



THERMOVAR

PIPES & FITTINGS

**For hot and cold waterline
PP-R and PPR-CT**

ThermoVAR Overview

Thermovar Pipes began its operation on March 2007, in Chunico Building, Sta Mesa, Manila. Thermovar aimed to provide the need of quality plastic pipes at affordable prices. Thermovar is able to do this by being the Philippine partner to the largest and most quality-assured plastic pipe manufacturer in China. With this, Thermovar sets apart its products from other China manufactured pipes as reliably world-class. Thermovar Pipes also distributes large diameter plastic pipes for municipal and industrial water supply and sewage transport use. Thermovar furthermore boasts its team of passionate members whose aim is to deliver excellence in all aspects including professionalism, customer service, and execution.

Quality Assurance

- ThermoVAR products have passed the certification of NSF, CSA, WRAS and other local testing.
- ThermoVAR attaches great importance to pre-sale service, insale service and after-sale service, providing the flexible and best solution to satisfy the various needs of our customers. We continue to value our customers with utmost priority and improving customer service with innovation.





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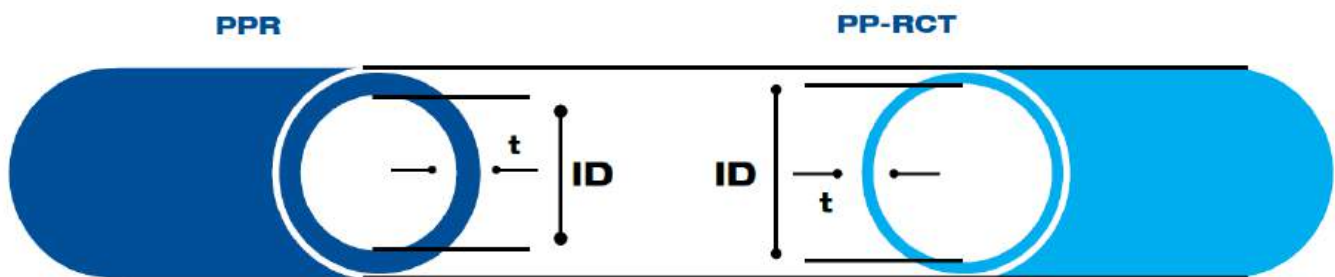
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PPR- CT Advantages

- **Larger inner bore and better flow rates.**
- **Improved pressure resistance at higher temperatures for long term period.**
- **Easier to carry, install and handle**
- **PP-RCT can be used with all standard PP-R fittings**

PPR Advantages

- **High Temperature Resistance:** The maximum sustained working temperature is up to 70~ the maximum transient temperature is up to 95°
- **Heat Preservation:** Low thermal conductivity which is only 1/1500 of brass pipe, and 1/250 of steel pipe
- **Non-toxic:** No heavy metal additives, would not be covered with dirt or contaminated by bacterium
- **Corrosion Resistance:** Resist chemical matters and electron chemical corrosion
- **High Flow Capacity:** Smooth interior walls and low friction result in low flow resistance and high volume
- **Excellent Flexibility:** Can be supplied in coil
- **Low Installation Costs:** Light- weight and ease of installation can reduce installation costs
- **Longevity:** More than 50 years with proper use
- **Recyclable and environment-friendly**



Explanatory notes:

t: wall thickness ID: internal diameter

Property Comparison of Pipes

Material	Galvanized Steel	PVC	PEX	PP-R	PPR-CT
Scale, Rust	Yes	No	No	No	No
Sanitary Condition Poor	Has C1	Good	Good	Good	Good
Thermal Insulation Poor	Good		Good	Good	Good
Heat Resistance	Ovenproof	Not Ovenproof	Not Ovenproof	Not Ovenproof	Not Ovenproof
Compressive Resistance	High	Low	Medium	Medium	Medium
Linear Expansion	Even	Even	Uneven	Uneven	Uneven
Joining Compression	Solvent	Weld	Compression	Fusion	Fusion
Recycling	Cannot	Can	Cannot	Can	Can

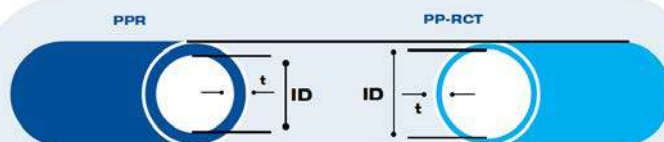
Physical and Mechanical Properties of PP-R and PPR-CT Pipe and Fittings

Table 1 PPR

Item	Index	
	Pipe	Fittings
Specific Gravity g/cm ³ (20° C)	0.89-0.91	
Thermal Conductivity w/mK (20° C)	0.23- 0.24	
Coefficient Of Linear Expansion mm/mK	0.14-0.16	
Elastic Modulus N/mm ² (20° C)	800	
Tensile Strength Mpa	~ 20	
Longitudinal Contraction Ratio (135° C , 2h)	~ 2%	-
Drop Dart Impact Test (15j , oo C , 2h)	Breaking Ratio <1 0%	-
Hydraulic Pressure Test	20°C , 1 h , circular Stress 16mpa	No leakage, No break
	95°C, 1 000h , circular Stress 3.5mpa	No leakage, No break
	110°C, 8760h, circular Stress 1.90mpa	No leakage, No break
Seal Test of Socket Joining		No leakage
	20°C, 1h, test pressure is 2.4 times of nominal pressure	No break

Table 2 PPR-CT

Properties	Testing Conditions	Unit	Testing Method	Result
MRS Classification	20°C, extrapolation 50 years	MPa	ISO 9080	11,2
CRS Classification	70°C, extrapolation 50 years	MPa	ISO 9080	5,3
Density	23°C	g/cm ³	ISO 1183	0,89 - 0,91
Melting Flow Index MFI	190°C, 5 kg	g/10dk g/10min	ISO 1133	0,4 - 0,6
	230°C, 2,16 kg			0,2 - 0,5
	230°C, 5 kg			0,8 - 1,3
Tensile Stress at Yield	23°C, 50 mm/dk 50 mm/min	MPa	ISO 527	23 - 28
Tensile Strain at Yield	23°C, 50 mm/dk 50 mm/min	%	ISO 527	min %10
Elasticity Modulus	23°C, 1 mm/dk 1 mm/min	MPa	ISO 179	800 - 900
Charpy Notched Impact Strength	0°C	kJ/m ²	ISO 179	9,5
Izod Notched Impact Strength	0°C	kJ/m ²	DIN 52612	17
Thermal Conductivity	-	W/(m K)	DIN 52612	0,24
Coefficient of Thermal Expansion (0°C/90°C)	-	W/(m K)	DIN 53752	1,5*10-4



Explanatory notes:

t: wall thickness ID: internal diameter

Parameter		PPR	PP - RCT	PPR	PP - RCT
OD	mm	20	20	25	25
Pipe Serie	-	2,5	4	2,5	4
Wall Thickness	mm	3,4	2,3	4,2	2,8
ID	mm	13,2	15,4	16,6	19,4
Inner Flow Area A	mm ²	137	186	217	296
Δ A	%	0	36%	0	37%

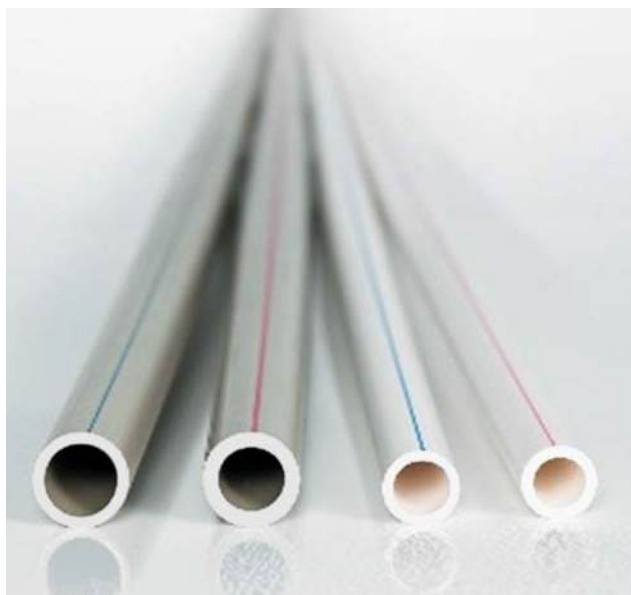
PP-R PIPES

2.0 MPa

* Suitable for Cold and Hot Water Supply

d _n (mm)	e _n (mm) Series 2.5
20	3.4
25	4.2
32	5.4
40	6.7
50	8.3
63	10.5
75	12.5
90	15.0
110	18.3
160	26.6

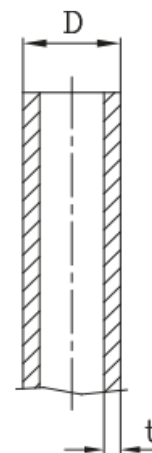
PP-R PIPES



PPR-CT PIPES

DN	t (mm)	s 4SDR 9PN 22	Bundle
20	2,3	3065542	25
25	2,8	3065543	20
32	3,6	3065544	10
40	4,5	3065545	5
50	5,6	3065546	5
63	7,1	3065547	3
75	8,4	3065548	2
90	10,1	3065549	2
110	12,3	3065550	1
125	14	3065551	1
160	17,9	3076333	1
200	22,4	3076334	1

PPR-CT PIPES





Features

- **Material:** Random Polypropylene
- **Size:** full 16mm through 160mm availability
- **Pressure Rating:** 2.5MPa, 2.0MPa, 1.6MPa, 1.25MPa
- **Standard:** ISO15874 / DIN8077-78
- **Color:** White or other colors available upon request
- **Joint:** joining pipe and socket fusion fittings by socket fusion joint

Advantages

- **High Temperature Resistance:** The maximum sustained working temperature is up to 70°C, the maximum transient temperature is up to 95°C
- **Heat Preservation:** Low thermal conductivity results in preserving heat
- **Non-toxic:** No heavy metal additives, would not be covered with dirt or contaminated by bacteria
- **Low Installation Costs:** Light-weight and ease of installation can reduce installation costs
- **High Flow Capacity:** Smooth interior walls result in low pressure loss and high volume
- **Longevity:** With proper use, more than 50 years



Female Threaded Union Ball Valve

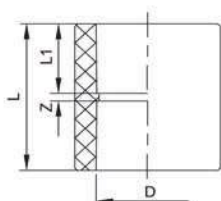
Size (mm)	SKU
20x1/2"	7532
25x3/4"	7533
32x1"	7534
40x1 1/4"	7535
50x1 1/2"	7536
63x2"	7537



True Union Ball Valve

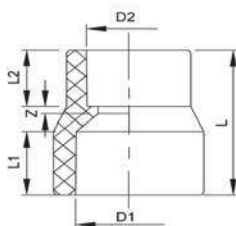
Size (mm)	SKU
20	7477
25	7527
32	7528
40	7529
50	7530
63	7531

Coupling
(Soc X Soc)



Size (mm)	L (mm)	L1 (mm)	Z (mm)	SKU
20	35	16.5	2	TV-CS-01
25	40	18.5	3	TV-CS-02
32	44	20.5	3	TV-CS-03
40	49	23	3	TV-CS-04
50	54	25.5	3	TV-CS-05
63	62	29.5	3	TV-CS-06
75	67	32	3	TV-CS-07
110	93	43.5	6	TV-CS-09

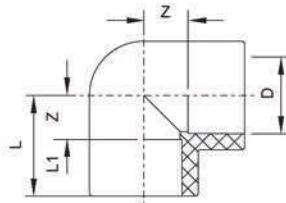
Reducer
(Soc X Soc)



Size (mm)	L (mm)	L1 (mm)	L2 (mm)	SKU
25x20	39.5	18.5	16.5	TV-CR-26
32x20	43.5	20.5	16.5	TV-CR-25
32x25	44.5	20.5	18.5	TV-CR-24
40x20	47	23	16.5	TV-CR-23
40x25	49	23	18.5	TV-CR-22
40x32	50.5	23	20.5	TV-CR-21
50x20	53.73	25.5	16.5	TV-CR-20
50x25	55	25.5	18.5	TV-CR-19
50x32	57	25.5	20.5	TV-CR-18
50x40	59	29.5	23	TV-CR-17
63x25	56.65	29.5	18.5	TV-CR-16
63x32	59	29.5	20.5	TV-CR-15
63x40	61	29.5	23	TV-CR-14
63x50	63	29.5	25.5	TV-CR-13
75x32	63	32	20.5	TV-CR-12
75x40	65	32	23	TV-CR-11
75x50	67	32	25.5	TV-CR-10
75x63	70	32	29.5	TV-CR-09
90x40	75	37	23	TV-CR-08
90x50	77	37	25.5	TV-CR-07
90x63	81	37	29.5	TV-CR-06
90x75	84	37	32	TV-CR-05
110x50	86	43	25.5	TV-CR-04
110x63	89	43	29.5	TV-CR-03
110x75	92	43	32	TV-CR-02
110x90	98	43	37	TV-CR-01
125x63	210	85	75	
125x110	200	85	85	
160x90	230	90	80	
160x110	220	90	85	TV-CR-27
160x125	210	90	85	

90° Elbow

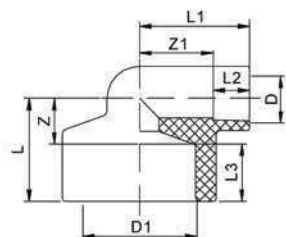
(Soc X Soc)



Size (mm)	L (mm)	L1 (mm)	Z (mm)	SKU
20	42	16.5	11.2	TV-ELBOW 90-01
25	49	18.5	13.3	TV-ELBOW 90-01
32	59.3	20.5	17	TV-ELBOW 90-03
40	71.62	23	21.72	TV-ELBOW 90-04
50	85.9	25.5	26.72	TV-ELBOW 90-05
63	105.1	29.5	33.14	TV-ELBOW 90-06
75	121.2	32	38.73	TV-ELBOW 90-07
90	144.7	37	47.03	TV-ELBOW 90-08
110	176.5	43.5	58.84	TV-ELBOW 90-09
125				
160				TV-ELBOW 90-10

90° Reducing Elbow

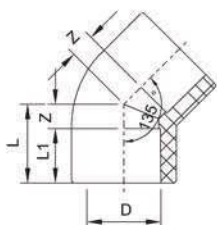
(Soc X Soc)



Size (mm)	L1 (mm)	Z1 (mm)	L2 (mm)	Z2 (mm)
25x20	18.5	12	16.5	13.5
32x20	20.5	13	16.5	17
32x25	20.5	15	18.5	16.5
40x20	23	14.5	16.5	14
40x25	23	18	18.5	13.5
40x32	23	21	20.5	16.5
50x25	25.5	21.5	18.5	20.5
50x32	25.5	23.5	20.5	19.5
50x40	25.5	29	23	20.5
63x32	29.5	24	20.5	26
63x40	29.5	28.5	23	24.5
63x50	29.5	33	25.5	27.5

45° Elbow

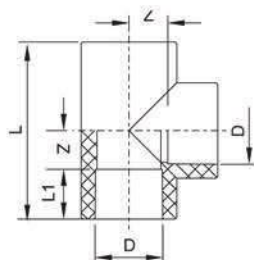
(Soc X Soc)



Size (mm)	L (mm)	L1 (mm)	Z (mm)	SKU
20	22	16.5	5.5	TV-ELBOW 45-01
25	25	18.5	6.5	TV-ELBOW 45-02
32	29	20.5	8.5	TV-ELBOW 45-03
40	33	23	10	TV-ELBOW 45-04
50	37.5	25.5	12	TV-ELBOW 45-05
63	44.5	29.5	15	TV-ELBOW 45-06
75	51.71	32	19.71	TV-ELBOW 45-07
90	60.9	37	23.9	TV-ELBOW 45-08
110	72.5	43	29.5	TV-ELBOW 45-09
125	132	90	42	
160	154	100	54	TV-ELBOW 45-10

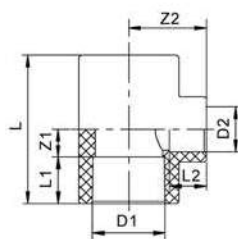
90° Tee

(Soc X Soc X Soc)



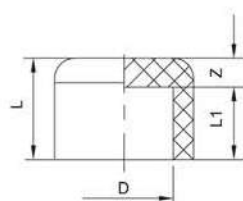
Size (mm)	L (mm)	L1 (mm)	Z (mm)	SKU
20	55.8	16.5	11.4	TV-TEE 90-01
25	64.7	18.5	13.85	TV-TEE 90-02
32	76.6	20.5	17.8	TV-TEE 90-03
40	89.4	23	21.7	TV-TEE 90-04
50	105.6	25.5	27.3	TV-TEE 90-05
63	126.6	29.5	33.8	TV-TEE 90-06
75	143	32	39.5	TV-TEE 90-07
90	170	37	48	TV-TEE 90-08
110	203	43	58.5	TV-TEE 90-09
125				
160				TV-TEE 90-10

Reducing Tee
(Soc X Soc X Soc)



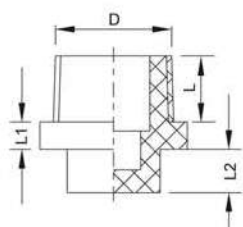
Size (mm)	L (mm)	L1 (mm)	L2 (mm)	Z1 (mm)	Z2 (mm)	SKU
25x20	59	18.5	16.5	11	13	TV-TR-29
32x20	64	20.5	16.5	11.5	16.5	TV-TR-03
32x25	68.5	20.5	18.5	13.75	17	TV-TR-04
40x20	70.8	23	16.5	12.4	21.2	TV-TR-05
40x25	75.7	23	18.5	14.85	21.2	TV-TR-06
40x32	82.6	23	20.5	18.3	21.7	TV-TR-07
50x20	75.8	25.5	16.5	12.4	26.3	TV-TR-08
50x25	80.7	25.5	18.5	14.85	26.3	TV-TR-09
50x32	87.6	25.5	20.5	18.3	26.8	TV-TR-10
50x40	95.4	25.5	23	22.2	26.8	TV-TR-11
63x25	88.7	29.5	18.5	14.85	32.8	TV-TR-12
63x32	95.6	29.5	20.5	18.3	33.3	TV-TR-13
63x40	103.4	29.5	23	22.2	33.3	TV-TR-14
63x50	113.6	29.5	25.5	27.3	33.8	TV-TR-15
75x32	100.6	32	20.5	18.3	39	TV-TR-28
75x40	108.4	32	23	22.2	39	TV-TR-16
75x50	118.6	32	25.5	27.3	39.5	TV-TR-17
75x63	131.6	32	29.5	33.8	39.5	TV-TR-18
90x40	120.4	37	23	23.2	46.5	TV-TR-19
90x50	130.6	37	25.5	28.3	47	TV-TR-20
90x63	143.6	37	29.5	34.8	47	TV-TR-21
90x75	155	37	32	40.5	47	TV-TR-22
110x50	146.5	42	25.5	28.3	57	TV-TR-24
110x63	155.6	42	29.5	34.8	57	TV-TR-25
110x75	167	42	32	40.5	57	TV-TR-26
110x90	182	42	37	48	58.5	TV-TR-27
160x63	330	100	29.5	65	100	
160x75	332.5	100	32	66.25	100	
160x90	338	100	37	69	100	
160x110	350	100	42	75	95	TV-TR-26

End Cap
(Soc X Soc)



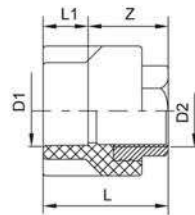
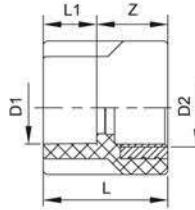
Size (mm)	L (mm)	L1 (mm)	SKU
20	24	16.5	TV-EC-01
25	27.5	18.5	TV-EC-02
32	31.5	20.5	TV-EC-03
40	35.5	23	TV-EC-04
50	42.5	25.5	TV-EC-05
63	51.5	29.5	TV-EC-06
75	57	32	TV-EC-07
90	68	37	TV-EC-08
110	82	43	TV-EC-09
125			
160			TV-EC-10

Male Thread Plug
(Mipt)



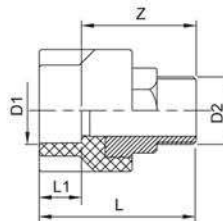
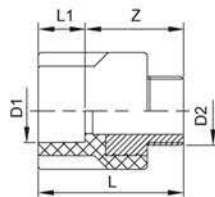
Size (mm)	L (mm)	L1 (mm)
R1/2"	26	13
R3/4"	29	14
R1"	34	16

Female Thread Adapter (Soc X Fipt with Metal Insert)



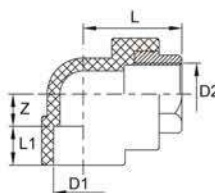
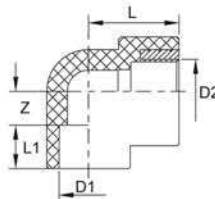
Size (mm)	D1	D2	Z	L1	L	Qty/Ctn
20x1/2"	20	1/2"	24	16	40	384
20x3/4"	20	3/4"	24	16	40	240
25x1/2"	25	1/2"	24	18	42	300
25x3/4"	25	3/4"	24	18	42	180
32x1/2"	32	1/2"	24	20.5	44.5	180
32x3/4"	32	3/4"	24	20.5	44.5	210
20x1/2"	20	1/2"	34	16	50	
20x3/4"	20	3/4"	37	16	53	
25x3/4"	25	3/4"	39	18	57	
32x1"	32	1"	38	20.5	58.5	128
40x1	40	1"	38	22	60	120
40x1/ 1/4"	40	1 1/4"	44	22	66	64
50x1 1/4"	50	1 1/4"	44	25	69	64
50x1 1/2"	50	1/2"	44	25	69	48
63x2"	63	2"	48	29	77	44
75x2"	75	2"	48.5	31	79.5	44

Male Thread Adapter (Soc X Mipt with Metal Insert)



Size (mm)	D1	D2	Z	L1	L	Qty/Ctn
16x1/2"						
20x1/2"	20	1/2"	38	16	40	240
20x3/4"	20	3/4"	38	16	40	180
25x1/2"	25	1/2"	38	18	42	210
25x3/4"	25	3/4"	38	18	42	180
32x1/2"	32	1/2"	38	20.5	44.5	180
32x3/4"	32	3/4"	38	20.5	44.5	180
32x1"	20	1"	57	20.5	77.5	96
40x1"	20	1"	57	22	79	96
40x1 1/4"	25	1 1/4"	65	22	87	64
50x1 1/4"	32	1 1/4"	65	25	90	64
50x1 1/2"	40	1 1/2"	65	25	90	48
63x2"	40	2"	73	29	120	40
75x2"	50	2"	77.5	31	108.5	28

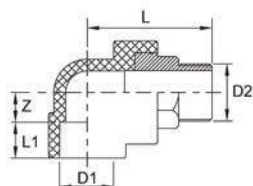
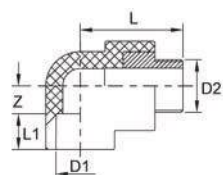
Female Thread Elbow (Soc X Fipt with Metal Insert)



Size (mm)	L1 (mm)	Z2 (mm)
20x1/2"	16.5	20
20x3/4"	16.5	21
25x1/2"	18.5	25
25x3/4"	18.5	25
25x1"		
32x1/2"	20.5	30
32x3/4"	20.5	30
40x3/4"	23	33.5
40x1 1/4"		
50x3/4"	25.5	44.5
Size (mm)	L1 (mm)	Z2 (mm)
32x1"	20.5	35.5
40x1"	23	38
40x1 1/4"	23	46
50x1"	25.5	37.5
50x 1 1/4"	25.5	50.5
50 x 1 1/2"	25.5	52.5
63x1"	29.5	49.5
63x1 1/4"	29.5	63.5
63x1 1/2"	29.5	63.5
63x2"	29.5	62.5

Male Thread Elbow

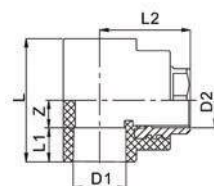
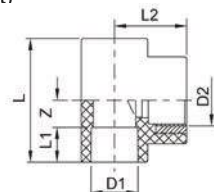
(Soc X Mipt with Metal Insert)



Size (mm)	L1 (mm)	Z1 (mm)	L2 (mm)	Z2 (mm)
20x1/2"	16.5	12.5	15	36
20x3/4"	16.5	13.5	15	36
25x1/2"	18.5	12.5	15	40
25x3/4"	18.5	15.5	15	40
25x1"				
32x1/2"	20.5	13	15	45
32x3/4"	20.5	15	15	45
40x3/4"	23	21.5	15	47.5
50x3/4"	24.5	26.8	15	58.5

Female Thread Tee

(Soc X Soc X Fipt with Metal Insert)

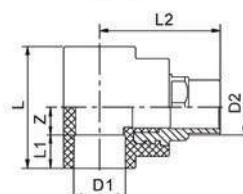
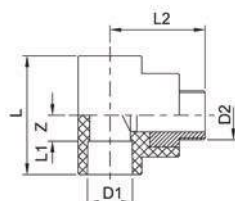


Size (mm)	D1	D2	Z	L2	L1	L	Qty/Ctn
20x1/2"	20	1/2"	12	35	16	56	250
20x3/4"	20	3/4"	14	35	16	60	225
25x1/2"	25	1/2"	12	37.5	18	60	180
25x3/4"	25	3/4"	14	37.5	18	64	180
32x1/2"	32	1/2"	12	37.5	20.5	65	168
32x3/4"	32	3/4"	14.5	37.5	20.5	70	135

20x1/2"	20	1/2"	12	35	16	56	
32x1"	32	1"	17	52	20.5	75	80

Male Thread Tee

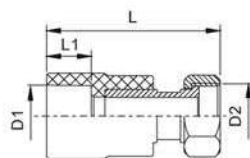
(Soc X Soc X Mipt with Metal Insert)



Size (mm)	D1	D2	Z	L2	L1	L	Qty/Ctn
20x1/2"	20	1/2"	12	49	16	56	180
20x3/4"	20	3/4"	14	49	16	60	150
25x1/2"	25	1/2"	12	51.5	18	60	150
25x3/4"	25	3/4"	14	51.5	18	64	120
32x1/2"	32	1/2"	12	51.5	20.5	65	135
32x3/4"	32	3/4"	14.5	51.5	20.5	70	100

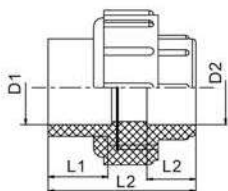
32x1"	32	1"	17	71	20.5	75	80
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Flexible Joint I (Soc X Fipt with Metal)



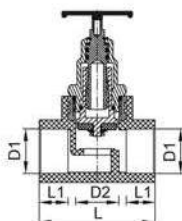
Size (mm)	L (mm)	L1 (mm)	Z (mm)
20x1/2"	68.6	16.5	43.5
20x3/4"	69.1	16.5	43.8
25x1/2"	70.6	18.5	43.5
25x3/4"	71.3	18.5	44
32x1"	79.5	20.5	48.5

Union (Soc X Soc)



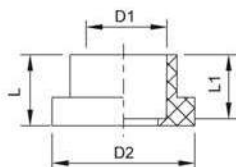
Size (mm)	L (mm)	L1 (mm)	L2 (mm)	SKU
20	46	16.5	16.5	TV-UNION-01
25	51.3	18.5	18.5	TV-UNION-02
32	59.8	20.5	20.5	TV-UNION-03
40	63.2	23	23	
50	65	25.5	25.5	
63	76	29.5	29.5	

Stop Valve (Soc X Soc)



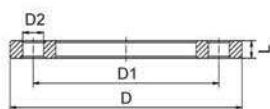
Size (mm)	L (mm)	L1 (mm)	SKU
20	70	16.5	TV-VALVE-01
25	80	18.5	TV-VALVE-02
32	94	20.5	TV-VALVE-03
40	95	23	TV-VALVE-04
50	115	25.5	TV-VALVE-05
63	135	29.5	TV-VALVE-06
75	134	32	
90	188	37	
110	198	43	

Stub Flange (Soc X Flange)



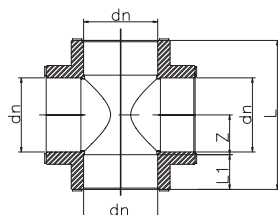
Size (mm)	L (mm)	L1 (mm)	D (mm)	SKU
40	26	23	80	TV-FF-05
50	30	25.5	90	TV-FF-06
63	34.5	29.5	107	TV-FF-07
75	37	32	125	TV-FF-01
90	42.5	37	143	TV-FF-02
110	49.5	43	169	TV-FF-03
125				
160				TV-FF-04

Flange (Steel Tray)



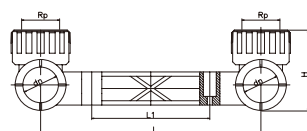
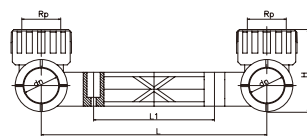
Size (mm)	L (mm)	D (mm)	D1 (mm)	D2 (mm)	D3 (mm)	SKU
40	9.6	130	90	57	18	TV-FT-01
50	10	150	110	68	18	TV-FT-02
63	11.6	160	125	86	18	TV-FT-03
75	13.8	175	145	92	18	TV-FT-04
90	14	190	161	108	18	TV-FT-05
110	15	216	180	120	18	TV-FT-06
125						
160	17.5	275	240	178	18	TV-FT-07

Straight Cross



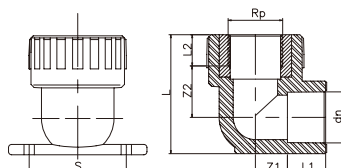
Size (mm)	L (mm)	L1 (mm)	Z (mm)
20	35	16.5	2
25	40	18.5	3
32	44	20.5	3
40	49	23	3
50	54	25.5	3
63	62	29.5	3
75	67	32	3
90	78	37	4
110	93	43.5	6

Double Female Thread Elbow with Seat



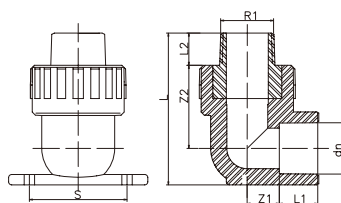
Size (mm)	L (mm)	L1 (mm)	H (mm)
20x1/2"	153	82	48.5
25x1/2"	153	82	55.6

Female Thread Elbow with Seat



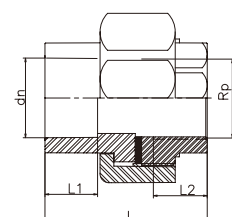
Size (mm)	L (mm)	L1 (mm)	Z1 (mm)	L2 (mm)	Z2 (mm)
20x1/2"	50	16.5	12.5	15	21
20x3/4"	50	16.5	13.5	15	21
25x1/2"	57.5	18.5	12.5	15	42.5
25x3/4"	57.5	18.5	15.5	15	42.5

Male Thread Elbow with Seat



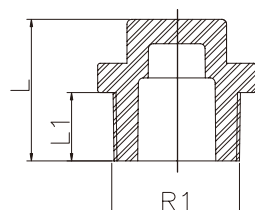
Size (mm)	L (mm)	L1 (mm)	Z1 (mm)	L2 (mm)	Z2 (mm)
20x1/2"	65	16.5	12.5	15	36
20x3/4"	65	16.5	13.5	15	36
25x1/2"	72.5	18.5	12.5	15	40
25x3/4"	72.5	18.5	15.5	15	40

Female Thread Union



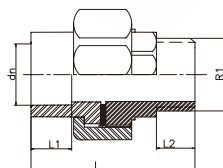
Size (mm)	L (mm)	L1 (mm)	L2 (mm)
20x1/2"	39	16.5	15
25x3/4"	43.8	18.5	15
32x1"	48	20.5	20.5

Male Thread Plug



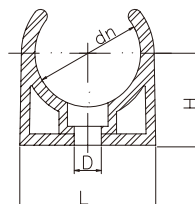
Size (mm)	L (mm)	L1 (mm)
R1/2"	26	13
R3/4"	29	14
R1"	34	16

Male Thread Union



Size (mm)	L (mm)	L1 (mm)	L2 (mm)
20x1/2"	52	16.5	15
25x3/4"	57.5	18.5	15
32x1"	65.5	20.5	18

Pipe Clamp



Size (mm)	L (mm)	H (mm)	D (mm)
20	28	20.5	8
25	33	23	8
32	40	26.8	8
40			

Ball Valve



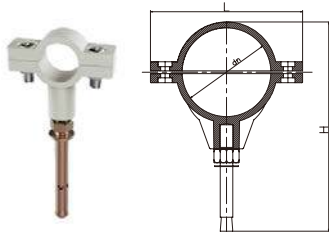
Size (mm)
20
25
32

Male Thread Union Ball Valve



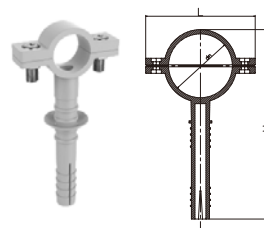
Size (mm)
20x1/2"
25x3/4"
32x1"
40x1 1/4"
50x1 1/2"
63x2"

Pipe Clamp (Screw)



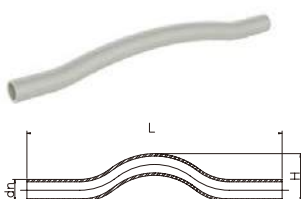
Size (mm)	L (mm)	H (mm)
20	50	90
25	57	101
32	64	118
40	76	126
50	87	135
63	104	150
75	113	162
90	130	186
110	148	206

Pipe Clamp with Steel Nail



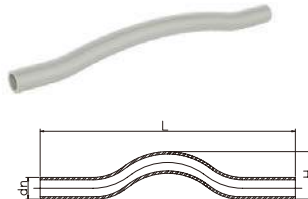
Size (mm)	L (mm)	H (mm)
20	50	110
25	57	105
32	64	113
40	76	112

Pipe Bending (Cold Water)



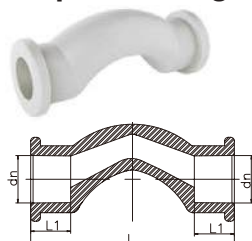
Size (mm)	L (mm)	H (mm)
20	215	45
25	325	50
32	315	65

Pipe Bending (Hot Water)



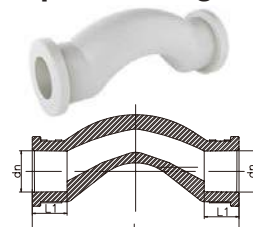
Size (mm)	L (mm)	H (mm)
20	215	45
25	325	50
32	315	65

Pipe Bending I



Size (mm)	L (mm)	L1 (mm)
20	84	16.5
25	95	18.5
32	120	21

Pipe Bending II



Size (mm)	L (mm)	L1 (mm)
20	98	16.5
25	125	18.5
32	140	21

Rubber Gasket



Size (mm)	SKU
40	TV-FG-01
50	TV-FG-02
63	TV-FG-03
75	TV-FG-04
90	TV-FG-05
110	TV-FG-06
125	
160	TV-FG-07
110	198

Pipe Cutter



Part Number	Model	Application Range (mm)
2350001		16~32

Size (mm)
20
25
32

Socket Fusion Welding Machine



Part Number	Model	Application Range (mm)
2360001	1000w	20-63
2360002	1600w	75-110
2360003	2500w	160

Welding Socket



Part Number	Model	Application Range (mm)
2370001		16
2370002		20
2370003		25
2370004		32
2370005		40
2370006		50
2370007		63
2370008		75
2370009		90
2370010		110
2370013		160

Definitions of abbreviated configuration description follow

Soc: Socket
 Spig: Spigot
 Fipt: Female Iron Pipe Thread
 Mipt: Male Iron Pipe Thread

Socket Fusion Joint for PP-R and PPR-CT Pipelines



1. Cut the pipe rectangularly with a pipe cutter. Take care that the pipe axis is free from burrs or cuttings debris and remove where necessary. Mark the welding depth at the end of the pipe according to the socket depth of fittings.
2. Clean the socket and the spigot with cleansing clothes.
3. After the welding machine reaches the necessary operating temperature, push the end of the pipe and fitting, without turning, up to the welding depth into the welding tool. Heat up the pipe's spigot and fitting's socket according to the following heating time.

The fusion is subject to the following data

Diameter (mm)	Welding Depth (mm)	Heating Time (s)	Welding Time (s)	Cooling Time (min)
16	9.8	5	4	2
20	11.0	5	4	2
25	12.5	7	4	2
32	14.6	8	6	4
40	17.0	12	6	4
50	20.0	18	6	4
63	23.9	24	8	6
75	27.5	30	8	8
90	32.0	40	8	8
110	38.0	50	10	8

Remark:

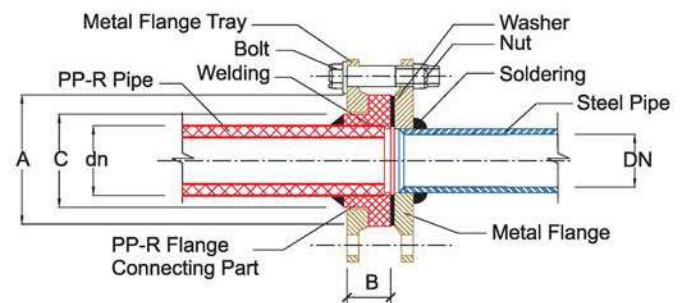
The heating time should comply with the requirement of products and be adjusted according to the working temperature. When the working temperature is below 5°, the heating time should be extended by 50%.

4. After the heating time, quickly remove the pipe and the fitting from the welding tools. Join them immediately without turning, until the marked welding depth is covered by the bead of PP-R from the fittings.
5. The joint elements have to be fixed during the specified assembly time. After the cooling period, the fused joint is ready for use.

Flange Joint PP-R and PPR-CT Pipelines

1. Wrap the PP-R pipe with the metal flange tray in advance.
2. Connect the PP-R pipe and flange faucet by heating welding.
3. Wrap the flange faucet with the metal flange tray.
4. Keep the flange of PP-R pipe and flange of steel pipe vertical to the axes of pipes.
5. Add the washer between the two flanges, the washer should be heat resistant and meet the sanitary requirement.
6. Set up the brackets, connect the two flanges with the same size bolt in one direction. The bolt should tighten without coaxial tension.

Flange Joint Illustration							Unit: mm
dn	40	50	63	75	90	110	
C	27	30	34	38	42	50	
B	50	60	75	99.5	119.4	146.0	
A	78	87	100	122	140	166	



Layout of Pipe

1. Pipe should be installed in an invisible manner, avoiding the main wall.
2. Pipe can be installed in pipe well, hole or ceiling. When diameter of pipe is not more than 25mm, the pipe could follow the grooved wall or cushion layer in the manner of butt-fusion connection. The laid node is showed in the picture 1, picture 2. The pipe used for heating should be protected by corrugated pipe sleeve which thickness is not less than 10mm.
3. If exposed to impact, freeze or sunlight, pipe should be protected reasonably.
4. When crossing the wall, girder, board or pole, pipe should be covered with sleeve pipe. If the crossed wall is underground wall, special moisture-resistant sleeve pipe is needed. Additional water-repellent measure should be taken into account when pipe crosses the floor layer or house wall.
5. Keep pipe far away from heating source. Vertical pipe is at least 400mm distant from water heater or cooker. If above requirement can't be fulfilled completely, heat-isolation measure should be taken with the distance not less than 200mm.
6. PP-R pipe must not be connected directly to water-heater where metal pipe with the length of at least 400mm should be used for transition.
7. Pipe should not cross extension slot or sedimentation slot. If pipe has to cross it, relevant measure should be taken against the extension or shearing distortion from pipe itself.
8. Metal pipe is used as supply and drainage pipe of tank and connection pipe from tank to valve.
9. The weight of valve should be fixed by additional support instead of pipe which is connected to valve.
10. Take UV protective or heat-isolation measurement when the pipe will be hanged in the air or exposed under the sun.
11. Lay the outdoor pipe connecting to house under the freeze-depth according to local climate. The depth of soil above the top of pipe should be not less than 300mm.

Fig.10 Pipe Crosses Steel Reinforced Concrete and Brick Wall
Unit: mm

() The sleeve used to wrap the heat isolation layer of the inner pipe

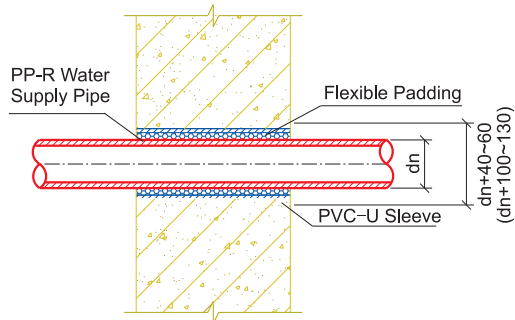


Fig.11 Pipe crosses roof surface (bearing persons)
Unit: mm

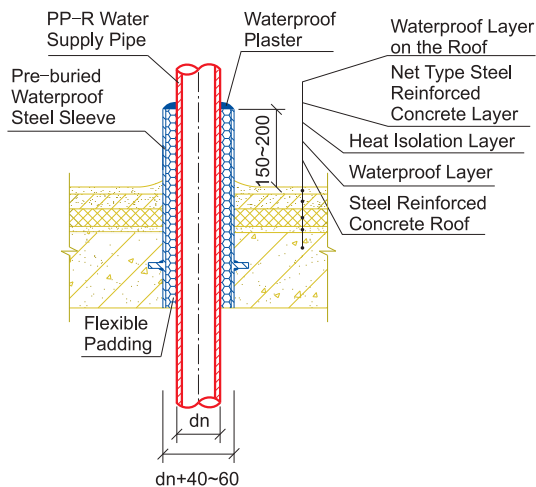


Fig.12 Pipe crosses roof surface (non-bearing persons)
Unit: mm

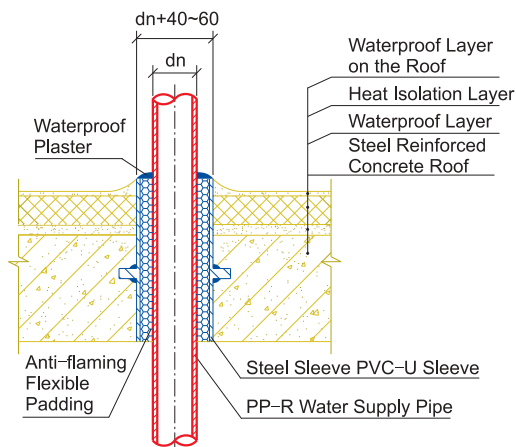


Fig.13 Pipe Crosses Ground
Unit: mm

() The sleeve used to wrap the heat isolation layer of the inner pipe

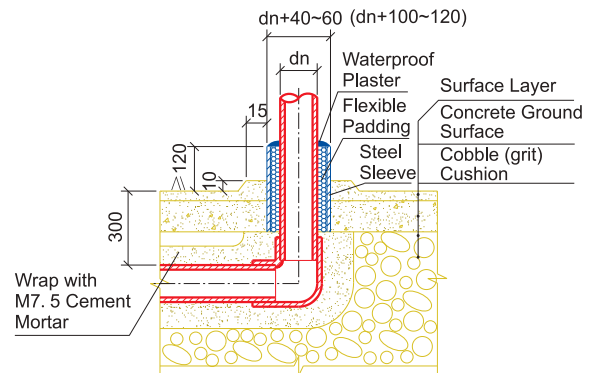


Fig.14 Pipe Crosses Steel Reinforced Concrete Pool
Unit: mm

(or water tank)

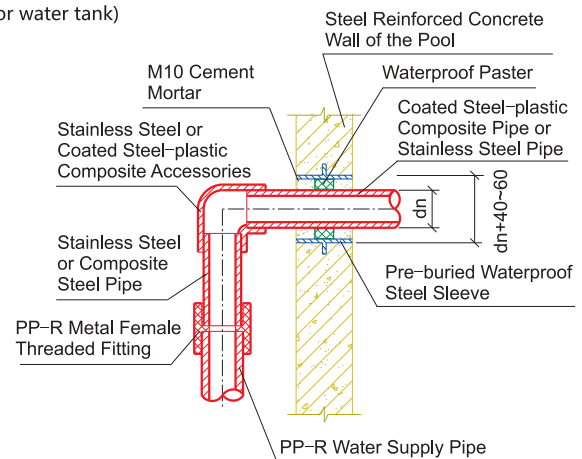


Fig.15 Pre-buried Waterproof Steel Sleeve
Unit: mm

() The sleeve used to wrap the heat isolation layer of the inner pipe

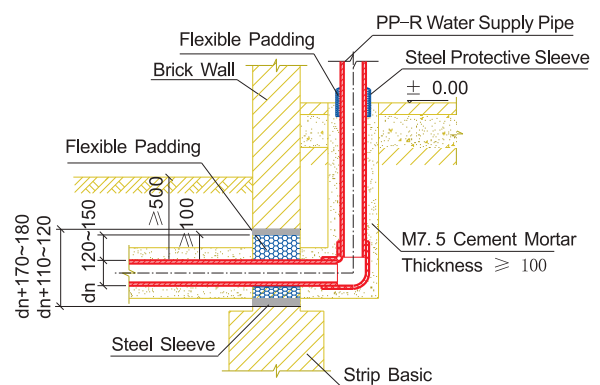


Fig. 1
Installation guide for embedded pipe

Unit: mm

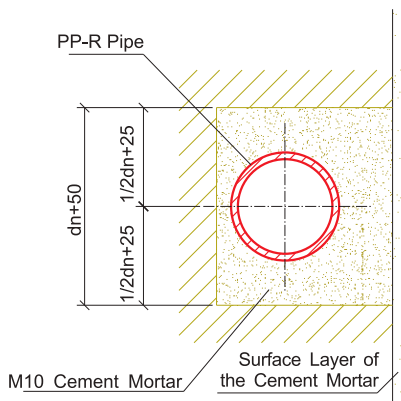
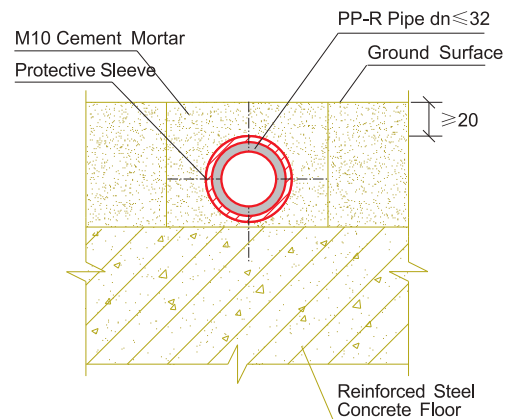


Fig. 2
Bury pipe in layer of backfilled groove

Unit: mm



Compensation for Pipe Distortion

Compensation measurement should be taken between the clamp fixing pipe so as to decrease and absorb the extension which leads to failure of fatigue in pipe for purpose of stable operation in pipe system. Usual measurement as follows

1. Bending leg is used as compensation for pipe system. It works following the theory of compensation from longitudinal expansion of bending leg. The method is also named after Bending Leg, showed as Fig.3. It is the simplest way and is primarily chosen
2. The straight part of pipe system could be changed into ring or rectangle compensator which forms the second Bending Leg for compensation. see Fig.4, Fig.5.
3. For heat-water pipe, it can be added with half-round mental support plate which can fix the pipe itself and absorb the expansion due to gap of different temperature. The method can reduce the extent of expansion effectively. as shown in Fig.6. The method works obviously and the Liansu' s relevant mental support plate is available now.
4. Aside from the method of Bending Leg, there is another method which replaces all the free clamp with fixed ones between designated fixed clamp. It results from the strategy of breaking up the whole into parts. Any kind of compensation measure depends on the design or field environment when we should make a choice .

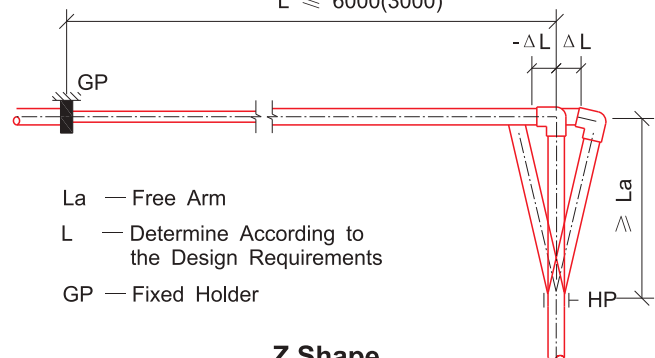
Fig.3
Sketch Map for Bending Leg in
Pipe System

Unit: mm

Note: The number in “()” is size for installation of heat-water pipe

L Shape

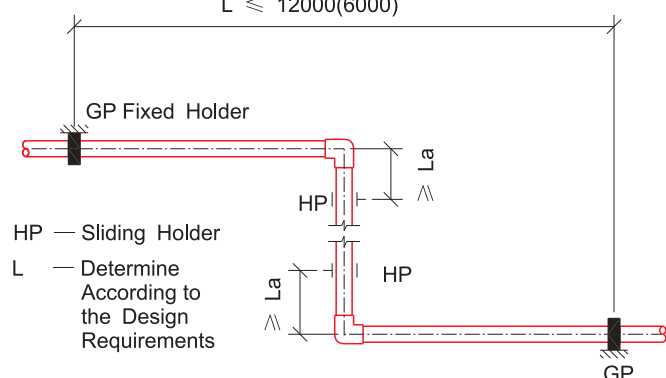
$L \leq 6000(3000)$



La — Free Arm
L — Determine According to the Design Requirements
GP — Fixed Holder

Z Shape

$L \leq 12000(6000)$



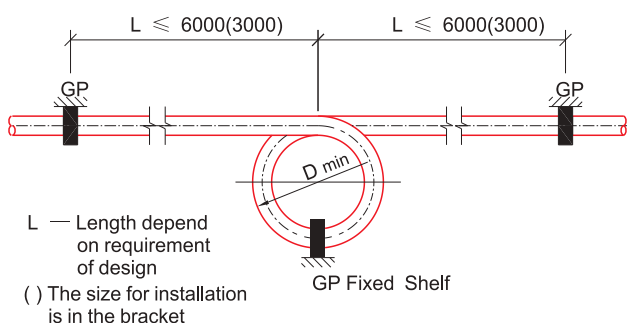
HP — Sliding Holder
L — Determine According to the Design Requirements

The minimum length of bending leg should conform to the list below :

Nominal Diameter: dn	20	25	32	40	50	63	75	90	110
Heating water pipe La	370	410	320	420	580	350	710	730	850
Cooling water pipe La	250	280	460	360	400	450	500	550	600

Fig.4
Installation of Ring-type Compensator

Unit: mm



Nominal Outside Diameter dn	20	25	32
Dmin	350	400	450

Fig.5
Installation of Rectangle-type Compensator

Unit: mm

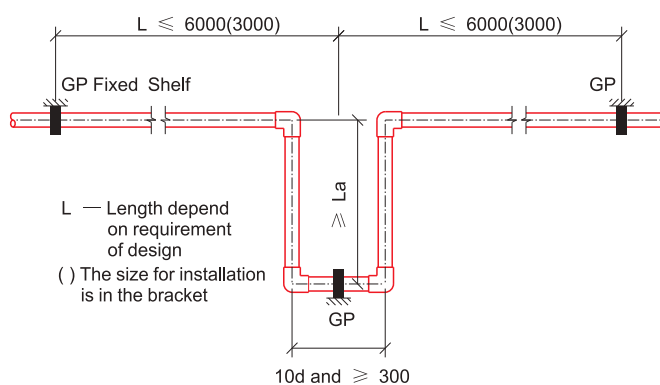
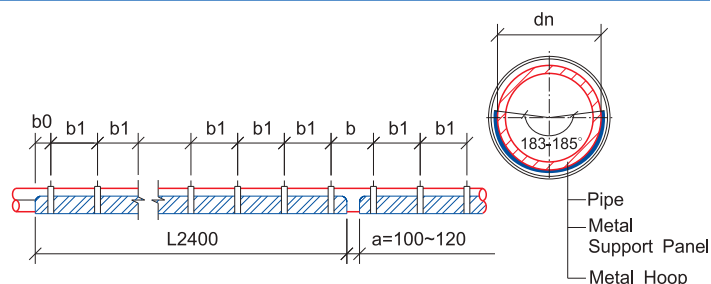


Fig 6 Metal Pipe Support and Installation

Nominal diameter dn	32	40	50	63	75	90	110
Distance of the supports b1	350	350	350	400	400	450	450
Thickness of the support panel	0.60	0.80	0.80	0.80	1.00	1.00	1.00



Pipe Construction

1. General Regulations

- 1.1** Check whether the appearance, quality and size of the pipe and fittings comply with the requirements of design and construction before construction. it is forbidden to use pipes with obvious scratch.
- 1.2** Review the S series of the pipe before construction, The mark on the pipe should face the outer side and placed in the apparent location.
- 1.3** All of the machines used for solvent weld connection should be supplied by the manufacturer, or the special welding machines have been verified by the authority parties.
- 1.4** Use a special pipe cutter to cut the pipe, the fraction surface should be vertical with the center line of the pipe.
- 1.5** Seal up all of the open areas immediately when construction is discontinued.
- 1.6** Pay attention to the low temperature brittleness of PP-R pipe when constructing in winter.
- 1.7** The pipe system can be sealed and used after it passes the water pressure test and final acceptance.

2. Crossing of the Pipe

- 2.1 The anti-leakage measurements should be well - prepared before crossing the pipe. The details of pipe crossing the floor are shown in figure 7 and figure 8. The crossing parts should be constructed with the clamps in the pipe system, take anti-leakage measurements, and fix the pipe well.
- 2.2 Pre-bury the steel waterproof sleeve when the pipe crosses the concrete wall in the basement. The construction details have been shown in figure 9.
- 3.3 Pre-bury the PVC-U sleeve when the pipe crosses brick wall or steel reinforced concrete wall. The construction details have been shown in figure 10.
- 3.4 Prepare the anti-leakage measurements when the pipe crosses the roof surface for bearing persons or non-bearing persons. The construction details have been showed in figure 11 and 12.
- 3.5 Lay the pipe under the concrete floor and cross the floor when introducing the pipe to the house from outside. The construction details have been shown in figure 13.
- 3.6 When the water inlet, outlet and drain to empty pipe or other pipes cross the steel reinforced concrete pool (or water tank), the crossing pipe sections should use coated steel-plastic composite pipe or stainless steel pipe with corrosion resistance from inner and outer sides. The construction details have been shown in figure 14.
- 3.7 Use corner type when introducing the pipe into the house, the length of the corner sections should be determined by the descendant length of the building, generally not less than 700mm.
- 3.8 When the pipe crosses multilayer of strips basic, then there should be gaps with height no less than 120-150mm on the pipe top. The construction details have been shown in figure 15.

Fig.7 Pipe Crosses Floor (I Type)

Unit: mm

The size for installation is in the bracket

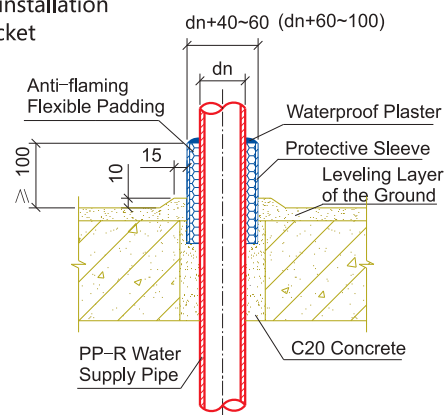


Fig.8 Pipe Crosses Floor (II Type)

Unit: mm

The size for installation is in the bracket

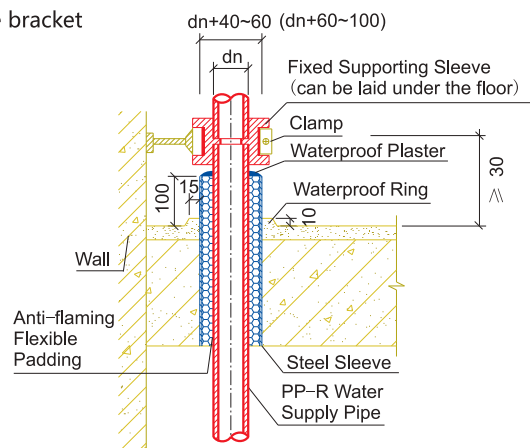
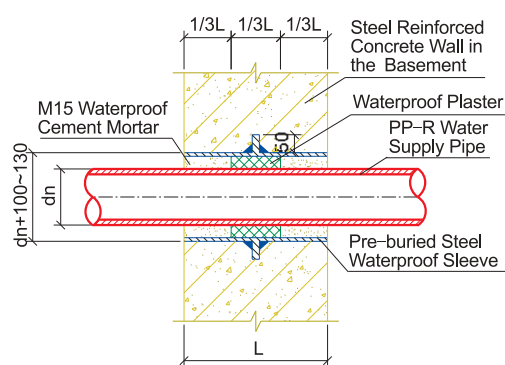


Fig.9 Pipe Crosses Concrete in the Basement

Unit: mm



3. Installation of the Holder and Hanger

- 3.1** Set clamps, holders or hangers according to different diameters and requirements in the installation. The location of the clamps, holders or hangers should be precise, and the setting should be smooth. Though the clamp is set close to the pipe, it should not damage the surface of the pipe.
- 3.2** In the vertical and horizontal pipe systems, the distance between the holders, hangers or clamps should comply with the requirements in the chart below. (mm)
- 3.3** When the pipe connects with metal accessories, the clamps, holders or hangers should be set on the metal accessories.
- 3.4** When use metal clamps, metal holders or metal hangers, the inner side of the hoops should be cylinder. There should be gasket such as rubber gasket between the hoops and the pipe. The body of the fixed holders and hangers should bear enough stiffness. They should not deformed.
- 3.5** Set reliable fixing measurements on the parts of tee, elbow, end of the water distribution point, valve, and the parts where the pipe crosses wall (or floor). The bending leg to compensate the flexibility of the pipe should not be fixed.

Nominal Diameter dn		20	25	32	40	50	63	75	90	110
Cold Water Pipe	Horizontal Pipe	600	750	900	1000	1200	1400	1600	1600	1800
	Vertical Pipe	1000	1200	1500	1700	1800	2000	2000	2100	2500
Hot Water Pipe	Horizontal Pipe	500	600	700	800	900	1000	1100	1200	1500
	Vertical Pipe	900	1000	1200	1400	1600	1700	1700	1800	2000

Note: When the cold water pipe and hot water pipe share the same holders and hangers, the distance between the holders and hangers should be determined according to the requirements of hot water pipe. With regards to the straight buried pipe, the distance between the clamps of cold water and hot water pipe can use 1.00~1.50m.

4. Anti-frozen, Heat Isolation and Heat Preservation of the Pipe

- 4.1** The pipe introduced into the house should be laid under the local frozen line. The thickness of the backfill earth above the pipe top should not less than 300mm.
- 4.2** The PP-R pipe should not surface when installed outdoor. Or take effective shading measurements when unavoidable.
- 4.3** Take anti-frozen measurements when installing the pipe in the area where it may freeze.
- 4.4** As regarding to the surface installation hot water pipe, the minimum thickness of heat preservation layer has been shown in the chart below.
- 4.5** Set reliable fixing measurements on the parts of tee, elbow, end of the water distribution point, valve, and the parts where the pipe crosses wall (or floor). The bending leg to compensate the flexibility of the pipe should not be fixed.

Heat conduction coefficient of the heat preservation material w/m.°C	0.030	0.035
Nominal diameter of the pipe (mm)	Recommended min. thickness of the heat preservation layer	
20	6mm or 1/4"	10mm or 3/8"
25	6mm or 1/4"	10mm or 3/8"
32	10mm or 3/8"	13mm or 1/2"
40	10mm or 3/8"	13mm or 1/2"
50	10mm or 3/8"	13mm or 1/2"
63	13mm or 1/2"	20mm or 3/4"
75	20mm or 3/4"	20mm or 3/4"
90	20mm or 3/4"	25mm or 1"
110	20mm or 3/4"	32mm or 1 1/4"

5. Safety Construction

- 5.1** Check the electric power and the voltage when using the solvent weld or electrofusion machines. Comply with the safety operation regulations of the electric tools. Maintain the cleaning of the tools and pay attention to prevent damp.
- 5.2** There should be no flame in the construction site. forbidden to store inflammable fluids in the construction site, and forbidden to bend the PP-R pipe by using flame.
- 5.3** Check if there is any object blocking the pipe before connection. Seal up the pipe end when stopping construction temporarily.
- 5.4** After sealing the straight buried pipe, stick related marks on the wall or the ground surface where the pipe is buried. It is forbidden to knock or peg metal nail or other sharp objects above the pipe.

■ Annex

The relationship between pipe series S and nominal pressure PN

- 1.** When the total using (design) coefficient of the pipe is 1.25, then the relationship of the pipe series and the nominal pressure PN shows in the below chart:
- 2.** When the total using (design) coefficient of the pipe is 1.5, then the relationship of the pipe series and the nominal pressure PN shows in the below chart:

Chart1. Relationship between the pipe series S and nominal pressure PN (C=1.25)

Pipe Series	S5	S4	S3.2	S2.5	S2
Nominal Pressure PN/MPa	1.25	1.6	2.0	2.5	3.2

Chart2. Relationship between the pipe series S and nominal pressure PN (C=1.5)

Pipe Series	S5	S4	S3.2	S2.5	S2
Nominal Pressure PN/MPa	1.0	1.25	1.6	2.0	2.5

THERMOVAR PPR PIPES S4.0 (PN12.5 S.F. 1.25)

Q			dn (mm)																	
(m ³ / h)	(L/s)	GPM	20		25		32		40		50		63		75		90		110	
			v	i	v	i	v	i	v	i	v	i	v	i	v	i	v	i	v	i
0.108	0.03	0.48	0.16	3.24																
0.144	0.04	0.64	0.21	5.51	0.14	1.79														
0.180	0.05	0.80	0.27	8.33	0.17	2.71														
0.216	0.06	0.95	0.32	11.67	0.20	3.79														
0.252	0.07	1.11	0.38	15.53	0.24	5.04	0.14	1.53												
0.288	0.08	1.27	0.43	19.88	0.27	6.46	0.17	1.95												
0.324	0.09	1.43	0.48	24.72	0.30	8.03	0.19	2.43	0.12	0.82										
0.360	0.10	1.59	0.54	30.03	0.34	9.76	0.21	2.95	0.13	1.00										
0.396	0.11	1.75	0.59	35.83	0.37	11.64	0.23	3.52	0.15	1.19										
0.432	0.12	1.91	0.64	42.08	0.41	13.67	0.25	4.13	0.16	1.39										
0.468	0.13	2.07	0.70	48.80	0.44	15.85	0.27	4.79	0.17	1.62	0.11	0.54								
0.504	0.14	2.23	0.75	55.97	0.47	18.18	0.29	5.50	0.19	1.85	0.12	0.62								
0.540	0.15	2.39	0.81	63.59	0.51	20.66	0.31	6.25	0.20	2.11	0.13	0.71								
0.576	0.16	2.54	0.86	71.66	0.54	23.27	0.33	7.04	0.21	2.37	0.14	0.80								
0.612	0.17	2.70	0.91	80.16	0.58	26.04	0.35	7.87	0.23	2.66	0.14	0.89								
0.648	0.18	2.86	0.97	89.10	0.61	28.94	0.37	8.75	0.24	2.95	0.15	0.99								
0.684	0.19	3.02	1.02	98.47	0.64	31.99	0.39	9.67	0.25	3.26	0.16	1.09	0.16	1.09						
0.720	0.20	3.18	1.07	108.28	0.68	35.17	0.41	10.64	0.26	3.59	0.17	1.20	0.17	1.20						
0.900	0.25	3.98	1.34	163.61	0.85	53.14	0.52	16.07	0.33	5.42	0.21	1.82	0.21	1.82						
1.080	0.30	4.77	1.61	229.25	1.01	74.46	0.62	22.52	0.40	7.60	0.25	2.55	0.25	2.55						
1.260	0.35	5.57	1.88	304.90	1.18	99.03	0.72	29.95	0.46	10.10	0.30	3.39	0.30	3.39	0.13	0.17				
1.440	0.40	6.36	2.15	390.34	1.35	126.79	0.83	38.34	0.53	12.93	0.34	4.34	0.34	4.34	0.15	0.60				
1.620	0.45	7.16	2.42	485.37	1.52	157.65	0.93	47.68	0.60	16.08	0.38	5.39	0.38	5.39	0.17	0.75	0.12	0.31		
1.800	0.50	7.95	2.68	589.82	1.69	191.58	1.04	57.94	0.66	19.54	0.42	6.55	0.42	6.55	0.19	0.91	0.13	0.38		
1.980	0.55	8.75	2.95	703.55	1.86	228.52	1.14	69.11	0.73	23.31	0.47	7.81	0.47	7.81	0.21	1.08	0.14	0.45		
2.160	0.60	9.54	3.22	826.43	2.03	268.43	1.24	81.18	0.79	27.38	0.51	9.18	0.51	9.18	0.23	1.27	0.16	0.53		
2.340	0.65	10.34			2.20	311.28	1.35	94.14	0.86	31.75	0.55	10.64	0.55	10.64	0.24	1.48	0.17	0.61	0.11	0.23
2.520	0.70	11.13			2.37	357.02	1.45	107.97	0.93	36.42	0.59	12.21	0.59	12.21	0.26	1.69	0.18	0.7	0.12	0.26
2.100	0.75	9.28			2.54	405.62	1.55	122.67	0.99	41.38	0.63	13.87	0.63	13.87	0.28	1.93	0.20	0.79	0.13	0.30
2.880	0.80	12.72			2.71	457.06	1.66	138.23	1.06	48.63	0.68	15.63	0.68	15.63	0.3	2.17	0.21	0.90	0.14	0.34
3.060	0.85	13.52			2.88	511.31	1.76	154.63	1.13	52.16	0.72	17.49	0.72	17.49	0.32	2.43	0.22	1.00	0.15	0.38
3.240	0.90	14.31			3.04	568.34	1.86	171.88	1.19	57.98	0.76	19.44	0.76	19.44	0.34	2.70	0.24	1.11	0.16	0.42
3.420	0.95	15.11					1.97	189.96	1.26	64.08	0.80	21.48	0.80	21.48	0.36	2.98	0.25	1.23	0.17	0.46
3.600	1.00	15.90					2.07	208.87	1.32	70.46	0.85	23.62	0.85	23.62	0.38	3.28	0.26	1.35	0.17	0.51
3.780	1.05	16.70					2.17	228.60	1.39	77.11	0.89	25.85	0.89	25.85	0.39	3.59	0.27	1.48	0.18	0.55
3.960	1.10	17.49					2.28	249.14	1.46	84.04	0.93	28.17	0.93	28.17	0.41	3.91	0.29	1.61	0.19	0.60
4.140	1.15	18.29					2.38	270.50	1.52	91.25	0.97	30.59	0.97	30.59	0.43	4.25	0.30	1.75	0.20	0.66
4.320	1.20	19.08					2.48	292.66	1.59	98.72	1.01	33.09	1.01	33.09	0.45	4.59	0.31	1.90	0.21	0.71
4.500	1.25	19.88					2.59	315.61	1.66	106.46	1.06	35.69	1.06	35.69	0.47	4.95	0.33	2.04	0.22	0.77
4.680	1.30	20.67					2.69	339.37	1.72	114.48	1.10	38.37	1.10	38.37	0.49	5.33	0.34	2.20	0.23	0.82
4.860	1.35	21.47					2.79	363.91	1.79	122.75	1.14	41.15	1.14	41.15	0.51	5.71	0.35	2.36	0.24	0.88

THERMOVAR PPR PIPES S4.0 (PN12.5 S.F. 1.25)

Q			dn (mm)																	
(m3 / h)	(L/s)	GPM	20		25		32		40		50		63		75		90		110	
			v	i	v	i	v	i	v	i	v	i	v	i	v	i	v	i		
5.040	1.40	22.26					2.90	389.23	1.85	131.30	1.18	44.01	0.75	14.41	0.53	6.11	0.37	2.52	0.24	0.94
5.220	1.45	23.06					3.00	415.34	1.92	140.10	1.23	46.96	0.78	15.37	0.55	6.52	0.38	2.69	0.25	1.01
5.400	1.50	23.85							1.99	140.17	1.27	50.00	0.80	16.37	0.56	6.94	0.39	2.86	0.26	1.07
5.580	1.55	24.65							2.05	158.50	1.31	53.13	0.83	17.39	0.58	7.38	0.41	3.04	0.27	1.14
5.760	1.60	25.44							2.12	168.09	1.35	56.35	0.86	18.44	0.60	7.82	0.42	3.23	0.28	1.21
5.940	1.65	26.24							2.19	177.94	1.40	59.65	0.88	19.53	0.62	8.28	0.43	3.42	0.29	1.28
6.120	1.70	27.03							2.25	188.04	1.44	63.03	0.91	20.63	0.64	8.75	0.44	3.61	0.30	1.35
6.300	1.75	27.83							2.32	198.40	1.48	66.51	0.94	21.77	0.66	9.23	0.46	3.81	0.31	1.43
6.480	1.80	28.62							2.38	209.01	1.52	70.06	0.96	22.94	0.68	9.73	0.47	4.01	0.31	1.50
6.660	1.85	29.42							2.45	219.88	1.56	73.71	0.99	24.13	0.70	10.23	0.48	4.22	0.32	1.58
6.840	1.90	30.21							2.52	231.00	1.61	77.43	1.02	25.35	0.71	10.75	0.50	4.44	0.33	1.66
7.020	1.95	31.01							2.58	242.37	1.65	81.25	1.04	26.60	0.73	11.28	0.51	4.65	0.34	1.74
7.200	2.00	31.80							2.65	254.00	1.69	85.14	1.07	27.87	0.75	11.82	0.52	4.88	0.35	1.83
7.560	2.10	33.39							2.78	277.99	1.78	93.19	1.12	30.50	0.79	12.94	0.55	5.34	0.37	2.00
7.920	2.20	34.98							2.91	302.97	1.86	101.56	1.18	33.25	0.83	14.10	0.57	5.82	0.38	2.18
8.280	2.30	36.57							3.05	328.94	1.95	110.27	1.23	36.09	0.86	15.31	0.60	6.32	0.40	2.37
8.640	2.40	38.16									2.03	119.03	1.28	39.05	0.90	16.56	0.63	6.83	0.42	2.56
9.000	2.50	39.75									2.11	128.66	1.34	42.12	0.94	17.86	0.65	7.37	0.44	2.76
9.360	2.60	41.34									2.20	138.34	1.39	45.28	0.98	19.20	0.68	7.92	0.45	2.97
9.720	2.70	42.93									2.28	148.34	1.44	48.56	1.01	20.59	0.71	8.5	0.47	3.18
10.080	2.80	44.52									2.37	158.67	1.50	51.94	1.05	22.03	0.73	9.09	0.49	3.40
10.440	2.90	46.11									2.45	169.31	1.55	55.42	1.09	23.50	0.76	9.7	0.51	3.63
10.800	3.00	47.70									2.54	180.27	1.60	59.01	1.13	25.02	0.78	10.33	0.52	3.87
11.160	3.10	49.29									2.62	191.54	1.66	62.7	1.17	26.59	0.81	10.97	0.54	4.11
11.520	3.20	50.88									2.71	203.13	1.71	66.49	1.20	28.20	0.84	11.64	0.56	4.36
11.880	3.30	52.47									2.79	215.03	1.76	70.39	1.24	29.85	0.86	12.32	0.58	4.61
12.240	3.40	54.06									2.88	227.24	1.82	74.38	1.28	31.54	0.89	13.02	0.59	4.87
12.600	3.50	55.65									2.96	239.76	1.87	78.48	1.32	33.28	0.91	13.73	0.61	5.14
12.960	3.60	57.24									3.04	252.58	1.92	82.68	1.35	35.06	0.94	14.47	0.63	5.42
13.320	3.70	58.83											1.98	86.98	1.39	36.89	0.97	15.22	0.65	5.70
13.680	3.80	60.42											2.03	91.38	1.43	38.75	0.99	15.99	0.66	5.99
14.040	3.90	62.01											2.09	95.88	1.47	40.66	1.02	16.78	0.68	6.28
14.400	4.00	63.60											2.14	100.48	1.50	42.61	1.05	17.58	0.70	6.58
14.760	4.10	65.19											2.19	105.17	1.54	44.60	1.07	18.40	0.72	6.89
15.120	4.20	66.78											2.25	109.97	1.58	46.63	1.10	19.24	0.73	7.21
15.480	4.30	68.37											2.30	114.86	1.62	48.71	1.12	20.10	0.75	7.53
15.840	4.40	69.96											2.35	119.85	1.65	50.82	1.15	20.97	0.77	7.85
16.200	4.50	71.55											2.41	124.94	1.69	52.98	1.18	21.86	0.79	8.19
16.560	4.60	73.14											2.46	130.12	1.73	55.18	1.20	22.77	0.80	8.53
16.920	4.70	74.73											2.51	135.40	1.77	57.42	1.23	23.70	0.82	8.87
17.280	4.80	76.32											2.57	140.78	1.80	59.70	1.25	24.64	0.84	9.22
17.640	4.90	77.91											2.62	146.25	1.84	62.02	1.28	25.59	0.86	9.58

PP-R AND PPR-CT WATER PIPES

THERMOVAR PPR PIPES S4.0 (PN12.5 S.F. 1.25)

Q			dn (mm)																	
(m ³ / h)	(L/s)	GPM	20		25		32		40		50		63		75		90		110	
			v	i	v	i	v	i	v	i	v	i	v	i	v	i	v	i	v	i
18.000	5.00	79.50											2.67	151.82	1.88	64.38	1.31	26.57	0.87	9.95
18.360	5.10	81.09											2.73	157.49	1.92	66.79	1.33	27.56	0.89	10.32
18.720	5.20	82.68											2.78	163.25	1.95	69.23	1.36	28.57	0.91	10.70
19.080	5.30	84.27											2.83	169.11	1.99	71.71	1.39	29.59	0.93	11.08
19.440	5.40	85.86											2.89	175.06	2.03	74.23	1.41	30.63	0.94	11.47
19.800	5.50	87.45											2.94	181.10	2.07	76.80	1.44	31.69	0.96	11.87
20.160	5.60	89.04											2.99	187.24	2.11	79.40	1.46	32.77	0.98	12.27
20.520	5.70	90.63											3.05	193.47	2.14	82.04	1.49	33.86	1.00	12.68
20.880	5.80	92.22													2.18	84.73	1.52	34.96	1.01	13.09
21.240	5.90	93.81													2.22	87.45	1.54	36.09	1.03	13.51
21.600	6.00	95.40													2.26	90.21	1.57	37.23	1.05	13.94
21.960	6.10	96.99													2.29	93.01	1.59	38.38	1.06	14.37
22.320	6.20	98.58													2.33	95.85	1.62	39.55	1.08	14.81
22.680	6.30	100.17													2.37	98.73	1.65	40.74	1.10	15.26
23.040	6.40	101.76													2.41	101.65	1.67	41.95	1.12	15.71
23.400	6.50	103.35													2.44	104.61	1.7	43.17	1.13	16.16
23.760	6.60	104.94													2.48	107.61	1.72	44.41	1.15	16.63
24.120	6.70	106.53													2.52	110.64	1.75	45.66	1.17	17.10
24.480	6.80	108.12													2.56	113.72	1.78	46.93	1.19	17.57
24.840	6.90	109.71													2.59	116.83	1.80	48.21	1.20	18.05
25.200	7.00	111.30													2.63	119.98	1.83	49.51	1.22	18.54
25.560	7.10	112.89													2.67	123.17	1.86	50.83	1.24	19.03
25.920	7.20	114.48													2.71	126.40	1.88	52.16	1.26	19.53
26.280	7.30	116.07													2.74	129.67	1.91	53.51	1.27	20.04
26.640	7.40	117.66													2.78	132.97	1.93	54.87	1.29	20.55
27.000	7.50	119.25													2.82	136.31	1.96	56.25	1.31	21.06
27.360	7.60	120.84													2.86	139.70	1.99	57.65	1.33	21.59
27.720	7.70	122.43													2.89	143.12	2.01	59.06	1.34	22.11
28.080	7.80	124.02													2.93	146.57	2.04	60.49	1.36	22.65
28.440	7.90	125.61													2.97	150.07	2.06	61.93	1.38	23.19
28.800	8.00	127.20													3.01	153.60	2.09	63.39	1.40	23.73
29.160	8.10	128.79															2.12	64.86	1.41	24.29
29.520	8.20	130.38															2.14	66.35	1.43	24.84
29.880	8.30	131.97															2.17	67.85	1.45	25.41
30.240	8.40	133.56															2.20	69.37	1.47	25.98
30.600	8.50	135.15															2.22	70.91	1.48	26.55
30.960	8.60	136.74															2.25	72.46	1.50	27.13
31.320	8.70	138.33															2.27	74.03	1.52	27.72
31.680	8.80	139.92															2.30	75.61	1.54	28.31
32.040	8.90	141.51															2.33	77.21	1.55	28.91
32.400	9.00	143.10															2.35	78.82	1.57	29.51
32.760	9.10	144.69															2.38	80.45	1.59	30.12

THERMOVAR PPR PIPES S4.0 (PN12.5 S.F. 1.25)

Q			dn (mm)																	
(m ³ / h)	(L/s)	GPM	20		25		32		40		50		63		75		90		110	
			v	i	v	i	v	i	v	i	v	i	v	i	v	i	v	i	v	i
32.760	9.10	144.69															2.38	80.45	1.59	30.12
33.120	9.20	146.28															2.40	82.09	1.61	30.74
33.480	9.30	147.87															2.43	83.75	1.62	31.36
33.840	9.40	149.46															2.46	85.42	1.64	31.98
34.200	9.50	151.05															2.48	87.11	1.66	32.62
34.560	9.60	152.64															2.51	88.81	1.68	33.25
34.920	9.70	154.23															2.53	90.53	1.69	33.9
35.280	9.80	155.82															2.56	92.37	1.71	34.55
35.640	9.90	157.41															2.59	94.02	1.73	35.2
36.000	10.00	159.00															2.61	95.78	1.75	35.86
36.900	10.25	162.98															2.68	100.26	1.79	37.54
37.800	10.50	166.95															2.74	104.83	1.83	39.25
38.700	10.75	170.93															2.81	109.49	1.88	41.00
39.600	11.00	174.90															2.87	114.25	1.92	42.78
40.500	11.25	178.88															2.94	119.1	1.96	44.59
41.400	11.50	182.85															3.01	124.04	2.01	46.45
42.300	11.75	186.83																	2.05	48.33
43.200	12.00	190.80																	2.09	50.25
44.100	12.25	194.78																	2.14	52.20
45.000	12.50	198.75																	2.18	54.19
45.900	12.75	202.73																	2.23	56.21
46.800	13.00	206.70																	2.27	58.27
47.700	13.25	210.68																	2.31	60.36
48.600	13.50	214.65																	2.36	62.48
49.500	13.75	218.63																	2.40	64.64
50.400	14.00	222.60																	2.44	66.83
51.300	14.25	226.58																	2.49	69.06
52.200	14.50	230.55																	2.53	71.32
53.100	14.75	234.53																	2.58	73.61
54.000	15.00	238.50																	2.62	75.93
55.800	15.50	246.45																	2.71	80.68
56.700	15.75	250.43																	2.75	83.10
57.600	16.00	254.40																	2.79	85.56
58.500	16.25	258.38																	2.84	88.05
59.400	16.50	262.35																	2.88	90.57
60.300	16.75	266.33																	2.92	93.13
61.200	17.00	270.30																	2.97	95.72
62.100	17.25	274.28																	3.01	98.34
63.000	17.50	278.25																	3.06	100.99

PP-R AND PPR-CT WATER PIPES

THERMOVAR PPR PIPES S3.2 (PN16 S.F. 1.25)

Q			dn (mm)																	
(m3 / h)	(L/s)	GPM	20		25		32		40		50		63		75		90		110	
			v	i	v	i	v	i	v	i	v	i	v	i	v	i	v	i	v	i
0.108	0.03	0.48	0.18	4.49																
0.144	0.04	0.64	0.25	7.65	0.16	2.58														
0.180	0.05	0.80	0.31	11.55	0.20	3.90														
0.216	0.06	0.95	0.37	16.19	0.24	5.46														
0.252	0.07	1.11	0.43	21.53	0.28	7.26	0.17	2.11												
0.288	0.08	1.27	0.49	27.56	0.31	9.30	0.19	2.70												
0.324	0.09	1.43	0.55	34.27	0.35	11.56	0.21	3.36	0.14	1.13										
0.360	0.10	1.59	0.61	41.65	0.39	14.05	0.24	4.08	0.15	1.38										
0.396	0.11	1.75	0.68	49.68	0.43	16.76	0.26	4.87	0.17	1.64										
0.432	0.12	1.91	0.74	58.36	0.47	19.69	0.28	5.72	0.18	1.93										
0.468	0.13	2.07	0.80	67.67	0.51	22.83	0.31	6.63	0.20	2.24	0.13	0.76								
0.504	0.14	2.23	0.86	77.62	0.55	26.18	0.33	7.61	0.21	2.57	0.14	0.87								
0.540	0.15	2.39	0.92	88.19	0.59	29.75	0.35	8.64	0.23	2.92	0.15	0.99								
0.576	0.16	2.54	0.98	99.37	0.63	33.52	0.38	9.74	0.24	3.29	0.16	1.12								
0.612	0.17	2.70	1.04	111.16	0.67	37.50	0.40	10.90	0.26	3.68	0.17	1.25								
0.648	0.18	2.86	1.11	123.56	0.71	41.68	0.43	12.11	0.27	4.09	0.17	1.39								
0.684	0.19	3.02	1.17	136.56	0.75	46.06	0.45	13.39	0.29	4.52	0.18	1.53								
0.720	0.20	3.18	1.23	150.15	0.79	50.65	0.47	14.72	0.30	4.96	0.19	1.69								
0.900	0.25	3.98	1.54	226.89	0.98	76.54	0.59	22.24	0.38	7.50	0.24	2.55	0.15	0.81						
1.080	0.30	4.77	1.84	317.91	1.18	107.24	0.71	31.16	0.45	10.51	0.29	3.57	0.18	1.14						
1.260	0.35	5.57	2.15	422.82	1.38	142.63	0.83	41.44	0.53	13.98	0.34	4.75	0.21	1.51	0.15	0.65				
1.440	0.40	6.36	2.46	541.30	1.57	182.59	0.95	53.06	0.61	17.90	0.39	6.08	0.24	1.93	0.17	0.84				
1.620	0.45	7.16	2.76	673.09	1.77	227.05	1.06	65.97	0.68	22.25	0.44	7.56	0.27	2.40	0.19	1.04	0.13	0.42		
1.800	0.50	7.95	3.07	817.94	1.96	275.91	1.18	80.17	0.76	27.04	0.49	9.18	0.30	2.92	0.22	1.26	0.15	0.52		
1.980	0.55	8.75			2.16	329.11	1.30	95.63	0.83	32.26	0.53	10.96	0.33	3.48	0.24	1.51	0.16	0.61		
2.160	0.60	9.54			2.36	386.59	1.42	112.33	0.91	37.89	0.58	12.87	0.36	4.09	0.26	1.77	0.18	0.72		
2.340	0.65	10.34			2.55	448.3	1.54	130.26	0.98	43.94	0.63	14.92	0.39	4.75	0.28	2.05	0.19	0.84	0.13	0.32
2.520	0.70	11.13			2.75	514.17	1.66	149.40	1.06	50.40	0.68	17.11	0.42	5.44	0.30	2.35	0.21	0.96	0.14	0.36
2.700	0.75	11.93			2.95	584.17	1.77	169.74	1.14	57.26	0.73	19.44	0.46	6.18	0.32	2.68	0.22	1.09	0.15	0.41
2.880	0.80	12.72			3.14	658.25	1.89	191.27	1.21	64.52	0.78	21.91	0.49	6.97	0.34	3.01	0.24	1.23	0.16	0.47
3.060	0.85	13.52					2.01	213.97	1.29	72.18	0.83	24.51	0.52	7.80	0.37	3.37	0.25	1.38	0.17	0.52
3.240	0.90	14.31					2.13	237.83	1.36	80.23	0.87	27.25	0.55	8.67	0.39	3.75	0.27	1.53	0.18	0.58
3.420	0.95	15.11					2.25	262.85	1.44	88.67	0.92	30.11	0.58	9.58	0.41	4.14	0.28	1.69	0.19	0.64
3.600	1.00	15.90					2.37	289.02	1.51	97.49	0.97	33.11	0.61	10.53	0.43	4.55	0.30	1.86	0.20	0.70
3.780	1.05	16.70					2.48	316.32	1.59	106.70	1.02	36.24	0.64	11.52	0.45	4.99	0.31	2.03	0.21	0.77
3.960	1.10	17.49					2.60	344.75	1.67	116.29	1.07	36.49	0.67	12.56	0.47	5.43	0.33	2.22	0.22	0.84
4.140	1.15	18.29					2.72	374.30	1.74	126.26	1.12	42.88	0.70	13.64	0.49	5.90	0.34	2.41	0.23	0.91
4.320	1.20	19.08					2.84	404.96	1.82	136.60	1.17	46.39	0.73	14.75	0.52	6.38	0.36	2.6	0.24	0.99
4.500	1.25	19.88					2.96	436.73	1.89	147.32	1.21	50.03	0.76	15.91	0.54	6.88	0.37	2.81	0.25	1.07
4.680	1.30	20.67					3.08	469.59	1.97	158.41	1.26	53.79	0.79	17.11	0.56	7.40	0.39	3.02	0.26	1.15
4.860	1.35	21.47							2.04	169.86	1.31	57.68	0.82	18.35	0.58	7.94	0.40	3.24	0.27	1.23

THERMOVAR PPR PIPES S3.2 (PN16 S.F. 1.25)

Q			dn (mm)																	
(m3 / h)	(L/s)	GPM	20		25		32		40		50		63		75		90		110	
			v	i	v	i	v	i	v	i	v	i	v	i	v	i	v	i		
5.040	1.40	22.26							2.12	181.68	1.36	61.70	0.85	19.62	0.6	8.49	0.42	3.46	0.28	1.31
5.220	1.45	23.06							2.20	193.87	1.41	65.84	0.88	20.94	0.62	9.06	0.43	3.69	0.29	1.40
5.400	1.50	23.85							2.27	206.42	1.46	70.10	0.91	22.29	0.65	9.64	0.45	3.93	0.30	1.49
5.580	1.55	24.65							2.35	219.32	1.51	74.48	0.94	23.69	0.67	10.25	0.46	4.18	0.31	1.59
5.760	1.60	25.44							2.42	232.59	1.55	78.90	0.97	25.12	0.69	10.87	0.48	4.43	0.32	1.68
5.940	1.65	26.24							2.50	246.22	1.60	83.62	1.00	26.59	0.71	11.50	0.49	4.69	0.33	1.78
6.120	1.70	27.03							2.57	260.20	1.65	88.36	1.03	28.1	0.73	12.16	0.51	4.96	0.34	1.88
6.300	1.75	27.83							2.65	274.53	1.70	93.23	1.06	29.65	0.75	12.83	0.52	5.23	0.35	1.98
6.480	1.80	28.62							2.73	289.22	1.75	98.22	1.09	31.24	0.77	13.51	0.54	5.51	0.36	2.09
6.660	1.85	29.42							2.80	304.26	1.80	103.33	1.12	32.86	0.80	14.22	0.55	5.80	0.37	2.20
6.840	1.90	30.21							2.88	319.65	1.85	108.55	1.15	34.52	0.82	14.93	0.57	6.09	0.38	2.31
7.020	1.95	31.01							2.95	335.38	1.89	113.90	1.18	36.22	0.84	15.67	0.58	6.39	0.39	2.42
7.200	2.00	31.80							3.03	351.46	1.94	119.36	1.21	37.96	0.86	16.42	0.60	6.70	0.40	2.54
7.560	2.10	33.39									2.04	130.63	1.27	41.55	0.90	17.97	0.63	7.33	0.42	2.78
7.920	2.20	34.98									2.14	142.37	1.34	45.28	0.95	19.59	0.65	7.99	0.44	3.03
8.280	2.30	36.57									2.23	154.57	1.40	49.16	0.99	21.27	0.68	8.67	0.46	3.29
8.640	2.40	38.16									2.33	167.24	1.46	53.19	1.03	23.01	0.71	9.38	0.48	3.56
9.000	2.50	39.75									2.43	180.36	1.52	57.36	1.08	24.81	0.74	10.12	0.50	3.84
9.360	2.60	41.34									2.53	193.93	1.58	61.68	1.12	26.68	0.77	10.88	0.52	4.13
9.720	2.70	42.93									2.62	207.95	1.64	66.14	1.16	28.61	0.80	11.67	0.54	4.43
10.080	2.80	44.52									2.72	222.43	1.70	70.74	1.20	30.60	0.83	12.48	0.56	4.74
10.440	2.90	46.11									2.82	237.34	1.76	75.49	1.25	32.65	0.86	13.32	0.58	5.05
10.800	3.00	47.70									2.91	252.71	1.82	80.37	1.29	34.77	0.89	14.18	0.60	5.38
11.160	3.10	49.29									3.01	268.51	1.88	85.40	1.33	36.94	0.92	15.07	0.62	5.72
11.520	3.20	50.88									3.11	284.75	1.94	90.57	1.38	39.18	0.95	15.98	0.64	6.06
11.880	3.30	52.47											2.00	95.87	1.42	41.47	0.98	16.91	0.66	6.42
12.240	3.40	54.06											2.06	101.31	1.46	43.82	1.01	17.87	0.68	6.78
12.600	3.50	55.65											2.12	106.90	1.51	46.24	1.04	18.86	0.70	7.16
12.960	3.60	57.24											2.19	112.62	1.55	48.71	1.07	19.87	0.72	7.54
13.320	3.70	58.83											2.12	118.47	1.59	51.25	1.10	20.90	0.74	7.93
13.680	3.80	60.42											2.31	124.46	1.63	53.84	1.13	21.96	0.76	8.33
14.040	3.90	62.01											2.37	130.59	1.68	56.49	1.16	23.04	0.78	8.74
14.400	4.00	63.60											2.43	136.85	1.72	59.20	1.19	24.14	0.80	9.16
14.760	4.10	65.19											2.49	143.25	1.76	61.96	1.22	25.27	0.82	9.59
15.120	4.20	66.78											2.55	149.78	1.81	64.79	1.25	26.42	0.84	10.03
15.480	4.30	68.37											2.61	156.44	1.85	67.67	1.28	27.60	0.86	10.47
15.840	4.40	69.96											2.67	163.24	1.89	70.61	1.31	28.80	0.88	10.93
16.200	4.50	71.55											2.73	170.17	1.94	73.61	1.34	30.02	0.90	11.39
16.560	4.60	73.14											2.79	177.23	1.98	76.66	1.37	31.27	0.92	11.86
16.920	4.70	74.73											2.85	184.42	2.02	79.78	1.4	32.54	0.94	12.34
17.280	4.80	76.32											2.91	191.75	2.07	82.94	1.43	33.83	0.96	12.83

PP-R AND PPR-CT WATER PIPES

THERMOVAR PPR PIPES S3.2 (PN16 S.F. 1.25)

Q			dn (mm)																	
(m ³ / h)	(L/s)	GPM	20		25		32		40		50		63		75		90		110	
			v	i	v	i	v	i	v	i	v	i	v	i	v	i	v	i	v	i
17.640	4.90	77.91											2.97	199.21	2.11	86.17	1.46	35.14	0.98	13.33
18.000	5.00	79.50											3.03	206.79	2.15	89.45	1.49	36.48	1.00	13.84
18.360	5.10	81.09													2.19	92.79	1.52	37.84	1.02	14.36
18.720	5.20	82.68													2.24	96.18	1.55	39.23	1.04	14.88
19.080	5.30	84.27													2.28	99.63	1.58	40.63	1.06	15.42
19.440	5.40	85.86													2.32	103.14	1.61	42.06	1.08	15.96
19.800	5.50	87.45													2.37	106.70	1.64	43.52	1.10	16.51
20.160	5.60	89.04													2.41	110.31	1.67	44.99	1.12	17.07
20.520	5.70	90.63													2.45	113.99	1.70	46.49	1.14	17.64
20.880	5.80	92.22													2.50	117.71	1.73	48.01	1.16	18.22
21.240	5.90	93.81													2.54	121.50	1.76	49.55	1.18	18.80
21.600	6.00	95.40													2.58	125.33	1.79	51.12	1.20	19.39
21.960	6.10	96.99													2.62	129.22	1.82	52.70	1.22	20.00
22.320	6.20	98.58													2.67	133.17	1.85	54.31	1.24	20.61
22.680	6.30	100.17													2.71	137.17	1.88	55.95	1.36	21.23
23.040	6.40	101.76													2.75	141.23	1.91	57.60	1.28	21.85
23.400	6.50	103.35													2.80	145.34	1.93	59.28	1.30	22.49
23.760	6.60	104.94													2.84	149.50	1.96	60.97	1.32	23.13
24.120	6.70	106.53													2.88	153.72	1.99	62.69	1.34	23.79
24.480	6.80	108.12													2.93	157.99	2.02	64.44	1.36	24.45
24.840	6.90	109.71													2.97	162.31	2.05	66.20	1.38	25.12
25.200	7.00	111.30													3.01	166.69	2.08	67.99	1.40	25.79
25.560	7.10	112.89													3.05	171.13	2.11	69.79	1.42	26.48
25.920	7.20	114.48													3.10	175.61	2.14	71.62	1.44	27.17
26.280	7.30	116.07															2.17	73.47	1.46	27.88
26.640	7.40	117.66															2.20	75.35	1.48	28.59
27.000	7.50	119.25															2.23	77.24	1.50	29.31
27.360	7.60	120.84															2.26	79.16	1.52	30.03
27.720	7.70	122.43															2.29	81.10	1.54	30.77
28.080	7.80	124.02															2.32	83.05	1.56	31.51
28.440	7.90	125.61															2.35	85.04	1.58	32.26
28.800	8.00	127.20															2.38	87.04	1.6	33.02
29.160	8.10	128.79															2.41	89.06	1.62	33.79
29.520	8.20	130.38															2.44	91.11	1.64	34.57
29.880	8.30	131.97															2.47	93.17	1.66	35.35
30.240	8.40	133.56															2.5	95.26	1.68	36.14
30.660	8.50	135.42															2.53	97.37	1.70	36.94
30.960	8.60	136.74															2.56	99.5	1.72	37.75
31.320	8.70	138.33															2.59	101.65	1.74	38.57
31.680	8.80	139.92															2.62	103.82	1.76	39.39
32.040	8.90	141.51															2.65	106.01	1.78	40.22

THERMOVAR PPR PIPES S3.2 (PN16 S.F. 1.25)

Q			dn (mm)																	
(m ³ / h)	(L/s)	GPM	20		25		32		40		50		63		75		90		110	
			v	i	v	i	v	i	v	i	v	i	v	i	v	i	v	i	v	i
32.400	9.00	143.10															2.68	108.23	1.80	41.06
33.760	9.10	149.11															2.71	110.46	1.82	41.91
33.120	9.20	146.28															2.74	112.72	1.84	52.77
33.480	9.30	147.87															2.77	115.00	1.86	43.63
33.840	9.40	149.46															2.88	117.29	1.88	44.50
34.200	9.50	151.05															2.83	119.61	1.90	45.68
34.560	9.60	152.64															2.86	121.95	1.92	46.27
34.920	9.70	154.23															2.89	124.31	1.94	47.17
35.280	9.80	155.82															2.92	126.69	1.96	48.07
35.640	9.90	157.41															2.92	129.10	1.98	48.98
36.000	10.00	159.00															2.98	131.52	2.00	49.90
36.900	10.25	162.98															3.05	137.67	2.05	52.23
37.800	10.50	166.95																	2.10	54.61
38.700	###	170.93																	2.15	57.04
39.600	11.00	174.90																	2.20	59.52
40.500	11.25	178.88																	2.25	62.05
41.400	11.50	182.85																	2.30	64.62
42.300	11.75	186.83																	2.35	67.25
43.200	12.00	190.80																	2.40	69.92
44.100	12.25	194.78																	2.45	72.64
45.000	12.50	198.75																	2.50	75.4
45.900	12.75	202.73																	2.55	78.22
46.800	13.00	206.70																	2.60	81.08
47.770	13.25	210.98																	2.65	83.98
48.600	13.50	214.65																	2.70	86.94
49.500	13.75	218.63																	2.75	89.94
50.400	14.00	222.60																	2.80	92.99
51.300	14.25	226.58																	2.85	96.09
52.200	14.50	230.55																	2.90	99.23
53.100	14.75	234.53																	2.95	102.42
54.000	15.00	238.50																	3.00	105.65
55.800	15.50	246.45																	3.10	112.26

PP-R AND PPR-CT WATER PIPES

THERMOVAR PPR PIPES S2.5 (PN20 S.F. 1.25)

Q			dn (mm)																	
(m3 / h)	(L/s)	GPM	20		25		32		40		50		63		75		90		110	
			v	i	v	i	v	i	v	i	v	i	v	i	v	i	v	i	v	i
0.108	0.03	0.48	0.22	5.28																
0.144	0.04	0.64	0.29	8.98	0.18	2.94														
0.180	0.05	0.80	0.37	13.57	0.23	4.45														
0.216	0.06	0.95	0.44	19.02	0.28	6.23	0.17	1.89												
0.252	0.07	1.11	0.51	25.29	0.32	8.28	0.20	2.52												
0.288	0.08	1.27	0.58	32.38	0.37	10.61	0.23	3.22												
0.324	0.09	1.43	0.66	40.27	0.42	13.19	0.25	4.01												
0.260	0.10	1.15	0.73	48.93	0.46	16.03	0.28	4.87	0.18	1.61										
0.396	0.11	1.75	0.80	58.37	0.51	19.12	0.31	5.81	0.20	1.92										
0.432	0.12	1.91	0.88	68.56	0.55	22.46	0.34	6.82	0.22	2.26										
0.468	0.13	2.07	0.95	79.50	0.60	26.04	0.37	7.91	0.23	2.62										
0.504	0.14	2.23	1.02	91.18	0.65	29.87	0.40	9.08	0.25	3.01										
0.540	0.15	2.39	1.10	103.60	0.69	33.93	0.42	10.31	0.27	3.41	0.17	1.13								
0.576	0.16	2.54	1.17	116.74	0.74	38.24	0.45	11.62	0.29	3.85	0.80	1.27								
0.612	0.17	2.70	1.24	130.59	0.79	42.77	0.48	13.00	0.31	4.30	0.19	1.42								
0.648	0.18	2.86	1.32	145.16	0.83	47.55	0.51	14.45	0.32	4.78	0.21	1.58								
0.684	0.19	3.02	1.39	160.43	0.88	52.55	0.54	15.97	0.34	5.29	0.22	1.75								
0.720	0.20	3.18	1.46	176.40	0.92	57.78	0.57	17.56	0.36	5.81	0.23	1.92								
0.900	0.25	3.98	1.83	266.55	1.16	87.31	0.71	26.53	0.45	8.79	0.29	2.90	0.18	0.95						
1.080	0.30	4.77	2.19	373.47	1.39	122.33	0.85	37.17	0.54	12.31	0.34	4.06	0.22	1.33						
1.260	0.35	5.57	2.56	496.72	1.62	162.70	0.99	49.44	0.63	16.37	0.40	5.40	0.25	1.77	0.18	0.76				
1.440	0.40	6.36	2.92	635.91	1.85	208.29	1.13	63.29	0.72	20.96	0.46	6.92	0.29	2.27	0.20	0.97				
1.620	0.45	7.16	3.29	790.73	2.08	259.00	1.27	78.70	0.81	26.06	0.51	8.60	0.32	2.82	0.23	1.21	0.16	0.50		
1.800	0.50	7.95			2.31	314.74	1.42	95.64	0.90	31.67	0.57	10.45	0.36	3.42	0.25	1.47	0.18	0.60		
1.980	0.55	8.75			2.54	375.43	1.56	114.08	0.99	37.78	0.63	12.47	0.40	4.09	0.28	1.75	0.19	0.72		
2.160	0.60	9.54			2.77	440.99	1.70	134.00	1.08	44.38	0.68	14.65	0.43	4.80	0.31	2.05	0.21	0.84		
2.340	0.65	10.34			3.00	511.38	1.84	155.39	1.17	51.46	0.74	16.98	0.47	5.56	0.33	2.38	0.23	0.98		
2.520	0.70	11.13					1.98	178.22	1.26	59.03	0.80	19.48	0.51	6.38	0.36	2.73	0.25	1.12		
2.700	0.75	11.93					2.12	202.48	1.35	67.06	0.86	22.13	0.54	7.25	0.38	3.10	0.27	1.28	0.18	0.48
2.880	0.80	12.72					2.27	228.16	1.44	75.57	0.91	24.94	0.58	8.17	0.41	3.50	0.28	1.44	0.19	0.54
3.060	0.85	13.52					2.41	255.24	1.53	84.53	0.97	27.90	0.61	9.14	0.43	3.91	0.30	1.61	0.20	0.60
3.240	0.90	14.31					2.55	283.71	1.62	93.96	1.03	31.01	0.65	10.16	0.46	4.35	0.32	1.79	0.21	0.67
3.420	0.95	15.11					2.69	313.55	1.71	103.85	1.08	34.27	0.69	11.23	0.48	4.80	0.34	1.98	0.22	0.74
3.600	1.00	15.90					2.83	344.76	1.80	114.18	1.14	37.68	0.72	12.35	0.51	5.28	0.35	2.17	0.24	0.81
3.780	1.05	16.70					2.97	377.33	1.89	124.97	1.20	41.24	0.76	13.51	0.53	5.78	0.37	2.38	0.25	0.89
3.960	1.10	17.49					3.12	411.24	1.98	136.20	1.26	44.95	0.79	14.73	0.56	6.30	0.39	2.59	0.26	0.97
4.140	1.15	18.29							2.07	147.88	1.31	48.80	0.83	15.99	0.59	6.84	0.41	2.81	0.27	1.05
4.320	1.20	19.08							2.16	159.99	1.37	52.80	0.87	17.30	0.61	7.40	0.42	3.05	0.28	1.14
4.500	1.25	19.88							2.25	172.54	1.43	56.94	0.90	18.66	0.64	7.98	0.44	3.28	0.30	1.23
4.680	1.30	20.67							2.34	185.52	1.48	61.22	0.94	20.06	0.66	8.58	0.46	3.53	0.31	1.32
4.860	1.35	21.47							2.43	198.94	1.54	65.65	0.97	21.51	0.69	9.20	0.48	3.79	0.32	1.42

THERMOVAR PPR PIPES S2.5 (PN20 S.F. 1.25)

Q			dn (mm)																	
(m ³ /h)	(L/s)	GPM	20		25		32		40		50		63		75		90		110	
			v	i	v	i	v	i	v	i	v	i	v	i	v	i	v	i	v	i
5.040	1.40	22.26							2.52	212.79	1.60	70.22	1.01	23.01	0.71	9.84	0.50	4.05	0.33	1.52
5.220	1.45	23.06							2.61	227.06	1.65	74.93	1.05	24.55	0.74	10.50	0.51	4.32	0.34	1.62
5.400	1.50	23.85							2.70	241.75	1.71	79.78	1.08	26.14	0.76	11.18	0.53	4.60	0.35	1.72
5.580	1.55	24.65							2.79	256.87	1.77	84.77	1.12	27.78	0.79	11.88	0.55	4.89	0.37	1.83
5.760	1.60	25.44							2.88	282.41	1.82	89.90	1.15	29.46	0.81	12.60	0.57	5.19	0.38	1.94
5.940	1.65	26.24							2.97	288.37	1.88	95.17	1.19	31.18	0.84	13.34	0.58	5.49	0.39	2.06
6.120	1.70	27.03							3.06	304.74	1.94	100.57	1.23	32.95	0.87	14.10	0.60	5.80	0.40	2.17
6.300	1.75	27.83									2.00	106.11	1.26	34.77	0.89	14.87	0.62	6.12	0.41	2.29
6.480	1.80	28.62									2.05	111.79	1.30	36.63	0.92	15.67	0.64	6.45	0.43	2.42
6.660	1.85	29.42									2.11	117.60	1.34	38.53	0.94	16.48	0.65	6.78	0.44	2.54
6.840	1.90	30.21									2.17	123.55	1.37	40.48	0.97	17.32	0.67	7.13	0.45	2.67
7.020	1.95	31.01									2.23	129.63	1.41	42.47	0.99	18.17	0.69	7.48	0.46	2.80
7.200	2.00	31.80									2.28	135.84	1.44	44.51	1.02	19.04	0.71	7.84	0.47	2.94
7.560	2.10	33.39									2.40	148.68	1.52	48.71	1.07	20.84	0.74	8.58	0.50	3.21
7.920	2.20	34.98									2.51	162.04	1.59	53.09	1.12	22.71	0.48	9.35	0.52	3.50
8.280	2.30	36.57									2.63	175.93	1.66	57.64	1.17	24.66	0.81	10.15	0.54	3.80
8.640	2.40	38.16									2.74	190.34	1.73	62.37	1.22	26.88	0.85	10.98	0.57	4.11
9.000	2.50	39.75									2.85	205.27	1.80	67.26	1.27	28.77	0.88	11.84	0.59	4.44
9.360	2.60	41.34									2.97	220.72	1.88	72.32	1.32	30.94	0.92	12.73	0.61	4.77
9.720	2.70	42.93									3.08	236.68	1.95	77.55	1.38	33.18	0.95	13.65	0.64	5.12
10.080	2.80	44.52											2.02	82.95	1.43	35.48	0.99	14.60	0.66	5.47
10.440	2.90	46.11											2.09	88.51	1.48	37.86	1.03	15.58	0.69	5.84
10.800	3.00	47.70											2.17	94.24	1.53	40.32	1.06	16.59	0.71	6.22
11.160	3.10	49.29											2.24	100.13	1.58	42.84	1.10	17.63	0.73	6.60
11.520	3.20	50.88											2.31	106.19	1.63	45.43	1.13	18.69	0.76	7.00
11.880	3.30	52.47											2.38	112.41	1.68	48.09	1.17	19.79	0.78	7.41
12.240	3.40	54.06											2.45	118.79	1.73	50.82	1.20	20.91	0.80	7.84
12.600	3.50	55.65											2.53	125.34	1.78	53.62	1.24	22.07	0.83	8.27
12.960	3.60	57.24											2.60	132.04	1.83	56.49	1.27	23.25	0.85	8.71
13.320	3.70	58.83											2.67	138.91	1.88	59.42	1.31	24.45	0.87	9.16
13.680	3.80	60.42											2.74	145.93	1.94	62.43	1.34	25.69	0.90	9.63
14.040	3.900	62.01											2.81	153.12	1.99	65.50	1.38	26.96	0.92	10.10
14.400	4.000	63.60											2.89	160.46	2.04	68.64	1.41	28.25	0.95	10.58
14.760	4.100	65.19											2.96	167.96	2.09	71.85	1.45	29.57	0.97	11.08
15.120	4.200	66.78											3.03	175.62	2.14	75.13	1.49	30.92	0.99	11.58
15.480	4.300	68.37											3.10	183.43	2.19	18.47	1.52	32.29	1.02	12.10
15.840	4.400	69.96													2.24	81.88	1.56	33.70	1.04	12.62
16.200	4.500	71.55													2.29	85.36	1.59	35.13	1.06	13.16
16.560	4.600	73.14													2.34	88.90	1.63	36.58	1.09	13.71
16.920	4.700	74.73													2.39	92.51	1.66	38.07	1.11	14.26
17.280	4.800	76.32													2.44	96.18	1.70	39.58	1.13	14.83
17.640	4.900	77.91													2.50	99.92	1.73	41.12	1.16	15.41

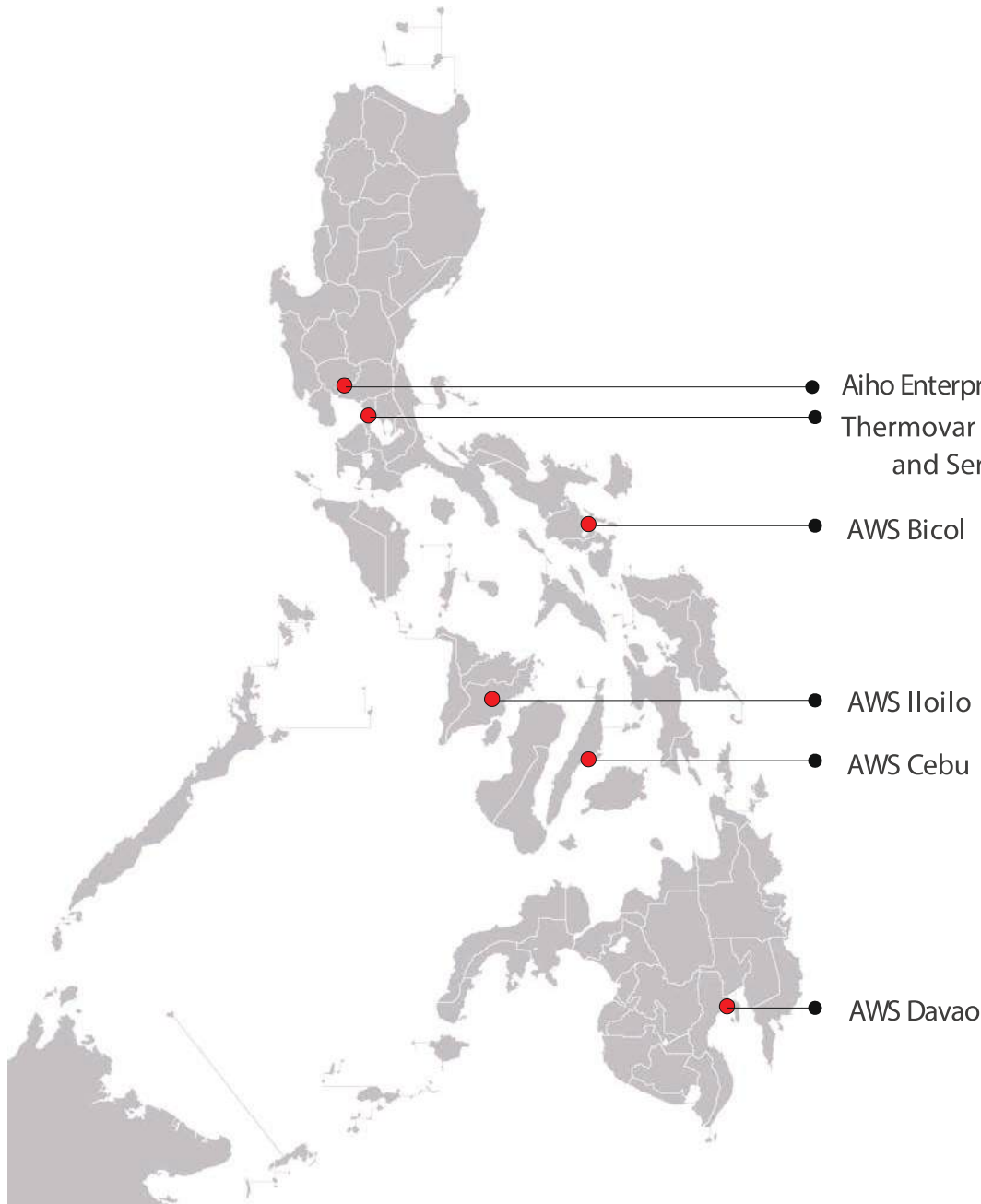
PP-R AND PPR-CT WATER PIPES

THERMOVAR PPR PIPES S2.5 (PN20 S.F. 1.25)

Q			dn (mm)																	
(m3 / h)	(L/s)	GPM	20		25		32		40		50		63		75		90		110	
			v	i	v	i	v	i	v	i	v	i	v	i	v	i	v	i	v	i
18 000	5.000	79.50													2.55	103.73	1.77	42.69	1.18	15.99
18 360	5.100	81.09													2.60	109.60	1.80	44.28	1.21	16.59
18 720	5.200	82.68													2.65	111.53	1.84	45.90	1.23	17.20
19 080	5.300	84.27													2.70	115.53	1.87	47.54	1.25	17.81
19 440	5.400	85.86													2.75	119.60	1.91	49.22	1.28	18.44
19 800	5.50	87.45													2.80	123.73	1.95	50.92	1.30	19.08
20 160	5.60	89.04													2.85	127.92	1.98	52.64	1.32	19.72
20 520	5.70	90.63													2.90	132.18	2.02	54.39	1.35	20.38
20 880	5.80	92.22													2.95	136.50	2.05	56.17	1.37	21.05
21 240	5.90	93.81													3.00	140.89	2.09	57.98	1.39	21.72
21 600	6.00	95.40													3.06	145.34	2.12	59.81	1.42	22.41
21 960	6.10	96.99															2.16	61.67	1.44	23.10
22 320	6.20	98.58															2.19	63.55	1.47	23.81
22 680	6.30	100.17															2.23	65.46	1.49	24.53
23 040	6.40	101.76															2.26	67.39	1.51	25.25
23 400	6.50	103.35															2.30	69.35	1.54	25.99
23 760	6.60	104.94															2.33	71.34	1.56	26.73
24 120	6.70	106.53															2.37	73.35	1.58	27.48
24 480	6.80	108.12															2.41	75.39	1.61	28.25
24 840	6.90	109.71															2.44	77.46	1.63	29.02
25 200	7.00	111.30															2.48	79.55	1.65	29.80
25 560	7.10	112.89															2.51	81.66	1.68	30.60
25 920	7.20	114.48															2.55	83.80	1.70	31.40
26 280	7.30	116.07															2.58	85.97	1.73	32.21
26 640	7.40	117.66															2.62	88.16	1.75	33.03
27 000	7.50	119.25															2.65	90.37	1.77	33.86
27 360	7.60	120.84															2.69	92.62	1.8	34.7
27 720	7.70	122.43															2.72	94.88	1.82	35.55
28 080	7.80	124.02															2.76	97.18	1.84	36.41
28 440	7.90	125.61															2.79	99.49	1.87	37.28
28 800	8.00	127.20															2.83	101.84	1.89	38.16
29 160	8.10	128.79															2.86	104.2	1.91	39.04
29 520	8.20	130.38															2.9	106.6	1.94	39.94
29 880	8.30	131.97															2.94	109.01	1.96	40.84
30 240	8.40	133.56															2.97	111.45	1.99	41.76
30 600	8.50	135.15															3.01	113.92	2.01	42.68
30 960	8.60	136.74															3.04	116.41	2.03	43.62
31 320	8.70	138.33																	2.06	44.56
31 680	8.80	139.92																	2.08	45.51
32 040	8.90	141.51																	2.1	46.47
32 400	9.00	143.10																	2.13	47.44

THERMOVAR PPR PIPES S2.5 (PN20 S.F. 1.25)

Q			dn (mm)																	
(m ³ / h)	(L/s)	GPM	20		25		32		40		50		63		75		90		110	
			v	i	v	i	v	i	v	i	v	i	v	i	v	i	v	i	v	i
32.760	9.10	144.69																	2.15	48.42
33.120	9.20	146.28																	2.17	49.41
33.480	9.30	147.87																	2.20	50.41
33.840	9.40	149.46																	2.22	51.42
34.200	9.50	151.05																	2.25	52.44
34.560	9.60	152.64																	2.27	53.46
34.920	9.70	154.23																	2.29	54.50
35.280	9.80	155.82																	2.32	55.54
35.640	9.90	157.41																	2.34	56.59
36.000	10.00	159.00																	2.36	57.66
36.900	10.25	162.98																	2.42	60.35
37.800	10.50	166.95																	2.48	63.10
38.700	10.75	170.93																	2.54	65.91
39.600	11.00	174.90																	2.60	68.77
40.500	11.25	178.88																	2.66	71.69
41.400	11.50	182.85																	2.72	74.67
42.300	11.75	186.83																	2.78	77.70
43.200	12.00	190.80																	2.84	80.78
44.100	12.25	194.78																	2.90	83.92
45.000	12.50	198.75																	2.95	87.12
45.900	12.75	202.73																	3.01	90.37



- Aiiho Enterprise
- ThermoVAR Pipes Sales and Services
- AWS Bicol
- AWS Iloilo
- AWS Cebu
- AWS Davao

ThermoVAR Pipes
Sales and Services
Unit A Victoria Villas, 28 Mayon Street,
Sta. Mesa Heights, Quezon City
T: 741-5889
F: 712-2213
E: info@thermovar.com

Amici Water Systems
Sales and Services Iloilo
Door B-1 Quezon Street,
Brgy. Sampaguita, Iloilo City
T: 033.333.1094
E: iloilo@amiciwatersystems.com

Aiiho Enterprise
1348 Miranda Extension,
Angeles City, Pampanga
T: 045.887.1764
F: 045.887.1764
E: aiho@amici.com.ph

Amici Water Systems
Sales and Services Cebu
Doors 111-112 MGA Arcade,
A.C. Cortes, Mandaue City, Cebu
T: 032.420.4042 / 032.344.6400
F: 032.344.5400
E: cebu@amiciwatersystems.com

Amici Water Systems
Sales and Service Bicol
Door 3-4, D & N Building,
Washington Drive, Legazpi City, Albay
T: 052.481.1277
E: bicol@amiciwatersystems.com

Amici Water Systems
Sales and Services Davao
Door 2 AMC Building, J. Camus Ext.
Cor. Quirino Ave., Davao City
T: 082.282.2900
F: 082.282.2900
E: davao@amiciwatersystems.com

HOTEL / RESORT

7 Stones Boracay
Amara En Terrazas, Batangas
Anvaya Cove
Anya Resort
Aqua, Boracay
Astoria Plaza Hotel – Baguio
Avenuesogo, San Fernando
Aziza Paradise Hotel
Baguio Hotel Project
Bay Leaf Hotel
Belfront Hotel
Berlin Hotel
Boracay Paradise Hotel, Boracay
Cariño Resort
Central Avenue Lodging and Parsonage
Chill Hotel, Pasig
Coral Way City Hotel
Crystal Plaza Hotel
El Nido Beach Resort, Palawan
Eurotel Baguio
Eurotel Makati
Eurotel North EDSA Project
Fairways and Bluewater Villa 7A Boracay
Gilsogo – Quezon
Grand Vista Resort, Boracay
Gratchi Resort – Tagaytay
Hong Kong Plaza Hotel, Cebu
Hotel 99 @ 11th Avenue
Icon Hotel North EDSA
Icon Timog
Imperial Palace Hotel, Cebu
Lima Park Hotel
Manila Bay Resort Phase 1
Marriott West Wing
Montage Hotel
Montano's Lodge Hotel
Moraville Hotel & Restaurant
Nemo Beach Hotel
One Union Place
Patio Pacific
Pimentel Beach House, Zambales
Providence Hotel
Savannah Hotel, Pampanga
Seda 2 – BGC
Seda Hotel Makati Circuit
Shangri-la at the Fort
Shangri-la, Boracay
Sheridan Beach Resort, Palawan
Sogo, Alabang
Sogo, Cabanatuan
Sogo, Caloocan
Sogo, Cubao
Sogo, Dau
Sogo, Malate
Sogo, North EDSA
Sogo, San Pedro, Laguna
Sogo, Santolan
Solaire, Mania

Subic Yacht Club Ballroom
Sulu Riviera Hotel, Tagaytay City
Tete a tete Hotel, Boracay
The Farm at San Benito
The Ivywall Hotel
Tryp Hotel
Tune Hotel, Aseana
Tune Hotel, Pampanga
World Hotel, Boracay

CONDOMINIUM

5th Avenue Flats
8 Forbestown
Acasia Residences
Alphaland – Makati
Amaia Skies – Cubao, Tower 1, 2 and 3
Amaia Skies – Sta. Mesa
Amaia Steps – Nuvali
Amaia Steps – Pasig
Anuva Tandem 1 Building
Arya Residences
Ascott – Makati
Aston Condominium
Asturias – Parañaque
Avida – Altura
Avida – Centera
Avida – Prime Taft
Avida – Cloverleaf
Azalea
Bayview Tower
BDO Tower
Birchwood
Bobby Dy Residences – Canlubang, Laguna
BSA Twin Towers
Calathea
Celadon Condominium
Citades
Cypress condominium
DDC Garden Plaza
Edades Project
Edwina San Agustin Residence
Eton Bay Park
Ferndale Villas
Flair Tower
Fora Condotel Tagaytay
Francesca Heights
Francesca Royale Tower 3
Grand Quartier 2
Green Meadows Residence
Greenbelt Madison
Herald Suites
Icon Tower 2
Ilustrata Residence
Infinity Condominium
Ivorywood
Jazz Residences
Kidzania
Knightbridge Residences
La Vista Quezon City

Lancaster Condominium
Levina Place
Lumiere II
Lumiere Residences
Maena Condominiums, Hamilo Coast
Mahogany 3
Manhattan Heights
Maple Place
Marquee Residences
Marriott – West Wing
Milano Residences
Mirea 3
Mirea Residences
Mivesa Garden Residences
Net Park, The Fort
One Castilla Place
One Shangri-la Place
One Union Place
Outlook Ridge Residences
Palm Plaza
Pioneer Woodland
Portico Tower 1
Qualimed, Altaraza, Bulacan
Ramos Tower
Richwood Tower
Royal Residences
RSG Residences
Sagana Homes
Sea Residences – Bldg. D & F
Sea Residences – Phase 3
Senta Condominium
Sheridan South Ground
Sial Terraces
Six Senses Phase 2
SO Residence
Sta. Lucia Land, Inc. - East Bel-air
Strata Gold Towers
Strata Views
Suntrust Parkview
The Avenue Residences
The Grove Rockwell
The Lerato
The Meranti at Two Serendra
The North Grove
The Venice
Torre de Manila
Treetop Villas
Unilab
Uptown Place Tower
Urban Deca
Vader
Verawood Residences
Vertis North Vita
Viera Tower
Villa Royal Residences
Zinnia South Tower

COMMERICAL

Avida Village Series – Nuvali, Canlubang
 AAP Building
 AB Telecom
 All Home Twin – Kawit
 Altura Podium Level, Tower 1
 Amaia Steps Nuvali
 Arca Pie
 Areza Town Center Mall, Laguna
 Asakusa Japanese Restaurant
 Avecshares
 Ayala BPO
 BDO Ortigas
 Blue Wave Phase 1 & 2
 Bo's Coffee
 Bon-chon
 BPO Araneta, Cubao
 BPO Molino
 BSFIL Technologies, Pulilan
 BSP Tacloban
 BSP Zamboanga
 Building 6 BPO
 Calveston & EC Building Pro
 Centennial Plaza
 Central Avenue, Minister Residence
 Centro Mall – Los Banos, Laguna
 Circuit BPO
 Circulo Verde Garden Homes
 Citibank BGC
 Ciudad de Victoria
 Danson Hatchery, Pampanga
 DCS Alabang
 DOH Building
 DOHLE House
 Eastwood Mall
 Enerland
 Eton Cyperpod
 Events Matrix Center
 Fisher Mall, Malabon
 Goodwill Supermarket
 Harmony Mall – San Pedro, Laguna
 INC Construction Materials Warehouse
 J. Co – Trinoma
 JP Morgan Net Plaza & Net Quad
 JTI Flex – Batangas
 Karete Kid
 Kenny Rogers – Roxas Blvd.
 Krispy Kreme
 Krypton Esplanade
 Latter Day Saints
 LDB Mall
 Lipa Parking Building
 LRT Monumento/Balintawak
 Mabuhay Flour Mill, Subic
 Mall of Asia Complex
 Mang Inasal Banlic
 Maybank Bldg., BGC
 MDC 100
 Menarco Boutique – BGC
 Microtel – Mall of Asia/Krypton Esplanade
 Mingkee Restaurant

MNHPI Project
 Net Lima
 Northstar Mall, Alibagu, Isabela
 Nutri Asia Tower
 Nuvali Sta. Rosa, Laguna
 One Pavillion Place, Cebu City
 Pasig Police Station
 Philip Morris, Subic
 Philippine Blood Center
 Pier Uno Resort
 Procter and Gamble, Taguig
 Quincy Supermarket
 Riofil Corporation – Hitachi
 Rustan's Supermarket
 S&R
 San Tierra, Nuvali, Sta. Rosa, Laguna
 Santen Philippines
 Savemore, Malabon
 Savemore, Pangasinan
 Science Hub Tower 4
 Security Bank
 Star Mall, Taguig
 Sto. Tomas Public Market
 Studio West
 Sucat Centrum
 Suntrust Capitol Plaza
 Supima BPO 1
 Technohub, Baguio City
 Terrazes de Sta. Mesa
 Three Central
 Tiendestias
 TIM Building
 Tony Roma's – Taguig
 Two Central
 U.P.I.S.
 UP HSBC
 UP Nuvali
 UP Town Mall
 Uptown Ritz
 Veronica Rabano – Tagaytay Project
 Vertis North CBG Mall
 Vigan Convention Center
 W2 Food Club Buffet Restaurant
 WNS Capella
 ZAMA Batangas

DepEd, JP Rizal, Pasig
 Dia Village, Valenzuela
 Disiplina Village Valenzuela
 Far Eastern University
 Gerry's Grill
 Global Medical City – Cabuyao
 Jaycees Ancestral House
 Kim Chiu Residence, LGV
 Laoag Provincial Hospital
 Little Fuse Industrial Plant
 Lyceum of the Philippines Univesity – Batangas
 Magsaysay Maritime College
 Malayan Colleges
 Masinloc Power Plant
 Maybank
 Megawide Taytay Precast
 Montala
 Montessori de San Ildefonso, Ildefonso, Bulacan
 Nabas Wind Power Plant
 New Life Christian Center
 NHA Housing Project
 NTSB Tanay, Rizal
 Nuciti – Tanauan, Batangas
 Our Lady of Lourdes Hospital
 Paco Church (San Fernando de Dilao Parish Church)
 Perpetual Help
 Philippine Blood Center Phase 2
 Philippine Science High School
 Qualimed Nuvali
 Rinconada Medical Center
 SAA Medical Clinic
 San Pablo Medical
 Sarimonde
 Security Bank
 St. Anthony of Padua Parish Church – Tacloban
 St. Jude Catholic School
 St. Lawrence Parish
 St. Paul Hospital
 Sta. Teresita Hospital
 Tagaytay Hospital
 Toyota School of Technology
 Unciano Hospital and Colleges
 University of the East – Anne
 Xavier School Nuvali

OTHERS

Asian Hospital
 Bangui Provincial Hospital, Ilocos Norte
 Batangas Health Care Hospital
 Bgy. Punta National School
 BSFIL Pulilan Plant
 Budget Lane Supermarket
 Celsius Restaurant
 Cotton Project
 CRS East Avenue, Quezon City
 De La Salle – College of St. Benilde
 De La Salle, Anitpolo
 Dental Health Lab – Pharmaceutical Lab

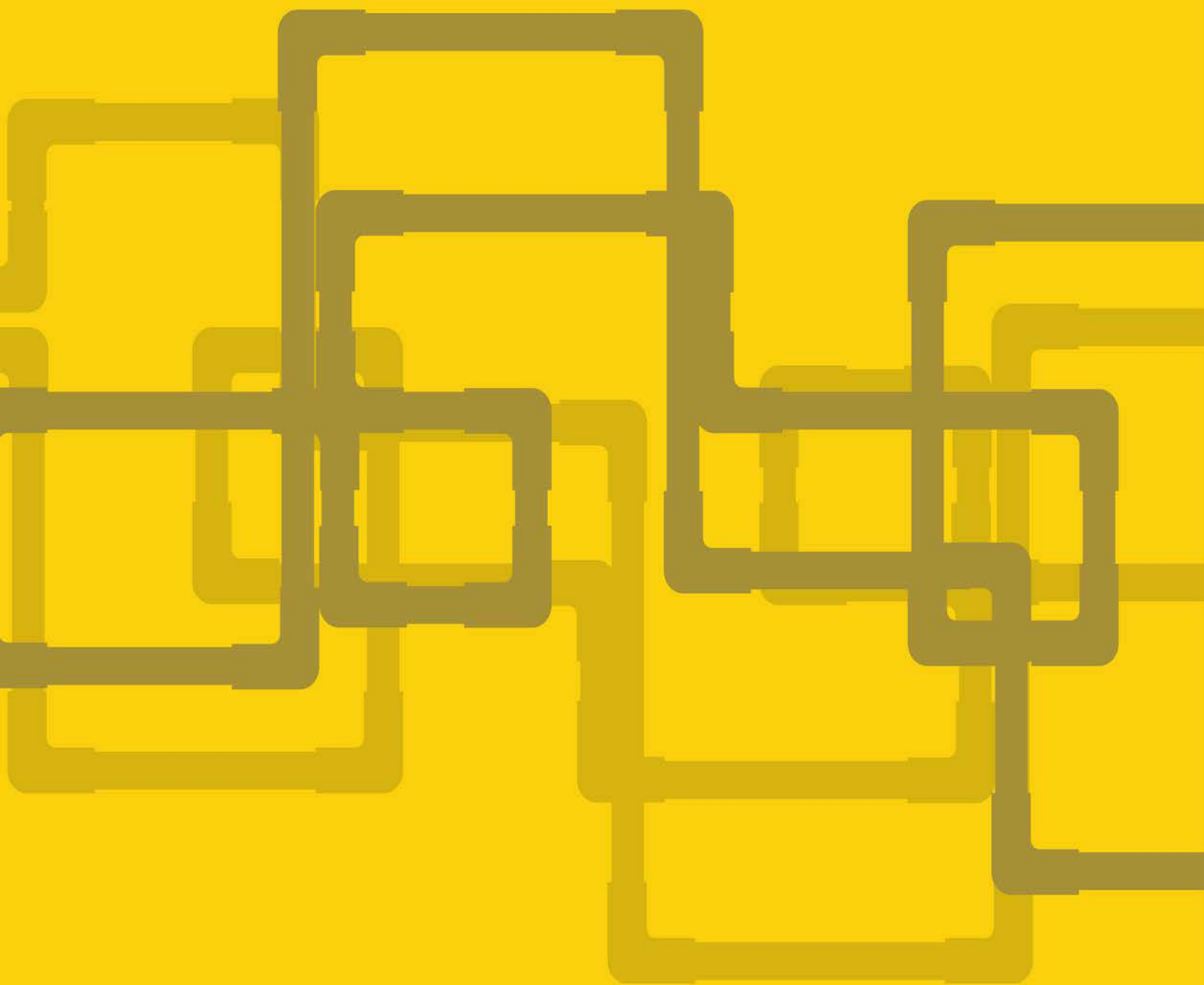


Oatey

Wavin AS

Exodura

HydroVAR



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