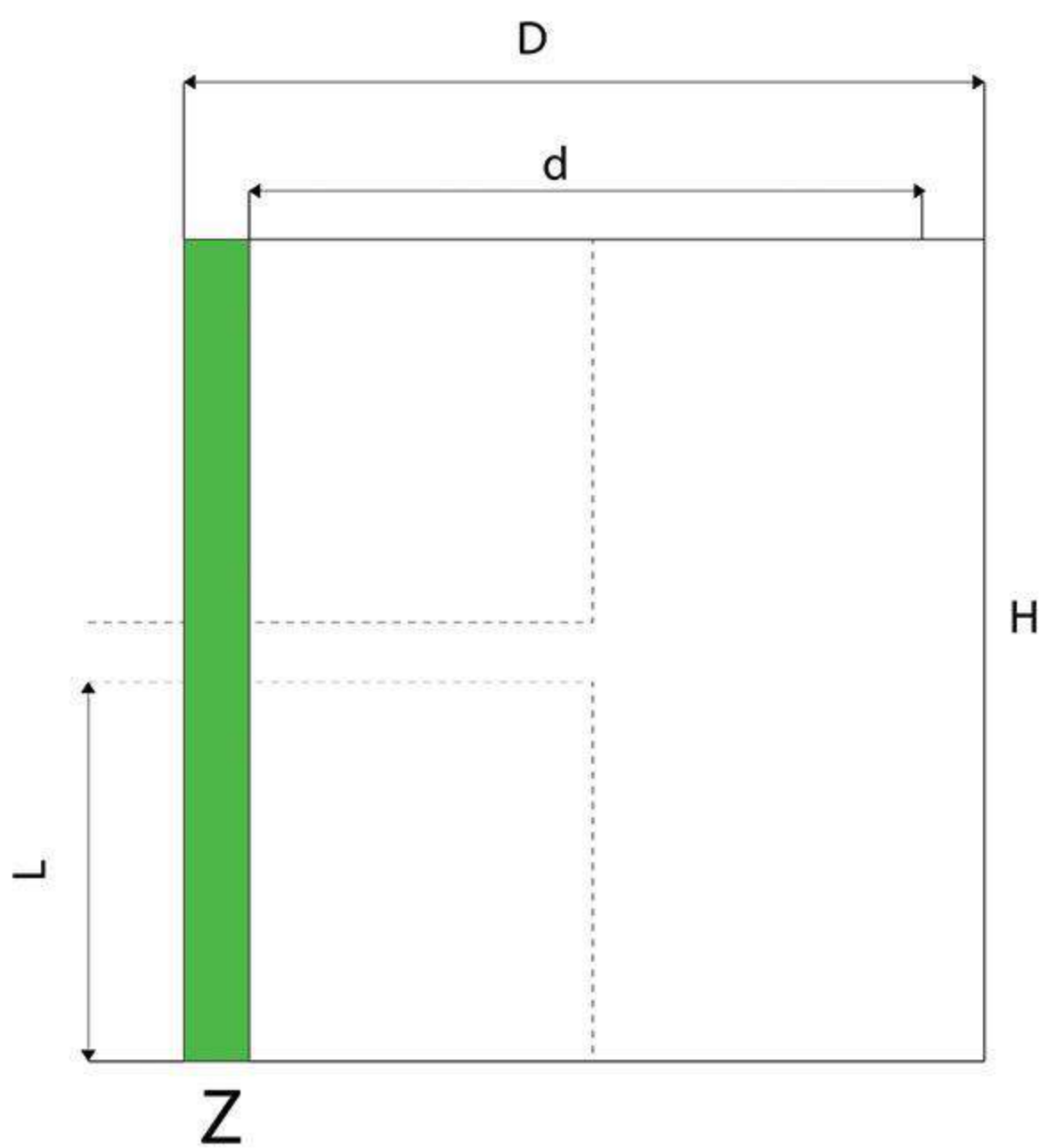
Size	d	D	H	L	T
20	19.0	30.3	42.5	16.2	5.5
25	23.6	31.3	49.3	18.4	6.0
32	31.0	44.3	59.2	19.6	6.6
50	49.2	67.2	87.2	24.2	9.3
63	61.7	82.2	103.4	27.4	9.9
75	74.2	95.5	117.6	31.4	10.8
90	88.1	113.8	136.0	34.0	12.9
110	107.2	138.0	166.0	42.0	15.0

Elbow45



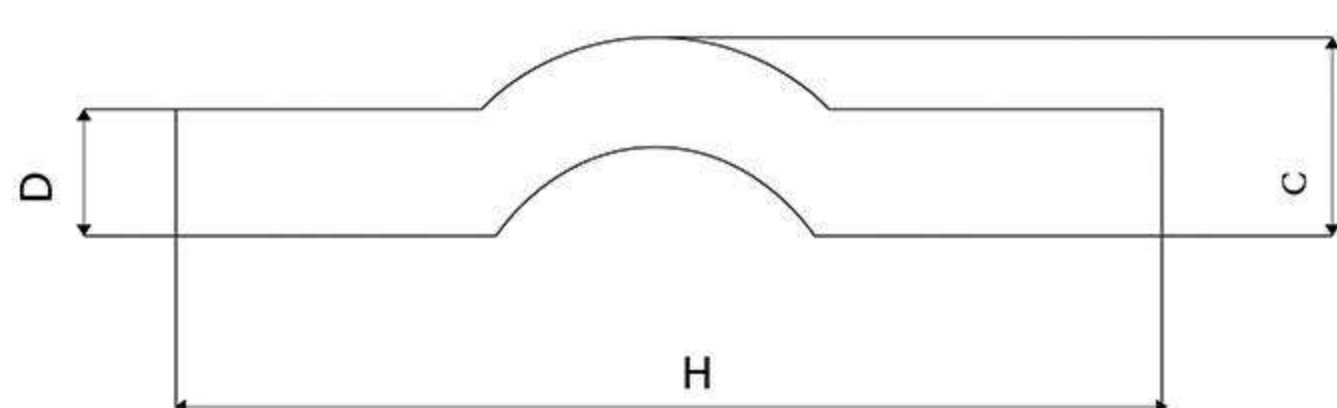
Size	d	D	H	L	T
25	24.4	36.6	49.8	15.9	5.9
32	31.3	45.5	61.3	20.1	7.1
50	49.2	67.4	87.1	24.1	9.0
63	61.5	81.9	102.6	27.0	10.8

Socket



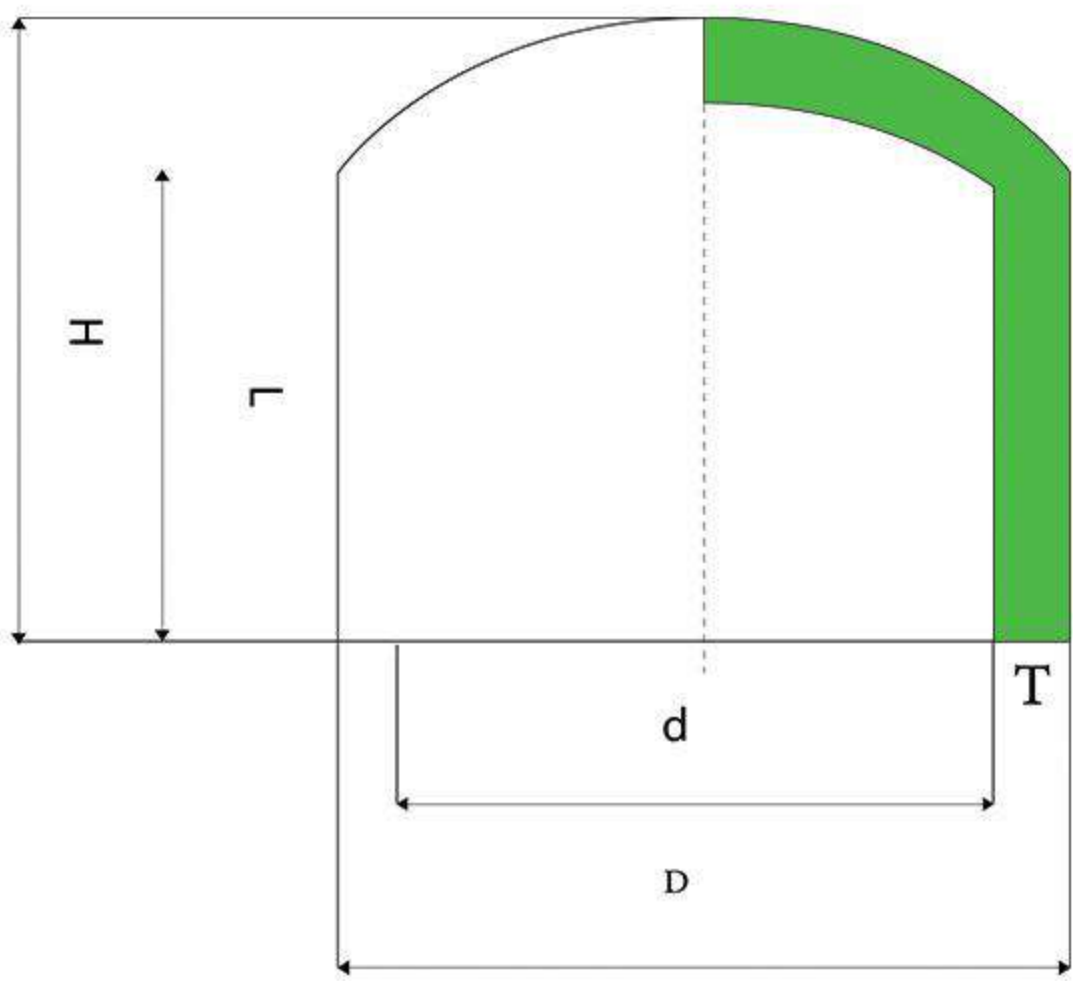
Size	d	D	H	L	T
20	19.2	30.2	34.3	16.3	5.5
25	24.3	36.2	37.1	17.6	6.5
32	30.9	45.3	43.3	20.2	7.2
50	48.0	66.3	55.2	24.3	9.1
63	61.8	81.6	62.9	27.7	10.1
75	73.6	95.5	68.2	31.7	11.0
90	87.7	115.1	76.6	35.3	13.9
110	105.7	135.7	90.0	39.8	15.5

Crossover



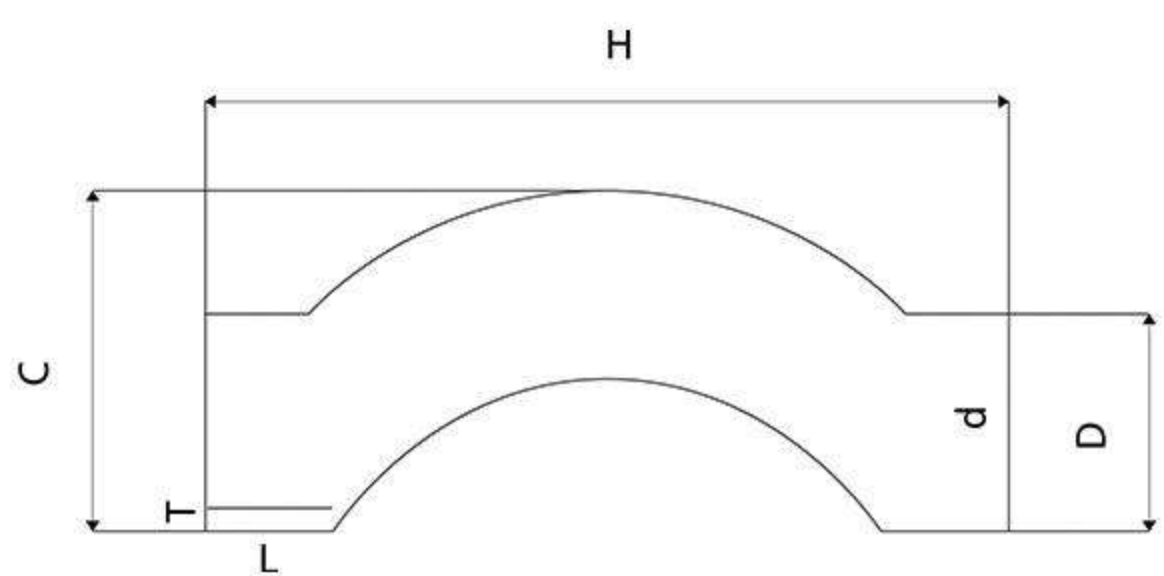
Size	d	D	H	L	T
20	13.3	20.5	302.5	40.9	3.8
25	17.4	25.3	304.5	50.5	4.0

Cap



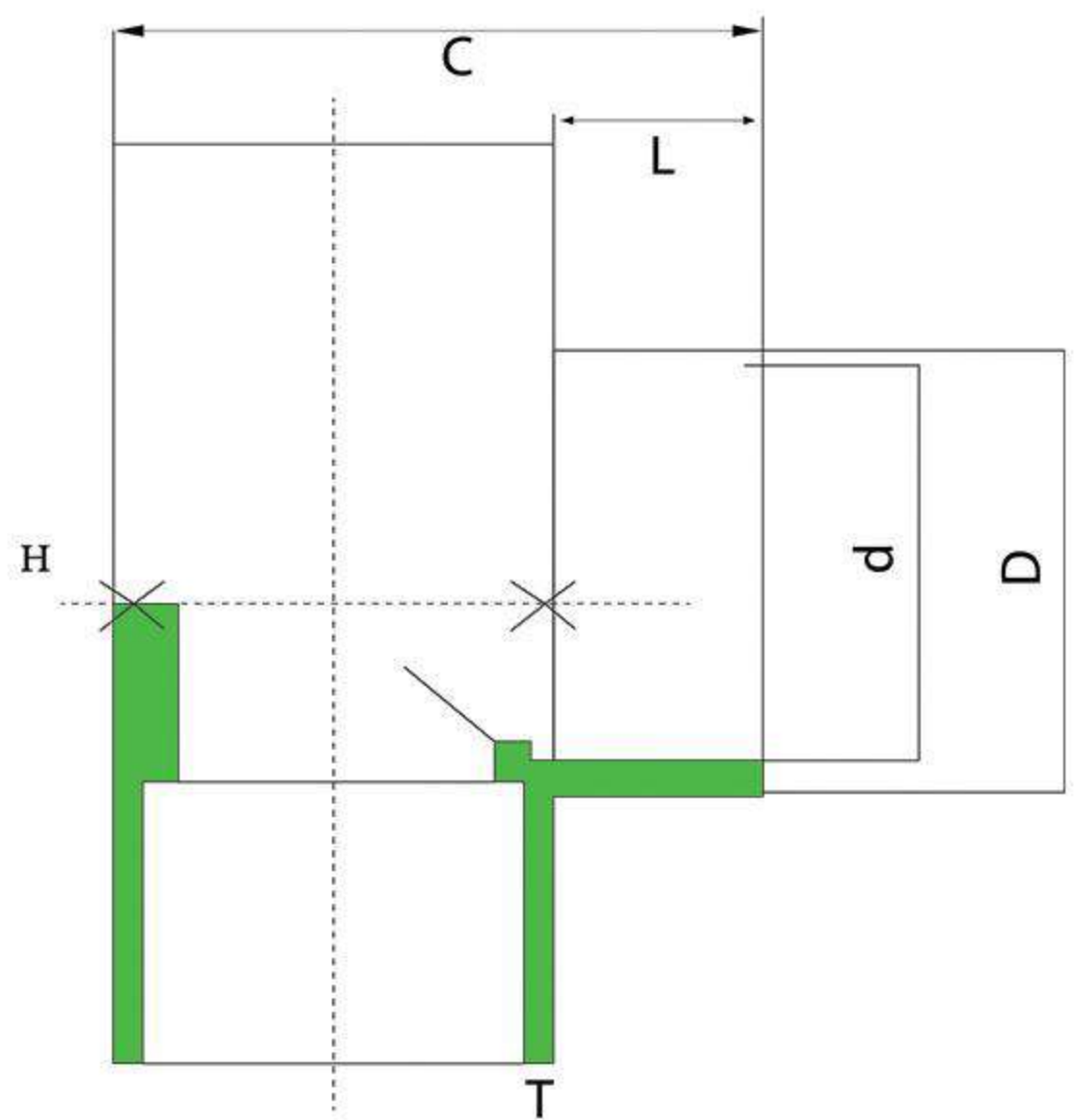
Size	d	D	H	L	T
20	19.0	29.5	24.8	18.3	5.0
25	23.9	36.0	26.6	16.6	6.1
32	31.2	44.6	30.4	20.3	6.5
50	49.3	67.2	41.5	28.5	9.0
63	61.2	81.9	50.6	28.2	10.4

Crossover 2 Socket



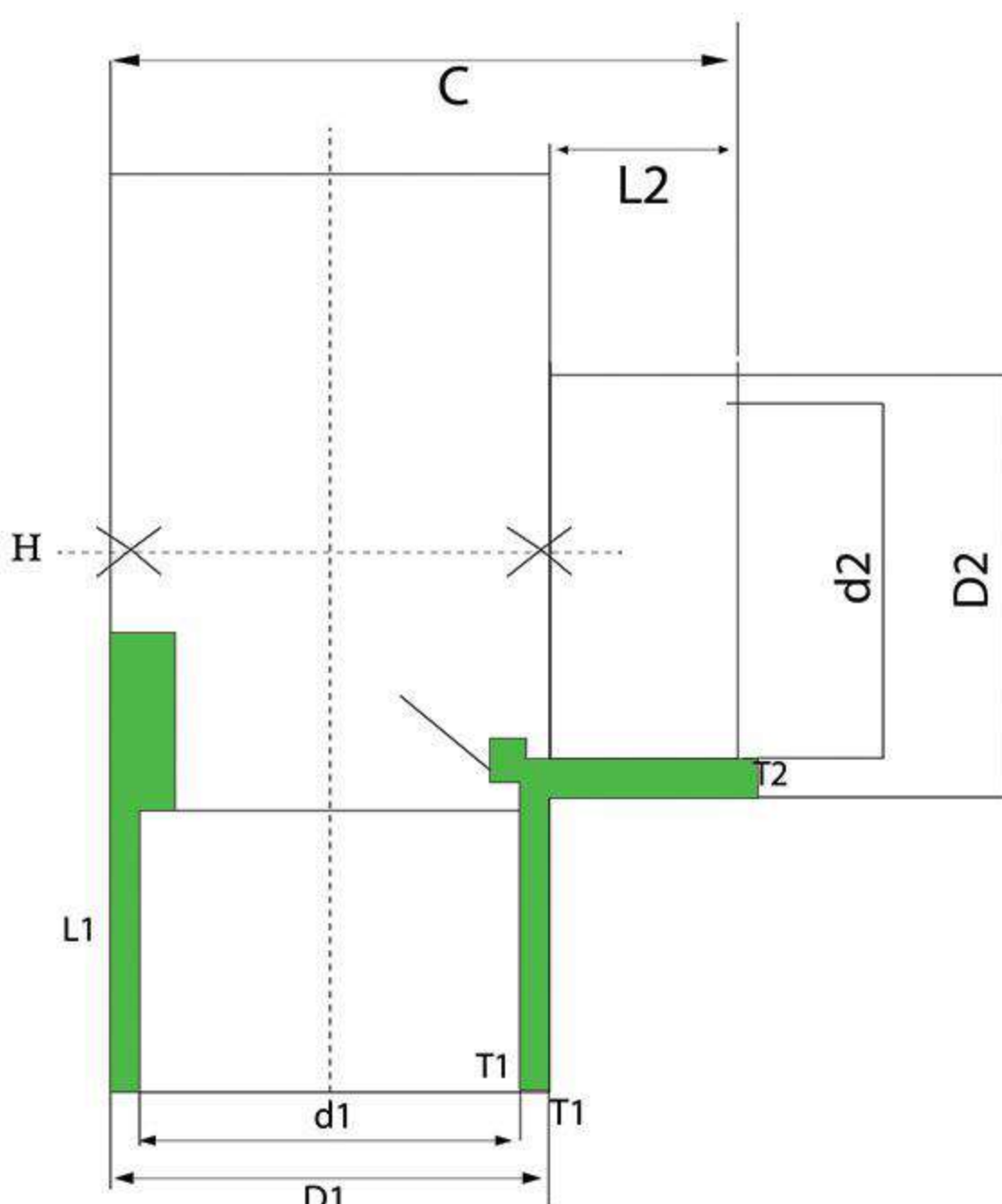
Size	d	D	H	C	L	T
25	23.9	36.4	116.7	54.6	17.7	7
32	30.5	45.0	129.3	62.2	20.2	7

Tee90



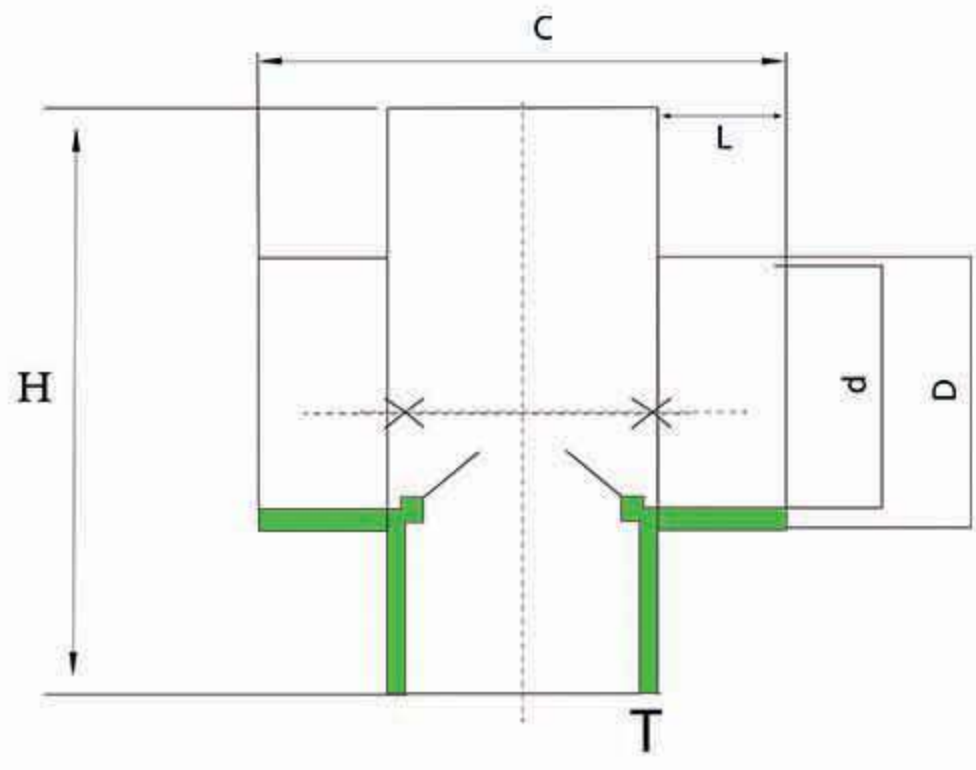
Size	d	D	H	C	L	T
20	19.1	29.9	53.5	41.5	16.6	5
25	23.9	36.3	63.6	49.2	17.4	6
32	31.0	45.3	74.5	60.0	20.0	7
50	48.8	66.1	106.1	85.4	25.0	9
63	61.2	81.8	126.5	100.8	27.5	11
75	72.3	95.8	143.1	116.1	31.2	12
90	86.4	114.9	163.0	137.2	35.0	15
110	106.2	137.4	196.0	166.0	41.4	16

Tee Reduced



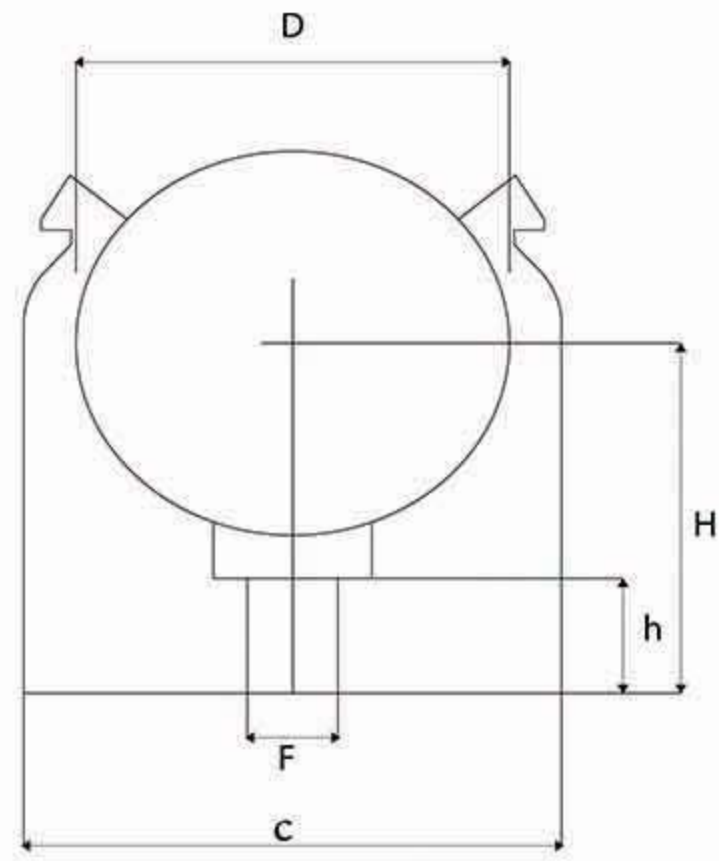
Size	d1	D1	d2	D2	H	C	L1	T1	L2	T2
25*20	23.9	36.0	18.3	29.7	63.4	47.2	17.8	6.0	15.6	6.0
32*25	31.0	45.2	23.6	36.8	74.6	55.7	20.4	7.3	16.3	7.0
32*20	30.8	45.0	18.7	30.0	79.5	55.4	20.0	7.3	15.8	6.0
50*25	49.2	67.0	23.5	36.0	89.2	80.5	26.0	9.5	18.5	6.1
50*32	48.7	66.5	30.8	45.4	88.6	79.6	25.0	9.0	20.6	7.5
63*32	60.9	82.2	29.6	82.0	127.0	101.9	27.3	10.9	19.3	26.0
75*63	73.0	95.5	62.0	82.6	119.0	114.6	31.4	11.3	28.2	10.2
90*63	88.0	114.2	61.7	82.6	136.5	135.2	35.0	13.0	27.0	10.5
90*75	89.2	115.1	74.0	96.9	154.0	137.0	35.3	13.3	31.6	11.2
110*90	106.5	138.4	61.0	114.5	183.0	162.0	42.0	16.1	16.1	16.9

Tee Cross



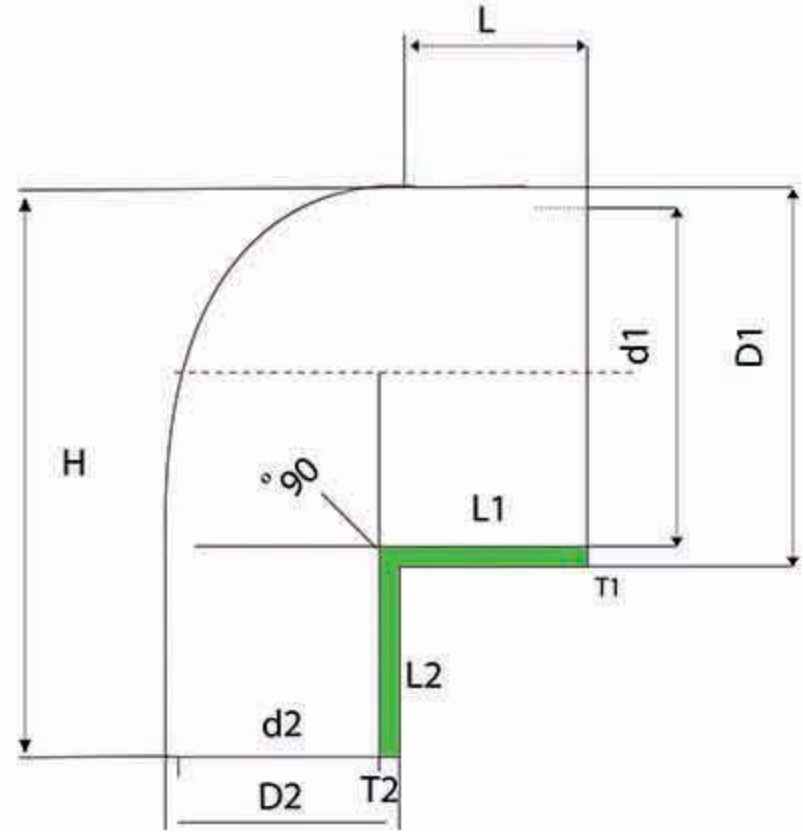
Size	d	D	H	C	L	T
25	24.2	36.2	76.7	76.6	18.0	6.1

Fisher



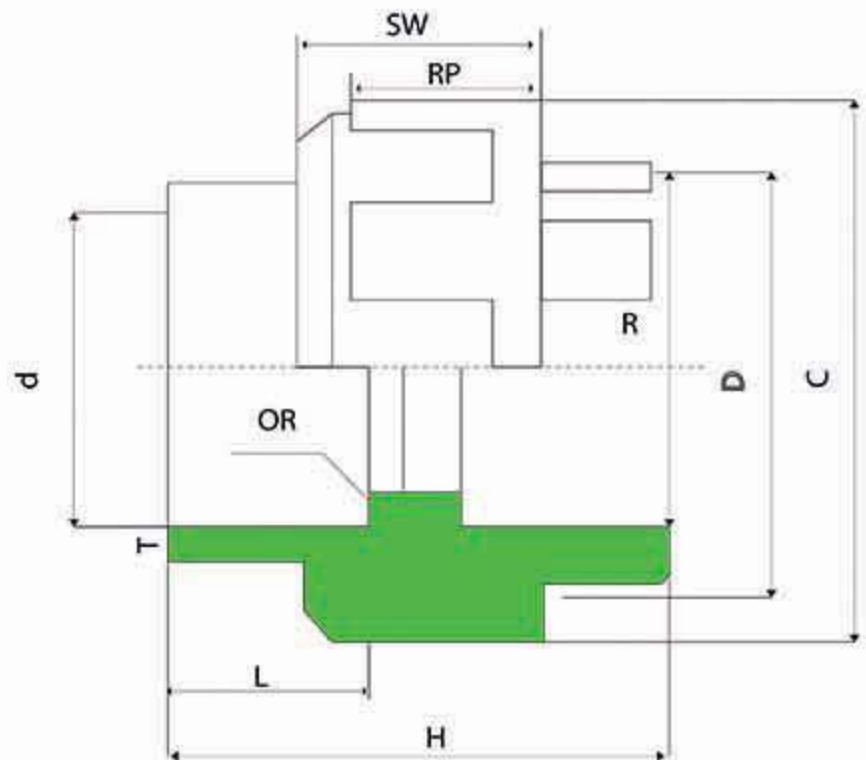
Size	D	h	H	C	F	T
20	18.5	16.0	27.7	31.8	5.5	3.5
25	22.4	15.6	30.7	35.7	5.7	3.6
32	38.0	16.1	46.0	43.5	6.0	3.5

Elbow Reduced



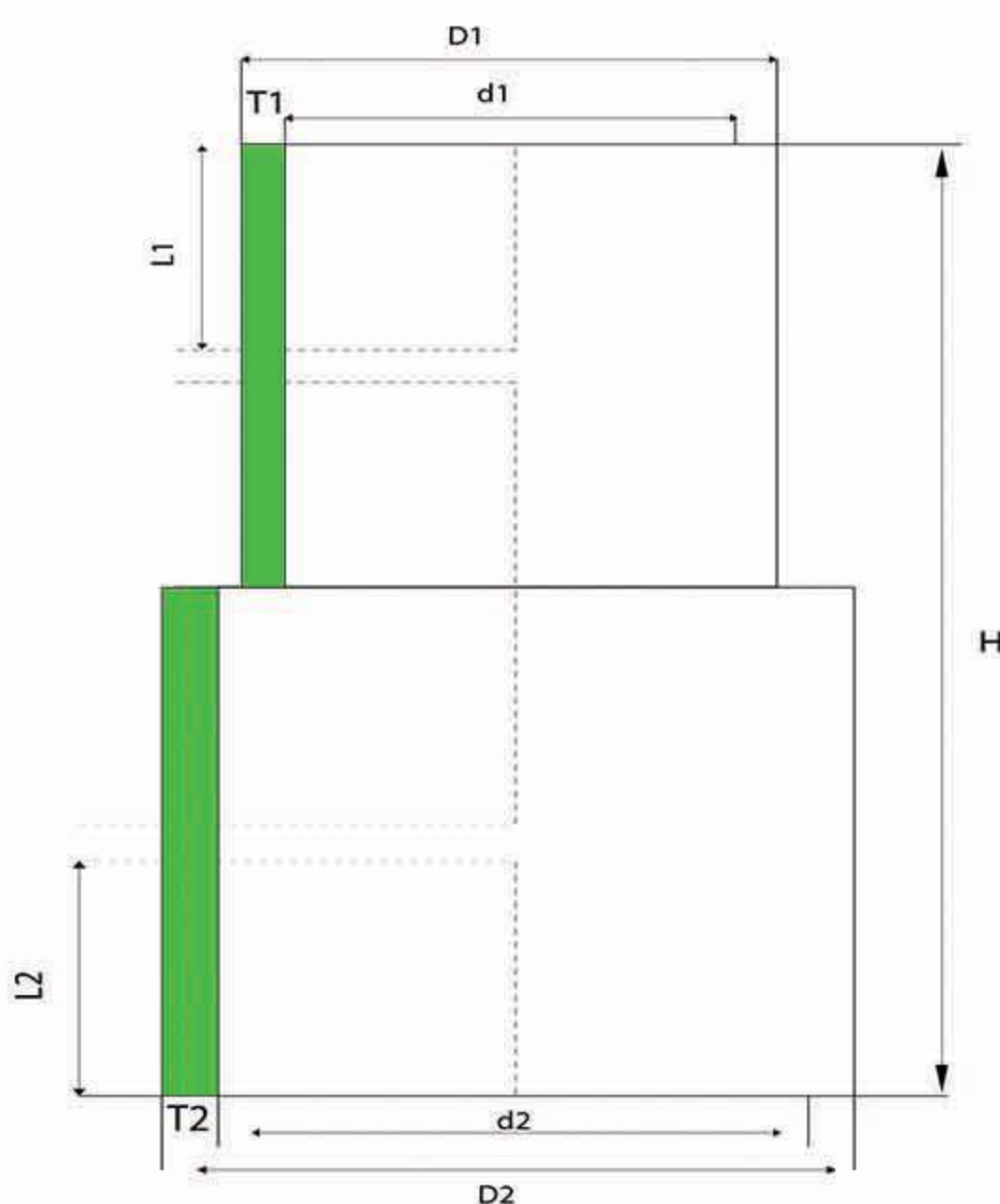
Size	d1	D1	L1	T1	H	C	d2	D2	L2	T2
32*20	31.1	45.3	20.0	7.2	57.9	46.9	19.4	29.4	16.2	5.1
32*25	30.1	45.1	19.7	7.3	57.6	53.4	24.3	36.2	16.9	5.9

Socket Union



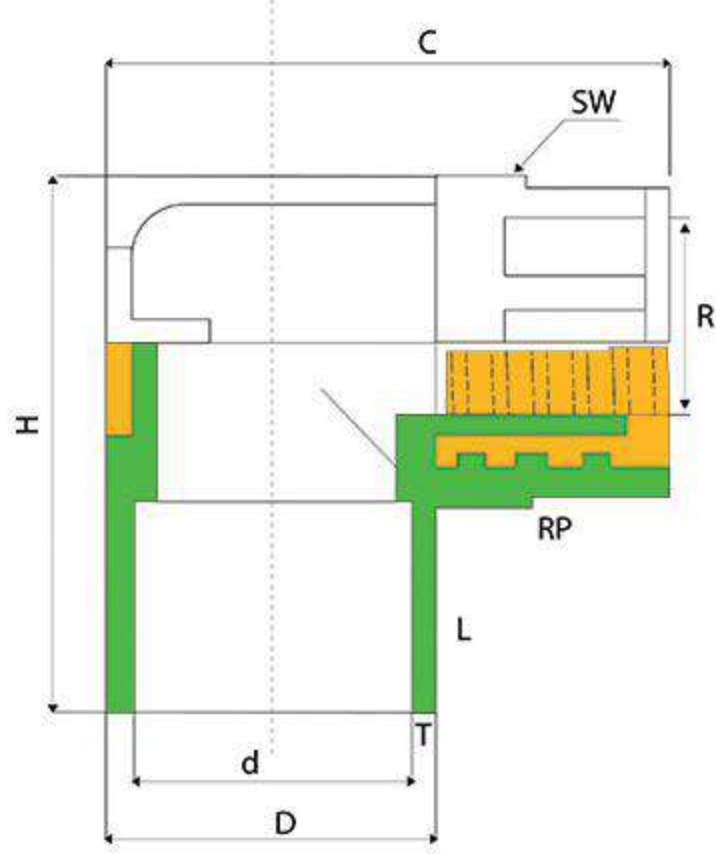
Size	d1	D1	L1	T1	H	C	SW	RP	R
32	31.2	44.1	19.2	6.5	69.0	65.9	22.0	22.6	52.2

Reduced Coupling



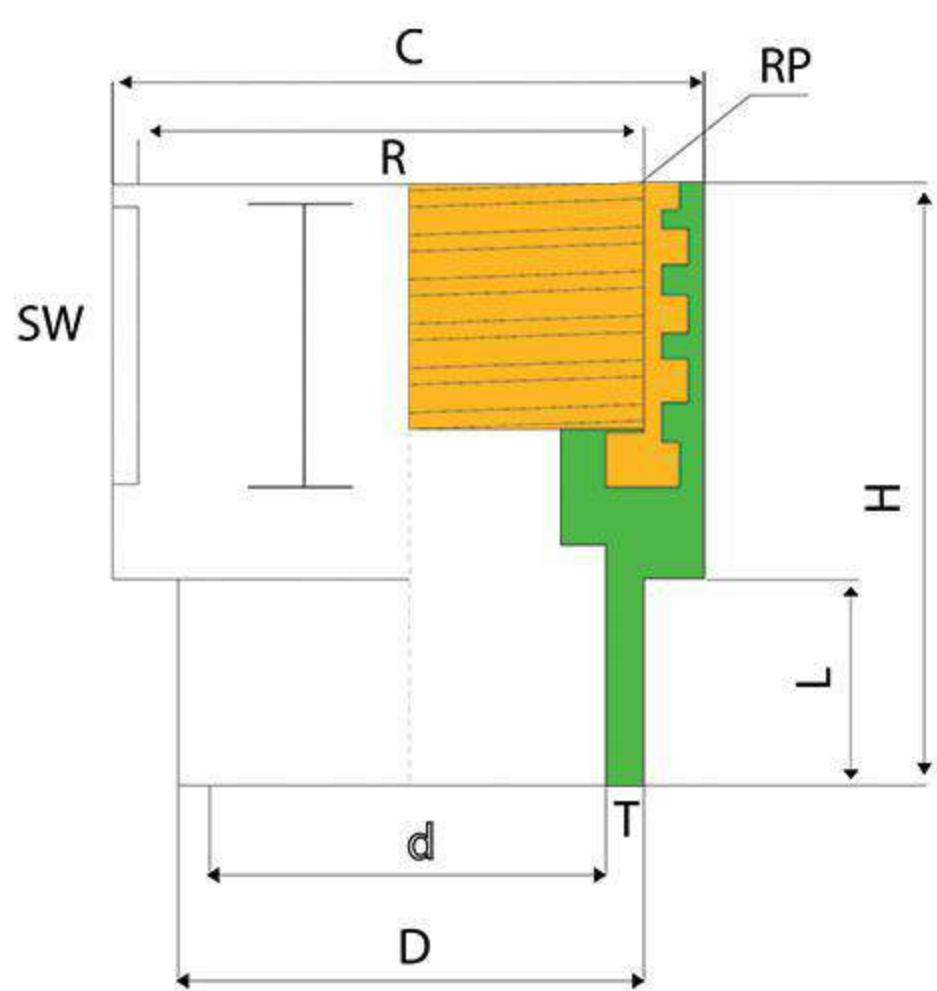
Size	d1	D1	d2	D2	H	L1	T1	L2	T2
25*20	24.2	35.6	19.0	31.2	38.0	23.4	6.1	16.6	5.9
32*25	30.7	45.0	24.0	35.7	42.0	20.0	7.3	12.3	6.0
32*20	31.1	43.9	18.9	29.1	39.4	20.0	6.6	16.0	5.0
50*32	48.1	66.2	30.8	45.5	51.1	24.5	9.2	19.1	7.5
63*32	61.7	81.0	30.5	45.0	52.5	28.2	10.0	8.5	7.2
63*50	61.4	81.8	48.9	66.3	55.9	28.2	10.0	24.3	9.0
75*50	74.0	95.0	62.0	81.6	63.2	31.8	10.7	27.3	10.0
75*63	74.3	95.5	49.6	81.5	63.4	31.6	10.7	30.7	16.0
90*50	88.1	114.2	49.5	95.0	71.5	35.6	13.4	18.6	23.0
90*75	87.9	114.2	61.8	115.6	71.7	35.5	13.4	30.3	17.0
110*90	106.5	137.5	61.3	114.0	84.7	41.4	126.0	34.6	20.7

Elbow90 Female Threaded



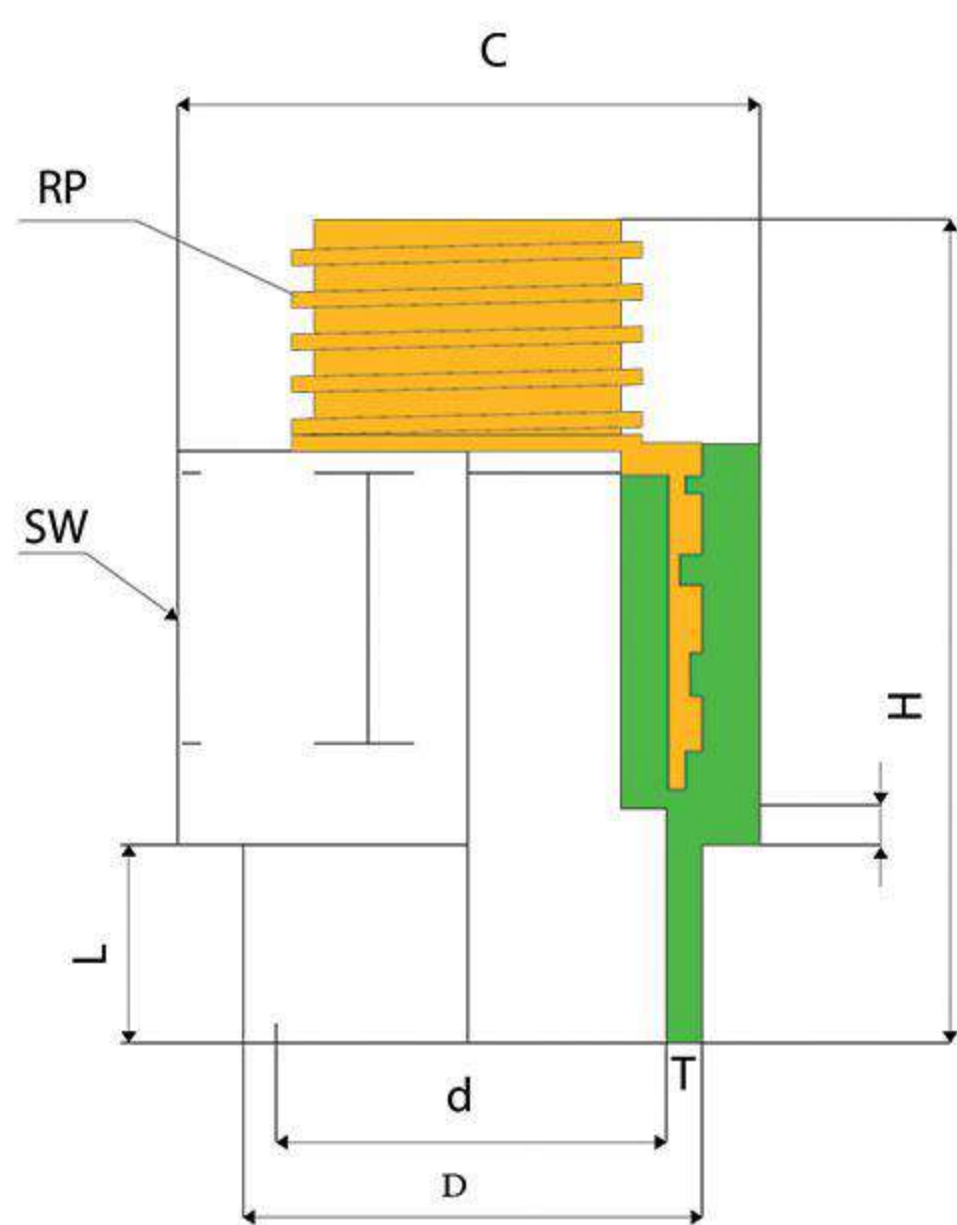
Size	d1	D1	L1	T1	d2	D2	L2	T2	H	C	SW	RP	R
20*20	19.0	29.9	16.6	5.5	26.7	37.5	26.1	4.7	71.4	48.5	19.0	13.4	0.5
25*20	24.2	36.2	18.0	6.0	26.8	37.4	26.3	4.5	75.6	54.7	19.0	13.4	0.5
25*25	24.2	36.0	18.1	6.1	31.0	44.8	28.1	6.3	75.5	55.5	20.0	17.6	0.8
32*25	30.9	45.3	19.8	7.3	31.7	44.9	28.1	6.9	80.0	63.4	20.0	17.6	0.8
32*20	30.5	45.3	20.0	7.2	27.6	37.9	20.2	4.7	67.7	65.0	19.0	13.4	0.5

Socket Female Threaded



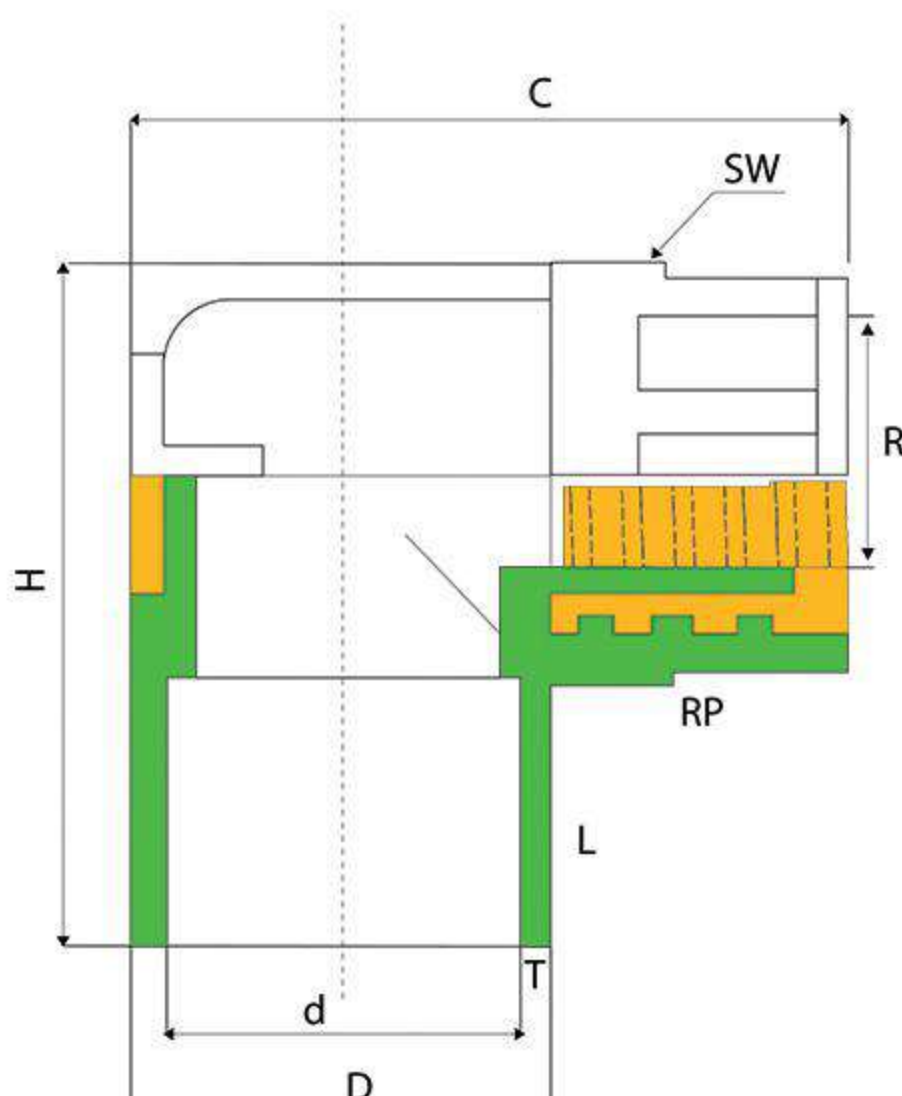
Size	d	D	L	T	H	C	SW	RP	R
20*20	19.2	30.0	15.5	5.5	39.3	37.4	19.0	13.4	0.5
25*20	24.1	36.1	18.3	6.2	34.2	37.5	19.0	13.4	0.5
25*25	24.1	36.1	18.5	6.0	43.8	45.5	20.0	17.6	0.8
32*1	31.2	45.5	20.5	7.3	48.6	55.2	24.0	20.8	1.0
50*50	67.5	47.7	24.0	9.6	60.2	73.8	25.1	19.0	1.5
63*2	60.3	82.0	28.2	10.3	61.4	91.2	32.3	24.8	2.0
75*2.5	73.2	98.9	32.7	13.1	79.5	112.9	31.2	21.2	2.5
90*3	87.7	114.6	35.0	13.2	80.0	127.0	40.0	25.5	3.0

Socket Male Threaded



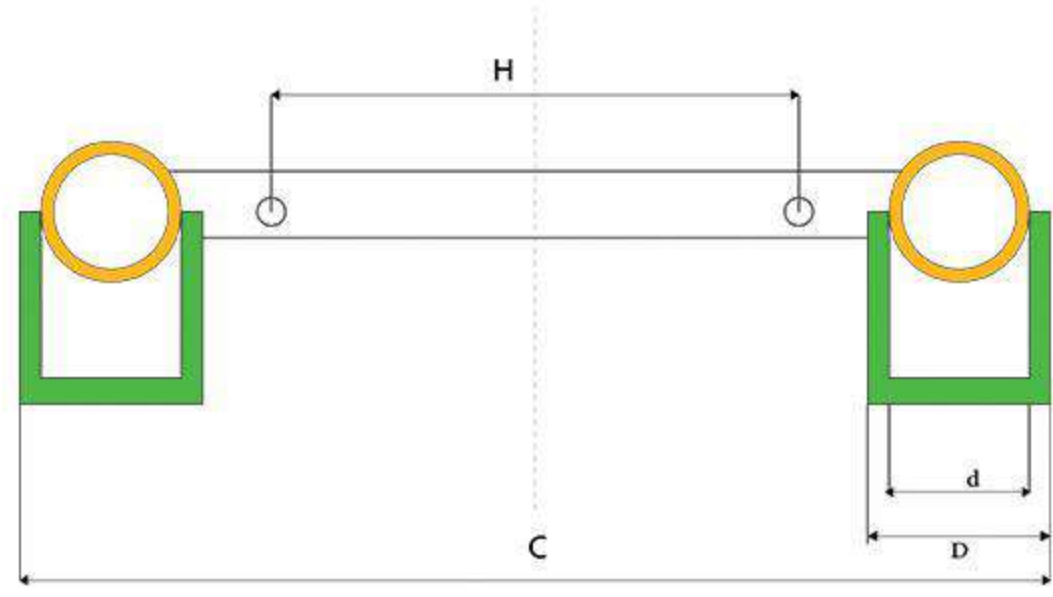
Size	d	D	L	T	H	C	SW	RP	R
20*20	19.1	29.7	16.1	5.4	54.1	36.9	16.8	14.7	0.5
25*20	24.2	35.8	17.8	6.2	56.0	37.5	16.8	14.7	0.5
25*25	24.2	35.8	18.1	6.2	63.7	44.8	20.2	15.5	0.8
32*1	31.1	44.9	20.0	7.3	66.4	55.3	21.9	17.9	1.0
50*50	48.5	67.4	24.1	9.7	82.8	74.1	17.9	21.1	1.5
63*2	61.2	81.9	27.8	10.8	94.5	86.4	56.6	24.0	2.0
90*3	88.3	117.7	35.6	13.4	110.3	126.5	74.1	30.0	3.0
110*4	107.2	138.8	42.2	15.5	128.5	152.3	90.5	31.4	4.0

Tee Female Threaded



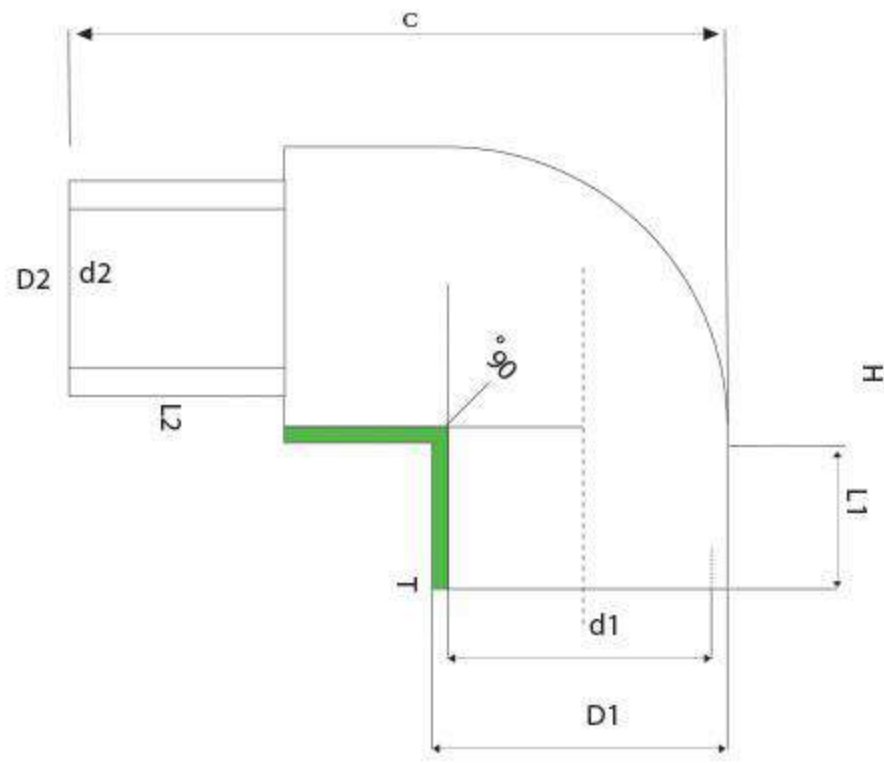
Size	d1	D1	L1	T1	d2	D2	L2	T2	H	C	SW	RP	R
20*20	19.0	29.9	16.6	5.5	26.7	37.5	26.1	4.7	71.4	48.5	19.0	13.4	0.5
25*20	24.2	36.2	18.0	6.0	26.8	37.4	26.3	4.5	75.6	54.7	19.0	13.4	0.5
25*25	24.2	36.0	18.1	6.1	31.0	44.8	28.1	6.3	75.5	55.5	20.0	17.6	0.8
32*25	30.9	45.3	19.8	7.3	31.7	44.9	28.1	6.9	80.0	63.4	20.0	17.6	0.8
32*20	30.5	45.3	20.0	7.2	27.6	37.9	20.2	4.7	67.7	65.0	19.0	13.4	0.5

Elbow Closed Female Threaded



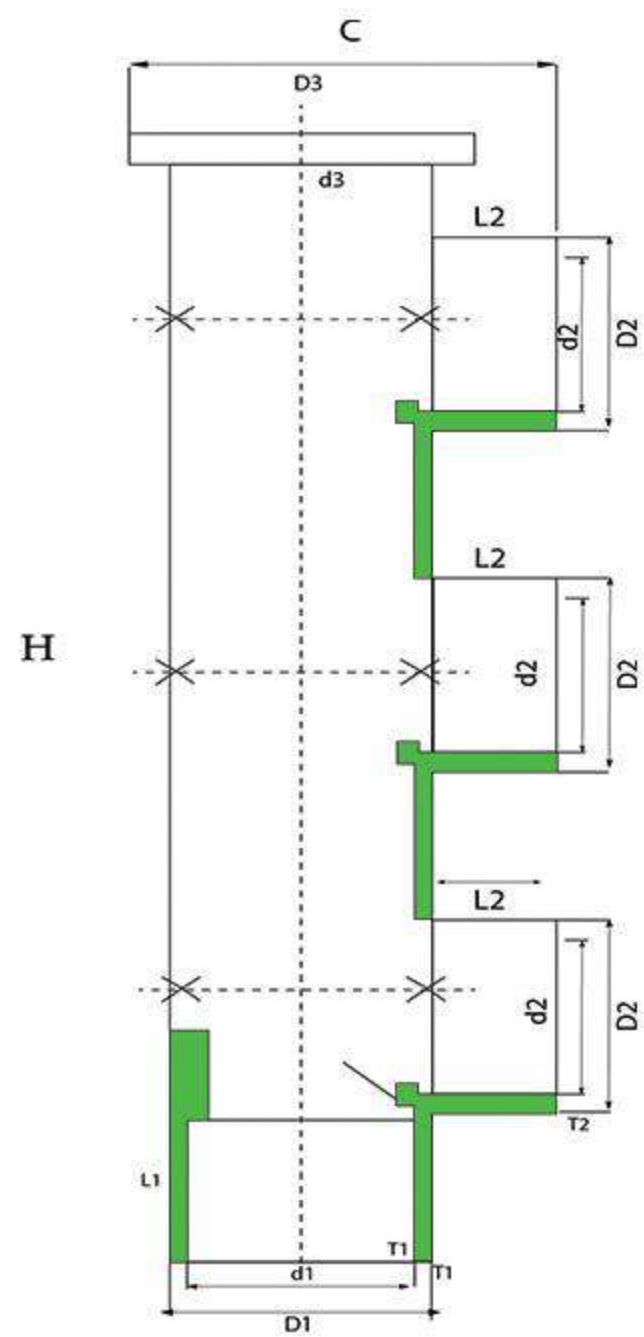
Size	d1	D1	L1	T1	H	h	C	c	SW	RP	R
25*20	24.1	36.3	18.5	6.0	56.5	21.4	190.6	68.0	19.0	13.4	0.5

Elbow Male



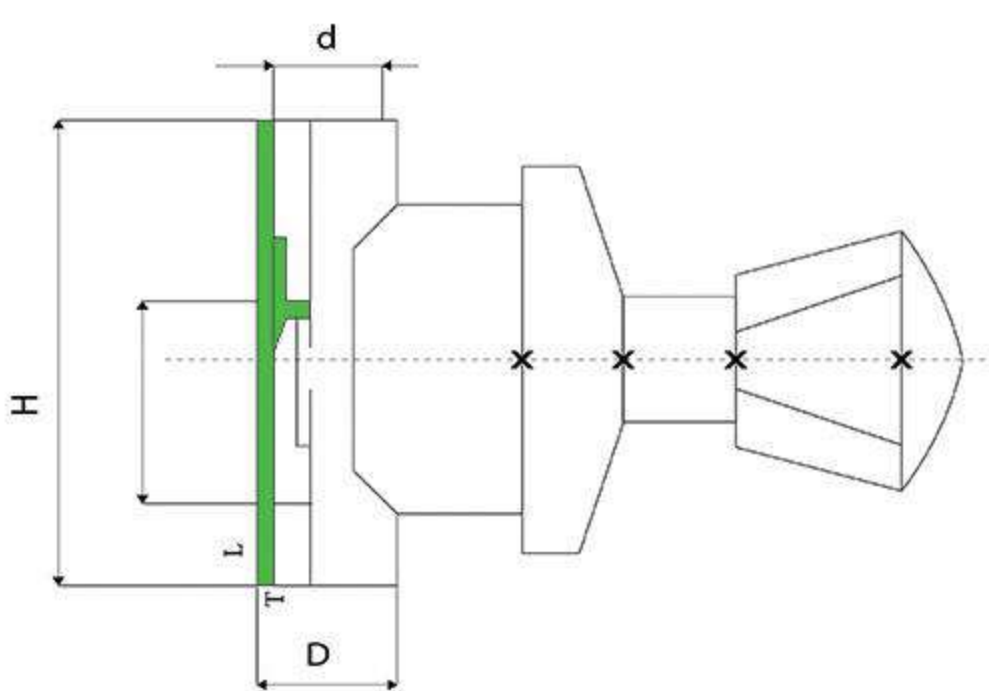
Size	d1	D1	L1	T1	d2	D2	L2	T2	H	C
25	23.8	35.9	18.4	5.9	16.1	25.0	16.9	4.5	49.1	67.2
32	30.6	45.3	19.6	7.4	19.8	31.8	20.9	6.0	59.5	80.5

Manifold Welding



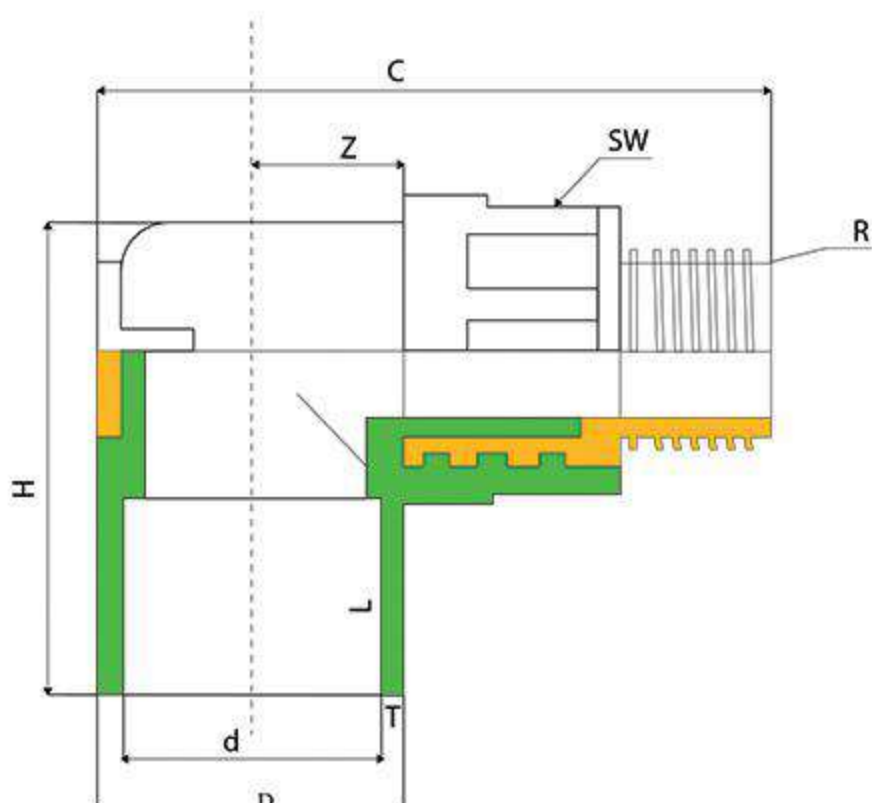
Size	d1	D1	L1	T1	d2	D2	L2	T2	D3	H	C
50*25	31.9	52.6	25.2	10.4	23.6	44.6	16.0	10.7	67.3	393.0	76.1
50*32	31.5	52.4	25.0	10.2	31.0	45.0	19.8	10.3	67.5	394.0	74.2

Valve



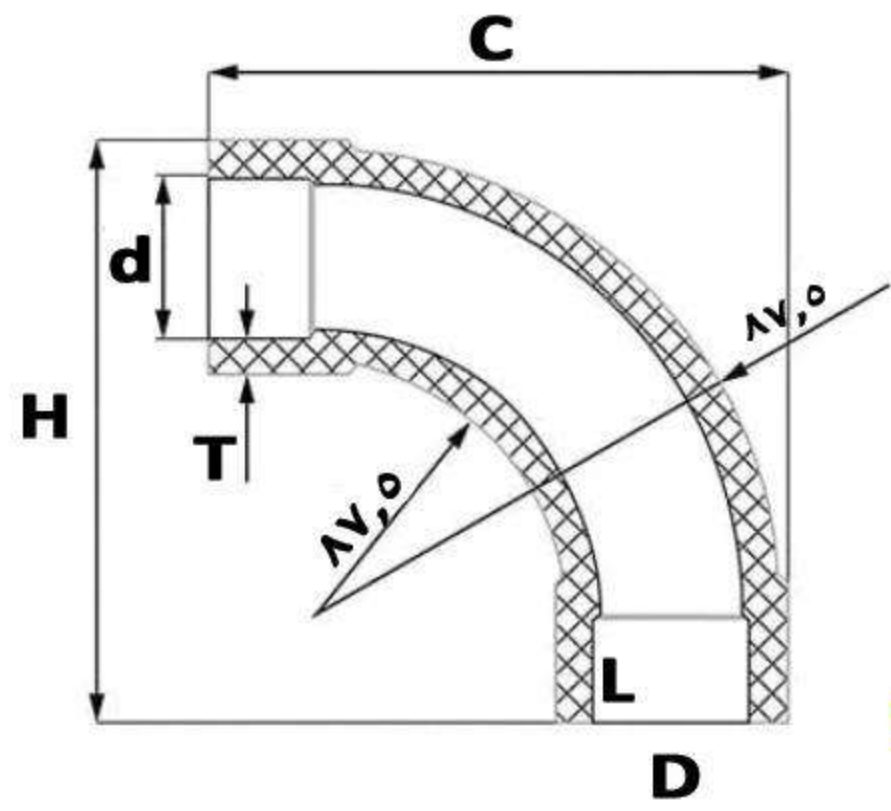
Size	d	D	H	C	L1	T	L2	L3	SW	RP	R
25	23.2	36.2	76.3	52.6	16.9	6.5	27.7	20.1	18.1	11.9	0.8

Elbow Male Threaded



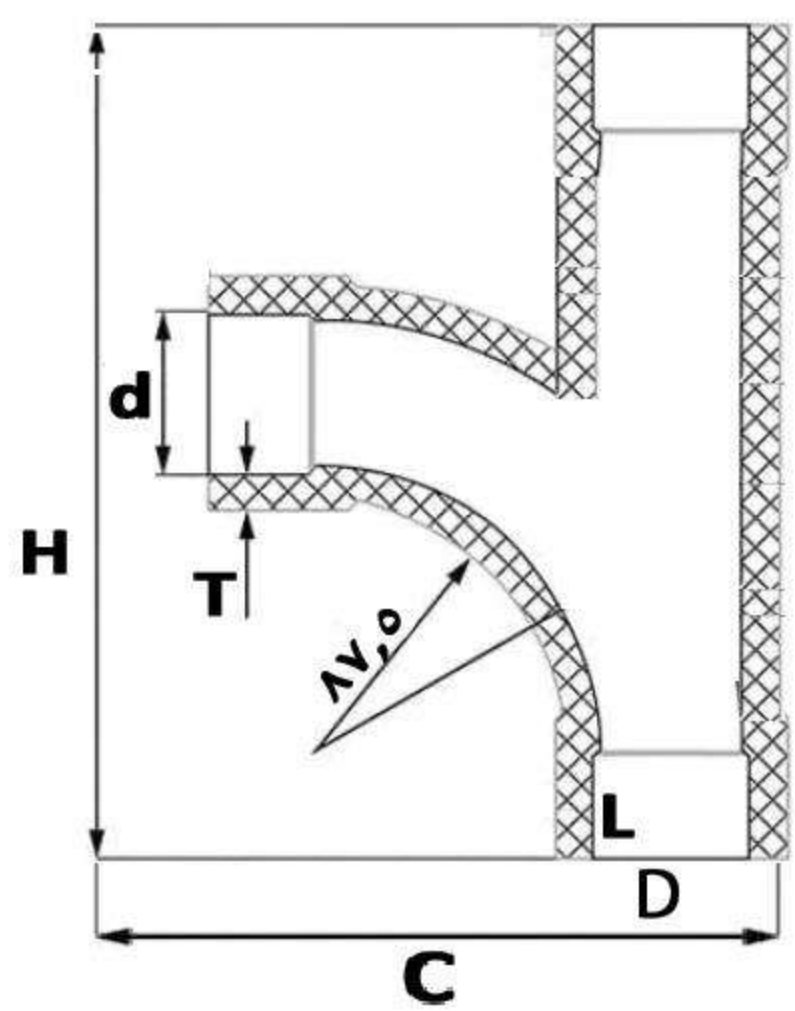
Size	d1	D1	L1	T1	d2	D2	L2	T2	H	C	SW	RP	R
25*20	24.2	36.1	17.9	6.1	36.9	37.9	26.1	5.2	48.5	73.1	16.8	14.7	0.5

Elbow 87.5 long



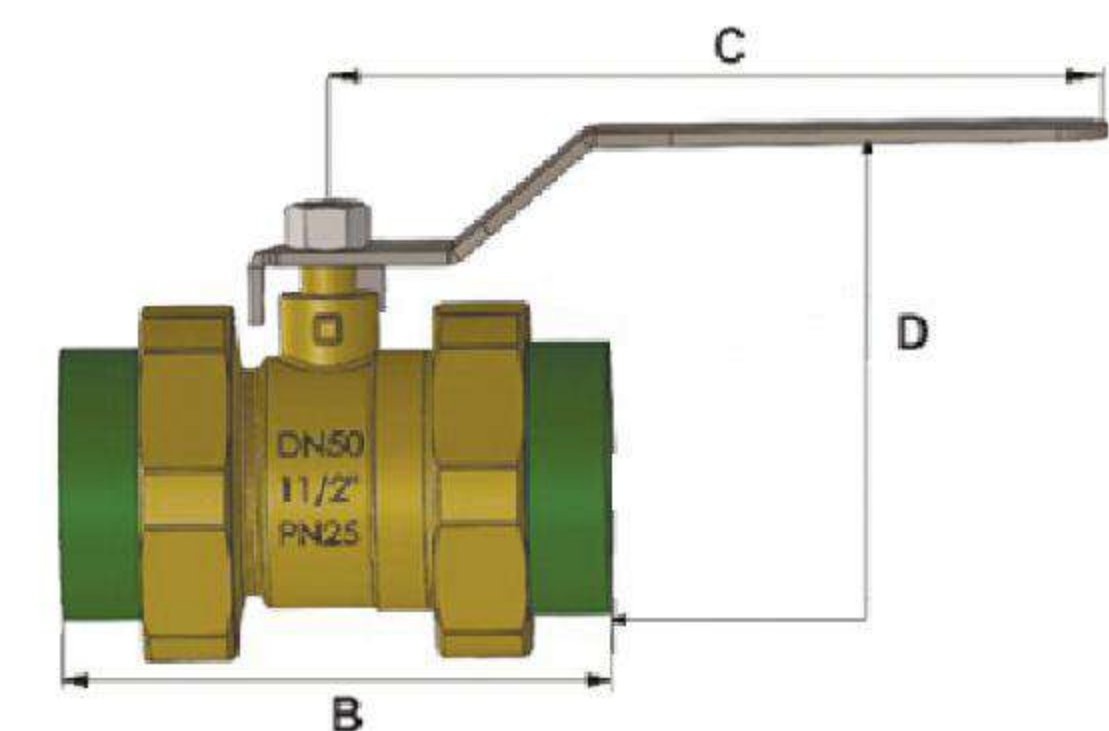
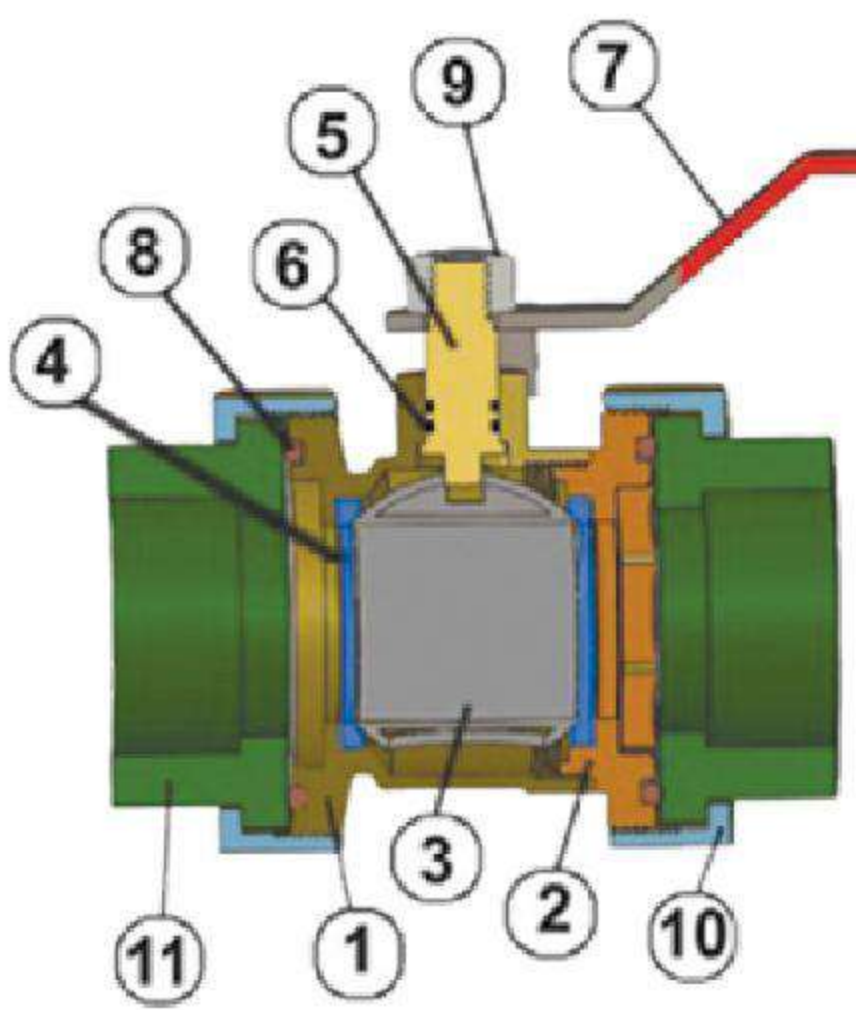
Size	d	D	H	C	L	T
25	23.9	35.5	80.8	83.4	18.3	5.8
32	30.4	42.8	98.8	100.3	20.2	7.3

Tee 87.5 long



Size	d	D	H	C	L	T
25	24.2	34.3	98.2	82.5	16.8	5.7
32	30.5	42.4	155.9	98.2	19.6	7.2

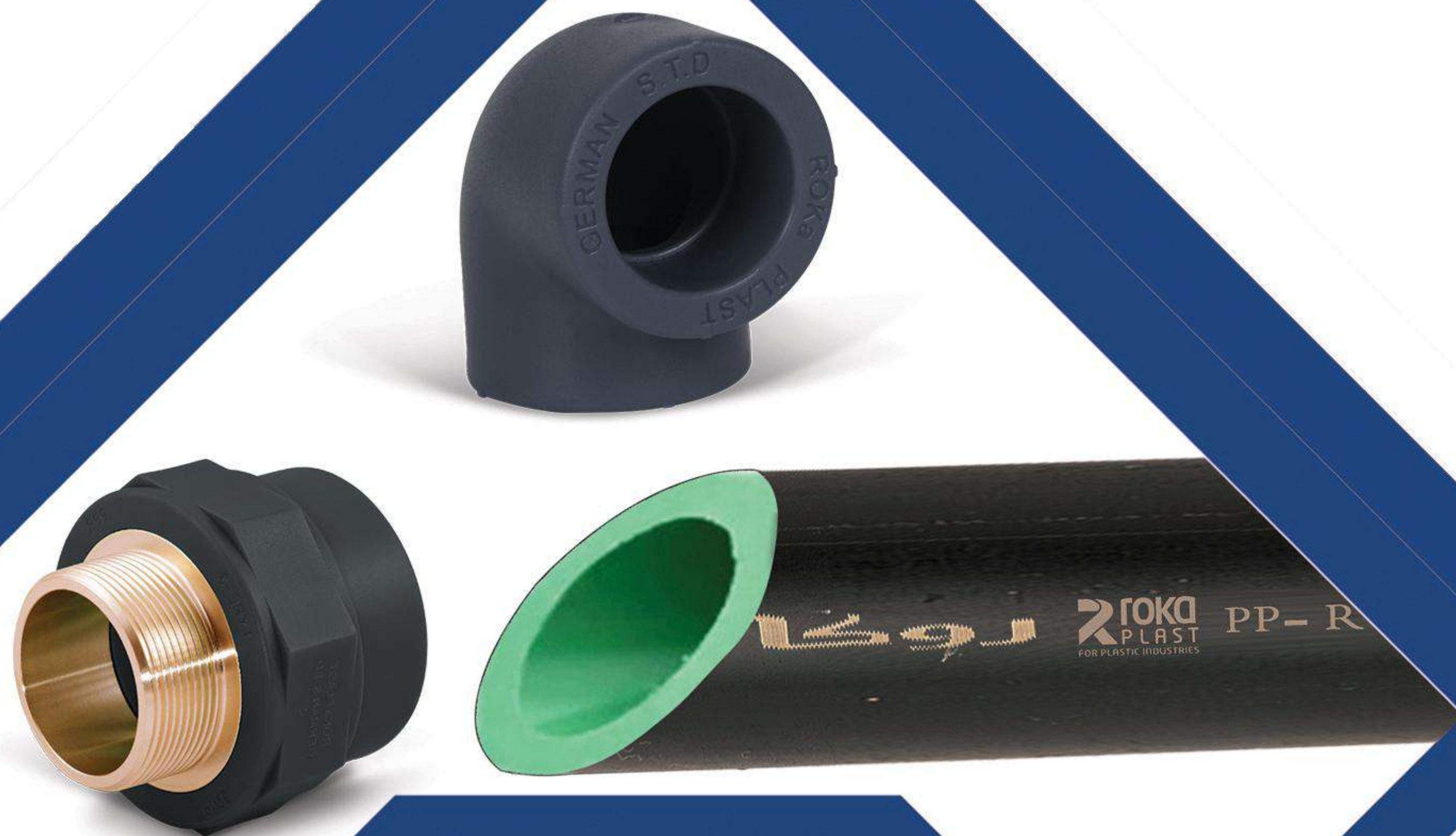
Ball Valve



Items	PCs	Materials
1 Body	1	Brass OT58 UNI 5705
2 End Connectic	1	Brass OT58 UNI 5705
3 Ball	1	Brass OT58 UNI 5705
4 Ball Seal	2	Virgin P.T.F.E
5 Stem	1	Brass OT58 UNI 5705
6 Stem O-Ring	2	NBR 70 SH A
7 Steel Handle	1	Plated Steel / Zinc
8 O-Ring	2	Silica Gel
9 Screw	1	Brass / Stainless
10 Union Cap	2	Brass OT58 UNI 5705
11 PPR Connecti	2	PPR

Size	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
DN	20	25	32	40	50	63	75	90	110
B (mm)	79.0	94.7	115.3	121.0	126.2	150.4	164.0	188.0	218.0
C (mm)	93.0	115.6	136.6	127.0	141.9	173.3	108.0	220.0	270.0
D (mm)	51.0	73.3	78.0	93.0	106.6	126.1	144.0	160.0	182.0
PN (bar)	25	25	25	25	25	25	25	25	25

UV-Resistant System



ROKA
PLAST

UV-Resistant system

Rokaplast PP-R/ PP-RCT for Outdoor Applications – UV-Resistant system for warm and cold water supply While the green PP-R pipes and fittings are designed to be used indoor, we developed an ultraviolet resistant water supply system to avoid the corrosion of the plumbing system under high temperatures and all weather conditions that might affect it.

Rokaplast – UV pipes consist of well-established four layers;

1. The first-outer layer is coated with a black UV-resistant material to ensure pipe long-term durability and prevent PP-R material from expansions and deformities.
2. The second layer of PP-R Polypropylene Copolymer, which is ideally integrated within the pipe structure to retain high water flow.
3. The unique third layer of absolute fiber/aluminum provides high rigidity and stability that prevents outside air from infiltration into the pipe.
4. The forth-inner layer is made of PP-R where the smooth surface is in direct contact with hot and cold water to guarantee you a safer and better way of water transportation.

Advantages of Black UV Pipes:

- Linear expansion coefficient is only 2030%- of ordinary PP-R pipe, completely resolves the stretching problem of common plastic pipe.
- Enhances pipe rigid, prevents droop down phenomenon, and also reduces the density and number of supporting points, thus cuts down the total cost of installation.
- Higher pressure-resistant level and longer working life under usual vibration.
- Better high-temperature resistance, and obvious energy-saving effect; used in water heating system, the normal temperature is up to 95100- degrees, it not only increases the medium temperature.
- Solves the oxygen permeability of the pipeline, the inner surface is non-toxic, fine sealing, and sphagnum will not appear. The middle layer of the pipe completely prevents outside air from infiltration into pipe inside, thereby inhibits algae growth, and maintains fresh pure water.

Note: All **Rokaplast** UV fittings are injected with UV-resistant material to ensure long-term durability

PP-R Pipes with UV resistance

PP-R Pipes with UV resistance / outdoor water supply solutions

Material: PP-R with integrated fiber reinforced layer and external UV layer

Pipes Series: SDR6/S2.5

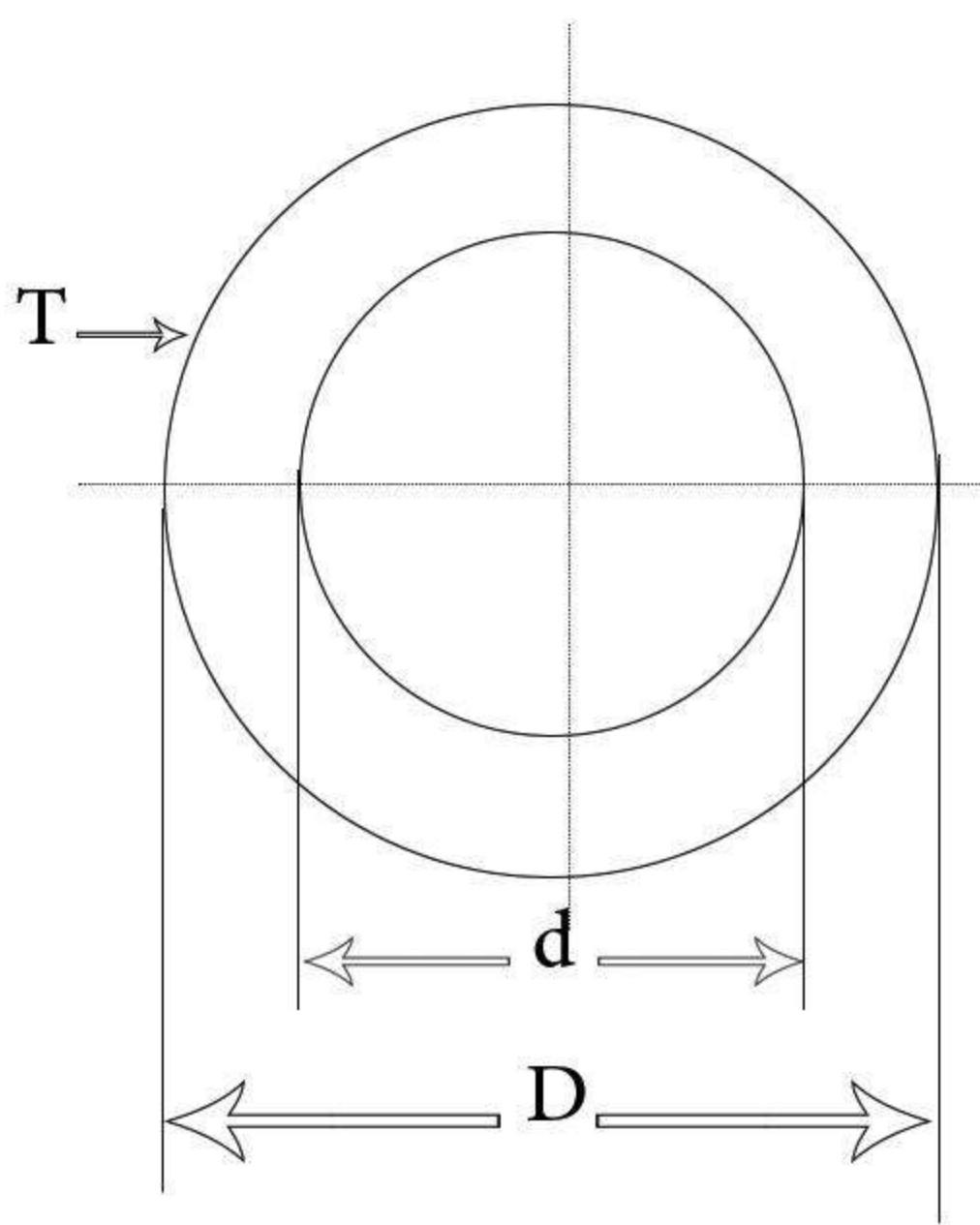
Standard: DIN 8077/DIN8078, DIN EN ISO 15874

Color: internal layer is green and outer layer is black.

Pipe: black pipes with laser labelling system

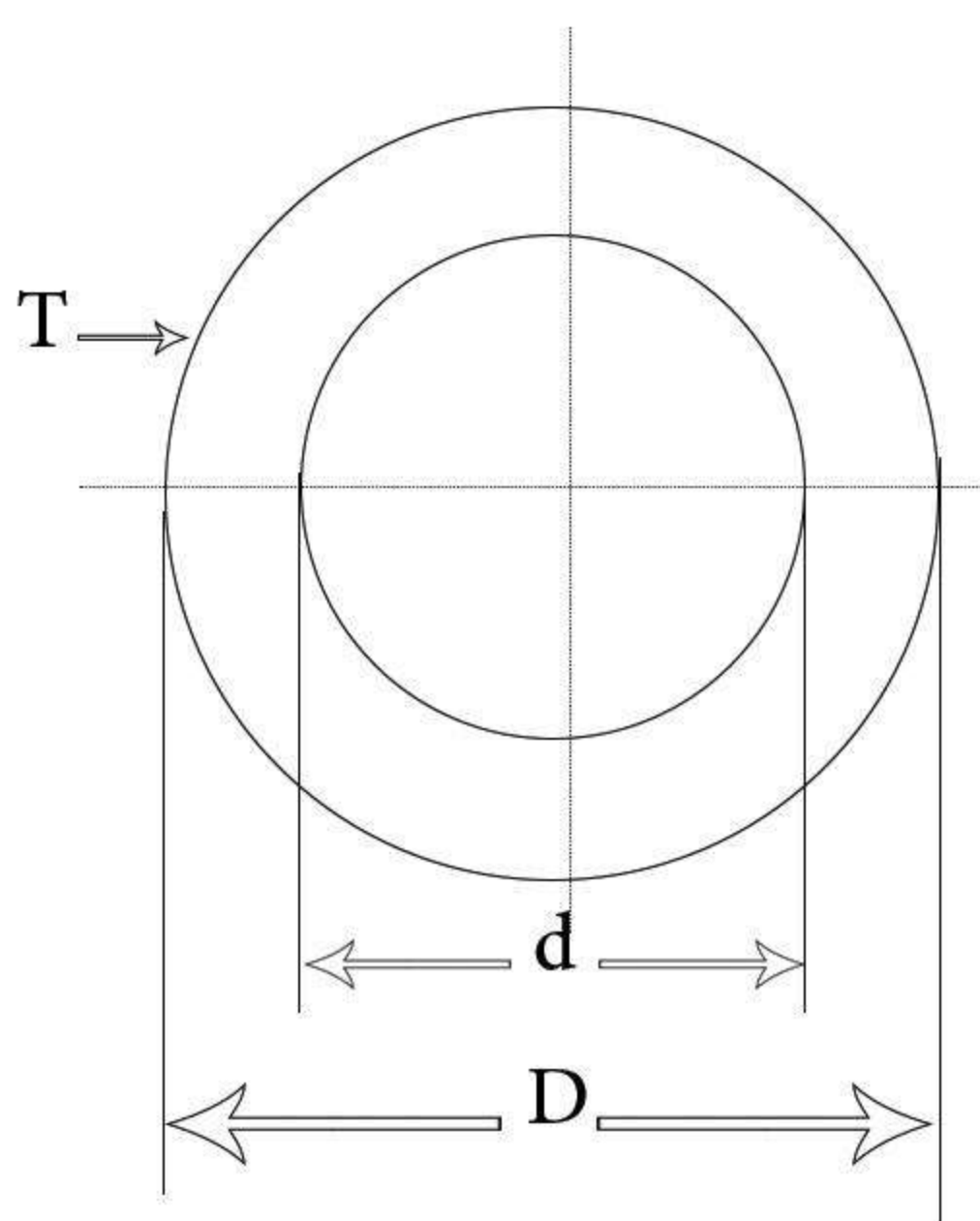


Multilayer pipes with fiber Reinforced UV in Black PN 20 SDR



Size	d	D	T	Water Capacity Lit/m	Kg/m	M/bag
20mm	13.2	20	3.4	0.187	0.137	100
25mm	16.6	25	4.2	0.216	0.216	100
32mm	21.2	32	5.4	0.451	0.353	60
40mm	26.6	40	6.7	0.711	0.637	40
50mm	33.4	50	8.3	1.068	0.988	32
63mm	42.0	63	10.5	1.695	1.336	20
75mm	50.0	75	12.5	2.404	1.963	4
90mm	60.0	90	15.0	3.452	2.827	4
110mm	73.0	110	18.3	5.148	4.094	4

Multilayer pipes with fiber Reinforced UV in Black PN16 SDR 6

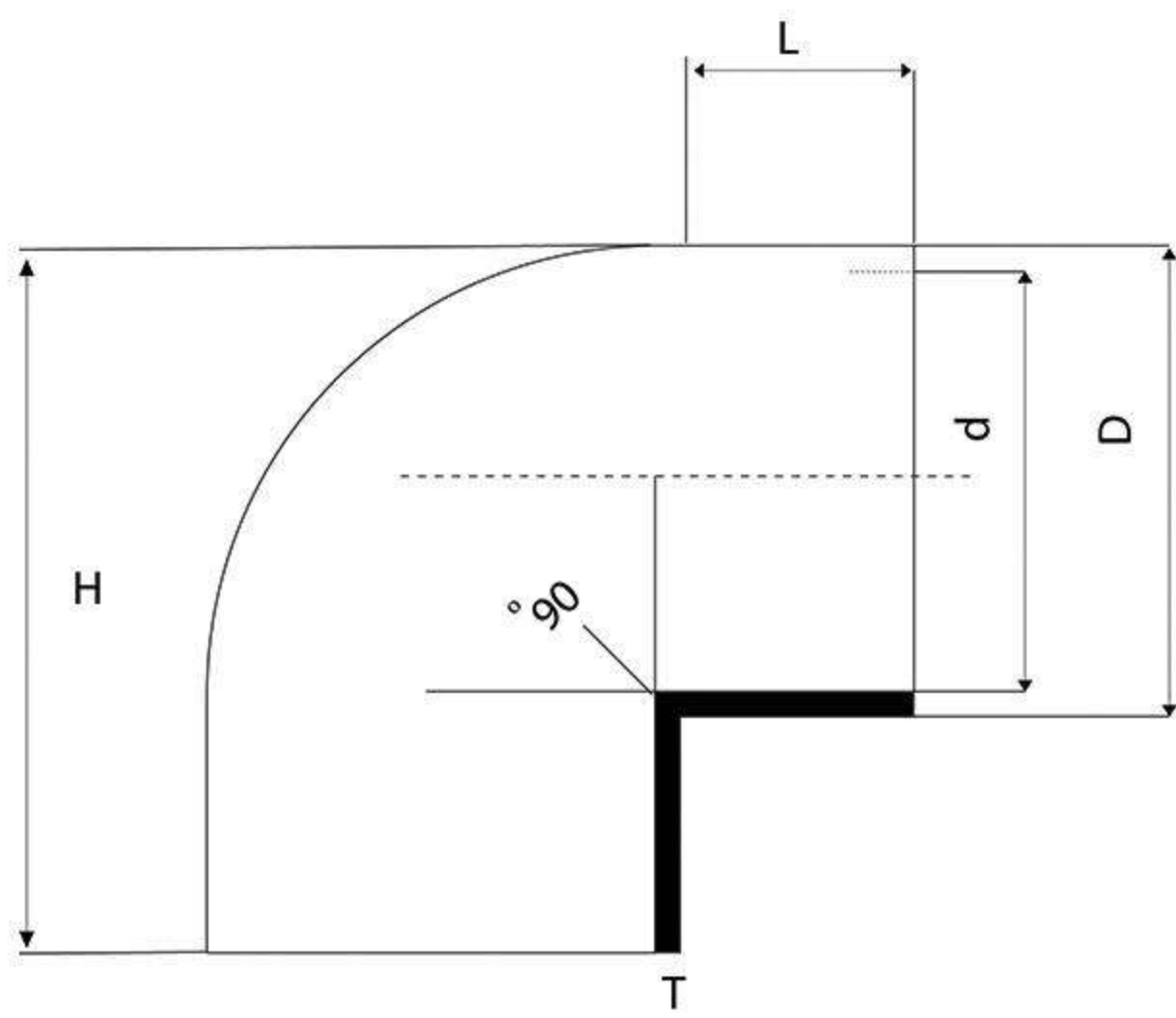


Size	d	D	T	Water Capacity Lit/m	Kg/m	M/bag
20mm	14.4	20	2.8	0.163	0.160	100
25mm	18.0	25	3.5	0.254	0.242	100
32mm	23.2	32	4.4	0.415	0.392	60
40mm	29.0	40	5.5	0.660	0.597	40
50mm	36.2	50	6.9	1.029	0.949	32
63mm	45.8	63	8.6	1.649	1.434	20
75mm	54.4	75	10.3	2.323	2.127	4
90mm	65.4	90	12.3	3.358	2.956	4
110mm	79.8	110	15.1	4.999	4.320	4

PP-R Fitting with UV resistance

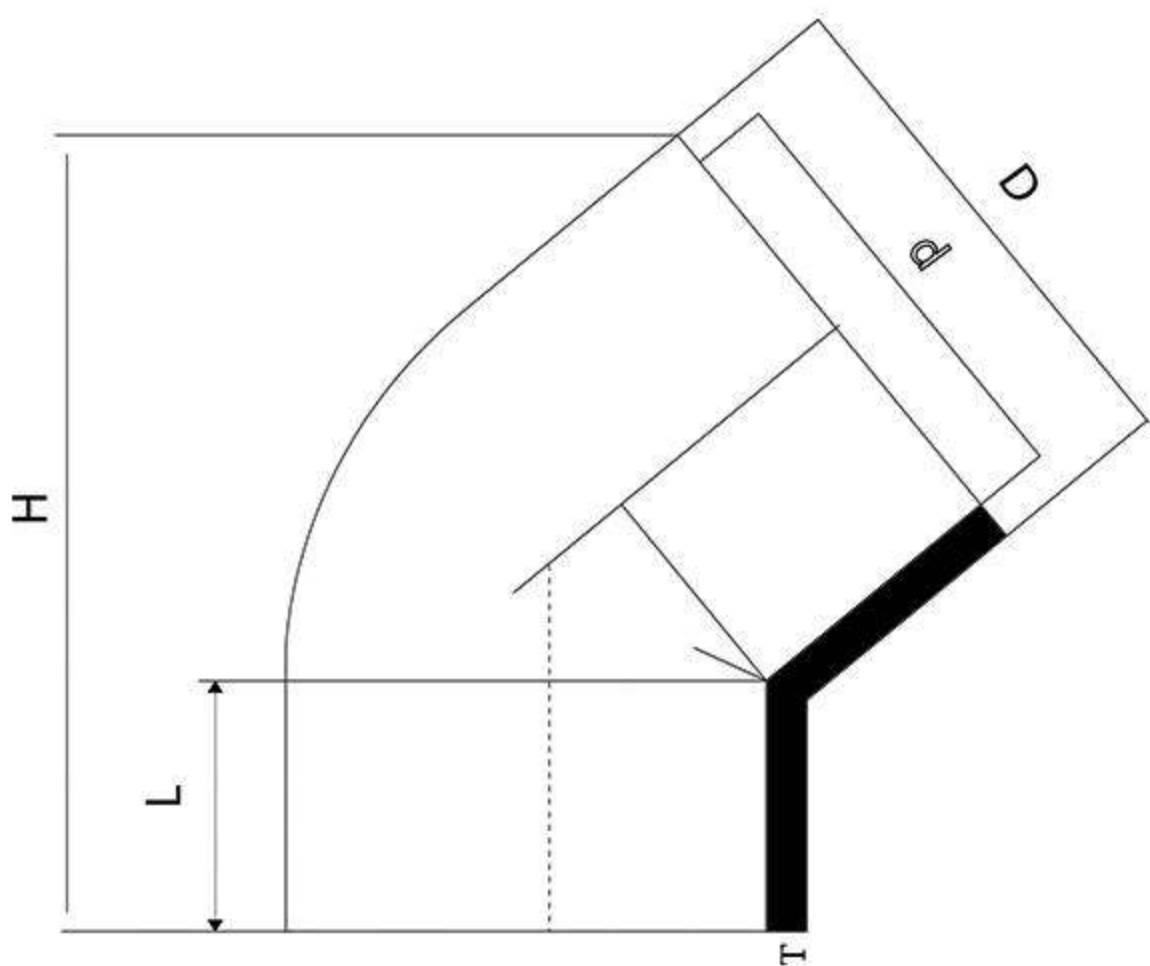
PP-R Fittings with UV resistance / outdoor water supply

Elbow90



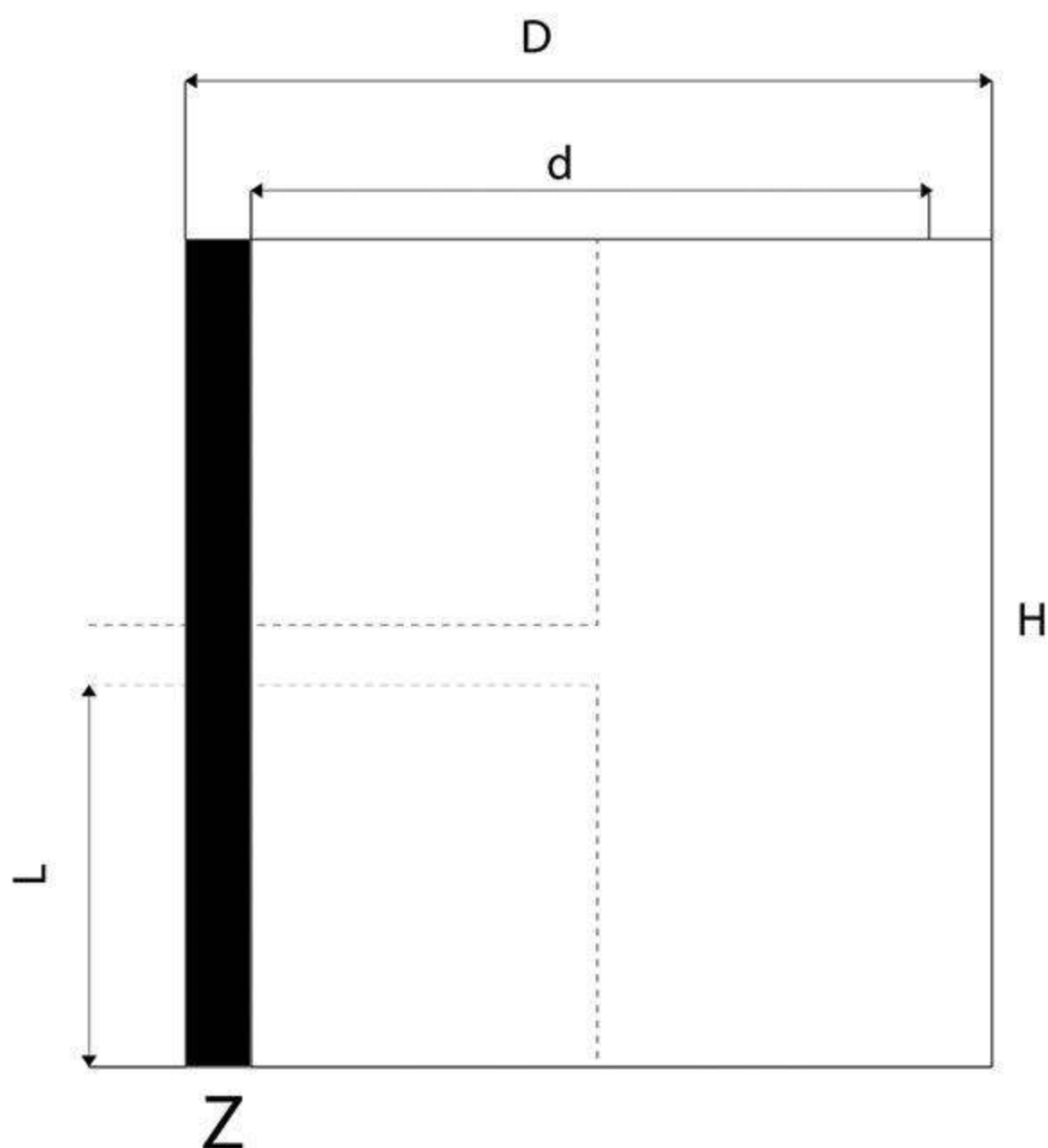
Size	d	D	H	L	T
20	19.0	30.3	42.5	16.2	5.5
25	23.6	31.3	49.3	18.4	6.0
32	31.0	44.3	59.2	19.6	6.6
50	49.2	67.2	87.2	24.2	9.3
63	61.7	82.2	103.4	27.4	9.9
75	74.2	95.5	117.6	31.4	10.8
90	88.1	113.8	136.0	34.0	12.9
110	107.2	138.0	166.0	42.0	15.0

Elbow45



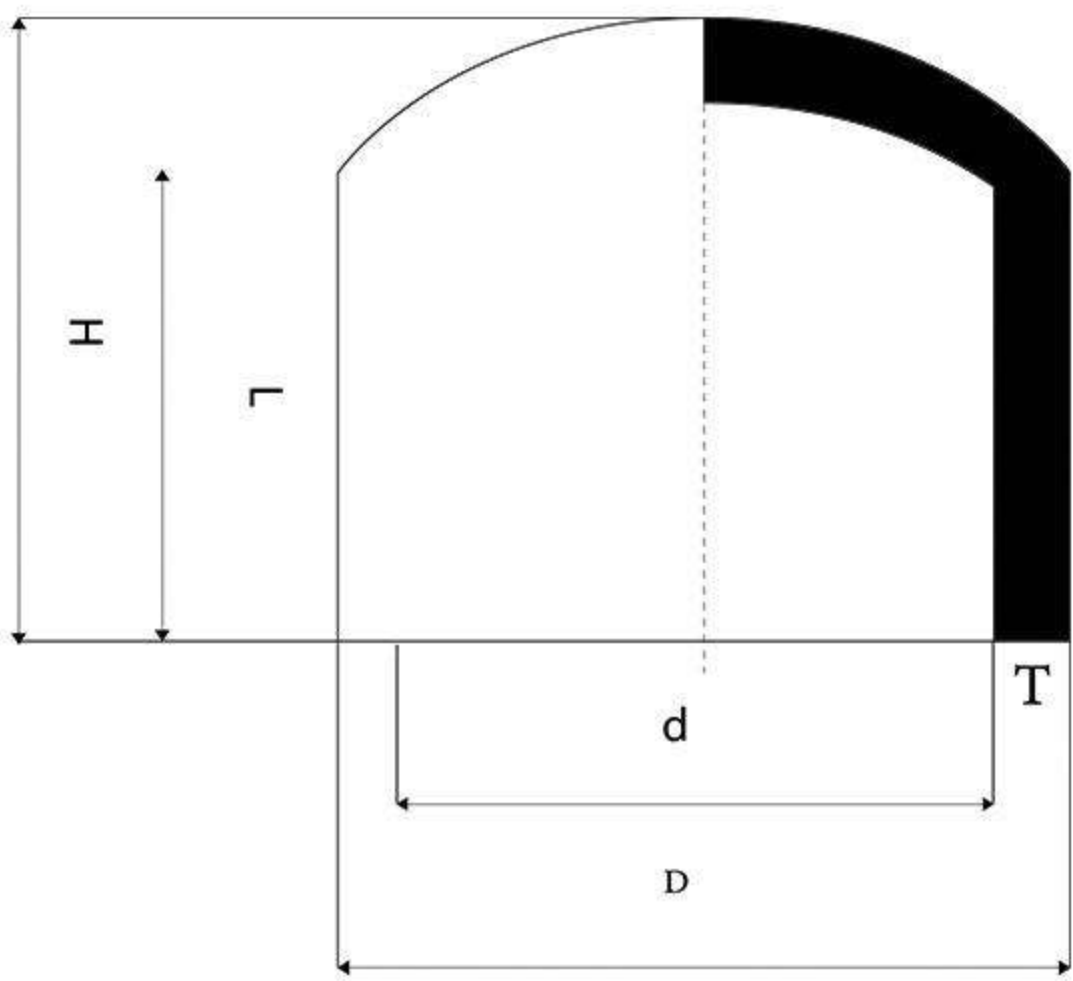
Size	d	D	H	L	T
25	24.4	36.6	49.8	15.9	5.9
32	31.3	45.5	61.3	20.1	7.1
50	49.2	67.4	87.1	24.1	9.0
63	61.5	81.9	102.6	27.0	10.8

Socket



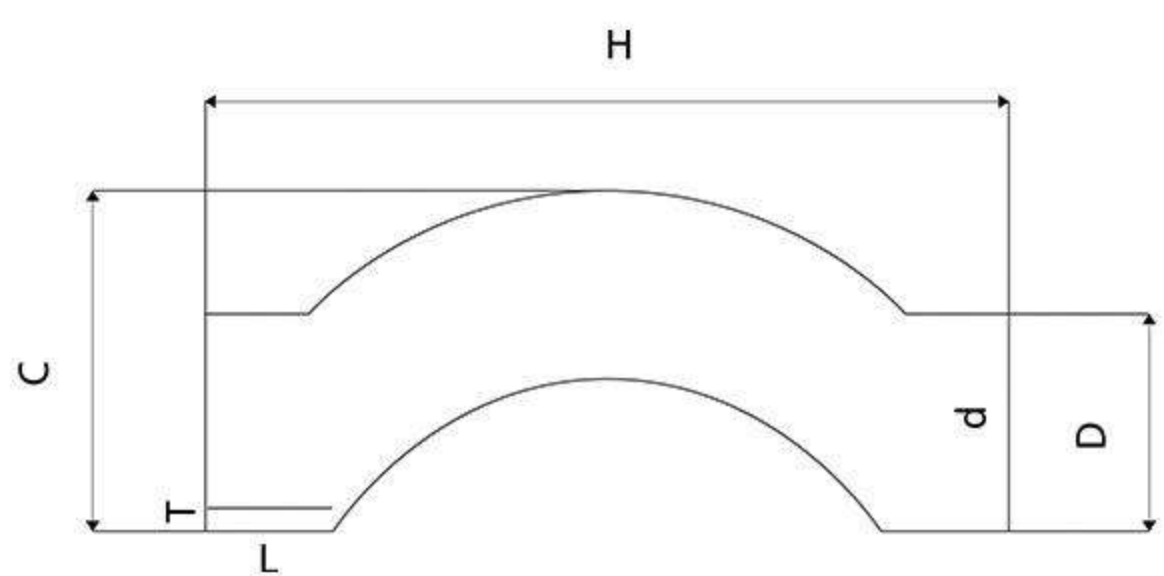
Size	d	D	H	L	T
20	19.2	30.2	34.3	16.3	5.5
25	24.3	36.2	37.1	17.6	6.5
32	30.9	45.3	43.3	20.2	7.2
50	48.0	66.3	55.2	24.3	9.1
63	61.8	81.6	62.9	27.7	10.1
75	73.6	95.5	68.2	31.7	11.0
90	87.7	115.1	76.6	35.3	13.9
110	105.7	135.7	90.0	39.8	15.5

Cap



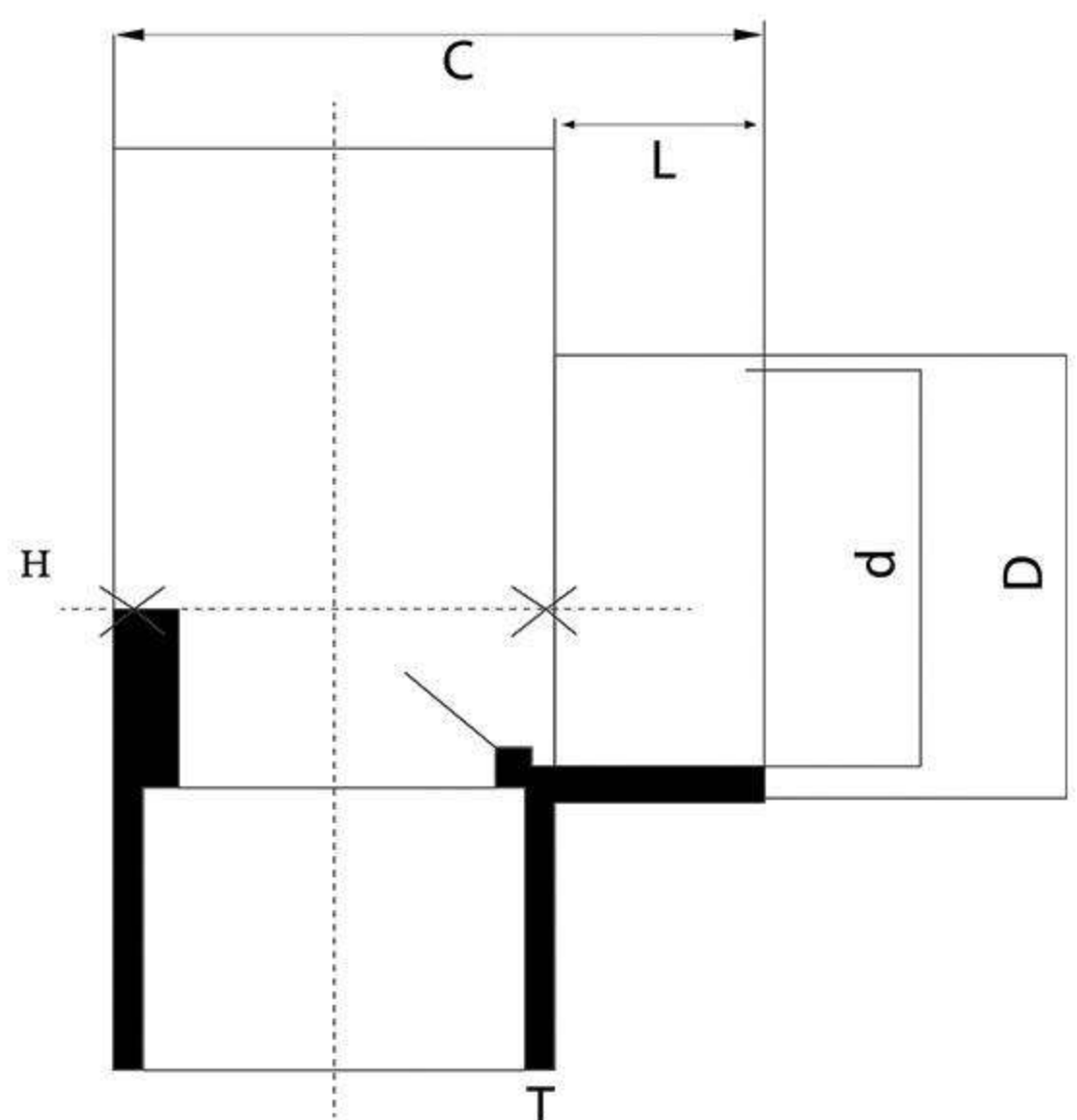
Size	d	D	H	L	T
20	19.0	29.5	24.8	18.3	5.0
25	23.9	36.0	26.6	16.6	6.1
32	31.2	44.6	30.4	20.3	6.5
50	49.3	67.2	41.5	28.5	9.0
63	61.2	81.9	50.6	28.2	10.4

Crossover 2 Socket



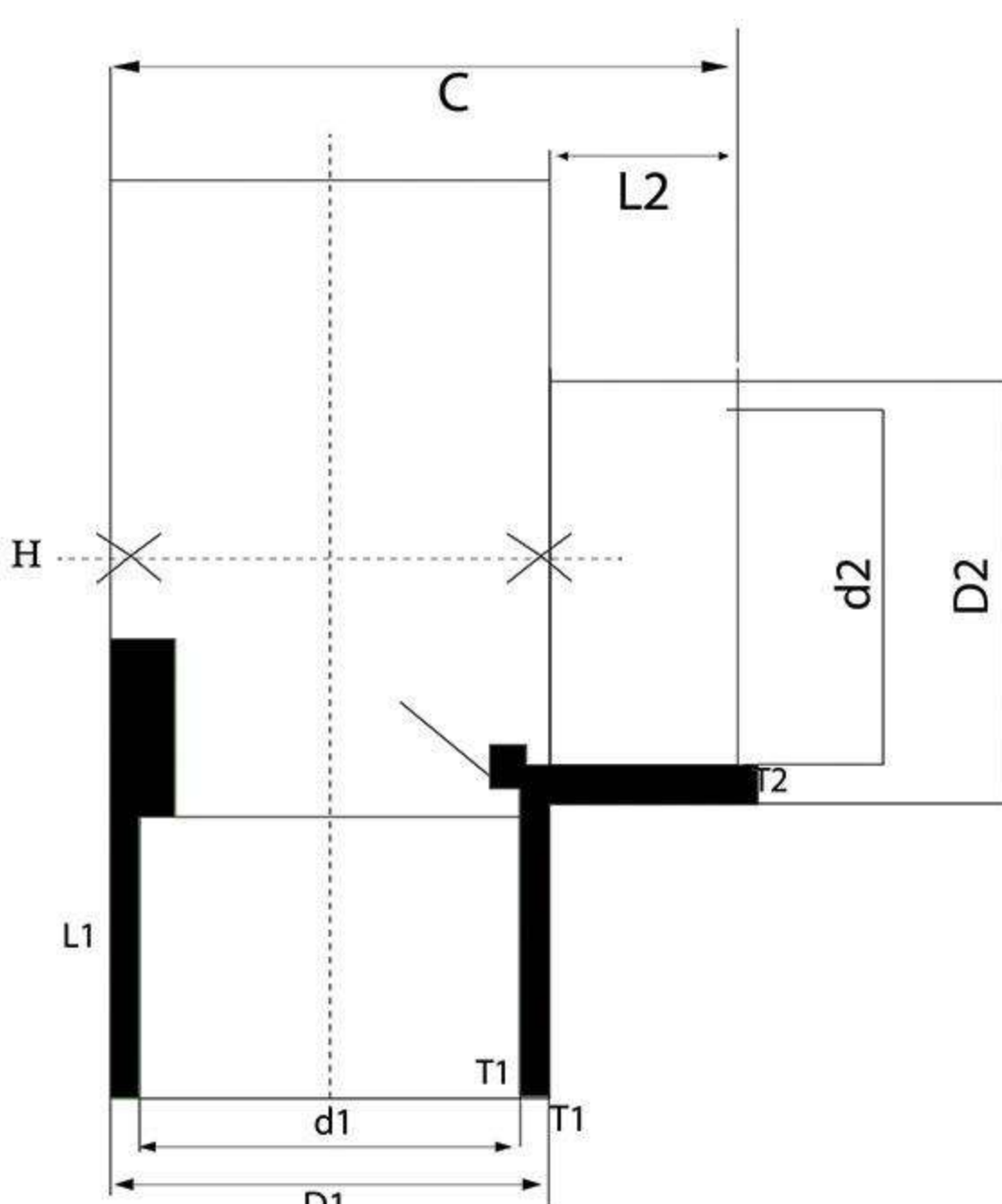
Size	d	D	H	C	L	T
25	23.9	36.4	116.7	54.6	17.7	7
32	30.5	45.0	129.3	62.2	20.2	7

Tee90



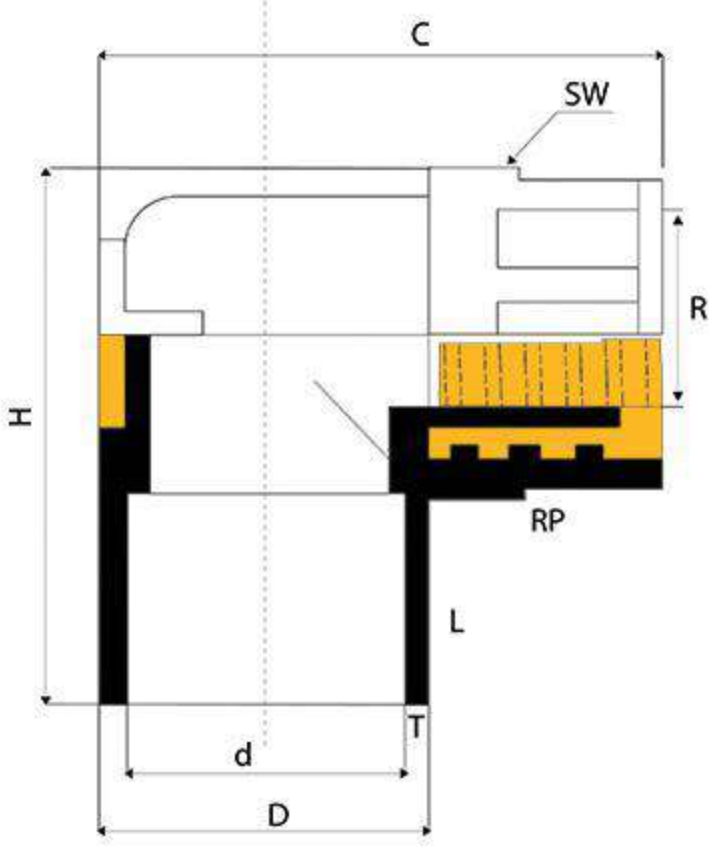
Size	d	D	H	C	L	T
20	19.1	29.9	53.5	41.5	16.6	5
25	23.9	36.3	63.6	49.2	17.4	6
32	31.0	45.3	74.5	60.0	20.0	7
50	48.8	66.1	106.1	85.4	25.0	9
63	61.2	81.8	126.5	100.8	27.5	11
75	72.3	95.8	143.1	116.1	31.2	12
90	86.4	114.9	163.0	137.2	35.0	15
110	106.2	137.4	196.0	166.0	41.4	16

Tee Reduced



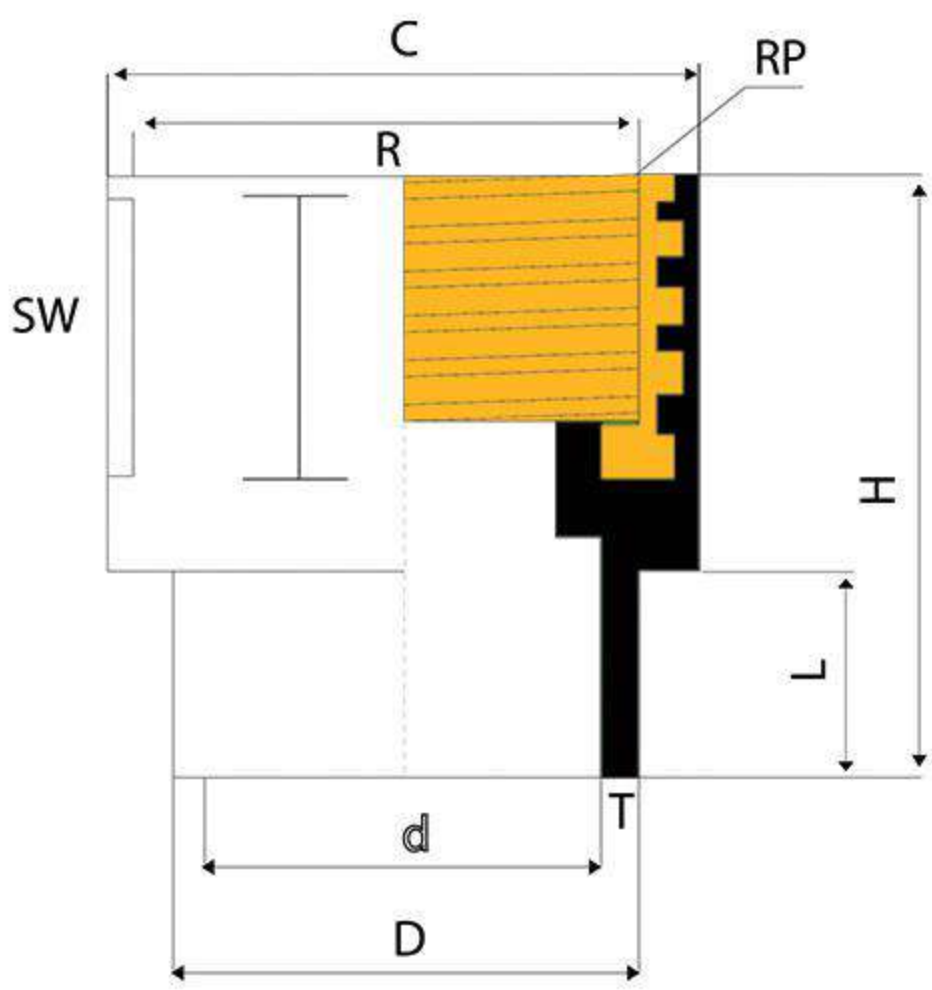
Size	d1	D1	d2	D2	H	C	L1	T1	L2	T2
25*20	23.9	36.0	18.3	29.7	63.4	47.2	17.8	6.0	15.6	6.0
32*25	31.0	45.2	23.6	36.8	74.6	55.7	20.4	7.3	16.3	7.0
32*20	30.8	45.0	18.7	30.0	79.5	55.4	20.0	7.3	15.8	6.0
50*25	49.2	67.0	23.5	36.0	89.2	80.5	26.0	9.5	18.5	6.1
50*32	48.7	66.5	30.8	45.4	88.6	79.6	25.0	9.0	20.6	7.5
63*32	60.9	82.2	29.6	82.0	127.0	101.9	27.3	10.9	19.3	26.0
75*63	73.0	95.5	62.0	82.6	119.0	114.6	31.4	11.3	28.2	10.2
90*63	88.0	114.2	61.7	82.6	136.5	135.2	35.0	13.0	27.0	10.5
90*75	89.2	115.1	74.0	96.9	154.0	137.0	35.3	13.3	31.6	11.2
110*90	106.5	138.4	61.0	114.5	183.0	162.0	42.0	16.1	16.1	16.9

Elbow90 Female Threaded



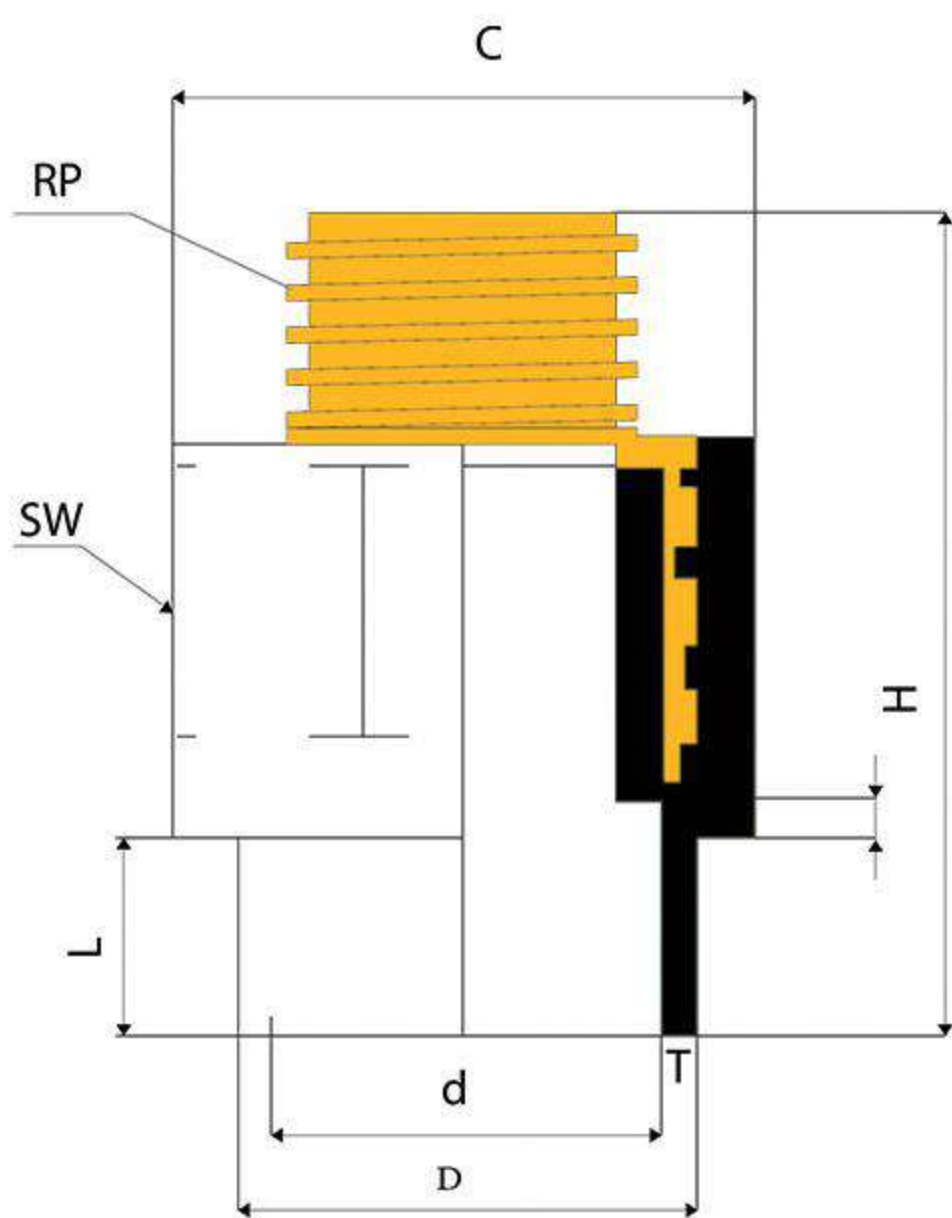
Size	d1	D1	L1	T1	d2	D2	L2	T2	H	C	SW	RP	R
20*20	19.0	29.9	16.6	5.5	26.7	37.5	26.1	4.7	71.4	48.5	19.0	13.4	0.5
25*20	24.2	36.2	18.0	6.0	26.8	37.4	26.3	4.5	75.6	54.7	19.0	13.4	0.5
25*25	24.2	36.0	18.1	6.1	31.0	44.8	28.1	6.3	75.5	55.5	20.0	17.6	0.8
32*25	30.9	45.3	19.8	7.3	31.7	44.9	28.1	6.9	80.0	63.4	20.0	17.6	0.8
32*20	30.5	45.3	20.0	7.2	27.6	37.9	20.2	4.7	67.7	65.0	19.0	13.4	0.5

Socket Female Threaded



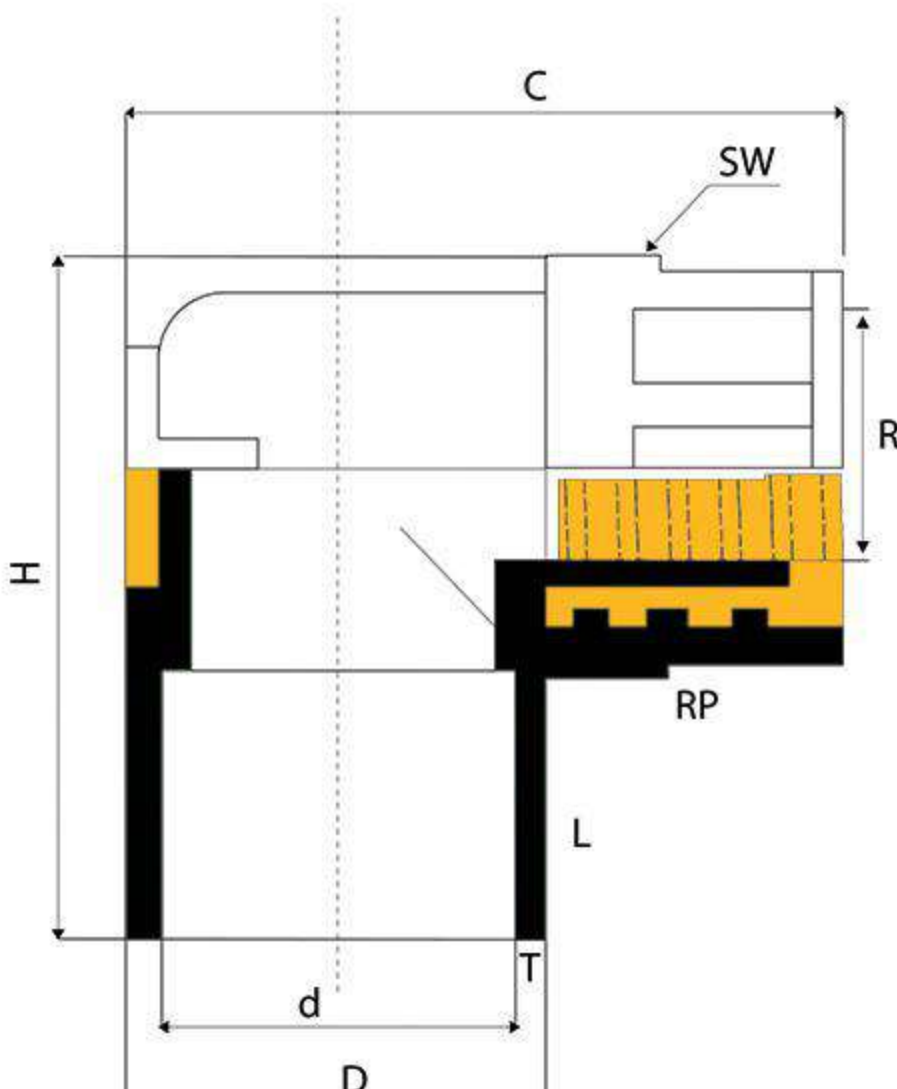
Size	d	D	L	T	H	C	SW	RP	R
20*20	19.2	30.0	15.5	5.5	39.3	37.4	19.0	13.4	0.5
25*20	24.1	36.1	18.3	6.2	34.2	37.5	19.0	13.4	0.5
25*25	24.1	36.1	18.5	6.0	43.8	45.5	20.0	17.6	0.8
32*1	31.2	45.5	20.5	7.3	48.6	55.2	24.0	20.8	1.0
50*50	67.5	47.7	24.0	9.6	60.2	73.8	25.1	19.0	1.5
63*2	60.3	82.0	28.2	10.3	61.4	91.2	32.3	24.8	2.0
75*2.5	73.2	98.9	32.7	13.1	79.5	112.9	31.2	21.2	2.5
90*3	87.7	114.6	35.0	13.2	80.0	127.0	40.0	25.5	3.0

Socket Male Threaded



Size	d	D	L	T	H	C	SW	RP	R
20*20	19.1	29.7	16.1	5.4	54.1	36.9	16.8	14.7	0.5
25*20	24.2	35.8	17.8	6.2	56.0	37.5	16.8	14.7	0.5
25*25	24.2	35.8	18.1	6.2	63.7	44.8	20.2	15.5	0.8
32*1	31.1	44.9	20.0	7.3	66.4	55.3	21.9	17.9	1.0
50*50	48.5	67.4	24.1	9.7	82.8	74.1	17.9	21.1	1.5
63*2	61.2	81.9	27.8	10.8	94.5	86.4	56.6	24.0	2.0
90*3	88.3	117.7	35.6	13.4	110.3	126.5	74.1	30.0	3.0
110*4	107.2	138.8	42.2	15.5	128.5	152.3	90.5	31.4	4.0

Tee Female Threaded



Size	d1	D1	L1	T1	d2	D2	L2	T2	H	C	SW	RP	R
20*20	19.0	29.9	16.6	5.5	26.7	37.5	26.1	4.7	71.4	48.5	19.0	13.4	0.5
25*20	24.2	36.2	18.0	6.0	26.8	37.4	26.3	4.5	75.6	54.7	19.0	13.4	0.5
25*25	24.2	36.0	18.1	6.1	31.0	44.8	28.1	6.3	75.5	55.5	20.0	17.6	0.8
32*25	30.9	45.3	19.8	7.3	31.7	44.9	28.1	6.9	80.0	63.4	20.0	17.6	0.8
32*20	30.5	45.3	20.0	7.2	27.6	37.9	20.2	4.7	67.7	65.0	19.0	13.4	0.5

Chemical Resistance

- **Product features .**

resistance values have been determined through internal pressure tests, at various temperature intervals: 20, 40, 60, 80, 95, 120 °C. A logarithmic graphic representation shows the comparative tensions, the lifetime (in years), and the regression curves at various temperatures according to the DIN 8078 standard. See (fig. A)

- **Advantages of Rokaplast Piping System.**

Rokaplast provides all the necessary parts, for a complete and easy installation, from the beginning to the end, saying goodbye to the conventional problems of the past. It is guaranteed to feel and see the difference with the Rokaplast piping system.

Rokaplast. is manufactured with Superior German quality. Rokaplast is made of corrosion resistant material, putting an end to old corrosion complications. Enjoy some serenity and peacefulness with Rokaplast because it is not as noisy as metal pipes. Unlike the alternatives, Rokaplast is made of opaque polypropylene, which is a nonpolluting material, preventing algae from growing.

Selected Chemical-Resistance Classification Data for PP According to ISO/TR 10358

Concentration and / or purity of the fluid	Dil Sol. Dilute aqueous solution at a concentration equal to or less than 10%
	Sol. Aqueous solution at a concentration higher than 10% but not saturated
	Sat Sol. Saturated aqueous solution, prepared at 20°C
	tg At least technical grade purity
	tg-s Technical grade, solid tg-l Technical grade, liquid
	tg-g Technical grade, gas
	Work Sol. Working solution of the concentration usually used in the industry concerned.
	Susp. Suspension of solid in a saturated solution at 20°C
Chemical resistance	S Satisfactory resistance The pipes can be used for applications in which they are not subjected to pressure or other stresses; for applications in which they are exposed to pressure, the final assessment shall be on the basis of subsequent test under pressure.
	L Limited resistance The pipes can be used for applications in which they are not subjected to pressure or other stresses, but in which a certain amount of corrosion can be accepted; for applications in which they are exposed to pressure, the final assessment shall be on the basis of subsequent test under pressure.
	NS Resistance not satisfactory The pipes are seriously attacked: they shall not be used for either pressure or non-pressure applications. There is no point in conducting tests under pressure as the pipes would be certain to fail these tests.

- Keys for chemical resistance table

Chemical Resistance Guide

Chemical	Formula	Conc.	Temp.	uPVC	PP	Chemical	Formula	Conc.	Temp.	uPVC	PP
		(%)	(°C)	-	-			(%)	(°C)	-	-
ACETALDEHYDE	CH3CHO	100	25	3	2	AMMONIA	NH3	deb	25	1	1
		-	60	3	-	- AQUEOUS SOLUTION		-	60	2	-
		-	100	-	-			-	100	-	-
- AQUEOUS SOLUTION		40	25	3	1			sat	25	1	1
		-	60	3	2			-	60	2	-
		-	100	-	-			-	100	-	-
ACETIC ACID	CH3COOH	≤25	25	1	1	- DRY GAS		100	25	1	1
		-	60	2	1			-	60	1	1
		-	100	-	1			-	100	-	-
		30	25	1	1	- LIQUID		100	25	2	1
		-	60	2	1			-	60	3	1
		-	100	-	1			-	100	-	-
		60	25	1	1	AMMONIUM	CH3COONH4	sat	25	-	1
		-	60	2	1	- ACETATE		-	60	2	1
		-	100	-	2			-	100	-	-
		80	25	1	1	- CARBONATE	(NH4)2CO3	all	25	1	1
		-	60	2	3			-	60	2	1
		-	100	-	3			-	100	-	-
- GLACIAL		100	25	2	1	- CHLORIDE	NH4Cl	sat	25	1	1
		-	60	3	2			-	60	1	1
		-	100	-	3			-	100	-	2
ACETIC ANHYDRIDE	(CH3CO)2O	100	25	3	1	- FLUORIDE	NH4F	25	25	1	1
		-	60	3	2			-	60	2	1
		-	100	-	3			-	100	-	-
ACETONE	CH3COCH3	10	25	3	1	- HYDROXIDE	NH4OH	28	25	-	1
		-	60	3	3			-	60	2	1
		-	100	-	3			-	100	-	-
		100	25	3	1	- NITRATE	NH4NO3	sat	25	1	1
		-	60	3	3			-	60	1	1
		-	100	-	3			-	100	-	1
ACETOPHENONE	CH3COC6H5	nd	25	-	1	- PHOSPHATE DIBASIC	NH4(HPO4)2	all	25	1	1
		-	60	-	3			-	60	1	1
		-	100	-	-			-	100	-	-
ACRYLONITRILE	CH2CHCN	technically pure	25	-	1	- PHOSPHATE META	(NH4)4P4O12	all	25	1	1
		-	60	3	1			-	60	1	1
		-	100	-	-			-	100	-	-
ADIPIC ACID	(CH2CH2CO2H)2	sat.	25	1	1	- PHOSPHATE TRI	(NH4)2HPO4	all	25	1	1
- AQUEOUS SOLUTION		-	60	2	1			-	60	1	1
		-	100	-	-			-	100	-	-
ALLYL ALCOHOL	CH2CHCH2OH	96	25	2	1	- PERSULPHATE	(NH4)2S2O8	all	25	1	1
		-	60	3	1			-	60	1	-
		-	100	-	1			-	100	-	-
ALUM	Al2(SO4)3.K2SO4.nH2O	dil	25	1	1	- SULPHIDE	(NH4)2S	deb	25	1	1
- AQUEOUS SOLUTION		-	60	2	1			-	60	2	1
		-	100	-	-			-	100	-	-
	Al2(SO4)3.K2SO4.nH2O	sat	25	-	1			sat	25	1	1
		-	60	2	1			-	60	1	1
		-	100	-	-			-	100	-	-
ALUMINIUM	AlCl3	all	25	1	-	- SULPHYDRATE	NH4OHSO4	dil	25	1	1
- CHLORIDE		-	60	1	-			-	60	2	1
		-	100	-	-			-	100	-	-
- FLUORIDE	AlF3	100	25	1	-			sat	25	1	1
		-	60	1	-			-	60	1	1
		-	100	-	-			-	100	-	-
- HYDROXIDE	Al(OH)3	all	25	1	-	AMYLACETATE	CH3CO2CH2(CH2)3CH3	100	25	3	2
		-	60	1	-			-	60	3	-
		-	100	-	-			-	100	-	-
- NITRATE	Al(NO2)3	nd	25	1	-	AMYLALCOHOL	CH3(CH2)3CH2OH	nd	25	1	1
		-	60	1	-			-	60	2	1
		-	100	-	-			-	100	-	1
- SULPHATE	Al(SO4)3	deb	25	1	1	ANILINE	C6H5NH2	25	25	3	1
		-	60	1	1			-	60	-	-
		-	100	-	-			-	100	3	1
		sat	25	1	1			-	100	-	-
		-	60	1	1	- CHLORHYDRATE	C6H5NH2HCl	25	25	2	2
		-	100	-	2			-	60	-	-
									100	3	2
									100	-	3

Class 1: High Resistance Class 2: Limited Resistance Class 3: No Resistance.

Chemical Resistance Guide

Chemical	Formula	Conc.	Temp.	uPVC	PP	Chemical	Formula	Conc.	Temp.	uPVC	PP
		(%)	(°C)	-	-			(%)	(°C)	-	-
CARBON	CO2	-	-	25	1	CHLOROSULPHONIC	ClHSO3	-	100	25	3
- DIOXIDE		-	-	60	1	ACID		-	-	60	3
AQUEOUS SOLUTION		-	-	100	-			-	-	100	-
- GAS		-	100	25	1	CHROME ALUM	KCr(SO4)2	-	nd	25	1
		-	-	60	1			-	-	60	1
		-	-	100	-			-	-	100	-
- DISULPHIDE	CS2	-	100	25	2	CHROMIC ACID	CrO3+H2O	-	10	25	2
		-	-	60	-			-	-	60	3
		-	-	100	-			-	-	100	-
- MONOXIDE	CO	-	100	25	1			-	30	25	2
		-	-	60	1			-	-	60	3
		-	-	100	-			-	-	100	-
- TETRACHLORIDE	CCl4	-	100	25	2			-	50	25	2
		-	-	60	3			-	-	60	3
		-	-	100	-			-	-	100	-
CARBONIC ACID	H2CO3	-	sat	25	-	CHROMIC SOLUTION	CrO3+H2O+H2SO4	-	50/15/35/	25	3
- AQUEOUS SOLUTION		-	-	60	-			-	-	60	3
		-	-	100	-			-	-	100	-
- DRY		-	100	25	-	CITRIC ACID	C	H4(OH)(CO2H)	50	25	1
		-	-	60	-		3	3	-	-	-
		-	-	100	-	AQ. SOL. min			-	60	1
- WET		-	all	25	-				-	100	-
		-	-	60	-	COPPER	CuCl2	-	sat	25	1
		-	-	100	-	- CHLORIDE		-	-	60	1
CARBON OIL		-	comm	25	-			-	-	100	-
		-	-	60	-	- CYANIDE	CuCN2	-	all	25	-
		-	-	100	-			-	-	60	-
CHLORAMINE		-	dil	25	1			-	-	100	-
		-	-	60	-	- FLUORIDE	CuF2	-	all	25	1
		-	-	100	-			-	-	60	1
CHLORIC ACID	HClO3	-	20	25	1			-	-	100	-
		-	-	60	3	- NITRATE	Cu(NO3)2	-	nd	25	1
		-	-	100	-			-	-	60	1
CHLORINE	Cl2	-	sat	25	-			-	-	100	-
		-	-	60	-	- SULPHATE	CuSO4	-	dil	25	1
		-	-	100	-			-	-	60	1
- DRY GAS		-	10	25	-			-	-	100	-
		-	-	60	-			-	sat	25	1
		-	-	100	-			-	-	60	1
		-	100	25	-			-	-	100	-
		-	-	60	-	COTTONSEED OIL		-	comm	25	-
		-	-	100	-			-	-	60	-
- WET GAS		-	5g/m3	25	-			-	-	100	-
		-	-	60	-	CRESOL	CH3C6H4OH	-	£90	25	1
		-	-	100	-			-	-	60	-
		-	10g/m3	25	-			-	-	100	-
		-	-	60	-			-	>90	25	-
		-	-	100	-			-	-	60	-
		-	66g/m3	25	-			-	-	100	-
		-	-	60	-	CRESYLIC ACID	CH3C6H4COOH	-	50	25	-
		-	-	100	-			-	-	60	-
- LIQUID		-	100	25	3			-	-	100	-
		-	-	60	-	CYCLOHEXANE	C6H12	-	all	25	1
		-	-	100	-			-	-	60	-
CHLOROACETIC ACID	ClCH2COH	-	85	25	2			-	-	100	-
		-	-	60	3	CYCLOHEXANONE	C6H10O	-	all	25	1
		-	-	100	-			-	-	60	-
		-	100	25	3			-	-	100	-
		-	-	60	3	DECAHYDRONAFTALENE	C10H18	-	nd	25	1
		-	-	100	-			-	-	60	2
CHLOROBENZENE	C6H5Cl	-	all	25	-			-	-	100	-
		-	-	-	-	DEMINERALIZED WATER		-	100	25	1
		-	-	60	-			-	-	60	1
		-	-	100	-			-	-	100	-
CHLOROFORM	CHCl3	-	all	25	2	DEXTRINE	C	H12OCH2O	nd	25	1
		-	-	60	-		6	-	-	-	-
		-	-	100	-			-	-	60	1
		-	-	-	-			-	-	100	-

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Chemical	Formula	Conc.	Temp.	uPVC	PP	Chemical	Formula	Conc.	Temp.	uPVC	PP
		(%)	(°C)						(°C)		
ANTIMONY	SbCl ₃	100	25	1	1	BROMINE	Br ₂	(%)	25	3	3
- TRICHLORIDE			60	1	1	- LIQUID		100	60	3	3
			100	-	-			-	100	-	3
ANTHRAQUINONE		suspension	25	1	1	- VAPOURS		-	25	2	3
SULPHONIC ACID			60	2	1			low	60	-	3
			100	-	-			-	100	-	-
AQUA REGIA	HC+HNO ₃	100	25	2	3	BUTADIENE	C ₄ H ₆	-	25	1	1
			60	2	3			100	60	1	3
			100	-	3			-	100	-	-
ARSENIC ACID	H ₃ AsO ₄	deb	25	1	1	BUTANEDIOL	CH ₃ CH ₂ CHOHCH ₂ OH	-	25	1	1
			60	2	1	AQUEOUS		10	60	3	-
			100	-	-			-	100	-	-
		80	25	1	1		concentrated	-	25	2	2
			60	2	1			-	60	3	2
			100	-	2			-	100	-	-
BARIUM		all	25	1	1	BUTANE	C	H10	25	1	1
- CARBONATE	BaCO ₃		60	1	1			4	10	-	-
			100	-	-	GAS		-	-	60	1
- CHLORIDE	BaCl ₂	10	25	1	1			-	-	100	-
			60	1	1	BUTYL	CH ₃ CO ₂ CH ₂ CH ₂ CH ₂ CH ₃	-	100	25	3
			100	-	-	- ACETATE		-	-	60	3
- HYDROXIDE	Ba(OH) ₂	all	25	1	1			-	-	100	-
			60	1	1	- ALCOHOL	C	-	-	25	1
			100	-	-		4	H ₉ OH	-	-	-
- SULPHATE	BaSO ₄	nb	25	1	1			-	-	60	1
			60	1	1			-	-	100	-
			100	-	-	- PHENOL	C	-	100	25	3
- SULPHIDE	BaS	sat	25	1	1		4	H ₉ C ₆ H ₄ OH	-	-	-
			60	1	-			-	-	60	3
			100	-	-			-	-	100	-
BEER		comm	25	1	-	BUTYLENE GLYCOL	C ₄ H ₆ (OH) ₂	-	100	25	1
			60	1	-			-	-	60	1
			100	-	-			-	-	100	-
BENZALDEHYDE	C ₆ H ₅ CHO	nd	25	3	3	BUTYRIC ACID	C ₂ H ₅ CH ₂ COOH	-	20	25	1
			60	3	3			-	-	60	2
			100	-	-			-	-	100	-
BENZENE	C ₆ H ₆	100	25	3	3			-	concentrated	25	3
			60	3	3			-	-	60	3
			100	-	3			-	-	100	-
- LIGROIN		2080/	25	3	3	CALCIUM	Ca(HSO ₃) ₂	-	nd	25	1
			60	3	3	- BISULPHITE		-	-	60	1
			100	-	-			-	-	100	-
- MONOCHLORINE	C ₆ H ₅ Cl	technically pure	25	3	1	- CARBONATE	CaCO ₃	-	all	25	1
			60	-	-			-	-	60	1
			100	-	-			-	-	100	-
BENZOIC ACID	C ₆ H ₅ COOH	sat	25	1	1	- CHLORATE	CaHCl	-	nd	25	1
			60	2	1			-	-	60	1
			100	-	3			-	-	100	-
BENZYL ALCOHOL	C ₆ H ₅ CH ₂ OH	100	25	1	1	- CHLORIDE	CaCl ₂	-	all	25	1
			60	2	2			-	-	60	1
			100	-	-			-	-	100	-
BLEACHING LYE	NaOCl+NaCl	12.50%	25	1	2	- HYDROXIDE	Ca(OH) ₂	-	all	25	-
	Cl		60	2	-			-	-	60	-
			100	-	-			-	-	100	-
BORIC ACID	H ₃ BO ₃	deb	25	1	1	- HYPOCHLORITE	Ca(OCl) ₂	-	sat	25	1
			60	2	1			-	-	60	1
			100	-	1			-	-	100	-
		sat	25	1	1	- NITRATE	Ca(NO ₃) ₂	-	50	25	1
			60	2	1			-	-	60	-
			100	-	1			-	-	100	-
BRINE		comm	25	1	1	- SULPHATE	CaSO ₄	-	nd	25	1
			60	1	-			-	-	60	1
			100	-	-			-	-	100	-
BROMIC ACID	HBrO ₃	10	25	1	-	- SULPHIDE	CaS	-	sat	25	2
			60	1	-			-	-	60	2
			100	1	-			-	-	100	-

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Chemical	Formula	Conc.	Temp.	uPVC	PP	Chemical	Formula	Conc.	Temp.	uPVC	PP
		(%)	(°C)					(%)	(°C)		
HEXANE	C6H14	100	25	1	1	LACTIC ACID	CH3CHOHCOOH	≤28	25	1	1
			60	2	2				60	2	1
			100						100		1
HYDROBROMIC ACID	HBr	≤10	25	1	1	LANOLINE		nd	25		1
			60	2	1				60	2	2
			100		3				100		
		48	25	1	1	LEAD ACETATE	Pb(CH3COO)2	sat	25	1	1
			60	2	1				60	1	2
			100		3				100		2
HYDROCHLORIC ACID	HCl	≤25	25	1	1	LINSEED OIL		comm	25	1	1
			60	2	1				60	2	1
			100		1				100		
		≤37	25	1	1	LUBRICATING OILS		comm	25	1	1
			60	1	1				60	1	2
			100		2				100		
HYDROCYANIC ACID	HCN	deb	25	1	1	MAGNESIUM	MgCO3	all	25	1	1
			60	1	1	- CARBONATE			60	1	1
			100						100		
HYDROFLUORIC ACID	HF	10	25	1	1	- CHLORIDE	MgCl2	sat	25	1	1
			60	2	1				60	1	1
			100		3				100		2
		60	25	2	1	- HYDROXIDE	Mg(OH)2	all	25	1	1
			60	3	3				60	1	1
			100		3				100		
HYDROGEN	H2	all	25			- NITRATE	MgNO3	nd	25	1	1
			60						60	1	1
			100						100		
HYDROGEN	H2O2	30	25	1	1	- SULPHATE	MgSO4	dil	25	1	1
- PEROXIDE			60	1	1				60	1	1
			100						100		
		50	25	1	1			sat	25	1	1
			60	1	2				60	1	1
			100						100		
		90	25	1	1	MALEIC ACID	COOHCHCHCOOH	nd	25	1	1
			60	1	2				60	1	1
			100						100		1
- SULPHIDE DRY		sat	25	1	1	MALIC ACID	CH2CHOH(COOH)2	nd	25	1	1
			60	2	1				60		1
			100						100		
- SULPHIDE WET		sat	25	1	1	MERCURIC	HgCl2	sat	25	1	1
			60	2	1	- CHLORIDE			60	1	1
			100						100		
HYDROSULPHITE		≤10	25	1	1	- CYANIDE	HgCN2	all	25	1	1
			60	2	1				60	1	1
			100						100		
HYDROXYLAMINE	(H2NOH)2H2SO4	12	25	1	1	MERCUROUS NITRATE	HgNO3	nd	25	1	1
SULPHATE			60	1	1				60	1	1
			100						100		
ILLUMINATING GAS		100	25	1	1	MERCURY	Hg	100	25	1	1
			60						60	2	1
			100						100		
IODINE	I2	3	25	2	1	METHYL	CH3COOCH3	100	25		1
- DRY AND WET			60	3		- ACETATE			60		1
			100						100		
- TINCTURE		>3	25	2	1	- ALCOHOL	CH3OH	nd	25	1	1
			60	3	3				60	1	2
			100						100		2
ISOCTANE	C8H18	100	25	1	2	- BROMIDE	CH3Br	100	25	3	3
			60		3				60		3
			100						100		
ISOPROPYL	(CH3)2CHOCH(CH3)2	100	25	2	2	- CHLORIDE	CH3Cl	100	25	3	3
- ETHER			60	3	3				60	3	3
			100						100		3
- ALCOHOL	(CH3)2CHOH	100	25		1	- ETHYLKETONE	CH3COCH2CH3	all	25	3	1
			60	2	1				60	3	2
			100						100		

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Chemical	Formula	Conc.	Temp.	uPVC	PP	Chemical	Formula	Conc.	Temp.	uPVC	PP
		(%)	(°C)					(%)	(°C)		
METHYLAMINE	CH ₃ NH ₂	32	25	2	1	OLEUM		nd	25	3	3
			60	3					60	3	3
			100						100		
METHYLENE CHLORIDE	CH ₂ Cl ₂	100	25	3	3	- VAPOURS		low	25	3	3
			60	3	3				60	3	3
			100		3			high	25	3	3
METHYL SULPHURIC ACID	CH ₃ COOSO ₄	50	25	1	2				60	3	3
			60	2	2				100		
			100		3	OLIVE OIL		comm	25		1
		100	25	1	3				60	2	1
			60	2	3				100		
MILK		100	25	1	1	OXALIC ACID	HO ₂ CCO ₂ H	10	25	1	1
			60	1	1				60	2	2
			100		1				100		2
MINERAL ACIDULOUS WATER		nd	25	1	1			sat	25	1	1
			60	1	1				60	1	2
			100		1				100		3
MOLASSES		comm	25	1	1	OXYGEN	O ₂	all	25	1	3
			60	2	1				60	1	3
			100		2				100		
NAPHTA		100	25	2	1	OZONE	O ₃	nd	25	1	3
			60	3	3				60	2	3
			100						100		
NAPHTALINE		100	25	1	3	PALMITIC ACID	CH ₃ (CH ₂) ₁₄ COOH	10	25	1	
			60		3				60	1	3
			100		3				100		
NICKEL - CHLORIDE	NiCl ₃	all	25	1	1			70	25	1	
			60	1	1				60	1	3
			100		1				100		
NICKEL - NITRATE	Ni(NO ₃) ₂	nd	25	1	1	PARAFFIN		nd	25		
			60	1	1				60	2	1
			100		2				100		
NICKEL - SULPHATE	NiSO ₄	dil	25	1	1	- EMULSION		comm	25	1	3
			60	1	1				60	1	3
			100						100		
		sat	25	1	1	- OIL		nd	25	1	1
			60	1	1				60	1	3
			100						100		
NITRIC ACID	HNO ₃	anhydrous	25	3	3	PERCHLORIC ACID	HClO ₄	100	25	1	1
			60	3	3				60	2	1
			100		3				100		
		20	25	1	1			70	25	1	1
			60	2	2				60	2	
			100		3				100		
		40	25	1	2	PETROL		100	25	1	1
			60	1	3	- REFINED			60		3
			100		3				100		
		60	25	1	2	- UNREFINED		100	25	1	1
			60	2	3				60	1	3
			100		3				100		
		98	25	3	3	PHENOL	C ₆ H ₅ OH	1	25	1	1
			60	3	3	- AQUEOUS SOLUTION			60		1
			100		3				100		3
NITROBENZENE	C ₆ H ₅ NO ₂	all	25	3	1			≤90	25	2	1
			60	3	2				60	3	3
			100						100		3
OLEIC ACID	C ₁₈ H ₃₃ O ₂	comm	25	1	1	PHENYL HYDRAZINE	C ₆ H ₅ NHNH ₂	all	25	3	2
			60	1	2				60	3	2
			100						100		
						- CHLORHYDRATE	C ₆ H ₅ NHNH ₃ Cl	sat	25	1	1
							6				
									60		3
									100		

Class 1: High Resistance Class 2: Limited Resistance Class 3: No Resistance.

Chemical Resistance Guide

Chemical	Formula	Conc.	Temp.	uPVC	PP	Chemical	Formula	Conc.	Temp.	uPVC	PP	
		(%)	(°C)					(%)	(°C)			
PHOSPHORIC - ACID	H3PO4	≤25	25	1	1	- PERBORATE	KBO3	-	all	25	1	1
			60	2	1			-	60	1		
			100		1			-	100			
		≤50	25	1	1	- PERMANGANATE	KMnO4	-	10	25	1	1
			60	1	1			-	60	1	2	
			100		1			-	100			
		≤85	25	1	1	- PERSULPHATE	K S2O8	nd	25	1	1	
			60	1	1		2	-	60	2	1	
			100		1			-	100			
- ANHYDRIDE	P2O5	nd	25	1	1	- SULPHATE	K SO4	sat	25		1	
			60	2	1		2	-	60	1	1	
			100					-	100			
PHOSPHORUS TRICHLORIDE	PCl3	100	25	3	1	PROPANE	C H8	100	25	1	1	
			60	3			3	-	60			
			100					-	100			
PHOTOGRAPHIC - DEVELOPER		comm	25	1		- GAS		-	60			
			60	1				-	100			
			100					-	100			
- EMULSION		comm	25	1		- LIQUID		-	100	25	1	2
			60	1				-	60			
			100					-	100			
PHTHALIC ACID	C H4(CO2H)2	50	25		1	PROPYL ALCOHOL	C H7OH	100	25	1	1	
	6		60	3	1		3	-	60	2	1	1
			100					-	100			
PICRIC ACID	HOC6H2(NO2)3	1	25	1	1	PYRIDINE	CH(CHCH)2N	nd	25	3	1	1
			60	1				-	60	3	2	3
			100					-	100			
		>1	25	3	3	RAIN WATER		100	25	1	1	1
			60	3	3			-	60	1	1	1
			100					-	100			1
POTASSIUM - BICHROMATE	K2CrO7	40	25	1	1	SEA WATER		100	25	1	1	1
			60	1				-	60	1	1	1
			100					-	100			1
- BORATE	K3BO3	sat	25	1	1	SILICIC ACID	H2SiO3	all	25	1	1	1
			60	2	1			-	60	1	1	1
			100					-	100			
- BROMATE	KBrO3	nd	25	1	1	SILICONE OIL		nd	25	1	1	
			60	2	1			-	60	3	2	
			100		2			-	100			
- BROMIDE	KBr	sat	25	1	1	SILVER - CYANIDE	AgCN	all	25	1		1
			60	1	1			-	60	1		1
			100					-	100			
- CARBONATE	K2CO3	sat	25	1	1	- NITRATE	AgNO9	nd	25	1	1	1
			60	1				-	60	2	1	1
			100					-	100			1
- CHLORIDE	KCl	sat	25	1	1	- PLATING SOLUTION		comm	25	1		1
			60	1	1			-	60	1		
			100		2			-	100			
- CHROMATE	KCrO4	40	25	1	1	SOAP		high	25	1		1
			60	1	1	- AQUEOUS SOLUTION		-	60	2		1
			100					-	100			
- CYANIDE	KCN	sat	25	1	1	SODIC LYE		£60	25	1		
			60	1	1			-	60	1		
			100					-	100			
- FERROCYANIDE	K4Fe(CN)6.3H2O	100	25	1	1	SODIUM - ACETATE	CH3COONa	100	25	1	1	1
			60	1	1			-	60	1	1	1
			100		2			-	100			1
- FLUORIDE	KF	sat	25	1	1	- BICARBONATE	NaHCO3	nd	25	1	1	1
			60	1	1			-	60	1	1	1
			100					-	100			1
- HYDROXIDE	KOH	≤60	25	1	1	- BISULPHITE	NaHSO3	100	25	1	1	1
			60	2	1			-	60	1	1	1
			100		1			-	100			1
- NITRATE	KNO3	sat	25	1	1	- BROMIDE	NaBr	sat	25	1		1
			60	1	1			-	60	1		1
			100					-	100			
						- CARBONATE	Na2CO3	sat	25	1	1	1
								-	60	1	1	2
								-	100			2

Class 1: High Resistance Class 2: Limited Resistance Class 3: No Resistance.

Chemical Resistance Guide

Chemical	Formula	Conc.	Temp.	uPVC	PP	Chemical	Formula	Conc.	Temp.	uPVC	PP	
		(%)	(°C)						(%)	(°C)		
- CHLORATE	NaClO3	nd	25	1	1	SULPHUR	S	100	25	1	1	
			60	2					60	2	1	
			100						100			
- CHLORIDE	NaCl	dil	25	1	1	- DIOXIDE AQUEOUS	SO2	sat	25	1	1	
			60	2	1				60	2		
			100						100			
		sat	25	1	1	- DIOXIDE DRY		all	25	1	1	
			60	1	1				60	1	1	
			100		3				100		3	
- CYANIDE	NaCN	all	25	1	1	- DIOXIDE LIQUID		100	25	2		
			60	1	1				60	3		
			100						100			
- FERROCYANIDE	Na4Fe(CN)6	sat	25	1		- TRIOXIDE	SO3	100	25	2	3	
			60	1					60	2	3	
			100						100			
- FLUORIDE	NaF	all	25	1		SULPHURIC ACID	H2SO4	≤10	25	1	1	
			60	1					60	1	1	
			100						100		1	
- HYDROXIDE	NaOH	60	25	1	1			≤75	25	1	1	
			60	1	1				60	2	2	
			100		1				100		2	
- HYPOCHLORITE	NaOCl	deb	25	1	1			≤90	25	1	1	
			60	2	2				60	2	2	
			100						100		3	
- HYPOSULPHITE	Na2S3O3	nd	25	1	1			≤96	25	2	3	
			60	1					60	3	3	
			100						100		3	
- NITRATE	NaNO3	nd	25	1	1	- FUMING		H2SO4/HNO3	25	2	3	
			60	1	1				60	3	3	
			100						100		3	
- PERBORATE	NaBO3H2O	all	25	1	1	- NITRIC AQUEOUS SOLUTION	H2SO4+HNO3+H2O	483/49/	25	1	3	
			60	1					60	2	3	
			100						100		3	
- PHOSPHATE di	Na2HPO4	all	25	1	1			500/50/	25	2	3	
			60	1	1				60	3	3	
			100		1				100		3	
- PHOSPHATE tri	Na3PO4	all	25	1	1			1070/20/	25	1	2	
			60	1	1				60	1	2	
			100		1				100			
- SULPHATE	Na2SO4	dil	25	1	1	TALLOW EMULSION		comm	25	1	1	
			60	1	1				60	1	2	
			100						100			
		sat	25	1	1	TANNIC ACID	C14H10O9	10	25	1		
			60	1	1				60	1		
			100						100			
- SULPHIDE	Na2S	dil	25	1	1	TARTARIC ACID	HOOC(CHOH)2COOH	all	25	1	1	
			60	2	1				60	2	1	
			100						100			
		sat	25	1	1	TETRACHLORO - ETHANE	CHCl2CHCl2	nd	25	3	2	
			60	1	1				60	3	3	
			100						100			
- SULPHITE	NaSO3	sat	25	1	1	- ETHYLENE	CCl2CCl2	nd	25	3	2	
			60	1	1				60	3	3	
			100						100			
STANNIC CHLORIDE	SnCl4	sat	25	1	1	TETRAETHYLLEAD	Pb(C2H5)4	100	25	1	1	
			60	1	1				60	2		
			100						100			
STANNOUS CHLORIDE	SnCl2	dil	25	1	1	TETRAHYDROFURAN	C4H8O	all	25	3	2	
			60	1	1				60	3	3	
			100						100		3	
STEARIC ACID	CH3(CH2)16CO2H	100	25	1	2	THIONYL CHLORIDE	SOCl2		25	3	3	
			60	1	2				60			
			100						100			
SUGAR SYRUP		high	25	1	1	THIOPHENE	C	H4S	100	25	3	2
			60	2			4					
			100						60	3	3	
									100			

Class 1: High Resistance Class 2: Limited Resistance Class 3: No Resistance.

Chemical Resistance Guide

Chemical	Formula	Conc.	Temp.	uPVC	PP	Chemical	Formula	Conc.	Temp.	uPVC	PP
		(%)	(°C)					(%)	(°C)		
DIBUTYLPHthalate	C ₆ H ₄ (CO ₂ C ₄ H ₉) ₂	100	25	3	3	FERROUS - CHLORIDE	FeCl ₂	sat	25	1	1
			60	3	3				60	1	
			100						100		
DICHLOROACETIC ACID	Cl ₂ CHCOOH	100	25	1	1	- SULPHATE	FeSO ₄	nd	25	1	1
			60	2	2				60	1	
			100						100		
DICHLOROETHANE	CH ₂ ClCH ₂ Cl	100	25	3	1	FERTILIZER		≤10	25	1	1
			60	3					60	1	1
			100						100		
DICHLOROETHYLENE	ClCH ₂ Cl	100	25	3	2			sat	25	1	1
			60	3					60	1	1
			100						100		
DIETHYL ETHER	C ₂ H ₅ OC ₂ H ₅	100	25	3	1	FLUORINE GAS - DRY F ₂		100	25	2	3
			60	3	1				60	3	3
			100						100		
DIGLYCOLIC ACID	(CH ₂) ₂ O(CO ₂ H) ₂	18	25	1	1	FLUOROSILICIC ACID	H ₂ SiF ₆	32	25	1	1
			60	2	1				60	1	1
			100						100		
DIMETHYLAMINE	(CH ₃) ₂ NH	100	25	2	1	FORMALDEHYDE	HCOH		25	1	1
			60	3	2				60	2	1
			100						100		
DIOCTYLPHthalate		all	25	3	2	FORMIC ACID	HCOOH	50	25	1	1
			60	3	2				60	2	1
			100						100		
DISTILLED WATER		100	25	1	1			100	25	1	1
			60	1	1				60	3	1
			100		1				100		
DRINKING WATER		100	25	1	1	FRUIT PULP AND JUICE		comm	25	1	1
			60	1	1				60	1	1
			100		1				100		
ETHERS		all	25	3	3	FUEL OIL		100	25	1	1
			60	3	3				60	1	2
			100						100		
ETHYL - ACETATE	CH ₃ CO ₂ C ₂ H ₅	100	25	3	2			comm	25	1	1
			60	3	3				60	1	2
			100		3				100		
- ALCOHOL	CH ₃ CH ₂ OH	nd	25	1	1	FURFUROLE ALCOHOL C ₅ H ₃ OCH ₂ OH		nd	25	3	2
			60	2	1				60	3	2
			100		1				100		
- CHLORIDE	CH ₃ CH ₂ Cl	all	25	3	3	GAS EXHAUST - ACID		all	25	1	
			60	3	3				60	1	
			100						100		
- ETHER	CH ₃ CH ₂ OCH ₂ CH ₃	all	25	3	3	- WITH NITROUS VAPOURS		traces	25	1	1
			60	3	3				60	1	1
			100						100		
ETHYLENE - CHLOROHYDRIN	ClCH ₂ CH ₂ OH	100	25	3		GAS PHOSGENE	ClCOCl	100	25	1	2
			60	3					60	2	2
			100						100		
- GLYCOL	HOCH ₂ CH ₂ OH	comm	25	1	1	GELATINE		100	25	1	1
			60	2	1				60	1	1
			100						100		
FATTY ACIDS		nd	25	1		GLUCOSE	C ₆ H ₁₂ O ₆	all	25	1	1
			60	1					60	2	1
			100						100		
FERRIC - CHLORIDE	FeCl ₃	10	25	1	1	GLYCERINE AQ.SOL	HOCH ₂ CHOHCH ₂ OH	all	25	1	1
			60	2	1				60	1	1
			100						100		
		sat	25	1	1	GLYCOGLUE AQUEOUS		10	25	1	1
			60	1	1				60	1	1
			100		1				100		1
- NITRATE	Fe(NO ₃) ₃	nd	25	1		GLYCOLIC ACID	HOCH ₂ COOH	37	25	1	1
			60	1					60	1	
			100						100		
- SULPHATE	Fe(SO ₄) ₃	nd	25	1	1	HEPTANE	C ₇ H ₁₆	100	25	1	3
			60	1					60	2	3
			100						100		

Class 1: High Resistance Class 2: Limited Resistance Class 3: No Resistance.

Chemical Resistance Guide

Chemical	Formula	Conc.	Temp.	uPVC	PP
		(%)	(°C)		
TOLUENE	C ₆ H ₅ CH ₃	100	25	3	2
			60	3	3
			100		3
TRANSFORMER OIL		nd	25	1	1
			60	2	2
			100		
TRICHLOROACETIC ACID	CCl ₃ COOH	≤50	25	1	1
			60	3	1
			100		
TRICHLOROETHYLENE	Cl ₂ CCHCl	100	25	3	3
			60	3	3
			100		
TRIETHANOLAMINE	N(CH ₂ CH ₂ OH) ₂	100	25	2	1
			60	3	
			100		
TURPENTINE		100	25	2	3
			60	2	3
			100		
UREA AQUEOUS SOLUTION	CO(NH ₂) ₂	2 ¹⁰	25	1	1
			60	2	1
			100		
		33	25	1	1
			60	2	1
			100		
URINE		nd	25	1	1
			60	2	1
			100		
URIC ACID	C ₅ H ₄ N ₄ O ₃	10	25	1	
			60	2	
			100		
VASELINE OIL		100	25	1	1
			60	3	2
			100		
VINYL ACETATE	CH ₃ CO ₂ CHCH ₂	100	25	3	
			60	3	
			100		
WHISKY		comm	25	1	1
			60	1	
			100		
WINES		comm	25	1	1
			60	1	1
			100	1	
WINE VINEGAR		comm	25	1	1
			60	2	1
			100		
ZINC - CHLORIDE	ZnCl ₂	dil	25	1	1
			60	1	1
			100		
		sat	25	1	1
			60	1	1
			100		2
- CHROMATE	ZnCrO ₄	nd	25	1	1
			60	1	1
			100		
- CYANIDE	Zn(CN) ₂	all	25	1	
			60	1	
			100		
- NITRATE	Zn(NO ₃) ₂	nd	25	1	1
			60	1	1
			100		
- SULPHATE	ZnSO ₄	dil	25	1	1
			60	1	1
			100		
		sat	25	1	1
			60	1	1
			100		

Class 1: High Resistance Class 2: Limited Resistance Class 3: No Resistance.

Characteristics of the raw materials used

ISO version

TECHNICAL DATA SHEET

Topilene® R200P

Polypropylene Random Copolymer
For PP-R Pipes and Fittings(Pressure Pipes Systems)

Product Description

Topilene® R200P is a specially designed polypropylene random copolymer (PP-R, natural colored) that features excellent long-term hydrostatic pressure resistance and heat stability. It is suitable for hot & cold water supply pipes and fittings as well as radiator connecting pipes. It is the outcome of HYOSUNG's integrated bimodal polymerization and crystallization technology with advanced PP manufacturing process technique.

Characteristics

Typical Application	Hot & cold water supply pipes and fittings / Radiator connecting pipes
Features	Excellent long-term hydrostatic pressure resistance and heat stability (PPR 125, MRS 12.5 MPa, CRS 3.3 MPa) / Excellent stiffness and impact strength balance / Chemical stability / Environment-friendly / Enhanced processability
Compliance	The pipes produced with Topilene® R200P complies with the hydrostatic pressure requirements according to DIN 8078, ISO/DIS 15874-2, GB/T 18742 and KS M 3362. This product complies with the requirements of NSF/ANSI 14, FDA 21 CFR 177.1520 and (EU) No 10/2011 for food contact. It is WRAS approved material and it corresponds to the BS6920, DVGW W270/KTW guidelines and GB/T 17219 for drinking water system.

Typical Properties

Resin Properties	Method	Value	Unit
Melt Index 熔体质量流动速率(230°C, 2.16kg)	ISO 1133	0.25	g/10min
Density 密度	ISO 1183	0.90	g/cm ³
Ash Content 灰分	ISO 3451	0.02	%
Melting Temperature 熔融温度	ISO 11357	144	°C
Oxidation Induction Time 氧化诱导时间(210°C, 铝皿)	ISO 11357	40	min
Heat Deflection Temperature 负荷变形温度	ISO 75	68	°C
Tensile Modulus of Elasticity 拉伸弹性模量	ISO 527	900	MPa
Tensile Strength at Yield 拉伸屈服应力	ISO 527	27	MPa
Tensile Strain at Break 拉伸断裂标称应变	ISO 527	830	%
Charpy Impact Strength, notched 简支梁缺口冲击强度(23°C / -20°C)	ISO 179	70 / 2.8	kJ/m ²
Mean Coefficient of Linear Thermal Expansion(0°C-80°C)	DIN 53752	1.5*10 ⁻⁴	K ⁻¹

The values listed above are typical values for reference purpose only and shall not be construed as specifications.

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HYOSUNG CHEMICAL

Characteristics of the raw materials used

ISO version

TECHNICAL DATA SHEET

Topilene® R200P

Polypropylene Random Copolymer
For PP-R Pipes and Fittings(Pressure Pipes Systems)

Storage and Handling

This product should be stored in dry condition at temperature below 40°C and protected from UV-light. When condensation is visible or can be expected, pre-drying is recommended. (Drying condition: 80~100°C/2~4hours at air circulated condition)

Process Guidelines

The actual extrusion conditions will depend on the type of equipment and the SDR of pipes produced. The below conditions may be used as guidelines for this material.

Cylinder feeding zone	160-180°C
Cylinder melting zone	180-210°C
Cylinder mixing zone	180-220°C
Head	180-220°C
Die	180-220°C
Melt temperature	200-220°C
Cooling temperature	20-30°C

Disclaimer

All information, including product characteristics, applications and properties are for reference purpose only and shall not be construed as specifications. Before using this product, customers should carefully review the instructions for use of the product to determine whether the product is suitable for the customer's particular purpose. The customer is responsible for the appropriate, safe and legal use, processing and handling of this product. HYOSUNG CHEMICAL CORPORATION assumes no legal responsibility or liability for the contents of this document. We reserve the right to change the contents of this document without prior notice. This document is copyrighted by HYOSUNG CHEMICAL CORPORATION. **Topilene®** is a registered trademark owned or used by HYOSUNG CHEMICAL CORPORATION.

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