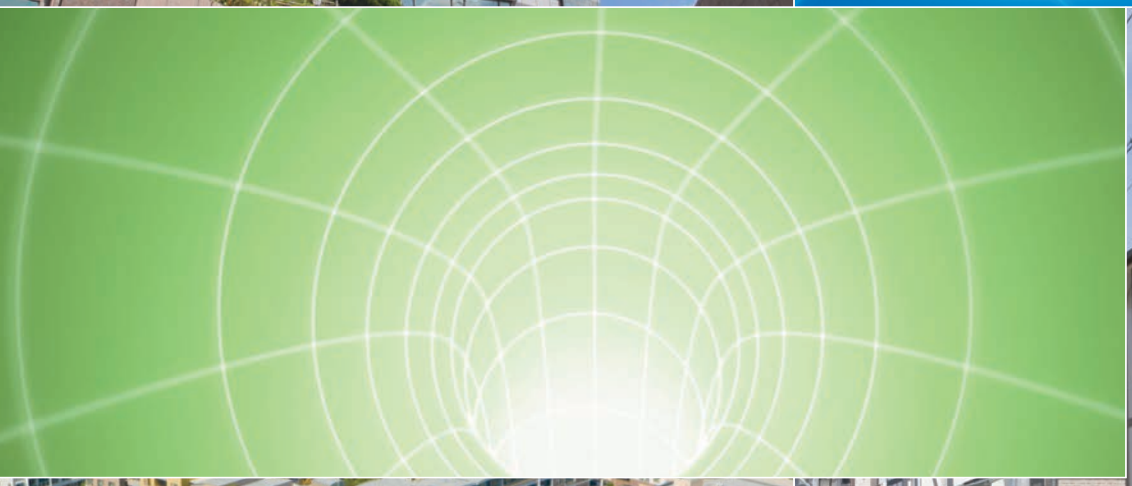
Kubota ChemiX

Catalog of Pipes and Accessories for Building

Water Supply | Hot Water Supply | Drain & Vent

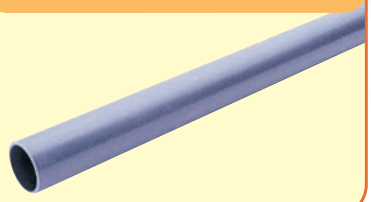






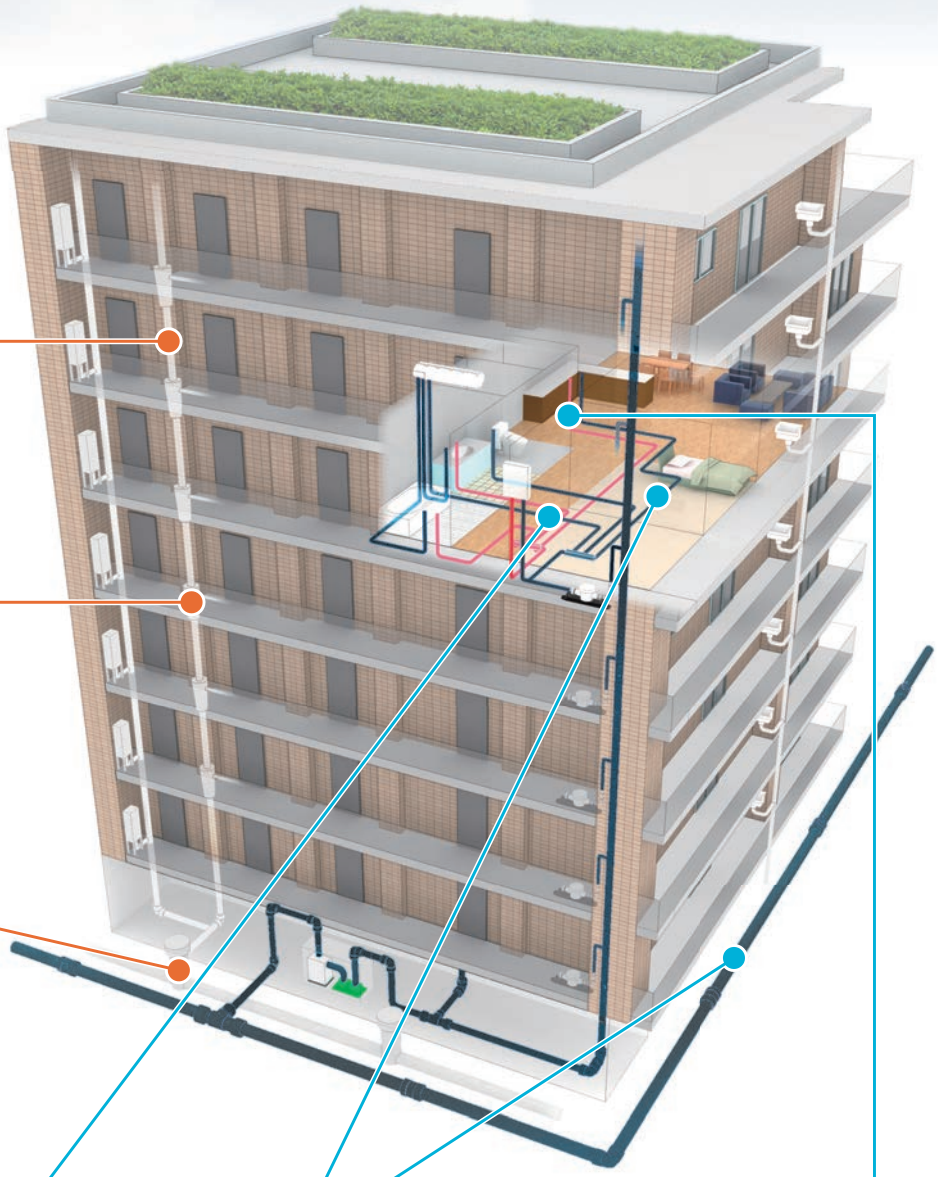
Kubota ChemiX Products for Building Applications

VP and VU Pipes
For drain and vent



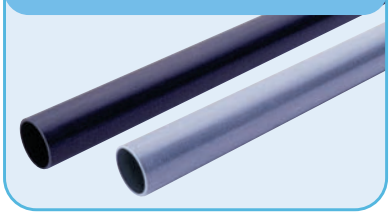
Transparent DV Fittings
For drain and vent

PVC Mini-Manhole
For drain and sewage

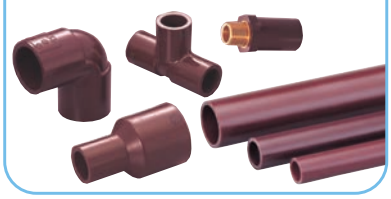


Transparent Fittings for Water Supply
For water supply

HI-VP and VP Pipes
For water supply



HT-VP Pipes and Fittings
For hot water supply



Products Introduction

For Water Supply

See page 5.

HI-VP Pipes

For water supply: Products conform to Japanese Industrial Standards JIS K6742.

Impact-resistant PVC-U pipes

HI-TS Fittings

For water supply: Products conform to Japanese Industrial Standards JIS K6743.

Impact-resistant PVC-U fittings

Dedicated Adhesive
Tough dyne HI (White)

For water supply pipes inside buildings and for piping in cold areas

These products are highly impact resistant even under low temperatures (low outdoor air temperatures) and minimize impact-induced damage during the cold season and when other plumbing work is conducted nearby.

Operating temperature and pressure

Operating temperature range	Normal temperature (5 to 35°C)
Maximum Operating pressure (MPa)	1.0

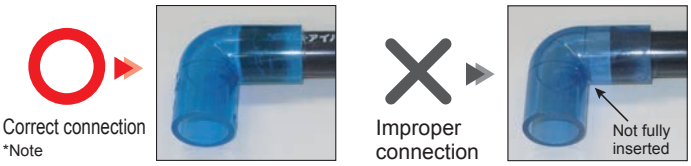
*Maximum operating pressure: Hydrostatic pressure + Water-hammer pressure

⚠ **Note that the water-hammer pressure becomes greater as the pipe flow velocity increases. (Make sure that the pipe flow velocity does not exceed 2 m/sec as a general rule.)**

Transparent Fittings for Water Supply

See page 14.

The transparent body enables to check the joint condition. It prevents plumbers from forgetting to apply adhesive.



*Note: It may be difficult to insert the pipe all the way to the stopper depending on the type of fitting. In that case, insert the pipe to the following position: Zero point + Min. 1/3 ℓ.

Available diameters (nominal diameters): 13mm to 50mm

For Hot Water Supply

See page 17.

HT Pipes and Fittings

Products conform to Japanese Industrial Standards JIS K6776/6777.

Thermal-resistant PVC-C pipes and fittings

Lightweight and thermal-resistant pipes suitable for hot water supply

These pipes are made from polyvinyl chloride and offer high corrosion resistance and excellent workability for hot water supply. Unlike metal pipes, these products eliminate the water quality degradation, electrolytic corrosion and electrical leakage accidents due to rusting or corrosion.

Operating temperature and pressure

Nominal diameters of 50 and less
Operating temperature and maximum operating pressure for HT pipes (JIS K6776)

Operating temperature (°C)	5 to 40	41 to 60	61 to 70	71 to 90
Maximum Operating pressure (MPa)	1.0	0.6	0.4	0.2

Nominal diameters of 65 and more
Operating temperature and maximum operating pressure for HT pipes (manufacturer's standards)

Operating temperature (°C)	5 to 40	41 to 60	61 to 70	71 to 85
Maximum Operating pressure (MPa)	1.0	0.4	0.25	0.15

*1. Continuous normal operating temperature: maximum of 85°C for pipes with nominal diameters 50 and less, maximum of 80°C for pipes with nominal diameters 65 and more
*2. Maximum operating pressure: Hydrostatic pressure + Water-hammer pressure

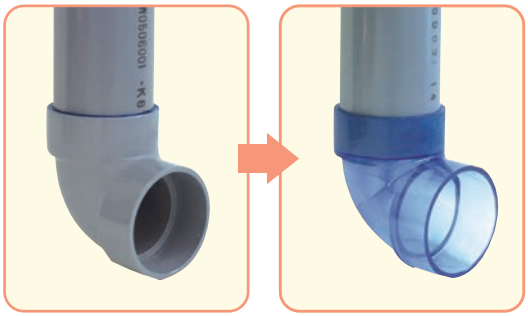
Dedicated Adhesive
Tough dyne HT

For Drain, Vent and Ventilation

Transparent DV and VU-DV Fittings

See page 32.

The transparent body enables to check the joint condition.



●It prevents plumbers from forgetting to apply adhesive and from not inserting the pipe all the way!

Features

Simplify the Construction Management.
Easy to check the joint part using the Transparent Fitting and Color Toughdyne Blue.

Preventing the human error.
Can prevent from failing to apply the adhesives.

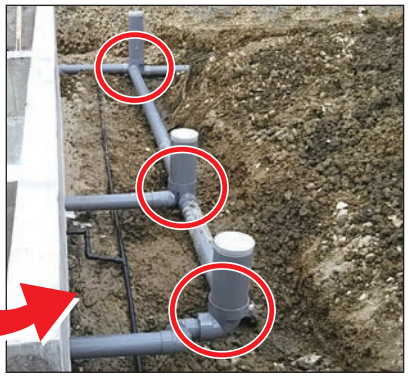
Color Tough dyne Blue

For Drain and Sewage

PVC Mini-Manholes

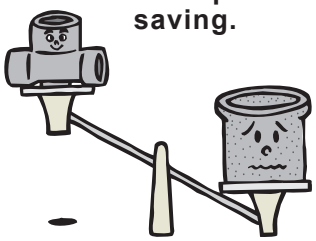
See page 35.

Can be used as the inspection chamber, which could be changed from concrete products, for confluent part or bent part of the drain pipe from apartment, factory and shopping mall.

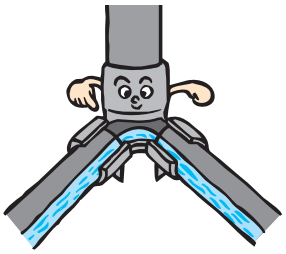


Features

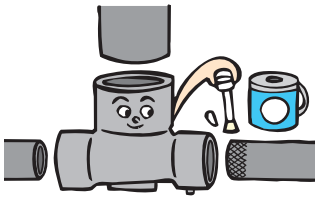
■Light-weight and space-saving.



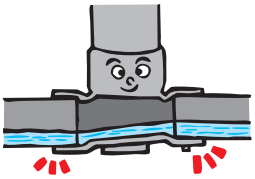
■Smooth water flow.



■Easily constructed with adhesives.



■No worry of leakage and invaded water.



Contents

Product Specifications

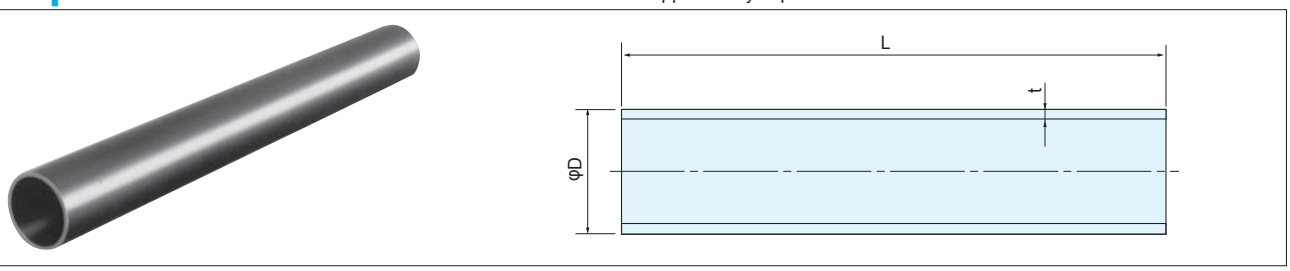
Reference

Product Specifications

I. PVC-U Pipes and Fittings for Water Supply and Pressure Pipeline

1. Pipes

Meaning of symbols
JIS K6741: Product conforms to Japanese Industrial Standards JIS K6741
JIS K6742: Product conforms to Japanese Industrial Standards JIS K6742
AS20: Product conforms to Japan PVC Pipe and Fittings Association's standards and approved by Japan Water Works Association



HI-VP Pipes for Water Supply　Code No. 6001　(Japanese Industrial Standards JIS K6742 : 2007)

VP Pipes for Water Supply　Code No. 1001　(Japanese Industrial Standards JIS K6742 : 2007)

Unit : mm

Nominal Dia.	Outside Dia.D			Thickness t		Approx. Inside Dia. (Reference)	Length L $^{+30}_{-10}$	Reference Weight				Standards
	Basic Dimension	Max./Min. OD Tolerance	Average OD Tolerance	Basic Dimension	Tolerance			VP		HI·VP		
								g/m	kg/piece	g/m	kg/piece	
13	18	±0.2	±0.2	2.5	±0.2	13	4000	174	0.696	170	0.680	JIS K 6742
16	22	±0.2	±0.2	3.0	±0.3	16	4000	256	1.024	251	1.004	
20	26	±0.2	±0.2	3.0	±0.3	20	4000	310	1.240	303	1.212	
25	32	±0.2	±0.2	3.5	±0.3	25	4000	448	1.792	439	1.756	
30	38	±0.3	±0.2	3.5	±0.3	31	4000	542	2.168	531	2.124	
40	48	±0.3	±0.2	4.0	±0.3	40	★2 4000	791	3.164	774	3.096	
							5000		3.955		3.870	
50	60	±0.4	±0.2	4.5	±0.4	51	★2 4000	1122	4.488	1098	4.392	
							5000		5.610		5.490	
65	76	±0.5	±0.2	4.5	±0.4	67	★ 4000	1445	5.780	1415	5.660	AS20
							★ 5000					
75	89	±0.5	±0.2	5.9	±0.4	77	★2 4000	2202	8.808	2156	8.624	JIS K 6742
							5000		11.010		10.780	
100	114	±0.6	±0.2	7.1	±0.5	100	★2 4000	3409	13.636	3338	13.352	
							5000		17.045		16.690	
125	140	±0.8	±0.3	7.5	±0.5	125	★ 4000	4464	17.856	4370	17.484	AS20
							★ 5000					
150	165	±1.0	±0.3	9.6	±0.6	146	★2 4000	6701	26.804	6561	26.244	JIS K 6742
							5000		33.505		32.805	

Notes
1. The "★" mark indicates a made-to-order product, and the "★ 2" mark indicates a made-to-order VP product.
2. The maximum/minimum OD tolerance is the difference between the basic dimension and the maximum/minimum outside diameter measured at randomly selected cross section.
3. The average OD tolerance is the difference between the basic dimension and the average outside diameter obtained by averaging diameters measured in two directions perpendicular to each other at randomly selected cross section.
4. The thickness applies to any location on the circumference of the pipe.
5. For pipe lengths other than those listed above, contact our company.
6. The reference weights are calculated by the basic dimension and pipe material density of 1.43 g/cm^3 for VP or 1.40 g/cm^3 for HI-VP.

HI-VP Pipes for General Purposes　Code No. 6001　(Japanese Industrial Standards JIS K 6741 : 2007)

Unit : mm

Nominal Dia.	Outside Dia.			Thickness		Approx. Inside Dia. (Reference)	Length	Reference Weight		Standards
	Basic Dimension	Max./Min. OD Tolerance	Average OD Tolerance	Min. Dimension	Tolerance			Weight/m (g/m)	Weight/m (kg/piece)	
65	76.0	±0.5	±0.2	4.1	+0.8	67	4000	1415	5.7	JIS K 6741
125	140.0	±0.8	±0.3	7.0	+1.0	125	4000	4370	17.5	
200	216.0	±1.3	±0.7	10.3	+1.4	194	4000	10129	40.5	
250	267.0	±1.6	±0.9	12.7	+1.8	240	4000	15481	61.9	
300	318.0	±1.9	±1.0	15.1	+2.2	286	4000	21962	87.8	

Note　For nominal diameters smaller than those listed above, refer to the section for HI pipes for water supply.

VP Pipes for General Purposes　Code No. 1001　(Japanese Industrial Standards JIS K 6741 : 2007)

Unit : mm

Nominal Dia.	Outside Dia.			Thickness		Approx. Inside Dia. (Reference)	Length	Reference Weight		Standards
	Basic Dimension	Max./Min. OD Tolerance	Average OD Tolerance	Min. Dimension	Tolerance			Weight/m (g/m)	Weight/m (kg/piece)	
40	48.0	±0.3	±0.2	3.6	+0.8	40	4000	791	3.2	JIS K 6741
50	60.0	±0.4	±0.2	4.1	+0.8	51	4000	1122	4.5	
65	76.0	±0.5	±0.3	4.1	+0.8	67	4000	1445	5.8	
75	89.0	±0.5	±0.3	5.5	+0.8	77	4000	2202	8.8	
100	114.0	±0.6	±0.4	6.6	+1.0	100	4000	3409	13.6	
125	140.0	±0.8	±0.5	7.0	+1.0	125	4000	4464	17.9	
150	165.0	±1.0	±0.5	8.9	+1.4	146	4000	6701	26.8	
200	216.0	±1.3	±0.7	10.3	+1.4	194	4000	10129	40.5	
250	267.0	±1.6	±0.9	12.7	+1.8	240	4000	15481	61.9	
300	318.0	±1.9	±1.0	15.1	+2.2	286	4000	21962	87.8	

Note　For nominal diameters of 13 to 30, use VP pipes for water supply.

⚠HI-VP pipes and VP pipes for general purposes cannot be used as pipes for drinking water.

VM Pipes Code No. 1002 **(Japanese Industrial Standards JIS K 6741 : 2007)**

Unit : mm

Nominal Dia.	Outside Dia.		Thickness		Approx. Inside Dia. (Reference)	Length	Reference Weight		Standards
	Basic Dimension	Average OD Tolerance	Min. Dimension	Tolerance			Weight/m (g/m)	Weight/m (kg/piece)	
350	370.0	±1.2	14.3	+2.0	339	4000	24380	97.5	JIS K 6741
400	420.0	±1.3	16.2	+2.2	385	4000	31298	125.2	
★450	470.0	±1.5	18.1	+2.6	431	4000	39272	157.1	
500	520.0	±1.6	20.0	+2.8	477	4000	47935	191.7	

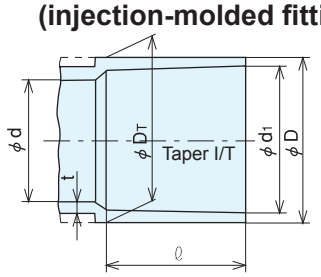
Note The "★" mark indicates a made-to-order product.

2. TS Fittings

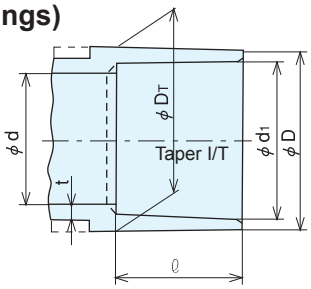
Common joint dimensions

Meaning of symbols
JIS K6743: Product conforms to Japanese Industrial Standards JIS K6743
AS21: Product conforms to Japan PVC Pipe and Fittings Association's standards and approved by Japan Water Works Association
Ⓜ: Product conforms to the manufacturer's standards

Type A (nominal diameter: 150 and less) (injection-molded fittings)

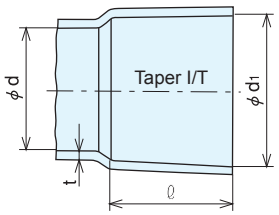


(Nominal Dia. : 13 to 50)

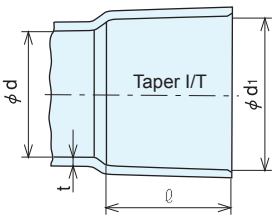


(Nominal Dia. : 65 to 150)

Type B (nominal diameter: 13 to 300) (fabricated fittings)



(Nominal Dia. : 13 to 50, 200 and more)



(Nominal Dia. : 65 to 150)

Unit : mm

Nominal Dia.	d1	Tolerance of d1	D	DT	Tolerance of D, DT	I/T	ℓ	d (min.)	t (min.)
13	18.40	±0.20	24	24	−0.6	1/30	26	13	2.7
16	22.40	±0.20	29	29	−0.7	1/34	30	16	2.7
20	26.45	±0.20	33	33	−0.8	1/34	35	20	3.2
25	32.55	±0.25	40	40	−1.0	1/34	40	25	3.6
30	38.60	±0.25	46	46	−1.0	1/34	44	31	3.6
40	48.70	±0.30	57	57	−1.2	1/37	55	40	4.1
50	60.80	±0.30	70	70	−1.5	1/37	63	51	4.5
65	76.60	±0.30	87	88.5	−1.5	1/48	61	67	4.1
75	89.60	±0.30	102	104.5	−1.5	1/49	64	77	7.5
100	114.70	±0.30	130	133.5	−1.8	1/56	84	100	9.4
125	140.85	±0.35	157	161	−1.8	1/58	104	125	7.0
150	166.00	±0.40	186	190	−2.0	1/63	132	146	12.2
200	217.90	±0.80	−	−	−	1/50	200	194	10.3
250	269.30	±0.90	−	−	−	1/50	250	240	12.7
300	320.70	±1.00	−	−	−	1/50	300	286	15.1

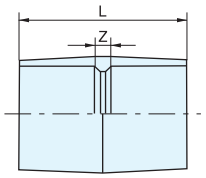
Notes 1. There is no limit on the plus tolerances of D and DT.
2. The thickness value t for Type B indicates the thickness of the unfabricated part.
3. The tolerance of ℓ is $^{+4}_{-0.5}$ mm for nominal diameters 150 mm and less and $^{+10}_{0}$ mm for nominal diameters 200 mm and more.

⚠ **Be sure to use the Tough dyne HI adhesive (see page 36) for the bonding HI pipes and fittings.**

HI-TS Sockets Code No. 6011
TS Sockets Code No. 5011

Unit : mm

(Abbreviation : S)

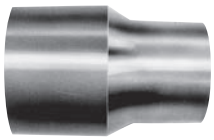


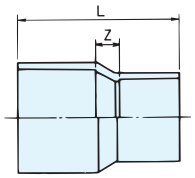
Type A
(Nominal Dia. : 150 and less)

Nominal Dia.	Z	L	Standards
13	5	57	JIS K 6743
16	7	67	
16×13	5	61	
20	7	77	
20×13	7	68	
20×16	6	71	
25	7	87	
25×13	20	86	
25×16	15	85	
25×20	9	84	
30	7	95	
30×20	14	93	
30×25	9	93	
40	7	117	
40×20	23	113	AS21
40×25	19	114	JIS K 6743
40×30	15	114	
50	7	133	
50×25	37	140	AS21
50×30	29	136	JIS K 6 743
50×40	18	136	

Nominal Dia.	Z	L	Standards
65	23	145	AS21
65× 50	25	149	
75	27	155	JIS K 6743
75× 50	38	165	
75× 65	31	156	Ⓜ
100	32	200	JIS K 6743
100× 75	42	190	
125	22	230	Ⓜ
125×100	42	230	AS21
150	36	300	JIS K 6743
150×100	79	295	

(Abbreviation : RS)



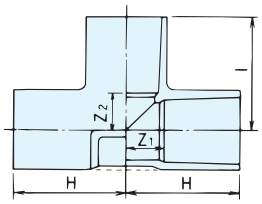


Type A
(Nominal Dia. : 150 x 100 and less)

HI-TS Tees Code No. 6013
TS Tees Code No. 5013

Unit : mm

(Abbreviation : T) Type A



Nominal Dia.	Z_1	Z_2	H	I	Standards
13	10	10	36	36	JIS K 6743
16	13	13	43	43	
16×13	11	12	41	38	
20	15	15	50	50	
20×13	11	14	46	40	
20×16	13	15	48	45	
25	18	18	58	58	
25×13	11	17	51	43	
25×16	13	18	53	48	
25×20	15	18	55	53	
30	21	21	65	65	
30×13	11	20	55	46	
30×16	15	21	57	51	
30×20	15	21	59	56	
30×25	18	21	62	61	
40	27	27	82	82	
40×13	11	26	66	52	
40×16	13	27	68	57	
40×20	15	27	70	62	
40×25	18	27	73	67	
40×30	21	27	76	71	

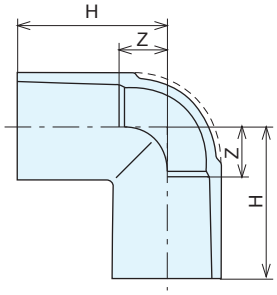
Nominal Dia.	Z_1	Z_2	H	I	Standards
50	33	33	96	96	JIS K 6743
50× 13	11	32	74	58	
50× 16	16	34	76	63	
50× 20	15	33	78	68	
50× 25	18	33	81	73	
50× 30	21	33	84	77	
50× 40	27	33	90	88	
65	49	49	110	110	AS21
65× 50	40	41	101	104	
75	56	56	120	120	JIS K 6743
75× 25	29	48	93	88	
75× 40	36	47	100	102	
75× 50	41	47	105	110	
75× 65	49	56	113	117	AS21
100	68	68	152	152	JIS K 6743
100× 50	41	59	125	122	
100× 75	56	68	140	132	
125	86	86	190	190	Ⓜ
125× 75	64	66	168	150	
125×100	73	85	177	169	
150	98	98	230	230	JIS K 6743
150× 75	63	94	195	158	
150×100	76	98	208	182	
150×125	87	101	219	205	Ⓜ

Notes 1. When uneven settlement or a change in water pressure is expected, SGR-NA Tees or cast-iron SGR T-shape pipes should be used for branching pipes with nominal diameter of 125 and more.
2. Nominal diameter 125 x 75 is not available for HI-VP products.

HI-TS Elbows Code No. 6012
TS Elbows Code No. 5012

Unit : mm

(Abbreviation : L) Type A

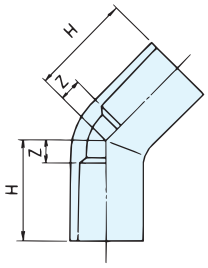


Nominal Dia.	Z	H	Standards
13	10	36	JIS K 6743
16	13	43	
20	15	50	
20×13	12 (side 20) | 15 (side 13)	47 (side 20) | 41 (side 13)	Ⓜ
25	18	58	JIS K 6743
30	21	65	
40	27	82	
50	33	96	
65	49	110	AS21
75	56	120	
100	69	153	
125	88	192	Ⓜ
150	98	230	

Notes 1. Elbow part must not be applied with bending force or vibration.
2. HI 90° Bends, TS 90° Bends or SGR 90° Bends is recommended for buried applications.
3. The dashed line in the diagram indicates the shape of elbows with nominal diameters of 50 and less.

HI-TS 45° Elbows Code No. 6012
TS 45° Elbows Code No. 5012

(Abbreviation : 45L) Type A



Unit : mm

Nominal Dia.	Z	H	Standards
13	7	33	JIS K 6743
16	8	38	Ⓜ
20	9	44	JIS K 6743
25	11	51	
30	12	56	
40	14	69	
50	17	80	
Ⓩ 75*	33	97	Ⓜ
Ⓩ 100	38	122	

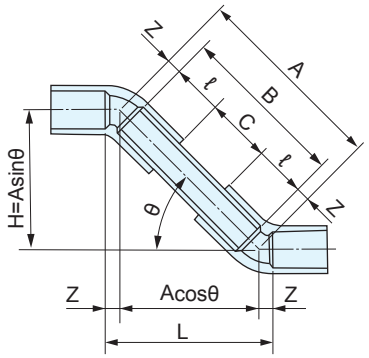
Notes 1. The HI-VP products with nominal diameter of 75 mm are now under planning.
2. The Ⓩ mark indicates that the product is manufactured by Maezawa Kasei Industries Co., Ltd.

<Reference> Guideline dimensions for S Bends formed with TS 45° Elbows

Calculation of guideline dimensions of S Bends formed with TS 45° Elbows

Item	Formula
Length of Diagonal Section	A=2Z+B
Cut Pipe Length	B=2ℓ+C
Distance between Fittings	C=B-2ℓ
Distance between Staggered Pipes	H=Asinθ
Effective Length of S-shape Section	L=2Z+Acosθ

Trigonometric Function	
sin45°	0.707
cos45°	0.707



Results of calculations of guideline dimensions for S Bends formed with TS 45° Elbows

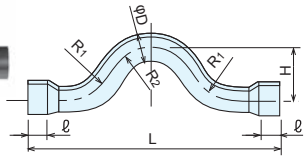
Unit : mm

Item / Nominal Dia.	TS 45° Elbow Dimension		Calculation Results by Joint Type									
	Effective Length	Length of Socket	When C = 0					When H = 200 mm				
	Z	ℓ	A	B	C	L	H	A	B	C	L	H
13	7	26	66	52	0	61	47	283	269	217	214	200
16	8	30	76	60	0	70	54	283	267	207	216	200
20	9	35	88	70	0	80	62	283	265	195	218	200
25	11	40	102	80	0	94	72	283	261	181	222	200
30	12	44	112	88	0	103	79	283	259	171	224	200
40	14	55	138	110	0	126	98	283	255	145	228	200
50	17	63	160	126	0	147	113	283	249	123	234	200
75	33	64	194	128	0	203	137	283	217	89	266	200
100	38	84	244	168	0	249	173	283	207	39	276	200

Note The above table shows the results of calculations when Z•ℓ is equal to the tolerance center dimension. However, Z•ℓ does not always equal to the tolerance center dimension in actual products. It is sometimes not possible to insert the pipe all the way to the stopper in the socket of the TS joint. Consequently, the dimension of S Bends formed with a combination of pipes and fittings may differ from the dimension in the above table. Therefore, consider the above dimensions as guideline figures.

HI-TS (Crossover) 180° Bends Code No. 9662

(Abbreviation : S-B) Type B

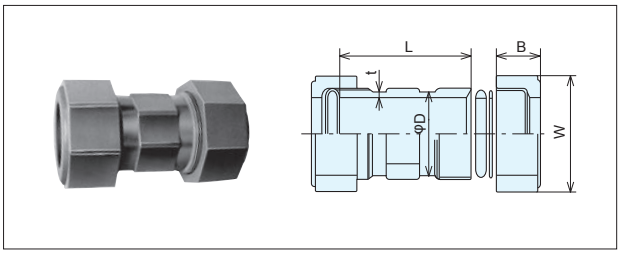


Unit : mm

Nominal Dia.	H	L	D	ℓ	R1	R2	Standards
★13	50	250	18	26	40	40	Ⓜ
20	50	270	26	35	60	43	

Note The "★" mark indicates a made-to-order product.

Injection-Molded Unions (Expansion Joints) Code No. 1066



Unit : mm

Nominal Dia.	D	t	L	B	W	Standards
13	26	3.0	68	25	38	JIS K 6743
Ⓐ 16	—	—	110	28	43	Ⓜ
20	35	3.5	78	29	50	JIS K 6743
25	43	4.0	89	29	56	
30	48	4.0	98	33.5	63	
40	59	4.5	108	38.5	79	
50	72	5.0	118	39	93	

Notes
1. The product with nominal diameter of 16 is not injection-molded and it's shape differ from that shown in the diagram.
2. The material of the rubber ring conforms to JIS K6353 Type I-A (rubber goods for water works).
3. The Ⓐ mark indicates that the product is manufactured by Aronkasei Co., Ltd.

HI-TS Union Sockets Code No. 6041
TS Union Sockets Code No. 5041

(Abbreviation : US) Type A

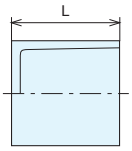
Unit : mm

Nominal Dia.	D_0	D_1	t	L	Standards
13	18	23	2.5	80	JIS K 6743
16	22	27.5	3.0	85	
20	26	29.5	3.0	90	
25	32	36.5	3.5	100	
30	38	42	3.5	110	
40	48	53	4.0	120	
50	60	71	4.5	130	

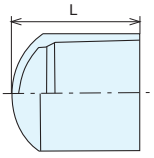
Note Nominal diameter 16 mm is presently only available for HI-TS union sockets.

HI-TS Caps Code No. 6042
TS Caps Code No. 5042

(Abbreviation : C)



Type A
Nominal Dia. : 50 mm and less



Type A
Nominal Dia. : 65 mm and more

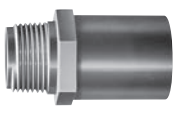
Unit : mm

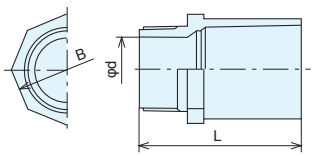
Nominal Dia.	L	Standards
13	29	JIS K 6743
16	33.5	
20	38.5	
25	44	
30	48	
40	59.5	
50	68	
65	96	AS21
75	105	JIS K 6743
100	138	
150	205	

Note Nominal diameter 65 mm is only available for TS caps.

HI-TS Valve Sockets Code No. 6031
TS Valve Sockets Code No. 5031

(Abbreviation : VS) Type A





Type A

* The sockets with nominal diameters of 30 x $1^{1}/_{4}$ and less are hexagon-shaped, and the sockets with nominal diameters of 40 x $1^{1}/_{2}$ and more are octagon-shaped.

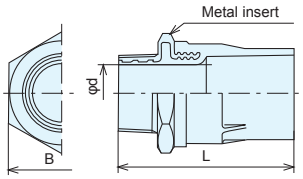
Unit : mm

Nominal Dia.	d	B	Nominal Thread Dia.	L	Standards
13× $^{1}/_{2}$	13	24	$R^{1}/_{2}$	50	JIS K 6743
16× $^{1}/_{2}$	13	29	$R^{1}/_{2}$	57	
20× $^{3}/_{4}$	18	33	$R^{3}/_{4}$	64	
25×1	23	40	R1	71	
30×$1^{1}/_{4}$	31	46	$R1^{1}/_{4}$	80	
40×$1^{1}/_{2}$	37	57	$R1^{1}/_{2}$	92	
50×2	48	70	R2	106	
65×$2^{1}/_{2}$	63	86	$R2^{1}/_{2}$	119	Ⓜ
75×3	74	101	R3	128	
100×4	97	129	R4	157	

Notes
1. The threads are tapered male threads conform to JIS B0203 (taper pipe threads).
2. When the sockets are installed in a place where bending force or vibration applies, or where the sockets are disconnected and reconnected frequently, valve sockets with metal insert should be used.

HI-TS Valve Sockets with Metal Insert — Code No. 7031
TS Valve Sockets with Metal Insert — Code No. 4031

(Abbreviation : MVS) Type II **PVC Inner Surface Type**



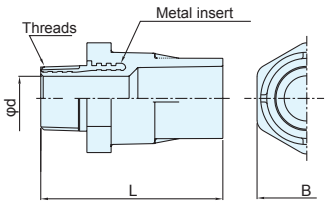
* The sockets with nominal diameters of 50 x 2 and less are hexagon-shaped at the section B and the sockets with nominal diameter of 65 x 2-1/2 and more are octagon-shaped.

Unit : mm

Nominal Dia.	d	B	Nominal Thread Dia.	L	Standards
13× 1/2	13	32	R1/2	60	JIS K 6743
16× 1/2	13	32	R1/2	67	
20× 3/4	18	40	R3/4	75	
25×1	23	50	R1	85	
30×1 1/4	31	55	R1 1/4	95	
40×1 1/2	37	65	R1 1/2	110	
50×2	48	75	R2	125	
65×2 1/2	61	98	R2 1/2	134	Ⓜ
75×3	72	112	R3	151	
100×4	96	140	R4	189	

Notes
1. The threads are tapered male threads conform to JIS B0203 (taper pipe threads).
2. The material of the thread insert conforms to JIS H5120 CAC406 (cast brass).
3. The shape of the socket with nominal diameter of 16 differs partially from that shown in the diagram.

(Abbreviation : MVS) Type I



* Section B is hexagon-shaped.

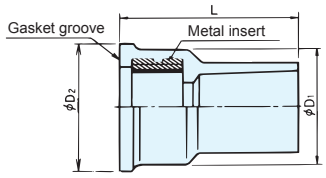
Unit : mm

Nominal Dia.	d	B	Nominal Thread Dia.	L	Standards	
					VP	HI-VP
13× 1/2	13	32	R1/2	60	JIS K 6743	
16× 1/2	13	34	R1/2	65		
20× 1/2	13	34	R1/2	72	—	Ⓜ
20× 3/4	18	41	R1/4	75	JIS K 6743	
25×1	23	50	R1	85		
30×1 1/4	31	56	R1 1/4	95		

Notes
1. The threads are tapered male threads conform to JIS B0203 (taper pipe threads).
2. The material of the thread insert conforms to JIS H3250 C3602 (free-cutting brass) or C3604 (free-cutting brass).

HI-TS Hydrant Sockets with Metal Insert — Code No. 7028
HI-TS Hydrant Sockets — Code No. 6021

(Abbreviation: MWS = With metal insert, WS = Without metal insert)
Type A



TS Hydrant Sockets with Metal Insert — Code No. 4028
TS Hydrant Sockets — Code No. 5021

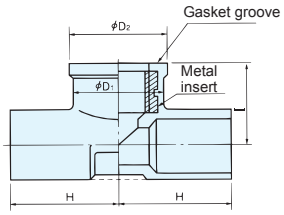
Unit : mm

Nominal Dia.	D1	D2	Nominal Thread Dia.	L	Standards	
					MWS	WS
13	30	34	Rp1/2	47	JIS K 6743	Ⓜ
16×13	30	34	Rp1/2	52		
20	37	42	Rp3/4	59		
20×13	30	34	Rp1/2	57		–
25	46	52	Rp1	68		Ⓜ

Notes
1. The threads are parallel female threads conform to JIS B0203 (taper pipe threads).
2. The material of the thread insert of the products with nominal diameters of 13, 16 and 20 conforms to JIS H3250 C3601, C3602 or C3604 (free-cutting brass) and that of the product with nominal diameter of 25 conforms to JIS H5121 CAC406C (cast brass).
3. Use seal tape on threads for firm sealing. A solvent-free sealing agent must be used when seal tape and sealing agent are used together. If a solvent-containing sealing agent is used, cracks may occur in the hydrant joint.
4. Excessive tightening of the tapered male threads may cause the RP female thread section to expand and break.
5. Do not connect the product to a steel pipe with tapered male threads that are fabricated at construction sites.

HI-TS Hydrant Tees with Metal Insert — Code No. 7030
HI-TS Hydrant Tees — Code No. 6023

(Abbreviation: MWT = With metal insert, WT = Without metal insert)
Type A



TS Hydrant Tees with Metal Insert — Code No. 4030
TS Hydrant Tees — Code No. 5023

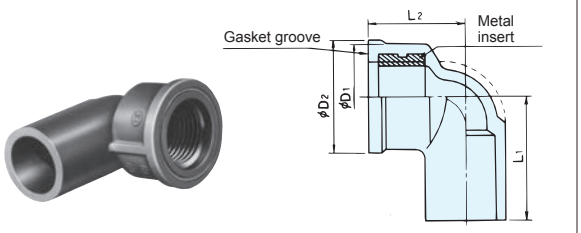
Unit : mm

Nominal Dia.	D1	D2	Nominal Thread Dia.	H	I	Standards	
						MWT	WT
13	30(28)	34	Rp1/2	38	29	JIS K 6743	Ⓜ
16×13	30	34	Rp1/2	43	32		
20	37	42	Rp3/4	51	36		
20×13	30	34	Rp1/2	47	34		
25	46	52	Rp1	59	42		

Notes
1. The threads are parallel female threads conform to JIS B0203 (taper pipe threads).
2. The material of the thread insert of the products with nominal diameters of 13, 16 and 20 conforms to JIS H3250 C3601, C3602 or C3604 (free-cutting brass) and that of the product with nominal diameter of 25 conforms to JIS H5121 CAC406C (cast brass).
3. Use seal tape on threads for firm sealing. A solvent-free sealing agent must be used when seal tape and sealing agent are used together. If a solvent-containing sealing agent is used, cracks may occur in the hydrant joint.
4. Excessive tightening of the tapered male threads may cause the RP female thread section to expand and break.
5. Do not connect the product to a steel pipe with tapered male threads that are fabricated at construction sites.
6. HI-TS Hydrant Tees with a nominal diameter of 20 x 13 or 25 are not available. Note that the numeric value in ( ) is the dimension of WT product.

HI-TS Hydrant Elbows with Metal Insert Code No. 7033
HI-TS Hydrant Elbows Code No. 6022

(Abbreviation: MWL = With metal insert, WL = Without metal insert)
Type A



TS Hydrant Elbows with Metal Insert Code No. 4033
TS Hydrant Elbows Code No. 5022

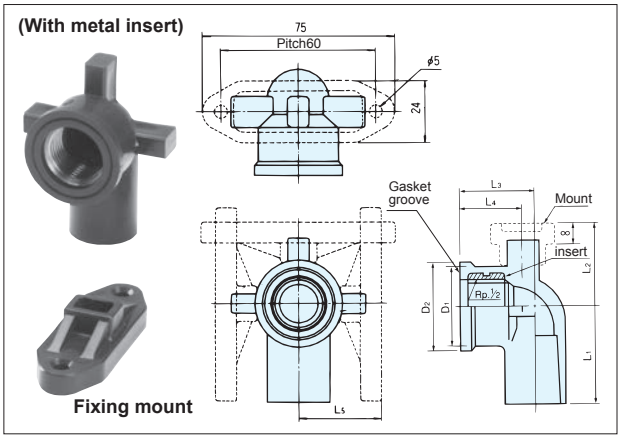
Unit : mm

Nominal Dia.	D1	D2	Nominal Thread Dia.	L1	L2	Standards		
						MWL		WL
						VP	HI	
13 (Type S)	30	34	Rp1/2	38	29	JIS K 6743	JIS K 6743	Ⓜ
13 (Type L)	30	34	Rp1/2	38	45	–		–
16×13	30	34	Rp1/2	43	32	JIS K 6743		Ⓜ
20	37	42	Rp3/4	51	36			
20×13	30	34	Rp1/2	47	33			–
25	46	52	Rp1	59	40			Ⓜ

Notes
1. For products with nominal diameter of 13, Type S (short size) and Type L (long size) are available.
2. The threads are parallel female threads conform to JIS B0203 (taper pipe threads).
3. The material of the thread insert of the products with nominal diameters of 13, 16 and 20 conforms to JIS H3250 C3601, C3602 or C3604 (free-cutting brass) and that of the product with nominal diameter of 25 conforms to JIS H5121 CAC406C (cast brass).
4. Use seal tape on threads for firm sealing. A solvent-free sealing agent must be used when seal tape and sealing agent are used together. If a solvent-containing sealing agent is used, cracks may occur in the hydrant joint.
5. Excessive tightening of the tapered male threads may cause the RP female thread section to expand and break.
6. Do not connect the product to a steel pipe with tapered male threads that are fabricated at construction sites.

HI-TS Hydrant Elbows with Mount Code No. 7034

(With metal insert)



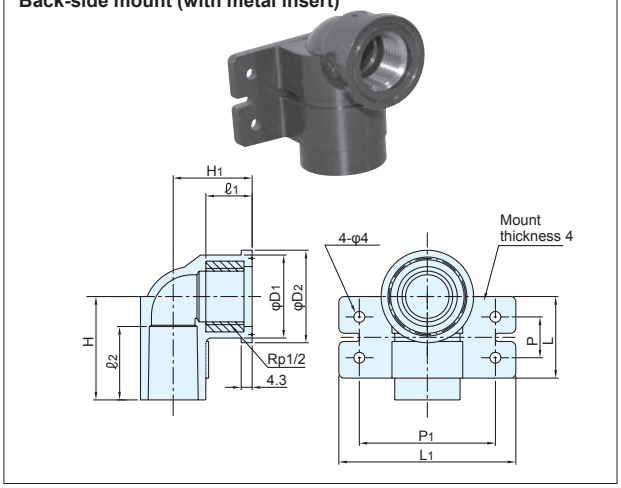
Unit : mm

Nominal Dia.	D1	D2	Nominal Thread Dia.	L1	L2	L3	L4	L5	Standards
13	31	34	Rp1/2	38	33	29	24.5	33	Ⓜ
16×13	33	35	Rp1/2	44	34	33	24.5	33	
20×13	32	34	Rp1/2	51	33.5	36	24.5	33	

Notes
1. The threads are parallel female threads conform to JIS B0203 (taper pipe threads).
2. The material of the thread insert conforms to JIS H3250 C3601 (free-cutting brass) or C3602 (free-cutting brass).
3. Use seal tape on threads for firm sealing. A solvent-free sealing agent must be used when seal tape and sealing agent are used together. If a solvent-containing sealing agent is used, cracks may occur in the hydrant joint.
4. Excessive tightening of the tapered male threads may cause the RP female thread section to expand and break.
5. Do not connect the product to a steel pipe with tapered male threads that are fabricated at construction sites.

HI-TS Hydrant Elbows with Mount (Back-Side Mount) Code No. 7036

Back-side mount (with metal insert)



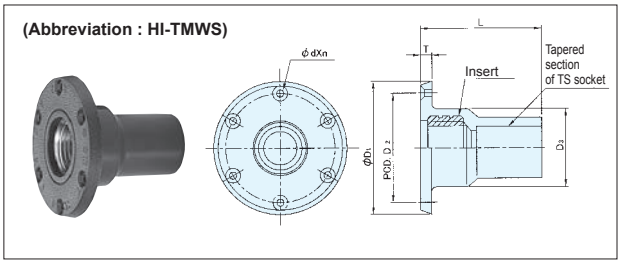
Unit : mm

Nominal Dia.	D1	D2	ℓ1	ℓ2	Nominal Thread Dia.	H	H1	L	L1	P	P1	Standards
13	30.5	34.5	17	27	Rp1/2	38	29	30	65	15	50	Ⓜ
16×13	30.5	34.5	17	31	Rp1/2	43	33	33	70	18	55	
20×13	31.0	34.5	17	35	Rp1/2	47	36	36	75	20	60	

Notes
1. The threads are parallel female threads conform to JIS B0203 (taper pipe threads).
2. The material of the metal insert conforms to JIS H3250 C371BD (brass for casting).
3. Use seal tape on threads for firm sealing. A solvent-free sealing agent must be used when seal tape and sealing agent are used together. If a solvent-containing sealing agent is used, cracks may occur in the hydrant joint.
4. Excessive tightening of the tapered male threads may cause the RP female thread section to expand and break.
5. Do not connect the product to a steel pipe with tapered male threads that are fabricated at construction sites.

HI-TS Hydrant Sockets with Flange Code No. 7035

(Abbreviation : HI-TMWS)



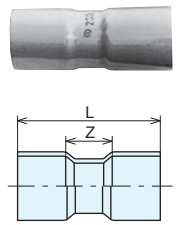
Unit : mm

Nominal Dia.	L +5 −1	D1	D2	D3	Nominal Thread Dia.	T	d	n	Standards
13	47	54	45	30	Rp1/2	4	3	6	Ⓜ
20×13	59	54	45	33	Rp1/2	4	3	6	

Notes
1. The threads are parallel female threads conform to JIS B0203 (taper pipe threads).
2. The material of the thread insert conforms to JIS H3250 C3602 (free-cutting brass).
3. Use seal tape on threads for firm sealing. A solvent-free sealing agent must be used when seal tape and sealing agent are used together. If a solvent-containing sealing agent is used, cracks may occur in the hydrant joint.
4. Excessive tightening of the tapered male threads may cause the RP female thread section to expand and break.
5. Do not connect the product to a steel pipe with tapered male threads that are fabricated at construction sites.

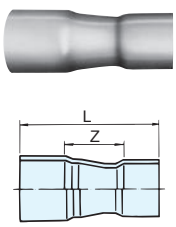
HI-TS Sockets Code No. 9661
TS Sockets Code No. 9061

(Abbreviation : S)



(Nominal Dia. : 200 and more)

(Abbreviation : RS)



(Nominal Dia. : 150 x 125 and more)

TS sockets with nominal diameter of 200 and more cannot be used on pipes for drinking water.

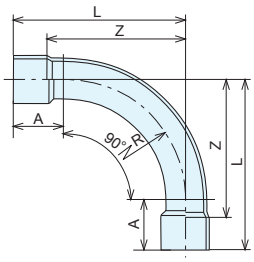
Unit : mm

Nominal Dia.	Z	L	Standards	
			For general purposes	
			VP	HI-VP
150×125	184	420	Ⓜ	★Ⓜ
200	150	550		
200×150	328	660		
250	200	700		
250×200	350	800		
300	250	850		
300×250	350	900		

Note The "★" mark indicates a made-to-order product.

HI-TS 90° Bends Code No. 9662
TS 90° Bends Code No. 9062

(Abbreviation : 90B) Type B



TS 90° Bends with nominal diameter of 200 and more cannot be used on pipes for drinking water.

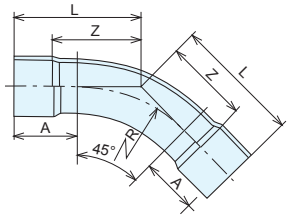
Unit : mm

Nominal Dia.	A	R (Reference)	Z	L	Standards			
					For water supply		For general purposes	
					VP	HI-VP	VP	HI-VP
13	40	40	54	80	★JIS K 6743	JIS K 6743	–	
16	50	50	170	100		★JIS K 6743		
20	55	60	180	115	JIS K 6743	JIS K 6743		
25	60	75	195	135				
30	65	90	111	155				
40	85	110	140	195				
50	100	150	187	250				
65	110	200	249	310	AS21	★AS21		
75	120	250	306	370	JIS K 6743	JIS K 6743		
100	145	300	361	445				
125	165	400	461	565	AS21	★AS21		
150	195	475	538	670	JIS K 6743	★JIS K 6743		
200	300	700	800	1000	–		Ⓜ	★Ⓜ
250	350	1000	1100	1350			★Ⓜ	–
300	400	1200	1300	1600				

Note The "★" mark indicates a made-to-order product.

HI-TS 45° Bends Code No. 9662
TS 45° Bends Code No. 9062

(Abbreviation : 45B) Type B



TS 45° Bends with nominal diameter of 200 and more cannot be used on pipes for drinking water.

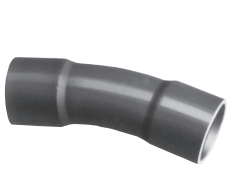
Unit : mm

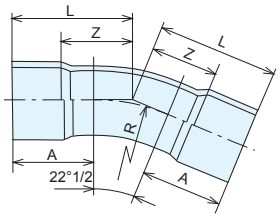
Nominal Dia.	A	R (Reference)	Z	L	Standards			
					For water supply		For general purposes	
					VP	HI-VP	VP	HI-VP
13	40	40	31	57	★JIS K 6743	★JIS K 6743	–	
16	50	50	41	71				
20	55	60	45	80		JIS K 6743		
25	60	75	51	91				
30	65	90	58	102	JIS K 6743			
40	85	110	76	131				
50	100	150	99	162				
65	110	200	132	193	AS21	AS21		
75	120	250	160	224	JIS K 6743	JIS K 6743		
100	145	300	185	269				
125	165	400	227	331	AS21	★AS21		
150	195	475	260	392	JIS K 6743	JIS K 6743		
200	310	700	400	600	–		Ⓜ	★Ⓜ
250	336	1000	500	750				–
300	403	1200	600	900				

Note The "★" mark indicates a made-to-order product.

HI-TS 22° 1/2 Bends Code No. 9662
TS 22° 1/2 Bends Code No. 9062

(Abbreviation : 22 1/2B) Type B





⚠ TS 22 ° 1/2 bends with nominal diameter of 200 and more cannot be used on pipes for drinking water.

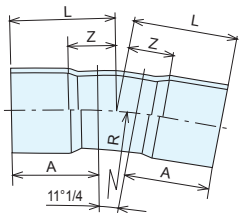
Unit : mm

Nominal Dia.	A	R (Reference)	Z	L	Standards			
					For water supply		For general purposes	
					VP	HI-VP	VP	HI-VP
13	40	40	22	48	★JIS K 6743	★JIS K 6743	–	–
16	50	50	30	60				
20	55	60	32	67		JIS K 6743		
25	60	75	35	75				
30	65	90	39	83	JIS K 6743			
40	85	110	52	107				
50	100	150	67	130				
65	110	200	89	150	AS21	AS21		
75	120	250	106	170	JIS K 6743	JIS K 6743		
100	145	300	121	205				
125	165	400	141	245	AS21	★AS21		
150	195	475	157	289	JIS K 6743	★JIS K 6743		
200	312	700	250	450	–		Ⓜ	★Ⓜ
250	352	1000	300	550				–
300	413	1200	350	650				

Note The "★" mark indicates a made-to-order product.

HI-TS 11° 1/4 Bends Code No. 9662
TS 11° 1/4 Bends Code No. 9062

(Abbreviation : 11 1/4B) Type B



⚠ TS 11 ° 1/4 bends with nominal diameter of 200 and more cannot be used on pipes for drinking water.

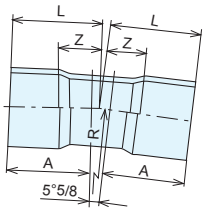
Unit : mm

Nominal Dia.	A	R (Reference)	Z	L	Standards			
					For water supply		For general purposes	
					VP	HI-VP	VP	HI-VP
13	40	40	18	44	★JIS K 6743	★JIS K 6743	–	–
16	50	50	25	55				
20	55	60	26	61				
25	60	75	27	67				
30	65	90	30	74		JIS K 6743		
40	85	110	41	96	JIS K 6743			
50	100	150	52	115				
65	110	200	67	128	AS21	★AS21		
75	120	250	81	145	JIS K 6743	JIS K 6743		
100	145	300	91	175				
125	165	400	97	201	AS21	★AS21		
150	195	475	110	242	JIS K 6743	★JIS K 6743		
200	281	700	150	350	–		Ⓜ	★Ⓜ
250	351	1000	200	450				–
300	381	1200	200	500				

Note The "★" mark indicates a made-to-order product.

HI-TS 5° 5/8 Bends Code No. 9662
TS 5° 5/8 Bends Code No. 9062

(Abbreviation : 5 5/8B) Type B



⚠ TS 5 ° 5/8 bends with nominal diameter of 200 and more cannot be used on pipes for drinking water.

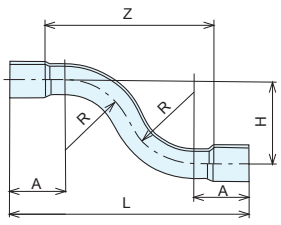
Unit : mm

Nominal Dia.	A	R (Reference)	Z	L	Standards			
					For water supply		For general purposes	
					VP	HI-VP	VP	HI-VP
40	85	110	35	90	★JIS K 6743	★JIS K 6743	–	–
50	100	150	44	107				
65	110	200	59	120	★AS21	★AS21		
75	120	250	68	132	JIS K 6743	★JIS K 6743		
100	145	300	76	160				
125	165	400	81	185	AS21	★AS21		
150	195	475	86	218	JIS K 6743	★JIS K 6743		
200	272	700	100	300	–		Ⓜ	★Ⓜ
250	330	1000	120	370				–
300	392	1200	140	440			★Ⓜ	

Note The "★" mark indicates a made-to-order product.

HI-TS S Bends Code No. 9660
TS S Bends Code No. 9060

(Abbreviation : S-B) Type B



Unit : mm

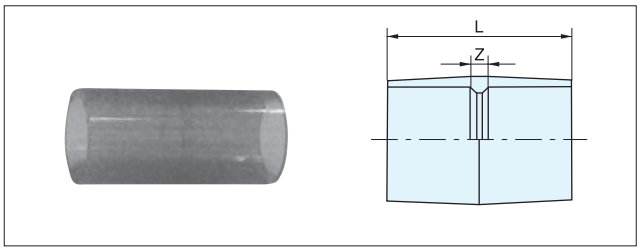
Nominal Dia.	A	R (Reference)	Z	H	L	Standards	
						VP	HI-VP
13	40	90	208	150	260	–	★JIS K 6743
16	55	100	240	150	300		
20	55	105	250	150	320		JIS K 6743
25	60	120	280	150	360		
30	65	130	302	200	390		★JIS K 6743
40	85	150	360	200	470	★JIS K 6743	JIS K 6743
50	100	150	399	200	525		
75	120	250	572	300	700		★JIS K 6743
100	145	300	642	300	810		
150	195	475	841	300	1105		

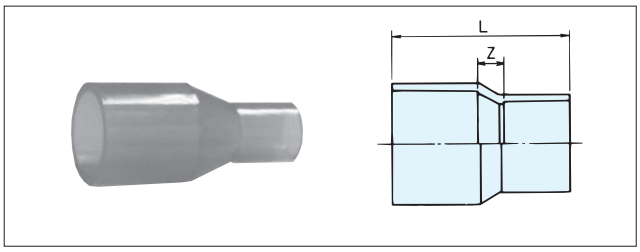
Note The "★" mark indicates a made-to-order product.

3. Transparent Fittings for Water Supply

Meaning of symbols
Ⓜ : Product conforms to the manufacturer's standards

Transparent Sockets for Water Supply Code No. 6011

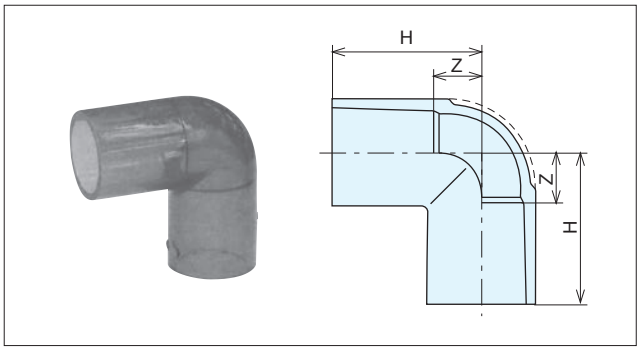




Unit : mm

Nominal Dia.	Z	L	Standards
13	5	57	Ⓜ
16	7	67	
16×13	5	61	
20	7	77	
20×13	7	68	
20×16	6	71	
25	7	87	
25×13	20	86	
25×16	15	85	
25×20	9	84	
30	7	95	
30×20	14	93	
30×25	9	93	
40	7	117	
40×25	19	114	
40×30	15	114	
50	7	133	
50×30	29	136	
50×40	18	136	

Transparent Elbows for Water Supply Code No. 6012

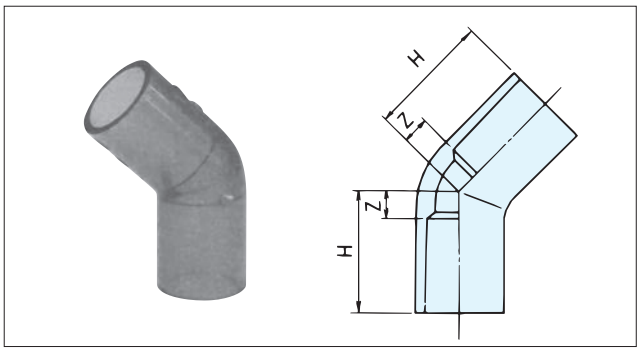


Unit : mm

Nominal Dia.	Z	H	Standards
13	10	36	Ⓜ
16	13	43	
20	15	50	
20×13	12 (side 20) | 15 (side 13)	47 (side 20) | 41 (side 13)	
25	18	58	
30	21	65	
40	27	82	
50	33	96	

Note Elbow sections must not be applied with a bending force or vibration.

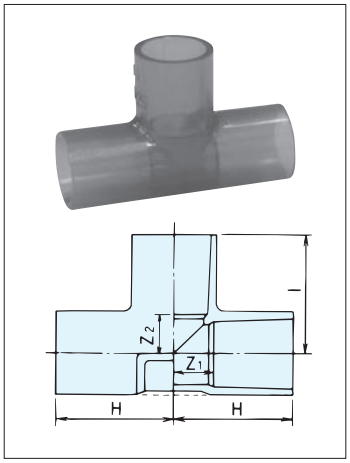
Transparent 45° Elbows for Water Supply Code No. 6012



Unit : mm

Nominal Dia.	Z	H	Standards
13	7	33	Ⓜ
20	9	44	
25	11	51	
30	12	56	
40	14	69	
50	17	80	

Transparent Tees for Water Supply Code No. 6013

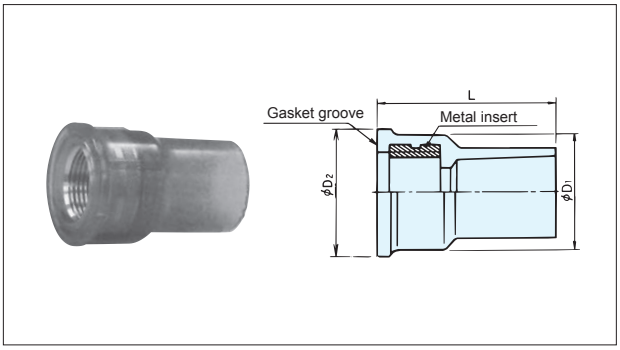


Unit : mm

Nominal Dia.	Z_1	Z_2	H	l	Standards
13	10	10	36	36	Ⓜ
16	13	13	43	43	
16×13	11	12	41	38	
20	15	15	50	50	
20×13	11	14	46	40	
20×16	13	15	48	45	
25	18	18	58	58	
25×13	11	17	51	43	
25×16	13	18	53	48	
25×20	15	18	55	53	
30	21	21	65	65	
30×13	11	20	55	46	
30×16	15	21	57	51	
30×20	15	21	59	56	
30×25	18	21	62	61	

Nominal Dia.	Z_1	Z_2	H	l	Standards
40	27	27	82	82	Ⓜ
40×13	11	26	66	52	
40×16	13	27	68	57	
40×20	15	27	70	62	
40×25	18	27	73	67	
40×30	21	27	76	71	
50	33	33	96	96	
50×13	11	32	74	58	
50×16	16	34	76	63	
50×20	15	33	78	68	
50×25	18	33	81	73	
50×30	21	33	84	77	
50×40	27	33	90	88	

Transparent Hydrant Sockets with Metal Insert Code No. 7028

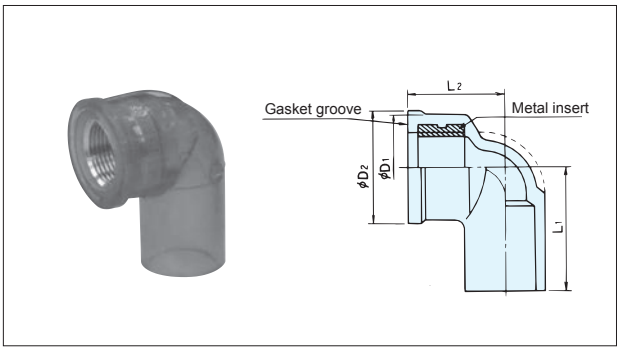


Unit : mm

Nominal Dia.	D1	D2	Nominal Thread Dia.	L	Standards
13	30	34	Rp1/2	47	Ⓜ
16×13	30	34	Rp1/2	52	
20	37	42	Rp3/4	59	
20×13	30	34	Rp1/2	57	
25	46	52	Rp1	68	

Notes
1. The threads are parallel female threads conform to JIS B0203 (taper pipe threads).
2. The material of the thread insert of the products with nominal diameters of 13, 16 and 20 conforms to JIS H3250 C3601, C3602 or C3604 (free-cutting brass) and that of the product with nominal diameter of 25 conforms to JIS H5121 CAC406C (cast brass).
3. Use seal tape on threads for firm sealing. A solvent-free sealing agent must be used when seal tape and sealing agent are used together. If a solvent-containing sealing agent is used, cracks may occur in the hydrant joint.
4. Excessive tightening of the tapered male threads may cause the RP female thread section to expand and break.
5. Do not connect the product to a steel pipe with tapered male threads that are fabricated at construction sites.

Transparent Hydrant Elbows with Metal Insert Code No. 7033

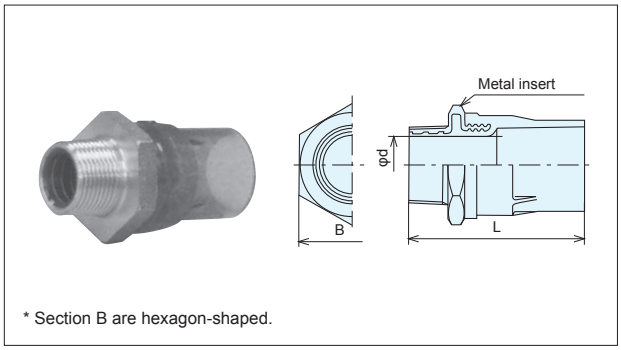


Unit : mm

Nominal Dia.	D1	D2	Nominal Thread Dia.	L1	L2	Standards
13	30	34	Rp1/2	38	29	Ⓜ
16×13	30	34	Rp1/2	43	32	
20	37	42	Rp3/4	51	36	
20×13	30	34	Rp1/2	47	33	
25	46	52	Rp1	59	40	

Notes
1. The threads are parallel female threads conform to JIS B0203 (taper pipe threads).
2. The material of the thread insert of the products with nominal diameters of 13, 16 and 20 conforms to JIS H3250 C3601, C3602 or C3604 (free-cutting brass) and that of the product with nominal diameter of 25 conforms to JIS H5121 CAC406C (cast brass).
3. Use seal tape on threads for firm sealing. A solvent-free sealing agent must be used when seal tape and sealing agent are used together. If a solvent-containing sealing agent is used, cracks may occur in the hydrant joint.
4. Excessive tightening of the tapered male threads may cause the RP female thread section to expand and break.
5. Do not connect the product to a steel pipe with tapered male threads that are fabricated at construction sites.

Transparent Valve Sockets with Metal Insert (Type II) Code No. 7031



* Section B are hexagon-shaped.

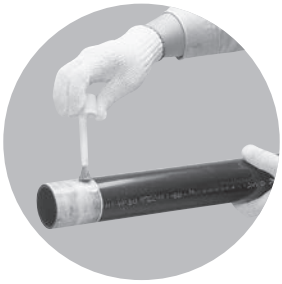
Unit : mm

Nominal Dia.	d	B	Nominal Thread Dia.	L	Standards
13× 1/2	13	32	R1/2	60	Ⓜ
16× 1/2	13	32	R1/2	67	
20× 3/4	18	40	R3/4	75	
25×1	23	50	R1	85	
30×1 1/4	31	55	R1 1/4	95	
40×1 1/2	37	65	R1 1/2	110	
50×2	48	75	R2	125	

Notes
1. The threads are tapered male threads conform to JIS B0203 (taper pipe threads).
2. The material of the thread insert conforms to JIS H5120 CAC406 (cast brass).
3. The shape of the socket with nominal diameter of 16 differs partially from that shown in the diagram.

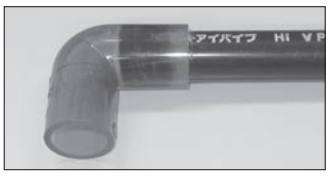
Tough dyne HI (White) Specially designed adhesive

Conform to JWWA S101
Be sure to apply **Tough dyne HI (White)** for bonding.

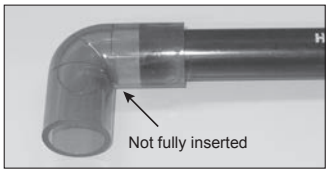


500 g can **1 kg can**

Correct connection
*note



Improper connection



*Note: It may be difficult to insert the pipe all the way to the stopper depending on the type of fitting.
In that case, insert the pipe to the following position: Zero point + Min. 1/3ℓ.

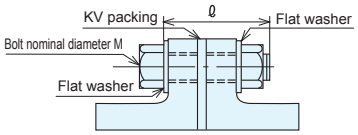
* Color Tough dyne Blue cannot be used to bond pipes that are used for drinking water.

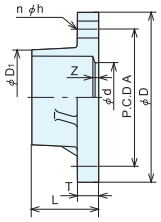
4. TS Flanges and KV Packings

Meaning of symbols
Ⓜ : Product conforms to the manufacturer's standards

TS Flanges

■ **Reference: Length of bolts used to connect TS flanges.**





Notes
1. **Use KV packings (gaskets). For JIS 5K flanges, use commercially available packings.**
2. **Install flat washers on both bolt side and nut side.**
3. **Be sure to tighten all bolts evenly to the same torque.**
4. **When installing a butterfly valve, check the product dimensions to make sure that the valve can open fully. When installing, align the centers of the parts.**

HI-JIS 10K Flanges　Code No. 7642

JIS 10K Flanges　Code No. 7142

Unit : mm

Nominal Dia.	D	A	d	D_1	L	T	Z	n-h	Bolt nominal length M-ℓ	Standards
15(16)	95	70	16	31	36	14	6	4-15	M12-55	Ⓜ
20	100	75	20	35	42	14	7	4-15	M12-55	
25	125	90	25	43	46	14	6	4-19	M16-60	
32(30)	135	100	31	49	51	16	7	4-19	M16-60	
40	140	105	40	61	62	16	7	4-19	M16-60	
50	155	120	51	73	72	20	9	4-19	M16-70	
65	175	140	67	88	69	22	8	4-19	M16-75	
80(75)	185	150	77	103	72	22	8	8-19	M16-75	
100	210	175	100	132	94	24	10	8-19	M16-80	
125	250	210	125	156	116	24	12	8-23	M20-80	
150	280	240	146	185	146	26	14	8-23	M20-85	
200	330	290	194	240	168	28	15	12-23	M20-90	
250	400	355	247	292	173	30	15	12-25	M22-95	
300	445	400	298	344	195	31	15	16-25	M22-95	

Notes
1. The flange dimensions conform to JIS B2220 (steel pipe flanges) 10 K.
2. The TS socket dimensions conform to JIS K6741, JIS K6743 and AS21.
3. The design pressure (hydrostatic pressure + water hammer) is 1.0 MPa for products with nominal diameters of 250 and less and 0.65 MPa for products with nominal diameter of 300.

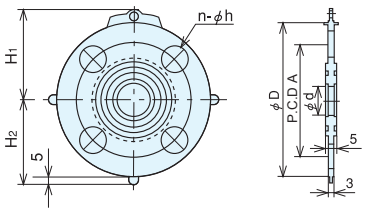
JIS 5K Flanges　Code No. 7144

Unit : mm

Nominal Dia.	D	A	d	D_1	L	T	Z	n-h	Bolt nominal length M-ℓ	Standards
★15(16)	80	60	18	29	35	9	5	4-12	M10-40	Ⓜ
20	85	65	22	33	40	10	5	4-12	M10-40	
★25	95	75	25	42	46	10	6	4-12	M10-40	
32(30)	115	90	31	51	50	12	6	4-15	M12-50	
40	120	95	41	57	61	12	6	4-15	M12-50	
50	130	105	51	70	70	14	7	4-15	M12-50	
65	155	130	67	87	70	14	9	4-15	M12-50	
80(75)	180	145	77	102	72	14	8	4-19	M16-55	
100	200	165	100	130	93	16	9	8-19	M16-60	
125	235	200	125	157	114	16	10	8-19	M16-60	
150	265	230	146	186	143	18	11	8-19	M16-65	

Notes
1. The "★" mark indicates a made-to-order product.
2. The flange dimensions conform to JIS B2220 (steel pipe flanges) 5K.
3. The TS socket dimensions conform to JIS K6743 and AS21.
4. The shape differs partially from that shown in the diagram depending on the size.
5. The design pressure (hydrostatic pressure + water hammer) is 0.5 MPa.

KV Packings (Flange Gaskets)



JIS 10K Flange Type　Code No. 9742

Unit : mm

Nominal Dia.	D	A	d	H_1	H_2	n-h	Standards
★ 15	95	70	18	57.0	52.5	4-15	Ⓜ
20	100	75	22	59.5	55.0	4-15	
25	125	90	30	73.0	67.5	4-19	
32	135	100	37	78.0	72.5	4-19	
40	140	105	43	80.5	75.0	4-19	
50	155	120	54	88.5	82.5	4-19	
65	175	140	69	99.0	92.5	4-19	
80	185	150	80	104.0	97.5	8-19	
100	210	175	102	118.5	110.0	8-19	
125	250	210	127	138.5	130.0	8-23	
150	280	240	150	153.5	145.0	8-23	
200	330	290	198	180.5	170.0	12-23	
★250	400	355	249	215.5	205.0	12-25	
★300	445	400	300	238.0	227.5	16-25	

Notes
1. The "★" mark indicates a made-to-order product.
2. The material is EPT (EPDM) and the operating temperature range is from -40°C to 90°C.

Flange Gaskets for Water Supply　Code No. 9743

Unit : mm

Nominal Dia.	D	A	d	H_1	H_2	n-h	Standards
★ 40	140	105	43	81.0	75.0	4-19	Ⓜ
★ 50	155	120	54	88.5	82.5	4-19	
75	211	168	80	117.0	110.5	4-19	
100	238	195	102	132.5	124.0	4-19	
★125	263	220	127	145.0	136.5	6-19	
★150	290	247	151	158.5	150.0	6-19	
★200	342	299	200	184.5	176.0	8-19	
★250	410	360	252	218.5	210.0	8-23	
★300	464	414	300	245.5	237.0	10-23	

Notes
1. The "★" mark indicates a made-to-order product.
2. The material is SBR and the operating temperature range is from 5°C to 35°C.

Types of Packings That Can Be Used

TS Flange \ Packing		JIS 10K Type
		EPT(EPDM)
JIS 10K Flange	VP	○
	HI-VP	○

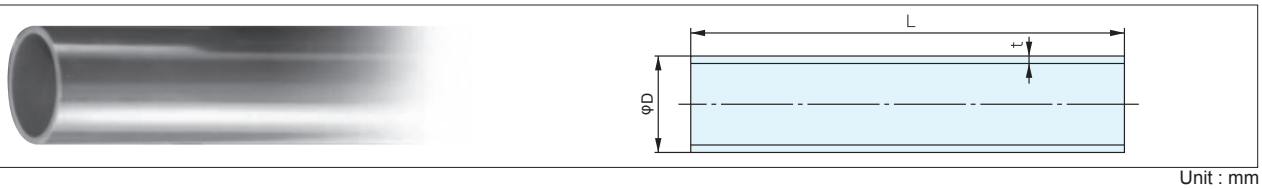
Note　Use commercially available packings for JIS 5K flanges.

II. HT Pipes and Fittings for Hot Water Supply

1. Pipes

HT Pipes — Code No. 2002

Meaning of symbols
JIS K6776: Product conforms to Japanese Industrial Standards JIS K6776
Ⓜ : Product conforms to the manufacturer's standards



Unit : mm

Nominal Dia.	Outside Dia.D			Thickness t		Approx. Inside Dia. (Reference)	Length L	Tolerance	Reference Weight		Standards
	Basic Dimension	Max./Min. OD Tolerance	Average OD Tolerance	Thickness	Tolerance				kg/m	kg/piece	
13×4m	18.0	±0.2	±0.2	2.5	±0.2	13	4000	+30 −10	0.191	0.76	JIS K 6776
16×4m	22.0	±0.2	±0.2	3.0	±0.3	16	4000		0.281	1.12	
20×4m	26.0	±0.2	±0.2	3.0	±0.3	20	4000		0.340	1.36	
25×4m	32.0	±0.2	±0.2	3.5	±0.3	25	4000		0.492	1.97	
30×4m	38.0	±0.3	±0.2	3.5	±0.3	31	4000		0.596	2.38	
40×4m	48.0	±0.3	±0.2	4.0	±0.3	40	4000		0.868	3.47	
50×4m	60.0	±0.4	±0.2	4.5	±0.4	51	4000		1.232	4.93	
65×4m	76.0	±0.5	±0.3	5.0	±0.5	66	4000		1.651	6.60	Ⓜ
75×4m	89.0	±0.5	±0.3	5.9	±0.4	77	4000		2.380	9.52	
100×4m	114.0	±0.6	±0.4	7.1	±0.5	100	4000		3.743	14.97	
125×4m	140.0	±0.8	±0.5	8.2	±0.6	124	4000		5.025	20.10	
150×4m	165.0	±1.0	±0.5	9.6	±0.6	146	4000		7.280	29.12	
40×1m	48.0	±0.3	±0.2	4.0	±0.3	40	1000	+10 0	0.868	0.87	JIS K 6776
40×2m	48.0	±0.3	±0.2	4.0	±0.3	40	2000		0.868	1.74	
50×1m	60.0	±0.4	±0.2	4.5	±0.4	51	1000		1.232	1.23	
50×2m	60.0	±0.4	±0.2	4.5	±0.4	51	2000		1.232	2.46	
50×3m	60.0	±0.4	±0.2	4.5	±0.4	51	3000		1.232	3.70	
★ 75×3m	89.0	±0.5	±0.3	5.9	±0.4	77	3000		2.380	7.14	Ⓜ

Notes 1. The reference weights are calculated by the basic dimension and a pipe material density of 1.48 g/cm³, and they are not part of the standards.
2. The ★ " mark indicates a made-to-order product.

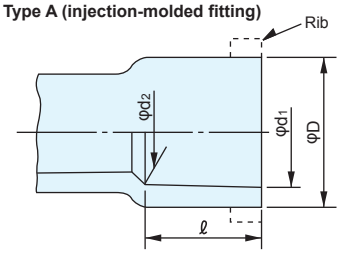
2. Fittings and Accessories

Meaning of symbols
JIS K6777 : Product conforms to Japanese Industrial Standards JIS K6777
Ⓜ : Product conforms to the manufacturer's standards

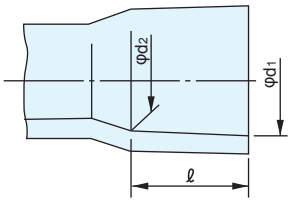
⚠ **Be sure to use the Tough dyne HT adhesive for bonding pipes and fittings.**

Unit : mm

Type A (injection-molded fitting)



Type B (fabricated fitting)



Nominal Dia.	Type A (injection-molded fitting) Type B (fabricated fitting)							Standards
	Product	d1	Tolerance	d2	Tolerance	ℓ±4	D (min.) Type A	
13	All products	18.30	±0.20	17.55	±0.25	22	26	JIS K 6777
16		22.35		21.55		27	29	
20		26.35		25.50		33	34	
25		32.50	±0.30	31.40	±0.35	38	41	
30		38.50		37.45		42	46	
40		48.50		47.45		47	56	

Nominal Dia.	Type A (injection-molded fitting)							Standards
	Product	d1	Tolerance	d2	Tolerance	ℓ±4	D (min.)	
50	All Type A products	60.50	±0.30	59.45	±0.35	52	69	JIS K 6777
65	Socket	76.60		75.30	±0.30	61	89	Ⓜ
	Elbow/Tee	76.60		–	–	61	91	
75	All Type A products	89.60		–	–	64	106	
100		114.70		–	–	84	134	
125		140.80		–	–	104	166	
150		166.00	±0.40	–	–	132	189	

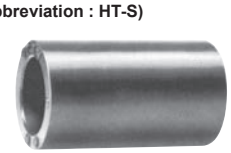
When the socketed end is rib-shaped, the dimension D above indicates the rib diameter.

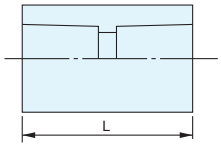
Nominal Dia.	Type B (fabricated fitting)							Standards
	Product	d1	Tolerance	d2	Tolerance	ℓ±4	D (min.)	
50	Bends	60.50	±0.30	59.45	±0.30	52	–	Ⓜ
				59.10		63	–	
65	All Type A products	76.80		75.12		69	–	
75		89.80		88.13		72	–	
100		115.00	±0.35	112.91	±0.35	92	–	
125		141.20	±0.40	138.71	±0.40	112	–	
150		166.50	±0.50	163.38	±0.50	140	–	

HT Sockets — Code No. 2011

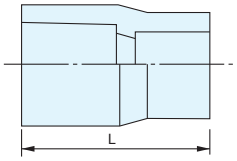
Unit : mm

(Abbreviation : HT-S)





(Abbreviation : HT-RS)



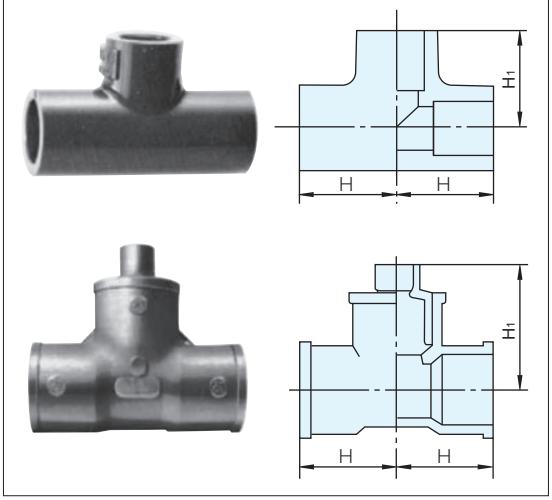
Nominal Dia.	L	Standards
13	49	JIS K 6777
16	59	
16×13	53	
20	71	
20×13	61.5	
20×16	66	
25	82	
25×13	73	
25×16	76	
25×20	80.5	
30	87	
30×20	85	
30×25	90	
40	99	
40×20	98	

Nominal Dia.	L	Standards
40×25	100	JIS K 6777
40×30	97	
50	109	
50×25	110	
50×30	110	
50×40	110	
65	136	Ⓜ
65×50	215	
75	155	
75×50	245	
75×65	163	
100	200	
100×75	190	
125	240	
150	300	

Note The tolerance for the dimension L of HT sockets is 6 mm and the tolerance for the dimension L of HT reducing sockets is ±5 mm.

HT Tees Code No. 2013

(Abbreviation : HT-T)



Note HT tee part must not be applied with a bending force or vibration.

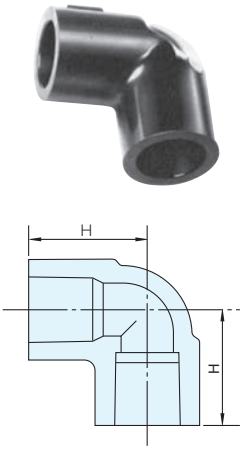
Unit : mm

Nominal Dia.	H	H1	Standards
13	34	34	JIS K 6777
16	41	41	
16×13	39	36	
20	53	53	
20×13	45	38	
20×16	47	43	
25	58	58	
25×13	49	41	
25×16	52	46	
25×20	54	52	
30	64	64	
30×13	54	44	
30×16	56	49	
30×20	58	55	
30×25	60	60	
40	75	75	
40×13	62	49	
40×16	63	54	
40×20	65	60	
40×25	68	65	
40×30	72	69	
50	87	87	
50×13	69	55	
50×16	70	60	
50×20	72	70	
50×25	75	75	

Nominal Dia.	H	H1	Standards
50× 30	79	75	JIS K 6777
50× 40	82	80	
65	110	110	
65× 13	100	135	Ⓜ
65× 16	100	137	
65× 20	100	142	
65× 25	100	147	
65× 30	100	150	
65× 40	95	95	
65× 50	102	104	
75	120	120	
75× 20	105	147	
75× 25	93	88	
75× 30	105	155	
75× 40	100	102	
75× 50	105	110	
100	152	152	
100× 20	125	159	
100× 25	125	164	
100× 30	125	167	
100× 40	125	178	
100× 50	125	122	
100× 75	140	132	
125	187	187	
150	230	230	

HT Elbows Code No. 2012

(Abbreviation : HT-L)



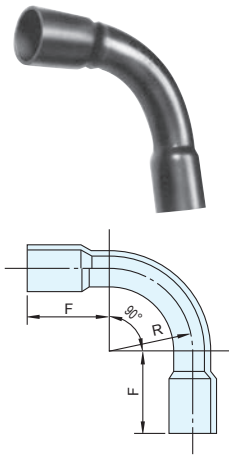
Unit : mm

Nominal Dia.	H	Standards
13	34	JIS K 6777
16	41	
20	53	
25	58	
30	64	
40	74	
50	85	
65	110	Ⓜ
75	120	
100	155	
125	188	
150	228	

Notes
1. Use HT 90° Bends for bending sections of buried pipes.
2. HT Elbow sections must not be applied with a bending force or vibration.
3. The tolerance for the dimension H of HT Elbows is ±4 and the tolerance for the dimension H of products with nominal diameters of 65 and more is +5/-1.

HT 90° Bends Code No. 9262

(Abbreviation : HT-90B)



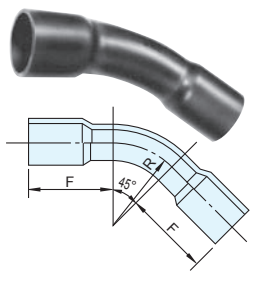
Unit : mm

Nominal Dia.	F	R	Standards
★ 13	42	40	Ⓜ
★ 16	47	48	
★ 20	54	55	
★ 25	62	78	
★ 30	70	100	
★ 40	86.5	120	
★ 50	100	160	
★ 65	110	200	
★ 75	120	245	
★100	145	300	
★125	165	400	
★150	195	500	

Note The "★" mark indicates a made-to-order product.

HT 45° Bends Code No. 9262

(Abbreviation : HT-45B)



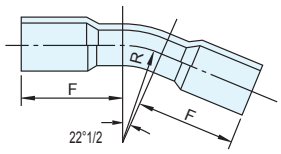
Unit : mm

Nominal Dia.	F	R	Standards
★ 13	42	40	Ⓜ
★ 16	47	48	
★ 20	54	55	
★ 25	62	78	
★ 30	70	100	
★ 40	86.5	120	
★ 50	100	160	
★ 65	110	200	
★ 75	120	245	
★100	145	300	
★125	165	400	
★150	195	500	

Note The "★" mark indicates a made-to-order product.

HT 22° 1/2 Bends Code No. 9262

(Abbreviation : HT-22½B)



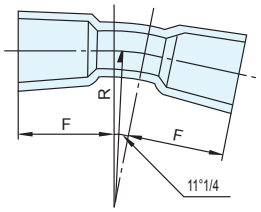
Unit : mm

Nominal Dia.	F	R	Standards
★ 13	42	40	Ⓜ
★ 16	47	48	
★ 20	54	55	
★ 25	62	78	
★ 30	70	100	
★ 40	86.5	120	
★ 50	100	160	
★ 65	110	200	
★ 75	120	245	
★100	145	300	
★125	165	400	
★150	195	500	

Note The "★" mark indicates a made-to-order product.

HT 11° 1/4 Bends Code No. 9262

(Abbreviation : HT-11¼B)



Unit : mm

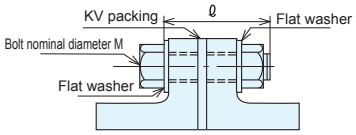
Nominal Dia.	F	R	Standards
★ 50	100	160	Ⓜ
★ 65	110	200	
★ 75	120	245	
★100	145	300	
★125	165	400	
★150	195	500	

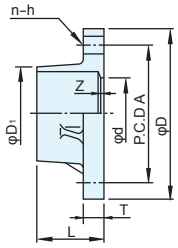
Note The "★" mark indicates a made-to-order product.

HT-TS Flanges　Code No. 2342　JIS 10K Flange Type

Unit : mm

■ **Reference: Length of bolts used to connect TS flanges**





Notes
1. **Use KV Packings (gaskets).**
2. **Install flat washers on both bolt side and nut side.**
3. **Be sure to tighten all bolts evenly to the same torque.**
4. **See the table at the right for the bolt tightening torque.**
5. **When installing a butterfly valve, check the product dimensions to make sure that the valve can open fully. When installing, align the centers of the parts.**

Nominal Dia.	D	A	d	D_1	L	T	Z	n-h	Dimension below Bolt Head ℓ	Standards
15 (16)	95	70	16	31	36	14	6	4-15	M12-50	Ⓜ
20	100	75	20	35	42	14	7	4-15	M12-50	
25	125	90	25	43	46	14	6	4-19	M16-55	
32 (30)	135	100	31	49	51	16	7	4-19	M16-60	
40	140	105	40	61	62	16	7	4-19	M16-60	
50	155	120	51	73	72	20	9	4-19	M16-70	
65	175	140	67	88	69	22	8	4-19	M16-70	
80 (75)	185	150	77	103	72	22	8	8-19	M16-70	
100	210	175	100	132	94	24	10	8-19	M16-75	

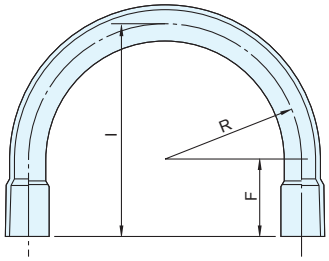
Nominal Dia.	Bolt Tightening Torque (Guideline Values) N・m(kgf・m)
13～30	15(1.5)
40	25(2.5)
50	30(3.1)
75(80)	40(4.1)
100	45(4.6)

Notes　1. The flange conforms to JIS B2220 (steel pipe flanges) 10K.
2. The TS sockets conform to JIS K6777, JIS K6743 and AS 21.

HT 180° Bends　Code No. 9262

Unit : mm

(Abbreviation : HT-180B)



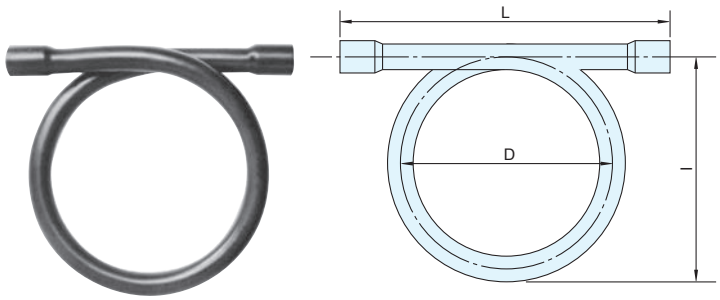
Nominal Dia.	F	I	R	Standards
★13	40	110	70	Ⓜ
★16	45	125	80	
★20	50	140	90	
★25	60	165	105	
★30	65	185	120	
★40	85	225	140	
★50	100	265	165	

Note　The "★" mark indicates a made-to-order product.

HT Loop Bends　Code No. 9262

Unit : mm

(Abbreviation : HT-RB)

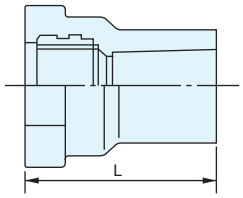


Nominal Dia.	L (min.)	I (Reference)	D	Standards
★13	212	167	158	Ⓜ
★16	256	198	187	
★20	305	230	217	
★25	358	264	248	
★30	406	299	280	
★40	537	340	316	
★50	638	408	378	

Note　The "★" mark indicates a made-to-order product.

HT Hydrant Sockets with Metal Insert　Code No. 3028

(Abbreviation : HT-MWS)



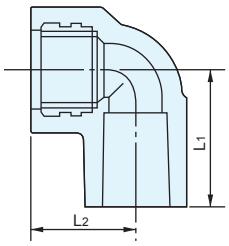
Unit : mm

Nominal Dia.	L	Thread Designation	Standards
13	47	Rp½	JIS K 6777
16×13	52	Rp½	
20	61	Rp¾	
20×13	56	Rp½	Ⓜ
25	69	Rp1	JIS K 6777

Notes
1. The threads are parallel female threads conform to JIS B0203 (taper pipe threads).
2. The material of the thread insert is free-cutting brass conforms to JIS H5120 CAC406, JIS H5121 CAC406C or JIS H3250.
3. Use seal tape on threads for firm sealing. A solvent-free sealing agent must be used when seal tape and sealing agent are used together. If a solvent-containing sealing agent is used, cracks may occur in the hydrant joint.
4. Excessive tightening of the tapered male threads may cause the RP female thread section to expand and break.
5. Do not connect the product to a steel pipe with tapered male threads that are fabricated at construction sites.

HT Hydrant Elbows with Metal Insert　Code No. 3033

(Abbreviation : HT-MWL)



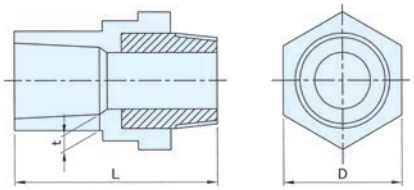
Unit : mm

Nominal Dia.	L_1	L_2	Thread Designation	Standards
13	35	29	Rp½	JIS K 6777
16×13	42	33	Rp½	
20	51	36	Rp¾	
20×13	48	37	Rp½	Ⓜ
25	60	40	Rp1	JIS K 6777

Notes
1. The threads are parallel female threads conform to JIS B0203 (taper pipe threads).
2. The material of the thread insert is free-cutting brass conforms to JIS H5120 CAC406, JIS H5121 CAC406C or JIS H3250.
3. Use seal tape on threads for firm sealing. A solvent-free sealing agent must be used when seal tape and sealing agent are used together. If a solvent-containing sealing agent is used, cracks may occur in the hydrant joint.
4. Excessive tightening of the tapered male threads may cause the RP female thread section to expand and break.
5. Do not connect the product to a steel pipe with tapered male threads that are fabricated at construction sites.

HT Valve Sockets with Metal Insert　Code No. 3031

(Abbreviation : HT-MVS)



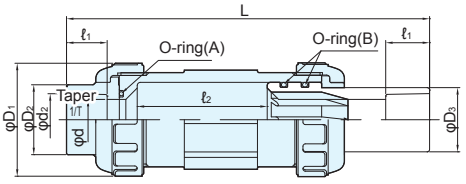
Unit : mm

Nominal Dia.	L	D (min.)	t (min.)	Thread Designation	Standards
13×½	64	34	3.5	R½	JIS K 6777
16×½	70	34	3.5	R½	
20×¾	85	40	4.0	R¾	
25×1	99	45	4.0	R1	
30×1¼	109	62	4.5	R1¼	
40×1½	114	68	4.5	R1½	
50×2	132	84	5.0	R2	

Notes
1. The threads are parallel male threads conform to JIS B0203 (taper pipe threads).
2. The material of the thread insert is free-cutting brass conforms to JIS H5120 CAC406, JIS H5121 CAC406C or JIS H3250.

Thermal-Resistant Expansion Joints　Code No. 1063

(Abbreviation : HT-EXP.J)



Unit : mm

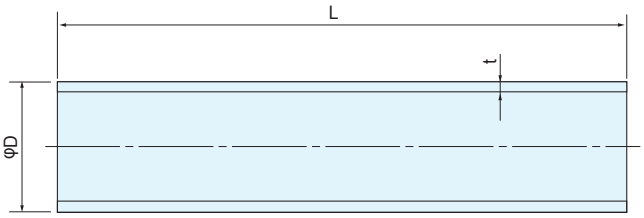
Nominal Dia.	L Max.	L Min.	d	d_1	ℓ_1
20	243	163	20	26	24
25	250	170	25	32	27

Nominal Dia.	1/T	D_1	D_2	D_3	ℓ_2 Amount of Expansion and Contraction	Standards
20	1/34	60	35	35	80	Ⓜ
25	1/34	70	43	39	80	

1. Pipes

Pipes for General Purposes

Meaning of symbols
JIS K6741 : Product conforms to Japanese Industrial Standards JIS K6741
AS59 : Product conforms to Japan PVC Pipe and Fittings Association's standards AS59
Ⓜ : Product conforms to the manufacturer's standards



VP Pipes — Code No. 1001

Unit : mm

Nominal Dia.	Outside Dia.D			Thickness t		Approx. Inside Dia. (Reference)	Length L ±10	Reference Weight		Standards
	Basic Dimension	Max./Min. OD Tolerance	Average OD Tolerance	Min. Dimension	Tolerance			Weight/m kg/m	Weight/m kg/piece	
40	48	±0.3	±0.2	3.6	+0.8	40	4000	0.791	3.2	JIS K 6741
50	60	±0.4	±0.2	4.1	+0.8	51	4000	1.122	4.5	
65	76	±0.5	±0.3	4.1	+0.8	67	4000	1.445	5.8	
75	89	±0.5	±0.3	5.5	+0.8	77	4000	2.202	8.8	
100	114	±0.6	±0.4	6.6	+1.0	100	4000	3.409	13.6	
125	140	±0.8	±0.5	7.0	+1.0	125	4000	4.464	17.9	
150	165	±1.0	±0.5	8.9	+1.4	146	4000	6.701	26.8	
200	216	±1.3	±0.7	10.3	+1.4	194	4000	10.129	40.5	
250	267	±1.6	±0.9	12.7	+1.8	240	4000	15.481	61.9	
300	318	±1.9	±1.0	15.1	+2.2	286	4000	21.962	87.8	

Note For nominal diameter of 30, use VP pipes for water supply shown on page 5.

VU Pipes — Code No. 1005

Unit : mm

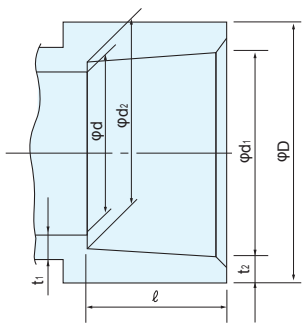
Nominal Dia.	Outside Dia.D		Thickness t		Approx. Inside Dia. (Reference)	Length L ±10	Reference Weight		Standards
	Basic Dimension	Average OD Tolerance	Min. Dimension	Tolerance			Weight/m kg/m	Weight/m kg/piece	
40	48	±0.2	1.8	+0.4	44	4000	0.413	1.7	JIS K 6741
50	60	±0.2	1.8	+0.4	56	4000	0.521	2.1	
65	76	±0.3	2.2	+0.6	71	4000	0.825	3.3	
75	89	±0.3	2.7	+0.6	83	4000	1.159	4.6	
100	114	±0.4	3.1	+0.8	107	4000	1.737	6.9	
125	140	±0.5	4.1	+0.8	131	4000	2.739	11.0	
150	165	±0.5	5.1	+0.8	154	4000	3.941	15.8	
200	216	±0.7	6.5	+1.0	202	4000	6.572	26.3	
250	267	±0.9	7.8	+1.2	250	4000	9.758	39.0	
300	318	±1.0	9.2	+1.4	298	4000	13.701	54.8	
350	370	±1.2	10.5	+1.4	348	4000	18.051	72.2	
400	420	±1.3	11.8	+1.6	395	4000	23.059	92.2	
450	470	±1.5	13.2	+1.8	442	4000	28.875	115.5	
500	520	±1.6	14.6	+2.0	489	4000	35.346	141.4	
600	630	±3.2	17.8	+2.8	592	4000	52.679	210.7	

2. DV and VU-DV Fittings

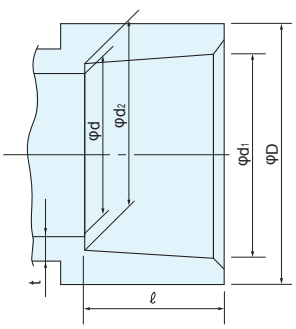
Meaning of symbols
JIS K6739 : Product conforms to Japanese Industrial Standards JIS K6739
K-1 : Product conforms to Japan Sewage Works Association Standard JSWAS K-1
K-11 : Product conforms to Japan Sewage Works Association Standard JSWAS K-11
AS12 : Product conforms to Japan PVC Pipe and Fittings Association's standards AS12
AS38 : Product conforms to Japan PVC Pipe and Fittings Association's standards AS38
Ⓜ : Product conforms to the manufacturer's standards

Common joint dimensions

DV fittings



VU-DV fittings



DV Fittings (VP Stoppers)

Unit : mm

Nominal Dia.	d_1		d_2		ℓ		D	d		t_1	t_2
	Basic Dimension	Tolerance	Basic Dimension	Tolerance	Basic Dimension	Tolerance	Reference Dimension	Basic Dimension	Tolerance	Min. Dimension	Min. Dimension
30	38.25	±0.25	37.85	±0.25	18	±1	44	31.0	±0.8	2.7	2.5
40	48.30	±0.30	47.80	±0.30	22	±1	54	40.0	±0.9	2.7	2.5
50	60.35	±0.30	59.75	±0.30	25	±1	67	51.0	±0.9	3.1	3.0
65	76.40	±0.30	75.70	±0.30	35	±1	83	67.0	±0.9	3.1	3.0
75	89.45	±0.30	88.65	±0.30	40	±2	97	77.2	±0.9	3.6	3.4
100	114.55	±0.35	113.55	±0.35	50	±2	124	98.8	±1.0	4.5	4.3
125	140.70	±0.40	139.40	±0.40	65	±2	151	125.0	±1.2	5.4	4.7
150	165.85	±0.45	164.25	±0.45	80	±2	178	145.8	±1.3	6.3	5.6

VU-DV Fittings (VU Stoppers)

Unit : mm

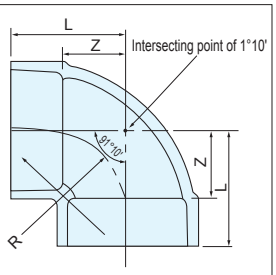
Nominal Dia.	d_1		d_2		ℓ		D	d		t
	Basic Dimension	Tolerance	Basic Dimension	Tolerance	Basic Dimension	Tolerance	Reference Dimension	Basic Dimension	Tolerance	Min. Dimension
40	48.30	±0.30	47.80	±0.30	22	±1	54	40(Reference)	–	1.8
50	60.50	±0.30	59.50	±0.30	25	±3	67	56	−0	2.2
65	76.60	±0.30	75.40	±0.30	35	±3	83	71	−0	2.5
75	89.60	±0.30	88.30	±0.30	40	±5	97	83	−0	3.0
100	114.80	±0.40	113.20	±0.40	50	±5	124	107	−0	3.5
125	140.90	±0.40	139.10	±0.40	65	±5	150	131	−0	4.5
150	166.10	±0.50	163.90	±0.50	80	±5	178	154	−0	5.5
200	217.30	±0.55	214.70	±0.55	105	−0	227	202(Reference)	–	5.5(Reference)
250	268.55	±0.60	265.45	±0.60	125(130)	−0	280	250(Reference)	–	6.5(Reference)
300	319.75	±0.65	316.25	±0.65	140(155)	−0	333	298(Reference)	–	7.5(Reference)
350	373.00	±0.70	368.50	±0.70	168	−0	392	347(Reference)	–	9.3(Reference)
400	423.00	±0.75	417.75	±0.75	200	−0	444	395(Reference)	–	10.5(Reference)

Nominal Dia.	Dimension ℓ (min.)	DL	LL	45L	DT	DS	IN
200	105	●	●	●	●	●	●
250	125	●	●	●	●		●
	130					●	
300	140	●	●	●	●		
	155					●	

Note Since the dimension ℓ of the fittings with nominal diameters of 200, 250 and 300 varies depending on the type of fitting, check the "●" mark in the above table for available lengths.

90° Elbows

(Abbreviation : DL•VU-DL)



DV Fittings Code No. 2151

Unit : mm

Nominal Dia.	Z	L	R(Reference)	Standards
30	22	40	23	JIS K 6739
40	27	49	27	
50	33	58	34	
65	42	77	43	
75	48	88	49	
100	62	112	65	
125	75	140	79.5	
150	88	168	89.5	

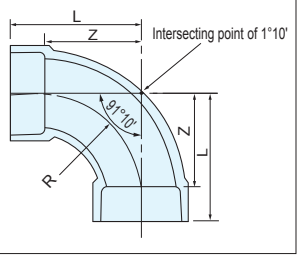
VU-DV Fittings Code No. 2251

Unit : mm

Nominal Dia.	Z	L	R(Reference)	Standards
40	27	49	28	Ⓜ
50	33	58	31	AS38
65	42	77	43	
75	48	88	54	
100	62	112	70	
125	75	140	84	
150	88	168	82	
200	110	216	114	Ⓜ
250	142	267	177	
300	168	308	181	
350	196	366	212	
400	222	422	252	

90° Large Radius Elbows

(Abbreviation : LL•VU-LL)



DV Fittings Code No. 2152

Unit : mm

Nominal Dia.	Z	L	R(Reference)	Standards
40	52	74	75	JIS K 6739
50	66	91	88	
65	90	125	108	
75	100	140	119	
75×50	101 (side 75) / 100 (side50)	141(side75)/125(side50)	–	
100	128	178	152	
100×65	128	178(side100)/163(side65)	–	
100×75	128	178(side100)/168(side75)	–	
125	140	205	180	
150	170	250	210	

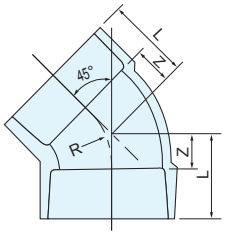
VU-DV Fittings Code No. 2252

Unit : mm

Nominal Dia.	Z	L	R(Reference)	Standards
50	66	91	85	AS38
75	100	140	120	
100	128	178	159	
125	140	205	180	
150	170	250	240	
200	196	301	270	K-1、AS12
250	225	350	225	
300	250	390	250	

45° Elbows

(Abbreviation : 45L•VU-45L)



VU-DV Fittings

Code No. 2253

Unit : mm

Nominal Dia.	Z	L	R(Reference)	Standards
40	14	36	34	Ⓜ
50	18	43	45	AS38
65	22	57	55	
75	25	65	60	
100	30	80	69	
125	38	103	92	
150	44	124	106	
200	48	153	114	AS12
250	58	183	140	
300	70	210	167	
350	90	258	212	Ⓜ
400	110	310	243	

DV Fittings

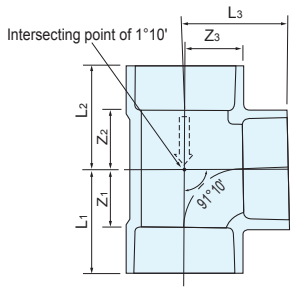
Code No. 2153

Unit : mm

Nominal Dia.	Z	L	R(Reference)	Standards
30	12	30	29	JIS K 6739
40	14	36	30	
50	18	43	42	
65	22	57	52	
75	25	65	58	
100	30	80	69	
125	38	103	90	
150	44	124	109	

90° Y

(Abbreviation : DT•VU-DT)



VU-DV Fittings

Code No. 2254

Unit : mm

Nominal Dia.	Z_1	Z_2	Z_3	L_1	L_2	L_3	Standards
50	34	34	34	59	59	59	AS38
65	42	43	42	77	78	77	
75	48	49	48	88	89	88	
75× 50	34	35	48	74	75	73	
100	62	63	62	112	113	112	
100× 50	34	35	62	84	85	87	
100× 75	48	49	62	98	99	102	
150	89	90	89	169	170	169	
200	113	113	113	218	218	218	AS12
200×100	62	63	116	167	168	166	Ⓜ
200×125	76	73	115	186	183	180	
200×150	88	88	113	198	198	193	AS12
250	139	139	139	264	264	264	Ⓜ
250×200	116	118	141	246	248	251	
300	165	165	165	305	305	305	
350	197	200	197	367	370	367	

DV Fittings

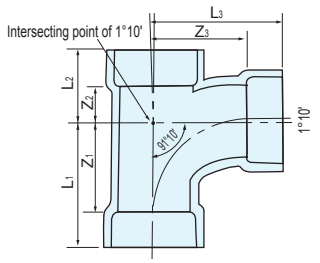
Code No. 2154

Unit : mm

Nominal Dia.	Z_1	Z_2	Z_3	L_1	L_2	L_3	Standards
30	22	22	22	40	40	40	JIS K 6739
40	27	27	27	49	49	49	
40× 30	22	22	27	44	44	45	
50	34	34	34	59	59	59	
50× 30	22	22	33	47	47	51	
50× 40	27	27	33	52	52	55	
65	42	43	42	77	78	77	
65× 40	27	28	42	62	63	64	
65× 50	34	35	42	69	70	67	
75	48	49	48	88	89	88	
75× 40	27	28	48	67	68	70	
75× 50	34	35	48	74	75	73	
75× 65	42	43	48	82	83	83	
100	62	63	62	112	113	112	
100× 40	27	28	62	77	78	84	
100× 50	34	35	62	84	85	87	
100× 65	42	43	62	92	93	97	
100× 75	48	49	62	98	99	102	
125	75	76	75	140	141	140	
125× 75	49	51	75	114	116	115	Ⓜ
125×100	62	64	75	127	129	125	
150	89	90	89	169	170	169	JIS K 6739
150× 75	51	53	88	131	133	128	Ⓜ
150×100	62	65	88	142	145	138	

90° Large Radius Y

(Abbreviation : LT•VU-LT)



VU-DV Fittings

Code No. 2255

Unit : mm

Nominal Dia.	Z1	Z2	Z3	L1	L2	L3	Standards
50	66	26	66	91	51	91	AS38
75	100	30	100	140	70	140	
75× 50	66	29	79	106	69	104	
100	128	45	128	178	95	178	
100× 50	66	32	90	116	82	115	
100× 75	100	33	110	150	83	150	
125	140	50	140	205	115	205	
150	170	65	170	250	145	250	
150×125	140	60	152	220	140	217	
200	196	94	196	301	199	301	Ⓜ
200×100	128	52	176	233	157	226	
200×150	170	57	196	275	162	276	

DV Fittings

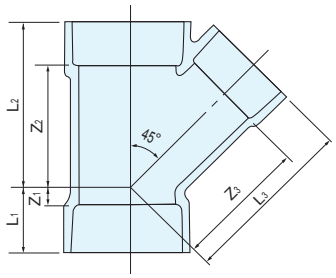
Code No. 2155

Unit : mm

Nominal Dia.	Z1	Z2	Z3	L1	L2	L3	Standards
40	52	23	52	74	45	74	JIS K 6739
50	66	26	66	91	51	91	
50× 40	52	23	57	77	48	79	
65	90	33	90	125	68	125	
65× 40	52	24	66	87	59	88	
65× 50	66	27	74	101	62	99	
75	100	30	100	140	70	140	
75× 40	52	25	71	92	65	93	
75× 50	66	29	79	106	69	104	
75× 65	90	32	95	130	72	130	
100	128	45	128	178	95	178	
100× 40	52	28	82	102	78	104	
100× 50	66	32	90	116	82	115	
100× 65	90	36	107	140	86	142	
100× 75	100	33	110	150	83	150	
125	140	50	140	205	115	205	
125× 65	90	38	120	155	103	155	
125× 75	100	42	124	165	107	164	
125×100	128	52	140	193	117	190	
150	170	65	170	250	145	250	
150× 65	90	42	130	170	122	165	
150× 75	100	45	135	180	125	175	
150×100	128	53	152	208	133	202	
150×125	140	60	152	220	140	217	

45° Y

(Abbreviation : Y•VU-Y)



VU-DV Fittings

Code No. 2257

Unit : mm

Nominal Dia.	Z1	Z2	Z3	L1	L2	L3	Standards
50	20	72	78	45	97	103	AS38
75	26	106	115	66	146	155	
75× 50	3	86	98	43	126	123	
100	32	134	144	82	184	194	
100× 50	−8	98	118	42	148	143	
100× 75	19	118	132	69	168	172	
125	38	172	175	103	237	240	
150	44	204	210	124	284	290	
200	42	258	268	147	363	373	AS12
200×100	−15	200	218	90	305	268	Ⓜ
200×150	7	224	243	112	329	323	

DV Fittings

Code No. 2157

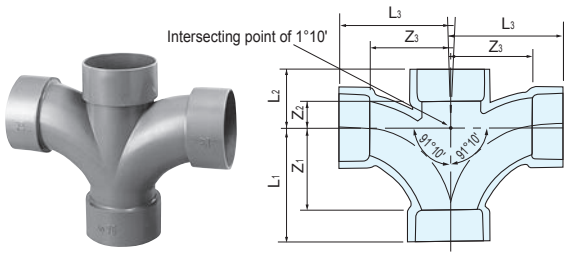
Unit : mm

Nominal Dia.	Z1	Z2	Z3	L1	L2	L3	Standards
40	12	58	62	34	80	84	JIS K 6739
Ⓩ40× 30	6	50	58	28	72	76	
50	20	72	78	45	97	103	
50× 40	8	62	70	33	87	92	
65	20	92	98	55	127	133	
65× 40	−1	72	82	34	107	104	
65× 50	8	80	88	43	115	113	
75	26	106	115	66	146	155	
75× 40	−6	78	92	34	118	114	
75× 50	3	86	98	43	126	123	
75× 65	14	98	106	54	138	141	
100	32	134	144	82	184	194	
100× 40	−14	96	112	36	146	134	
100× 50	−8	98	118	42	148	143	
100× 65	3	110	125	53	160	160	
100× 75	19	118	132	69	168	172	
125	38	172	175	103	237	240	
125×100	19	150	171	84	215	221	
150	44	204	210	124	284	290	
150×100	6	165	185	86	245	235	

Note The Ⓩ mark indicates that the product is manufactured by Maezawa Kasei Industries Co., Ltd.

90° Large Radius Double-Y

(Abbreviation : WLT)



DV Fittings Code No. 2156

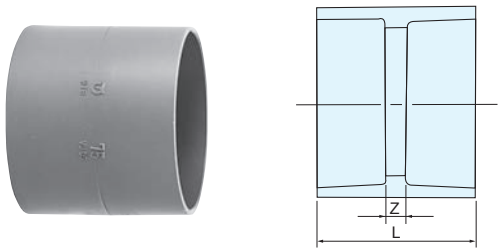
Unit : mm

Nominal Dia.	Z_1	Z_2	Z_3	L_1	L_2	L_3	Standards
65	90	33	90	125	68	125	JIS K 6739
75	100	38	100	140	78	140	
100	128	45	128	178	95	178	
100× 75	100	40	110	150	90	150	
Ⓣ125×100	128	52	140	193	117	190	

Note The mark Ⓣ indicates that the product is manufactured by Toeikanki Co., Ltd.

Sockets

(Abbreviation : DS•VU-DS)



VU-DV Fittings Code No. 2258

Unit : mm

Nominal Dia.	Z	L	Standards
40	3	47	Ⓜ
50	3	53	AS38
65	3	73	
75	4	84	
100	5	105	
125	5	135	
150	5	165	
200	5	215	K-11、AS12
250	6	270	
300	6	320	
350	12	352	Ⓜ
400	12	412	

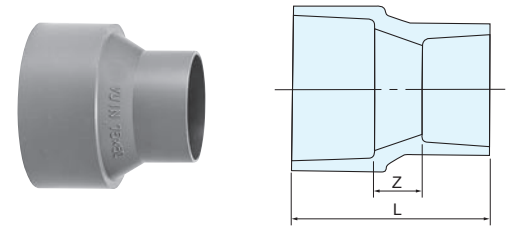
DV Fittings Code No. 2158

Unit : mm

Nominal Dia.	Z	L	Standards
30	3	39	JIS K 6739
40	3	47	
50	3	53	
65	3	73	
75	4	84	
100	4	104	
125	4	134	
150	4	164	

Increaser

(Abbreviation : IN•VU-IN)



VU-DV Fittings Code No. 2259

Unit : mm

Nominal Dia.	Z	L	Standards
50× 40	20	67	Ⓜ
75× 50	25	90	AS38
75× 65	25	100	
100× 50	30	105	
100× 65	30	115	
100× 75	30	120	
125×100	35	150	
150×100	40	170	
150×125	40	185	
200×100	45	203	Ⓜ
200×125	45	218	
200×150	50	235	
250×200	60	290	AS12

DV Fittings Code No. 2159

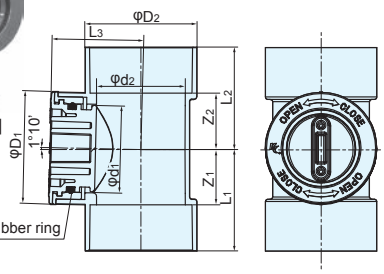
Unit : mm

Nominal Dia.	Z	L	Standards
40× 30	20	60	JIS K 6739
50× 30	20	63	
50× 40	20	67	
65× 40	20	77	
65× 50	20	80	
75× 40	25	87	
75× 50	25	90	
75× 65	25	100	
100× 40	30	102	
100× 50	30	105	
100× 65	30	115	
100× 75	30	120	
125× 65	35	135	Ⓜ
125× 75	35	140	
125×100	35	150	JIS K 6739
150× 75	40	160	Ⓜ
150×100	40	170	JIS K 6739
150×125	40	185	

Smart Cleaning Opening Fittings

(Abbreviation : SF-COS)

[Transparent Type]



DV Fittings and Transparent DV Fittings Code No. 2180

Unit : mm

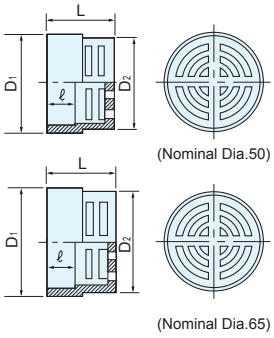
Nominal Dia.	Z1	Z2	L1	L2	L3	D1	D2	d1	d2	Standards
75	48	49	88	89	79	97	97	77	77.2	Ⓜ
100	48	49	98	99	90	97	124	77	98.8	

Notes
1. The dimensions not indicated with a tolerance are reference dimensions.
2. The socket dimensions conform to those of JIS K6739 DV fittings. Refer to the approved drawing for the details of dimensions.
3. If the large amount of adhesive is applied, cleaning opening could not be opened and closed.
4. Note that the cleaning opening of the transparent type is harder to turn than the non- transparent type.

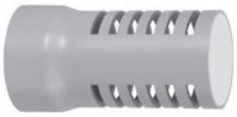
Vent Openings

(Abbreviation : VO)

(Nominal Dia.50•65)

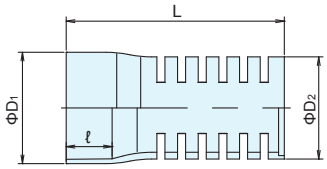


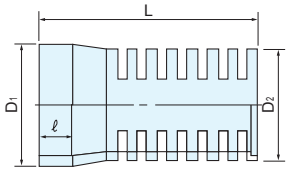
(Abbreviation : VO)



(Nominal Dia.75)

(Nominal Dia.100)





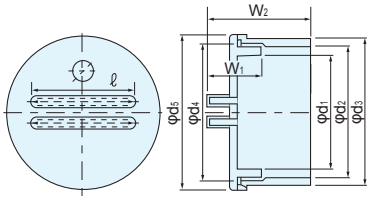
DV Fittings Code No. 2164

Unit : mm

Nominal Dia.	D1	D2	L	ℓ	Standards
50	68	64.3	50	22	Ⓜ
65	84	80.3	52	22	
75	97	89	190	40	
100	129	114	245	50	

Cleaning Openings with Tab

(Abbreviation : VCO)



DV Fittings Code No. 2361

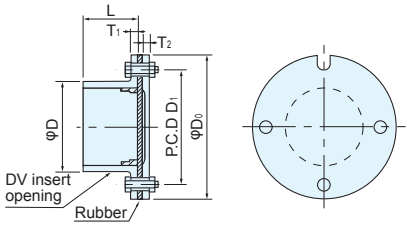
Unit : mm

Nominal Dia.	d1	d2	d3	d4	d5	W1	W2	ℓ	Standards
40	32.4	40.4	48	43.0	58	23.0	39	38	Ⓜ
50	45	52.2	60	55.5	69	28.5	44	40	
65	56.8	66.6	76	70.0	88	31.0	56.5	55	
75	70	78.5	89	82.5	100	36.0	65.5	65	
100	91.5	100	114	104.0	125	37.0	74	80	
125	108.9	125	140	130.0	150	52.0	99.5	100	
150	133	146	165	149.8	179	58.0	115	120	
200	183	197	216	197	235	60.0	153.0	165	

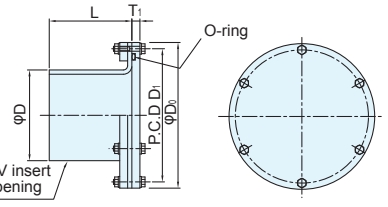
Notes
1. The seal rubber for products with nominal diameters of 40 to 125 is an O-ring.
2. The seal rubber for products with nominal diameters of 150 and 200 is a flat packing.

Flanged Cleaning Openings

(Abbreviation : CO)
Nominal Dia. : 50,75



(Abbreviation : CO)
Nominal Dia. : 65,100~150



DV Fittings Code No. 2161

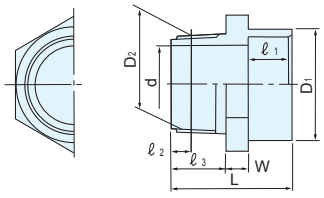
Unit : mm

Nominal Dia.	D	D0	D1	L	T1	T2	Number of Bolt	Standards
50	60	100	85	38	5	8	4	Ⓜ
65	76	120	106	80	10		4	
75	89	130	115	55	5	8	4	
100	114	177	161	100	10		6	
125	140	205	191	112	10		6	
150	165	240	223	130	10		8	

Note The bolts and nuts are made of stainless steel (SUS).

Valve Sockets

(Abbreviation : DVS)



DV Fittings Code No. 2166

Unit : mm

Nominal Dia.	D1	d	ℓ1	W	L	Threads				Standards
						D2	ℓ2	ℓ3	Number of Thread Crests 25.4mm	
40×11/2"	54	40	22	10	58	47.803	12.70	26	11	Ⓜ
50×2"	67	51	25	12	68	59.614	15.88	31	11	
65×21/2"	83	68	35	15	85	75.184	17.46	35	11	
75×3"	97	77.2	40	16	95	87.884	20.64	39	11	
100×4"	124	98.8	50	18	115	113.030	25.40	47	11	

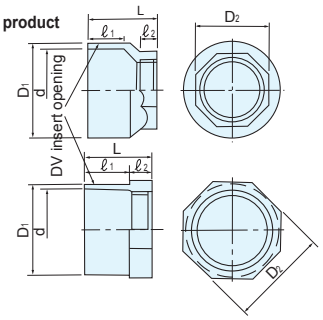
Notes
1. The male threads conform to JIS B0203 (taper pipe threads) male tapered threads (R).
2. The socket dimensions conform to JIS K6739.
3. The products with nominal diameters of 50 and less are hexagon-shaped, and the products with nominal diameters of 65 and more are octagon-shaped.

Adaptors for Steel Pipes

(Abbreviation : DA) Injection-molded product

(Nominal Dia:75×2",100×21/2")

(Nominal Dia:75×21/2")

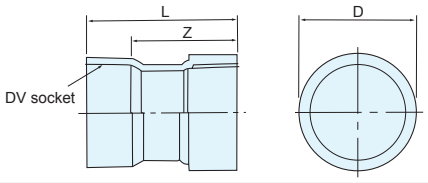


DV Fittings Code No. 2160

Unit : mm

Nominal Dia.	ℓ1	ℓ2	L	D1	D2	d	Nominal Thread Dia.	Standards
75×2"	40	16	65	89	72	77.2	Rc2	Ⓜ
75×21/2"	45	20	65	89	90	77.2	Rc21/2	

(Abbreviation : DA)
Fabricated product



DV Fittings Code No. 2160

Unit : mm

Nominal Dia.	Z	L	D	Nominal Thread Dia.	Standards
30×11/4"	62	80	45.2	Rc11/4	Ⓜ
40×11/2"	68	90	56.3	Rc11/2	
50×2"	85	110	69.3	Rc2	
65×21/2"	90	125	85.4	Rc21/2	
75×3"	95	135	101.2	Rc3	
100×4"	100	150	128.0	Rc4	

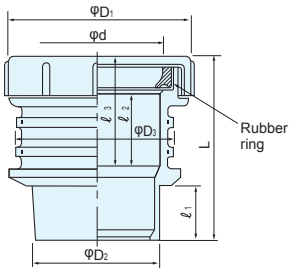
Notes
1. The female threads conform to JIS B0203 (tapered pipe threads) tapered female threads (Rc).
2. The DV socket dimensions conform to JIS K6739.

Insert Sockets (Expansion Fittings)

(Abbreviation : ES-A)

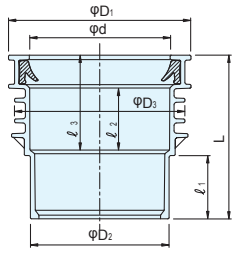
Type A

(Nominal Dia:40~150)



Type B

(Nominal Dia:75,100)



DV Fittings Code No. 2162

Unit : mm

Nominal Dia.	Type	D1	D2	D3	d	L	ℓ1	ℓ2	ℓ3	Standards
40	A	69	48	60	48.9	80	23	34	48	Ⓜ
50	A	85	60	76	60.8	85.5	26	35	51	
65	A	110	76	86	77.1	103.5	36	37	58	
75	B	120	89	114	91.0	114	42	43	65	
100	B	150	114	140	115.8	134.5	52	51	78	
125	A	181	140	165	141.2	160.5	66	53	83	
150	A	211	165	191	167.0	191.5	83	65	96	

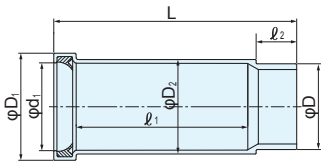
Nominal Dia.	40	50	65	75	100	125	150
Amount of expansion and contraction	±13	±11	±8	±10	±11	±13	±21

Notes
1. The material of the rubber ring is SBR in the case of Type A and EPDM in the case of Type B.
2. The pipe end to be inserted into the rubber ring end of the insert socket needs to be chamfered by about 1 to 2 mm. Use V Soap or V Spray as a joint lubricant.
3. These products can be used for horizontal and vertical piping.
4. The amount of expansion and contraction of each nominal diameter is shown in the table at the right.

Repair Sockets (Expansion Fittings)

(Abbreviation : ES-B)

Product name: ES-B+
(With Lubricant-Free Rubber Ring)



DV Fittings Code No. 2163

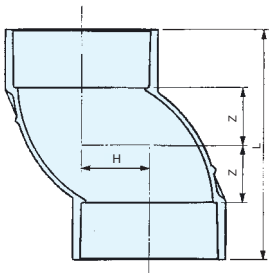
Unit : mm

Nominal Dia.	D	d	L	ℓ1	ℓ2	D1	D2	Standards
50	60	62	135	85	26	78	68	Ⓜ
65	76	78	170	107	36	97	86	
75	89	91	198	125	42	111	98	
100	114	116	240	152	52	140	124	
125	140	142	291	183	67	172	151	
150	165	167	351	223	82	201	178	

Notes
1. The material of the rubber ring is self-lubricating chloroprene (CR).
2. The pipe end to be inserted into the rubber ring socket needs to be chamfered by about 1 to 2 mm.
3. A lubricant-free rubber ring is used in these products. If it is difficult to insert the pipe, use a lubricant (V Soap or V Spray).
4. These products can be used with horizontal and vertical piping.

S Sockets

(Abbreviation : VUSS)



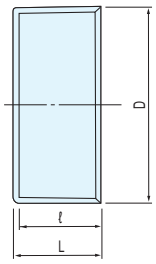
VU-DV Fittings Code No. 5437

Unit : mm

Nominal Dia.	Z	H	L	Standards
40	20	24	84	Ⓜ
50	25	30	100	
65	32	38	134	
75	37.5	44.5	155	
100	47.5	57	195	

VU Caps

(Abbreviation : VU-CAP)



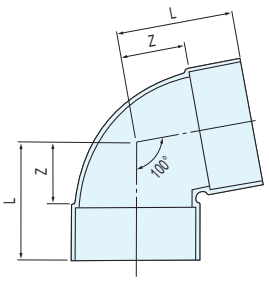
VU-DV Fittings Code No. 2354

Unit : mm

Nominal Dia.	L(Reference)	ℓ	D	Standards
40	25	22	54	Ⓜ
50	27	25	67	
65	37.5	35	83	
75	43	40	97	
100	53.5	50	124	
125	69	65	150	
150	85	80	178	
200	115	110	227	
250	138	128	280	
300	154	145	333	

Notes
1. In buried applications, these products must not be used to cover vertically buried pipes. When they are used to cover horizontally buried pipes, the following burial depth should be as follows.
   Allowable burial depths
   1.2 to 2 m when buried under streets and covered with soil
   0.6 to 2 m when buried under sidewalks and covered with soil
2. The shape of caps with nominal diameters of 40, 250 and 300 differ from that shown in the diagram.

100 Elbows



DV Fittings Code No. 2351

Unit : mm

Nominal Dia.	Z	L	Standards
Ⓣ 100	62	112	Ⓜ

Note The mark Ⓣ indicates that the product is manufactured by Toeikanki Co., Ltd.

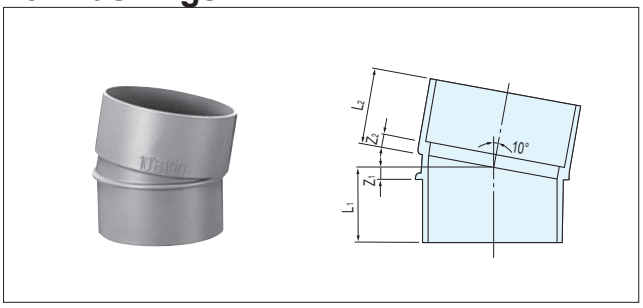
VU-DV Fittings Code No. 2351

Unit : mm

Nominal Dia.	Z	L	Standards
★ 50	31	56	Ⓜ
75	48	88	
100	62	112	

Note The "★" mark indicates a made-to-order product.

10° Bushings



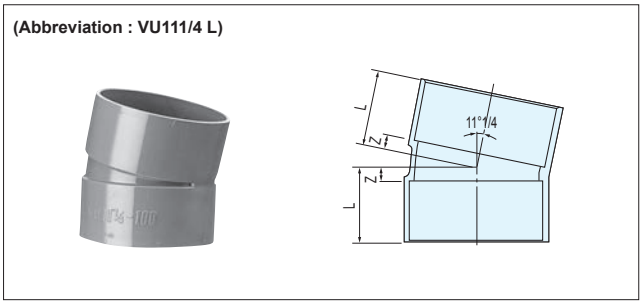
VU-DV Fittings Code No. 2353

Unit : mm

Nominal Dia.	Z_1	L_1	Z_2	L_2	Standards
50	6.0	31	6.0	31	Ⓜ
75	7.8	47.8	7.8	47.8	
100	2.0	52	14.0	64	

11° 1/4 Elbows

(Abbreviation : VU111/4 L)



VU-DV Fittings Code No. 5430

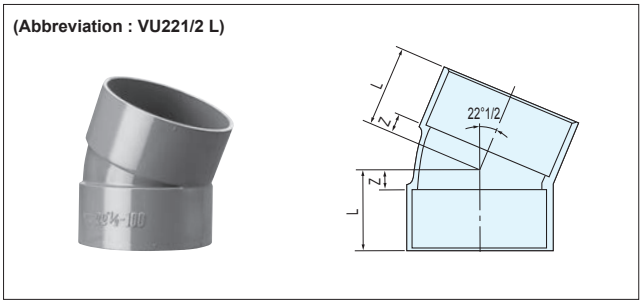
Unit : mm

Nominal Dia.	Z	L	Standards
★ Ⓩ 75	9	49	Ⓜ
100	11	61	
★ 150	17	97	

Notes 1. The "★" mark indicates a made-to-order product.
2. The Ⓩ mark indicates that the product is manufactured by Maezawa Kasei Industries Co., Ltd.

22° 1/2 Elbows

(Abbreviation : VU221/2 L)



VU-DV Fittings Code No. 5431

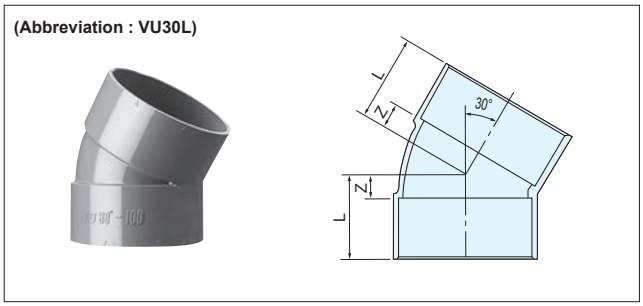
Unit : mm

Nominal Dia.	Z	L	Standards
★ Ⓩ 50	9	34	Ⓜ
Ⓩ 75	13	53	
100	16	66	
150	26	106	

Notes 1. The "★" mark indicates a made-to-order product.
2. The Ⓩ mark indicates that the product is manufactured by Maezawa Kasei Industries Co., Ltd.

30° Elbows

(Abbreviation : VU30L)



VU-DV Fittings Code No. 5432

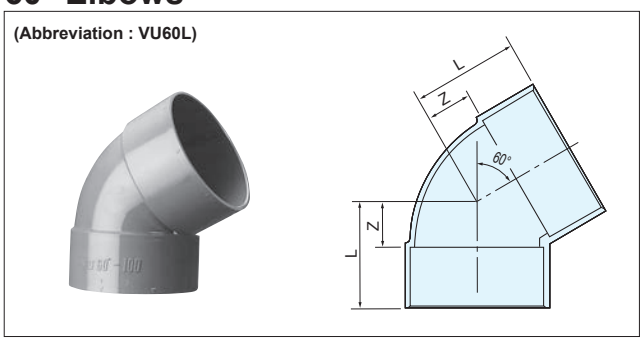
Unit : mm

Nominal Dia.	Z	L	Standards
50	11	36	Ⓜ
★ Ⓩ 75	16	56	
100	19	69	
150	30	110	

Notes 1. The "★" mark indicates a made-to-order product.
2. The Ⓩ mark indicates that the product is manufactured by Maezawa Kasei Industries Co., Ltd.

60° Elbows

(Abbreviation : VU60L)



VU-DV Fittings Code No. 5433

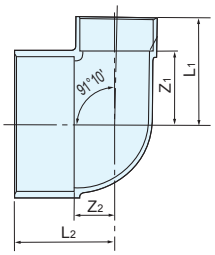
Unit : mm

Nominal Dia.	Z	L	Standards
★ Ⓩ 75	30	70	Ⓜ
100	37	87	

Notes 1. The "★" mark indicates a made-to-order product.
2. The Ⓩ mark indicates that the product is manufactured by Maezawa Kasei Industries Co., Ltd.

Reducing Elbows

(Abbreviation : VUL)



VU-DV Fittings Code No. 5434

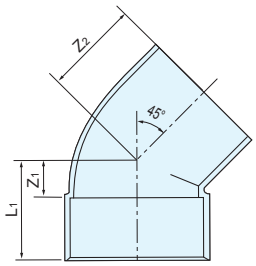
Unit : mm

Nominal Dia.	Z_1	Z_2	L_1	L_2	Standards
50× 40	32	26	54	51	Ⓜ
65× 50	41	33	66	68	
★Ⓩ 75× 40	48	27	70	67	
75× 50	47	32	72	72	
Ⓩ 75× 65	48	41	83	81	
100× 50	61	34	86	84	
100× 75	62	47	102	97	
★Ⓩ150×100	88	62	138	142	

Notes 1. The "★" mark indicates a made-to-order product.
2. The Ⓩ mark indicates that the product is manufactured by Maezawa Kasei Industries Co., Ltd.

45° Single Socket Elbows

(Abbreviation : 45KL)



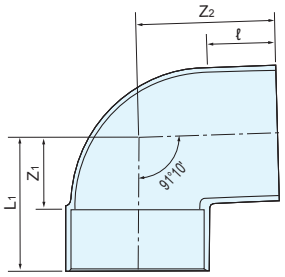
VU-DV Fittings Code No. 5435

Unit : mm

Nominal Dia.	Z_1	L_1	Z_2	Standards
50	18	43	41	Ⓜ
75	25	65	63	
100	30	80	78	

90° Single Socket Elbows

(Abbreviation : 90KL)



VU-DV Fittings Code No. 5436

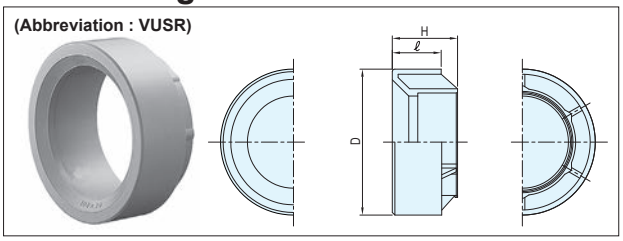
Unit : mm

Nominal Dia.	Z_1	L_1	Z_2	ℓ	Standards
Ⓩ 40	28	50	52	26	Ⓜ
50	33	58	62	28	
Ⓚ 65	41	76	81	39	
75	48	88	93	45	
100	62	112	116	52	

Notes 1. The Ⓩ mark indicates that the product is manufactured by Maezawa Kasei Industries Co., Ltd.
2. The products with the Ⓚ mark will change to products manufactured by Maezawa Kasei Industries Co., Ltd. when the current stock of products manufactured by Kubota ChemiX runs out.

VU Bushings

(Abbreviation : VUSR)



Code No. 5474

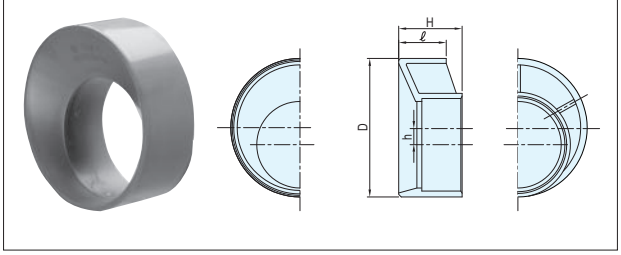
Unit : mm

Nominal Dia.	D	ℓ	H	Standards
Ⓩ 75×50	88.8	30	40	Ⓜ
★Ⓩ100×50	113.8	35	50	
★Ⓩ100×65	113.8	35	50	
★Ⓩ100×75	113.8	35	50	

Notes 1. The "★" mark indicates a made-to-order product.
2. The Ⓩ mark indicates that the product is manufactured by Maezawa Kasei Industries Co., Ltd.

VU Eccentric Bushings

(Abbreviation : VUHB)



Code No. 5475

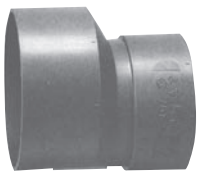
Unit : mm

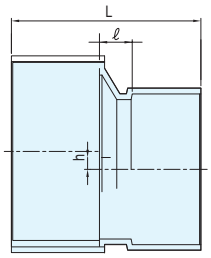
Nominal Dia.	D	ℓ	h	H	Standards
Ⓩ 75× 40	88.8	30	18	40	Ⓜ
Ⓩ 75× 50	88.8	30	11	40	
Ⓩ 75× 65	89.0	30	3.5	40	
Ⓩ100× 40	113.8	40	30.5	50	
100× 50	113.7	57	23.6	57	
★Ⓩ100× 65	113.8	40	16	50	
100× 75	113.7	57	8.8	57	
★Ⓩ125×100	139.8	55	8.4	65	
150×100	164.2	87	20.5	87	
150×125	164.7	80	7.4	80	

Notes 1. The "★" mark indicates a made-to-order product.
2. The Ⓩ mark indicates that the product is manufactured by Maezawa Kasei Industries Co., Ltd.

VU Eccentric Sockets

(Abbreviation : OJH)





Code No. 5476

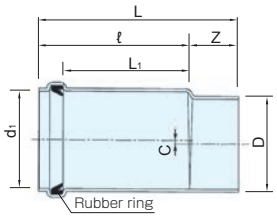
Unit : mm

Nominal Dia.	L	ℓ	h	Standards
Ⓩ 40× 50	60	13	6	Ⓜ
50× 65	80	20	7	
Ⓩ 50× 75	95	30	13.5	
Ⓩ 50×100	115	40	25.5	
Ⓩ 65× 75	98	23	6	
★Ⓩ 65×100	122	37	18	
Ⓩ 75×100	125	35	12	
★Ⓩ 100×125	145	30	12	
100×150	170	40	23	
125×150	175	30	11.5	

Notes 1. The "★" mark indicates a made-to-order product.
2. The Ⓩ mark indicates that the product is manufactured by Maezawa Kasei Industries Co., Ltd.

VU Eccentric Repair Sockets (Expansion Fittings)

(Abbreviation : SLRP)



Code No. 5531

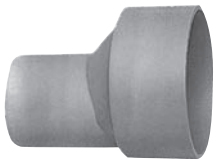
Unit : mm

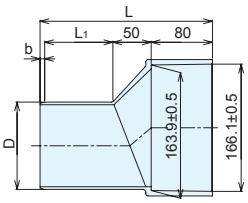
Nominal Dia.	D	d1	L	L1	ℓ	C	Z	Standards
★100	114±0.4	115	240	147	181	3.75	59	Ⓜ
150	165±0.5	166	355	218	260	5.75	95	

Note The "★" mark indicates a made-to-order product.

VU Eccentric Socket (Socket End/Pipe End)

(Abbreviation : HENSIN-S)





Code No. 5476

Unit : mm

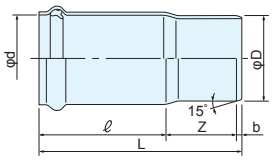
Nominal Dia.	D	L1	L	b	Standards
150-100	114±0.4	89	225	6	Ⓜ
★150-125	140±0.5	102	240	8	

Note The "★" mark indicates a made-to-order product.

Repair Sockets (Expansion Fittings)

(Abbreviation : SLR)

Expansion Fittings



Code No. 5531

Unit : mm

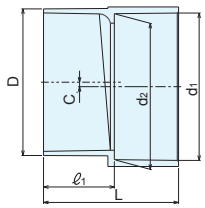
Nominal Dia.	d	D	ℓ	Z	L	b	Standards
100	115.5	114	209	125	340	6	Ⓜ
125	141.5	140	227	140	375	8	
150	166.5	165	270	155	435	10	AS19
*200	218.6	216	308	180	500	12	

Note It would be difficult to install the pipe, if the small amount of V Soap applied to the rubber ring end.

⚠Caution When using on a column pipe, use an insertion jig when connecting.

VU-VP Conversion Sockets

(Abbreviation : VU-VPS)



Code No. 5477

Unit : mm

Nominal Dia.	D	ℓ1	d1	d2	L	C	Standards
★ 100	114	55	114.6	113.5	105	3.5	Ⓜ
★ⓣ125	140	72	140.9	139.1	137	2	
★ⓣ150	165	110	166.1	163.9	190	4	

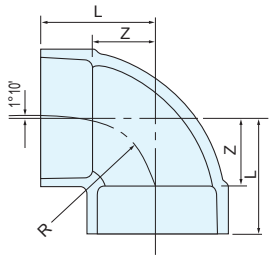
Notes 1. The "★" mark indicates a made-to-order product.
2. The "ⓣ" mark are manufactured by Takiron Co., Ltd.

3. Transparent DV and VU-DV Fittings

1. Be sure to use the Color Tough dyne Blue adhesive (see page 36) for the connection of pipes and fittings.
2. These products cannot be used as pressurized pipes such as for water supply and for hot water supply.
3. Store products indoors. Do not store products under the sun or in extremely hot place.

90° Elbows

(Abbreviation : DL)



Transparent DV Fittings Code No. 2151

Unit : mm

Nominal Dia.	Z	L	R(Reference)	Standards
30	22	40	23	JIS K 6739
40	27	49	27	
50	33	58	34	
65	42	77	43	
75	48	88	49	
100	62	112	65	

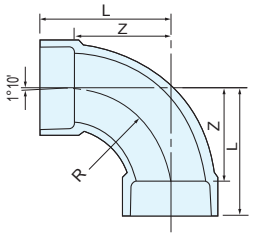
Transparent VU-DV Fittings Code No. 2251

Unit : mm

Nominal Dia.	Z	L	R(Reference)	Standards
50	33	58	31	AS38
75	48	88	54	
100	62	112	70	

90° Large Radius Elbows

(Abbreviation : LL)



Transparent DV Fittings Code No. 2152

Unit : mm

Nominal Dia.	Z	L	R(Reference)	Standards
40	52	74	75	JIS K 6739
50	66	91	88	
65	90	125	108	
75	100	140	119	
100	128	178	152	

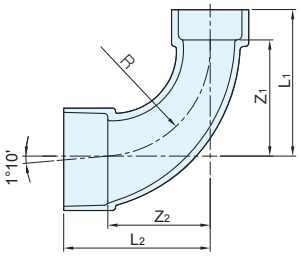
Transparent VU-DV Fittings Code No. 2252

Unit : mm

Nominal Dia.	Z	L	R(Reference)	Standards
50	66	91	85	AS38
75	100	140	120	
100	128	178	159	

90° Large Radius Reducing Elbows

(Abbreviation : LL)



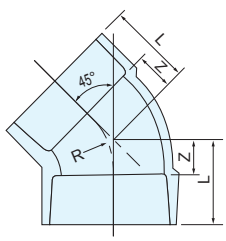
Transparent DV Fittings Code No. 2152

Unit : mm

Nominal Dia.	Z_1	Z_2	L_1	L_2	R(Reference)	Standards
50×40	66	66	88	91	105	Ⓜ

45° Elbows

(Abbreviation : 45L)



Transparent DV Fittings Code No. 2153

Unit : mm

Nominal Dia.	Z	L	R(Reference)	Standards
30	12	30	30	JIS K 6739
40	14	36	31	
50	18	43	44	
65	22	57	52	
75	25	65	58	
100	30	80	69	

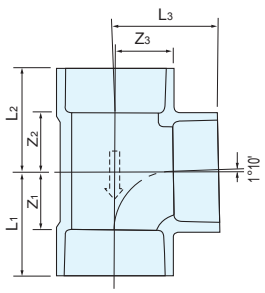
Transparent VU-DV Fittings Code No. 2253

Unit : mm

Nominal Dia.	Z	L	R(Reference)	Standards
50	18	43	45	AS38
75	25	65	60	
100	30	80	69	

90° Y

(Abbreviation : DT)



Transparent DV Fittings Code No. 2154

Unit : mm

Nominal Dia.	Z1	Z2	Z3	L1	L2	L3	Standards
30	22	22	22	40	40	40	JIS K 6739
40	27	27	27	49	49	49	
40× 30	22	22	27	44	44	45	
50	34	34	34	59	59	59	
50× 40	27	27	33	52	52	55	
65	42	43	42	77	78	77	
65× 40	27	28	42	62	63	64	
65× 50	34	35	42	69	70	67	
75	48	49	48	88	89	88	
75× 50	34	35	48	74	75	73	
100	62	63	62	112	113	112	
100× 50	34	35	62	84	85	87	
100× 75	48	49	62	98	99	102	
125×100	62	64	75	127	129	125	Ⓜ

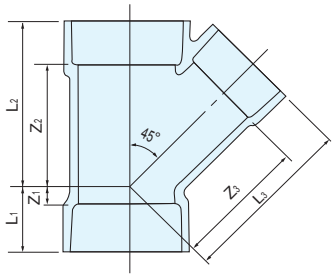
Transparent VU-DV Fittings Code No. 2254

Unit : mm

Nominal Dia.	Z1	Z2	Z3	L1	L2	L3	Standards
50	34	34	34	59	59	59	AS38
75	48	49	48	88	89	88	
75× 50	34	35	48	74	75	73	
100	62	63	62	112	113	112	
100× 50	34	35	62	84	85	87	
100× 75	48	49	62	98	99	102	
150×100	62	63	88	142	143	138	Ⓜ

45° Y

(Abbreviation : Y)



Transparent DV Fittings Code No. 2157

Unit : mm

Nominal Dia.	Z1	Z2	Z3	L1	L2	L3	Standards
40	12	58	62	34	80	84	JIS K 6739
50	20	72	78	45	97	103	
50×40	8	62	70	33	87	92	
65	20	92	98	55	127	133	
65×50	8	80	88	43	115	113	
75	26	106	115	66	146	155	
75×50	3	86	98	43	126	123	
100	32	134	144	82	184	194	
100×50	8	98	118	42	148	143	
100×75	19	118	132	69	168	172	

Transparent VU-DV Fittings Code No. 2257

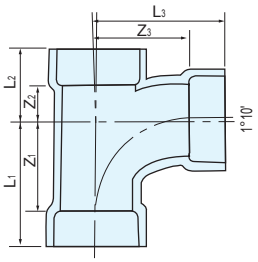
Unit : mm

Nominal Dia.	Z1	Z2	Z3	L1	L2	L3	Standards
50	20	72	78	45	97	103	AS38
75×50	3	86	98	43	126	123	
100	32	134	144	82	184	194	

90° Large Radius Y

(Abbreviation : LT)

65×50×50



Transparent DV Fittings Code No. 2155

Unit : mm

Nominal Dia.	Z1	Z2	Z3	L1	L2	L3	Standards
40	52	23	52	74	45	74	JIS K 6739
50	66	26	66	91	51	91	
50×40	52	23	57	77	48	79	
65	90	33	90	125	68	125	
65×40	52	24	66	87	59	88	
65×50	66	27	74	101	62	99	
75	100	30	100	140	70	140	
65×50×50	66	31	74	101	56	99	Ⓜ
75×50	66	29	79	106	69	104	JIS K 6739
75×65	90	32	95	130	72	130	
100	128	45	128	178	95	178	
100×40	52	28	82	102	78	104	
100×50	66	32	90	116	82	115	
100×65	90	36	107	140	86	142	
100×75	100	33	110	150	83	150	

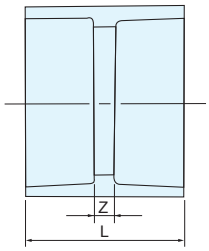
Transparent VU-DV Fittings Code No. 2255

Unit : mm

Nominal Dia.	Z1	Z2	Z3	L1	L2	L3	Standards
50	66	26	66	91	51	91	AS38
75	100	30	100	140	70	140	
75×50	66	29	79	106	69	104	
100	128	45	128	178	95	178	
100×50	66	32	90	116	82	115	
100×75	100	33	110	150	83	150	

Sockets

(Abbreviation : DS)



Transparent DV Fittings Code No. 2158

Unit : mm

Nominal Dia.	Z	L	Standards
30	3	39	JIS K 6739
40	3	47	
50	3	53	
65	3	73	
75	4	84	
100	4	104	

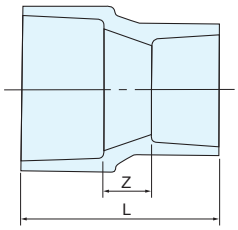
Transparent VU-DV Fittings Code No. 2258

Unit : mm

Nominal Dia.	Z	L	Standards
50	3	53	AS38
75	4	84	
100	5	105	

Increasers

(Abbreviation : IN)



Transparent DV Fittings Code No. 2159

Unit : mm

Nominal Dia.	Z	L	Standards
40×30	20	60	JIS K 6739
50×40	20	67	
65×50	20	80	
75×50	25	90	
75×65	25	100	
100×50	30	105	
100×75	30	120	

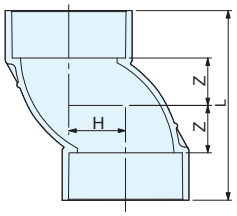
Transparent VU-DV Fittings Code No. 2259

Unit : mm

Nominal Dia.	Z	L	Standards
75×50	25	90	AS38
100×75	30	120	

S Sockets

(Abbreviation : SS)



Transparent DV Fittings Code No. 5437

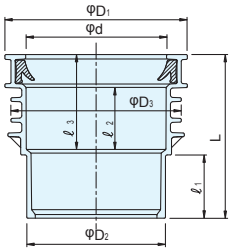
Unit : mm

Nominal Dia.	Z	L	H	Standards
50	25	100	30	Ⓜ

Notes 1. The tolerance for the dimension Z is ±2 mm.
2. The dimensions L and H are basic dimensions.

Insert Sockets (Expansion Fittings)

(Abbreviation : ES-A)

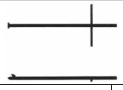


Transparent DV Fittings Code No. 2155

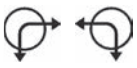
Unit : mm

Nominal Dia.	D1	D2	D3	D	L	ℓ1	ℓ2	ℓ3	Standards
75	120	89	114	91.0	114	42	43	65	Ⓜ
100	150	114	140	115.8	134.5	52	51	78	

4. PVC Mini-Manhole Product Lineup

Code No.	Abbreviation		Size			Pipe Connection
5409-0100-0151	ST 		100	—	150	Solvent cement joint
5409-0100-0200			100	—	200	Solvent cement joint
5409-0150-1201			150	—	200	Solvent cement joint
1592-2150-1301			150	—	300	Rubber ring joint
1592-2200-1301			200	—	300	Rubber ring joint
5202-0100-1200	90L 	Left	100	—	200	Solvent cement joint
1593-9015-1301		Left	150	—	300	Rubber ring joint
1593-9020-1301		Left	200	—	300	Rubber ring joint
5202-0100-2200		Right	100	—	200	Solvent cement joint
1593-9015-2301		Right	150	—	300	Rubber ring joint
1593-9020-2301		Right	200	—	300	Rubber ring joint
5202-0100-0150		Left/Right	100	—	150	Solvent cement joint
5202-0150-0200		Left/Right	150	—	200	Solvent cement joint
5203-0100-1200	45L 	Left	100	—	200	Solvent cement joint
5203-0150-1200		Left	150	—	200	Solvent cement joint
1593-4515-1301		Left	150	—	300	Rubber ring joint
1593-4520-1301		Left	200	—	300	Rubber ring joint
5203-0100-2200		Right	100	—	200	Solvent cement joint
5203-0150-2200		Right	150	—	200	Solvent cement joint
1593-4515-2301		Right	150	—	300	Rubber ring joint
1593-4520-2301		Right	200	—	300	Rubber ring joint
5203-0100-0150		Left/Right	100		150	Solvent cement joint
5205-0100-1150	90Y 	Left	100	—	150	Solvent cement joint
5205-0100-1200		Left	100	—	200	Solvent cement joint
5205-0150-1200		Left	150	—	200	Solvent cement joint
5205-0100-2150		Right	100	—	150	Solvent cement joint
5205-0100-2200		Right	100	—	200	Solvent cement joint
5205-0150-2200		Right	150	—	200	Solvent cement joint
5207-0100-1150	45Y 	Left	100	—	150	Solvent cement joint
5207-0150-1200		Left	150	—	200	Solvent cement joint
5207-0100-2150		Right	100	—	150	Solvent cement joint
5207-0150-2200		Right	150	—	200	Solvent cement joint
5206-0100-1150	90YS 	Left	100	—	150	Solvent cement joint
5206-0100-2150		Right	100	—	150	Solvent cement joint
5227-0100-0150	WY 		100	—	150	Solvent cement joint
5209-0100-0150	WLS 		100	—	150	Solvent cement joint
5881-6151-0000	Al Light with Chain 			150		
5881-6121-0000				200		
5881-6131-0000				300		
5685-0200-9001	Inner Cover (CV-R) 			200		
5685-0300-0001				300		
6527-0120-0001	Cast Iron Cover 	T25A		200		
6527-0130-0001				300		
6528-0120-0001		T14A		200		
6528-0130-0001				300		
6529-0120-0001		T8A		200		
6529-0130-0001				300		
6710-0000-9000	Cast Iron Cover Opening/ Closing Jig 					
6730-0200-9000	Cast Iron Cover Frame 	For T25A and T14A		200		
6730-0300-0000				300		
6731-0200-9000		For T8A		200		
6731-0300-9000				300		

Caution **About the "left" and "right" designations for PVC Mini-Manhole products**

Left	Right	Left/Right
Upstream side Downstream side Direction of view 	Upstream side Downstream side Direction of view 	 Can be used in either direction.

The arrow indicates the direction of water flow.

IV. Adhesives

1. Vinyl-Base Adhesives

⚠ **The adhesive must not be mixed with other adhesive. If the adhesive is mixed with other adhesive or a solvent, the adhesive strength decreases significantly.**

Usage range of nominal diameters covered by supplied brush

Can size	Guideline range of nominal diameter
100g	13~50
500g	13~50
1kg	65~150

Tough dyne HI — Code No. 1039

Product conforms to Japan Water Works Association's standards JWWA S101

100 g can (with brush) 500 g can (with brush) 1 kg can (with brush)

Use Bonding of HI products (can be used on general pipes and fittings)
Property Low viscosity (A), quick drying (viscosity: 500 MPa·s)
Color Colorless

Tough dyne HI (White) — Code No. 1039

Product conforms to Japan Water Works Association's standards JWWA S101

500 g can (with brush) 1 kg can (with brush)

Use Bonding of HI products (can be used on general pipes and fittings)
Property Low viscosity (A), quick drying (viscosity: 500 MPa·s)
Color White

Tough dyne Red — Code No. 1039

Product conforms to Japan Water Works Association's standards JWWA S101

500 g can (with brush) 1 kg can (with brush)

Use Bonding of general pipes and fittings
Property High viscosity (B), quick drying (viscosity: 1,700 MPa·s)
Color Colorless

⚠ **Caution**
- **This adhesive cannot be used to bond HI products.**

Tough dyne Blue — Code No. 1039

Product conforms to Japan Water Works Association's standards JWWA S101

100 g can (with brush) 500 g can (with brush) 1 kg can (with brush)

Use Bonding of general pipes and fittings
Property Low viscosity (A), quick drying (viscosity: 150 MPa·s)
Color Colorless

⚠ **Caution**
- **This adhesive dries quickly; therefore, it is not suitable for bonding pipes with nominal diameter of 200 and more.**
- **This adhesive cannot be used to bond HI products.**

Tough dyne HT — Code No. 2039

Product conforms to the manufacturer's standards

100 g can (with brush) 250 g can (with brush) 500 g can (with brush)

Use Bonding of HT products
Property Low viscosity, quick drying (viscosity: 500 MPa·s)
Color Colorless

⚠ **Caution**
- **This adhesive cannot be used to bond general pipes/fittings or HI products.**

(Note) Expiration date is indicated only on the Tough dyne HT can. Please check the expiration date before using.

Color Tough dyne Blue — Code No. 1039

Product conforms to the manufacturer's standards

500 g can (with brush) 1 kg can (with brush)

Use Bonding of DV fittings
Property Low viscosity, quick drying (viscosity: 500 MPa·s)
Color Blue

⚠ **Caution**
- **Use Tough dyne Yellow for drain pipes with nominal diameter of 200 and more.**
- **This adhesive must not be used to bond pipes and fittings for water supply such as for drinking water.**
- **Be sure to wipe off the adhesive adhered on the base material. The dye contained in the adhesive penetrates the sheet over time. As a result, the blue dye appears on the surface.**

Tough dyne Yellow — Code No. 1039

Product conforms to the manufacturer's standards

1 kg can (with brush) 3 kg can

Use Bonding of general pipes and fittings (nominal diameter of 200 and more)
Property High viscosity, slow drying (viscosity: 1,000 MPa·s)
Color Colorless

⚠ **Caution**
- **This adhesive must not be used to bond pipes and fittings for water supply such as for drinking water.**
- **When applying to pipes with large diameters, pour a necessary amount of adhesive into a different metal container and use a large brush.**

2. Selection of Vinyl-Base Adhesive to Use

◎Recommended ○Usable × Cannot be used

Pipeline Classification	Pressurized Pipeline						Nonpressurized Pipeline		
Application Classification	Water Supply/Hot Water Supply			General Pressurized Pipe			Drain and Vent		
Pipe Product Classification	HI Product	General Pipe	HT Product	HI Product	General Pipe		HT Product	General Pipe	
Nominal Diameter Classification	150 and less			150 and less	150 and less	200 and more (Note 1)	150 and less	150 and less	200 and more (Note 1)
Tough dyne HI	◎	○	×	◎	○	×	×	○	×
Tough dyne HI (White)	◎	○	×	◎	○	×	×	○	×
Tough dyne Red	×	○(Note 4)	×	×	○(Note 4)	◎	×	○ (Note 4)	◎
Tough dyne Blue	×	◎	×	×	◎	× (Note 2)	×	◎	× (Note 2)
Tough dyne HT	×	×	◎	×	×	×	◎(Note 3)	×	×
Color Tough dyne Blue	×	×	×	×	◎	×	×	◎	× (Note 2)
Tough dyne Yellow	×	×	×	×	×	◎(Note 2)	×	×	◎

Note 1. When applying the adhesive to pipes with nominal diameter of 200 and more, pour a necessary amount of adhesive into a different metal container and use a large brush.
Note 2. Tough dyne Blue and Color Tough dyne Blue dry quickly; therefore, they are not suitable for bonding pipes with nominal diameter of 200 and more.
Note 3. When bonding HT-DV products to general pipes, such as for the connection of the drain pipe from a dishwasher, use Tough dyne HT.
Note 4. Tough dyne Red is recommended for nominal diameters of 65 and more.
Note 5. Tough dyne Yellow must not be used to bond pipes and fittings for water supply such as for drinking water.
Note 6. Use Tough dyne HI for HI pipes and fittings with nominal diameter of 200 and more.

3. Lubricants for Rubber Ring Joints

V Soap

Code No. 7000 Product conforms to the manufacturer's standards

1 kg resin container (with brush)

2 kg resin container

Use Connecting pipes to fittings with rubber ring
Property Liquid
Main component Potassium soap

V Spray

Code No. 7000 Product conforms to the manufacturer's standards

340ml

Use Connecting pipes to fittings with rubber ring
Property Spray
Main component Silicone oil

4. Amount of Adhesive and Lubricant to Apply

1. The amount of adhesive/lubricant indicated in the tables are guideline figures. When ordering, add 20% to 30% more to compensate for the loss that can occur at the construction site.
2. The indicated amount is the amount applied on the socket and pipe at one location.

Amount of vinyl-base adhesive to apply (reference)

For TS socket g/location

Nominal Dia.	13	16	20	25	28	30	35	40	50	65	75	100	125	150	200	250	300	350	400	450	500	600
Tough dyne HI/ HI (White)	0.6	0.8	1.1	1.6	—	2.1	—	3.3	4.8	6.6	8.1	13	20	30	55	—	—	—	—	—	—	—
Tough dyne Red	0.9	1.2	1.7	2.4	2.6	3.2	3.5	5.0	7.1	9.9	12	20	30	45	80	130	180	—	—	—	—	—
Tough dyne Blue	0.6	0.8	1.1	1.6	1.7	2.1	2.3	3.3	4.8	6.6	8.1	13	20	30	—	—	—	—	—	—	—	—
Tough dyne HT	0.6	0.8	1.1	1.6	—	2.1	—	3.3	4.8	6.6	8.1	13	20	30	—	—	—	—	—	—	—	—
Tough dyne Yellow	—	—	—	—	—	—	—	—	—	—	—	—	—	—	70	105	150	205	265	330	410	595

Note The indicated amount is for a surface area of 1m^2. The amount in the table were calculated based on 300 g for Tough dyne Red, 200 g for Tough dyne HI and Tough dyne HI (White) , and 250 g for Tough dyne Yellow.

For DV socket g/location

Nominal Dia.	20	25	40	50	65	75	100	125	150	200	250	300	350	400	450	500	600	700
Tough dyne Blue	—	—	4	5	7	10	15	20	30	—	—	—	—	—	—	—	—	—
Color Tough dyne Blue	—	—	4	5	7	10	15	20	30	—	—	—	—	—	—	—	—	—
Tough dyne HT	0.8	1.1	4	5	—	10	—	—	—	—	—	—	—	—	—	—	—	—
Tough dyne Yellow	—	—	—	—	—	—	—	—	—	55	90	125	175	220	275	350	525	700

Amount of lubricant for rubber ring joint to apply (reference)

g/location

Nominal Dia.	40	50	75	100	125	150	200	250	300	350	400	450	500	600
Amount of V Soap used	5	5	7	10	15	20	25	35	50	65	90	115	140	190

Number of application locations per can

Nominal Dia.	150	200	250
Number of joint location per V Spray can	35	23	15

I. Performance and Quality

1.Operating Temperature and Pressure

(1) Operating temperature ranges and operating pressure for HI-VP, VP, VU and major fittings

Pipe	Major fitting	Use	Operating temperature range (see notes)		Operating pressure range (see notes)
HI-VP pipe for water supply VP pipe for water supply	HI-TS fitting TS fitting	Water pipe	Ordinary temperature (5 - 35ºC)		0.75 MPa (hydrostatic pressure)
VP pipe for general purposes	TS fitting	Pressure pipe	Ordinary temperature (5 - 35ºC)		1.0 MPa (hydrostatic + water hammer pressure)
	DV fitting	Non-pressure pipe	W/o external pressure	5 - 60 ºC	–
			W/ external pressure	5 - 45 ºC	
VU pipe for general purposes	VU fitting	Non-pressure pipe	W/o external pressure	5 - 60 ºC	–
			W/ external pressure	5 - 45 ºC	

Notes: 1. The operating temperature range and pressure may vary with the fitting type or joint technique.
2. Since PVC-U pipes expand and contract due to temperature differences, exposed PVC-U pipes require a means to absorb thermal expansion and contraction.

(2) Maximum operating pressures for HT pipes at various temperature

Use	Nominal Dia	Max. operating pressure various temperatures (hydrostatic + water hammer pressure)				
Pipes for hot water and hot-spring water supply (pressure pipe)	13-50	Operating temperature (ºC)	50-40	41-60	61-70	71-90 (see Notes)
		Max. operating pressure	1.0 MPa	0.6 MPa	0.4 MPa	0.2 MPa
	65-150	Operating temperature (ºC)	50-40	41-60	61-70	71-85 (see Notes)
		Max. operating pressure	1.0 MPa	0.6 MPa	0.25 MPa	0.15 MPa

Notes: 1. The continuous operating temperature range for pressure pipes is 5 to 85ºC for nominal diameters of 13 to 50 and 5 to 80ºC for nominal diameters of 65 to 150.
2. Since the thermal expansion coefficient of HT pipes due to temperature differences is four to six times those of copper and steel pipes, a means to absorb thermal expansion and contraction are important for HT pipes.

2. Performance Specification for VP and HI-VP Pipes for Water Supply

(excerpt from JIS K 6742: 2007)

Performance attribute		Performance	Applicable pipe
Tensile yield strength		Min. 45 MPa for the tensile strength at yield at 23ºC.	VP
		Min. 40 MPa for the tensile strength at yield at 23ºC.	HI -VP
Pressure resistance (hydrostatic pressure 4.0 MPa x 1 min at ordinary temperature)[1]		There shall be no leaks and other defects.	VP, HI-VP
Flatness		There shall be no cracks.	VP, HI-VP
Impact resistance		There shall be no anomalies.	HI-VP
Vicat softening temperature		MIn. 76ºC	VP, HI-VP
Opacity		Visible light transmittance shall be 0.2% or less.	VP
Leachability	Turbidity	Max. 0.5 degree	VP, HI-VP
	Chromaticity	Max. 1 degree	
	Organic matter (TOC)	Max. 1 mg/L	
	Lead	Max. 0.008 mg/L	
	Zinc	Max. 0.5 mg/L	
	Reduction in residual chlorine	Max. 0.7 mg/L	
	Odor	There shall be no anomalies.	
	Taste	There shall be no anomalies.	

Note: 1. 4.0 MPa is the pressure for the hydrostatic pressure test to check product quality. The maximum operating pressure of VP and HI-VP Pipes for water supply is 0.75 MPa and the maximum operating pressure (water hammer + hydrostatic pressure) is 1.0 MPa.

3. Performance Specification for VP Pipes for General Purposes

(excerpt from JIS K 6741: 2007)

Performance attribute	Performance	Applicable pipe
Tensile yield strength	Min. 45 MPa for the tensile strength at yield at 23ºC.	VP,VM, VU
Pressure resistance (VP: hydrostatic pressure 2.5 MPa x 1 min at ordinary temperature)[1]	There shall be no leaks or other defects.	VP,VM, VU
Joint pressure resistance[1,2]	There shall be no leaks or other defects.	VP,VM, VU
Flatness	There shall be no cracks.	VP,VM, VU
Vicat softening temperature	Min. 76ºC	VP,VM, VU

Notes: 1. 2.5 MPa is the pressure for the hydrostatic pressure test to check product quality. The maximum operating pressure (water hammer + hydrostatic pressure) of VP pipes for general purposes is 1.0 MPa.
2. The joint pressure resistance applies to pipes with rubber ring and bonding-type ends for pressure applications. For these pipes, this joint pressure resistance test may be substituted for a pressure test.

4. Performance Specification for HT-VP Pipes for Hot Water Supply

(excerpt from JIS K 6776: 2007)

Performance attribute		Performance		Applicable pipe
Tensile yield strength		Min. 50 MPa for the tensile strength at yield at 23ºC.		HT
Pressure resistance (hydrostatic pressure 4.0 MPa x 1 min at ordinary temperature)[1]		There shall be no leaks other defects.		HT
Hot internal pressure creep performance		There shall be no leaks other defects.		HT
Flatness		There shall be no cracks.		HT
Vicat softening temp erasure		Min. 95ºC		HT
Leachability[2]	Turbidity	Max. 0.5 degree		HT
	Chromaticity	Max. 1 degree		
	Organic matter (TOC)	Max. 1 mg/L		
	Lead	Max. 0.008 mg/L		
	Zinc	Max. 0.5 mg/L		
	Odor	There shall be no anomalies.		
	Taste	There shall be no anomalies.		
	Reduction in residual chlorine	Leachate at 90±2ºC[3]	Max. 1mg/L	
		Leachate at ordinary temperature[4]	Max. 0.7mg/L	

Notes: 1. 4.0 MPa is the pressure for the hydrostatic pressure test to check product quality. The operating temperature and the maximum operating pressure of HT Pipes for hot water supply are as per item1.
2. Unless otherwise specified, a leachate at 90±2ºC shall be used in the leaching test.
3. “Leachate at 90±2ºC” means a leaching test using a leachate at 90±2ºC.
4. “Leachate at ordinary temperature” means a leaching test using a leachate at ordinary temperature.

5. General Properties of VP, HI-VP, and HT-VP Products

	Attribute	Units	VP	HI	Test method	HT	Test method
Physical properties	Color	—	Gray	Grayish blue	—	Brown	—
	Specific gravity	—	1.43	1.40	JIS K 7112 Sink-float method 20ºC	1.48	ASTM D 792 20ºC
	Hardness	Rockwell R	115	115	ASTM D 785 20ºC	140	JIS K 7202 20ºC
	Water absorption	One week at ordinary temperature mg/cm^2	Max. 0.15	Max. 0.15		Max. 0.15	
Mechanical properties	Tensile strength	MPa (kgf/cm^2)	49-54(500-550)	49-52(500-530)	JIS K 6742 23ºC, eta.	51-56 (520-570)	JIS K 6776 20ºC
	Longitudinal elastic modulus	MPa (kgf/cm^2)	2942 (3X10^4)	2942 (3X10^4)	JIS K 7113 20ºC	2942 (3X10^4)	ASTM D 747 20ºC
	Elongation at fracture	%	50-150	50-150	JIS K 6741 20ºC	40-80	JIB K 6741 20ºC
	Bending strength	MPa (kgf/cm^2)	78.5-98.1 (800-1000)	78.5-98.1 (800-1000)	JIS K 7203 20ºC 65%RH	89 (900)	ASTM D 970 20ºC
	Bending elastic modulus	MPa (kgf/cm^2)	2746(2.8X10^4)	2746(2.8X10^4)	JIS K 7203 20ºC 65%RH	—	—
	Compression strength	MPa (kgf/cm^2)	69(700)	64(650)	JIS K 7208 20ºC 85%RH	69 (700)	ASTM D 695 20ºC
	Poisson's ratio	—	0.35-0.40	0.35-0.40		0.38	—
	Charpy impact strength	kJ/m^2 (kgf•cm/cm^2)	6.9-9.8(7-10)	Min. 17.7		7.84 (8.0)	ASTM D 256
Thermal properties	Vicat softening temperature	ºC	Min. 76	Min. 76	JIS K 6742	Min. 95	JIS K 6776
	Linear expansion coefficient	1/ºC	6-8X10^{-5}	6-8X10^{-5}		6-8X10^{-5}	
	Specific heat	J/(kg•K) (cal/g•ºC)	1.05X10^3 (0.25)	1.05X10^3 (0.25)		1.05X10^3(0.25)	
	Thermal conductivity	W/(m^2•K) (kcal/m•h•ºC)	0.15 (0.13)	0.15 (0.13)	DIN 8061	0.14 (0.12)	DIN 8061
	Combustibility	—	Self-extinguishability	Self-extinguishability		Self-extinguishability	—
Electrical properties	Voltage resistance	kV/mm	Min. 40	Min. 40		Min. 40	—
	Volume resistivity	Ωcm	5.3X10^{15}	5.3X10^{15}	30ºC 65%RH	5.3X10^{15}	ASTM D 257
	Dielectricity 60 Hz	—	3.2	3.2	30ºC 55%RH	3.2	ASTM D 150
	Dielectricity 10^3 Hz	—	3.1	3.1		—	—
	Dielectricity 10^6 Hz	—	3.0	3.0		—	—
	Power factor 60 Hz	10^2	1.18	1.18	30ºC 55%RH	—	—
	Power factor 10^3 Hz	10^2	1.91	1.91		—	—
	Power factor 10^6 Hz	10^2	1.72	1.72		—	—

Note: The above values indicate typical values.

6. Chemical resistance of VP, VU, HI-VP, and HT-VP Products

The chemical resistance shown in the table is for reference only. Please consult with Kubota ChemiX if using our product as the pipeline for chemical, etc.

Name of chemical		Concentration	Temperature						
			≦20ºC		≦35ºC		≦60ºC		≦80ºC
			①VP Pipes ②VU Pipes	①VP Pipes for Water Supply ②HI-VP Pipes ③HT Pipes	①VP Pipes ②VU Pipes	①VP Pipes for Water Supply ②HI-VP Pipes ③HT Pipes	①VP Pipes(No-pressure) ②VU Pipes(No-pressure)	HT Pipes	HT Pipes
Acid	Hydrochloric acid	<10%	◎	△	◎	△	◎	△	×
		10-25%	◎	△	◎	△	◎	×	×
		25-37%	◎	×	◎	×	◎	×	×
		37%≦	△	×	×	×	×	×	×
	Sulfuric acid	<50%	◎	×	◎	×	◎	×	×
		50-70%	△	×	△	×	△	×	×
		70%≦	△	×	△	×	×	×	×
	Nitric acid	<30%	◎	×	◎	×	◎	×	×
		30-55%	○	×	○	×	×	×	×
		55-65%	△	×	△	×	×	×	×
	Hydrofluoric acid	<10%	○	×	○	×	△	×	×
		10-40%	○	×	○	×	×	×	×
		40%≦	×	×	×	×	×	×	×
	Phosphoric acid	<60%	◎	◎	◎	△	◎	×	×
		60-95%	○	×	○	×	△	×	×
	Acetic acid	0-50%	○	△	○	×	○	×	×
		50-80%	○	×	△	×	△	×	×
		80%≦	△	×	△	×	×	×	×
	Formic acid	0-25%	○	△	○	×	△	×	×
		25-60%	○	×	○	×	△	×	×
		60%≦	△	×	×	×	×	×	×
	Lactic acid		◎	△	△	×	△	×	×
	Trichloroacetic acid		△	×	×	×	×	×	×
	Maleic acid		○	△	△	×	×	×	×
	Hydrogen peroxide water		◎	×	◎	×	×	×	×
	Aluminum polychloride (PAC)		◎	①②：◎ / ③：△	◎	①②：◎ / ③：△	○	×	×
Alkali	Sodium hydroxide (Caustic soda)	<10%	◎	×	◎	×	○	×	×
		10-50%	◎	×	◎	×	△	×	×
		50%≦	△	×	△	×	△	×	×
	Potassium hydroxide	≦50%	◎	△	◎	×	◎	×	×
	Calcium hydroxide		◎	△	◎	×	◎	×	×
	Sodium hypochlorite	<10%	◎	○	◎	○	○	×	×
		10-25%	◎	×	◎	×	○	×	×
		25-50%	◎	×	◎	×	○	×	×
		50%≦	△	×	△	×	△	×	×

【Note】◎：Not at all or mostly not affected　○：Slightly affected　△：Affected　×：Significantly affected

The chemical resistance shown in the table is for reference only.
Please consult with Kubota ChemiX if using our product as the pipeline for chemical, etc.

	Name of chemical	Concentration	Temperature						
			≦20ºC		≦35ºC		≦60ºC		≦80ºC
			①VP Pipes ②VU Pipes	①VP Pipes for Water Supply ②HI-VP Pipes ③HT Pipes	①VP Pipes ②VU Pipes	①VP Pipes for Water Supply ②HI-VP Pipes ③HT Pipes	①VP Pipes(No-pressure) ②VU Pipes(No-pressure)	HT Pipes	HT Pipes
Organic solvent	Chloromethane (Methyl chloride)		×	×	×	×	×	×	×
	Toluene		×	×	×	×	×	×	×
	Trichloroethylene		×	×	×	×	×	×	×
	Acetone		×	×	×	×	×	×	×
	Ketones		×	×	×	×	×	×	×
	Methyl alcohol		◎	×	◎	×	△	×	×
	Ethyl ether		×	×	×	×	×	×	×
	Ethyl alcohol	≦50%	◎	△	◎	×	△	×	×
		96%	◎	×	◎	×	△	×	×
	Butyl alcohol		◎	×	◎	×	△	×	×
	Aniline		×	×	×	×	×	×	×
	Benzene		×	×	×	×	×	×	×
	Carbon tetrachloride		×	×	×	×	×	×	×
	Trichloromethane (Chloroform)		×	×	×	×	×	×	×
	Ethyl acetate		×	×	×	×	×	×	×
	Formalin	≦40%	○	△	○	×	△	×	×
	Carbon disulfide		×	×	×	×	×	×	×
	Acetaldehyde		×	×	×	×	×	×	×
	Glycerin		◎	◎	◎	◎	◎	△	×
	Aromatic hydrocarbon		×	×	×	×	×	×	×
	Cresol aqueous solution		×	×	×	×	×	×	×
	Lacquer thinner		×	×	×	×	×	×	×
	Hexane		◎	△	△	×	×	×	×
	Triethylamine		×	×	×	×	×	×	×
	Butylcarbitol		△	×	△	×	×	×	×
	Propylene glycol	≦50%	△	○	△	○	×	△	×
		50%<	×	×	×	×	×	×	×
	Ethylene glycol	≦50%	◎	△	◎	△	△	×	×
		50%<	×	×	×	×	×	×	×
	Ethanolamine		×	×	×	×	×	×	×
Gas	Chlorine gas (Dry)		△	×	×	×	×	×	×
	Chlorine gas (Wet)		◎	×	△	×	×	×	×
	Ammonia gas		◎	×	◎	×	◎	×	×
	Hydrogen sulfide		◎	△	◎	×	△	×	×
Others	Gasoline		△	×	×	×	×	×	×
	Petroleum		×	×	×	×	×	×	×
	Oil and Fat		◎	×	◎	×	◎	×	×
	Olive oil		◎	×	◎	×	△	×	×
	Potassium permanganate		○	×	○	×	△	×	×
	Seawater		◎	◎	◎	◎	◎	○	○
	Ant repellent		×	×	×	×	×	×	×
	Ozone water		◎	×	△	×	×	×	×

【Note】◎ : Not at all or mostly not affected　○ : Slightly affected　△ : Affected　× : Significantly affected

II. Installation Design

1. Installation Design for HT Pipes for Hot Water Supply

1.1 Main check points

(1) Operating temperature ranges and operating pressure (hydrostatic + water hammer pressure)

Nominal diameters of 50 and less (JIS K 6776)

Operating temperature (°C)	5~40	41~60	61~70	71~90(Note)
Maximum operating pressure (MPa)	1.0	0.6	0.4	0.2

Note : Continuous normal operating maximum temperature is 85°C.

Nominal diameters of 65 and more (manufacturer's standards)

Operating temperature (°C)	5~40	41~60	61~70	71~85(Note)
Maximum operating pressure (MPa)	1.0	0.4	0.25	0.15

Note : Continuous operating maximum temperature is 80°C.

(2) Applications which HT pipes cannot be used

- Do not use HT pipes for instant water heaters since the water temperature can be as high as 100°C when the water flow rate decreases.
- Do not use HT pipes for solar water heaters or heat exchangers since the water temperature can be as high as 100°C.
- If the water heater is other than the types above and it directly receives water pressure, it is necessary to take a measure such as installing a pressure reducing valve.

(3) About expansion and contraction protection

- Use expansion joints or form a pipe loop.
- Use fixed supports at pipe sections near tees and elbows because the expansion and contraction force in the hot water supply pipe acts on the fittings.

* For details, refer to "1.5 Pipe Expansion and Contraction Protection" and "1.6 Pipe Supports."

(4) About buried pipes

- When burying pipes in concrete, use casing pipes or bury the pipes to a depth of less than 1 m, and do not bury fittings.
- When burying pipes under dirt floor or outdoors, do not use elbows at bending parts. Bends are only recommended at bending parts.
- Do not bury pipes that branch to multiple faucets, such as pipes to a bathroom.

(5) About freeze-up prevention and thermal insulation

For pipes that may freeze, take a freeze-up prevention measure such as installation of water drain port or thermal insulation material.

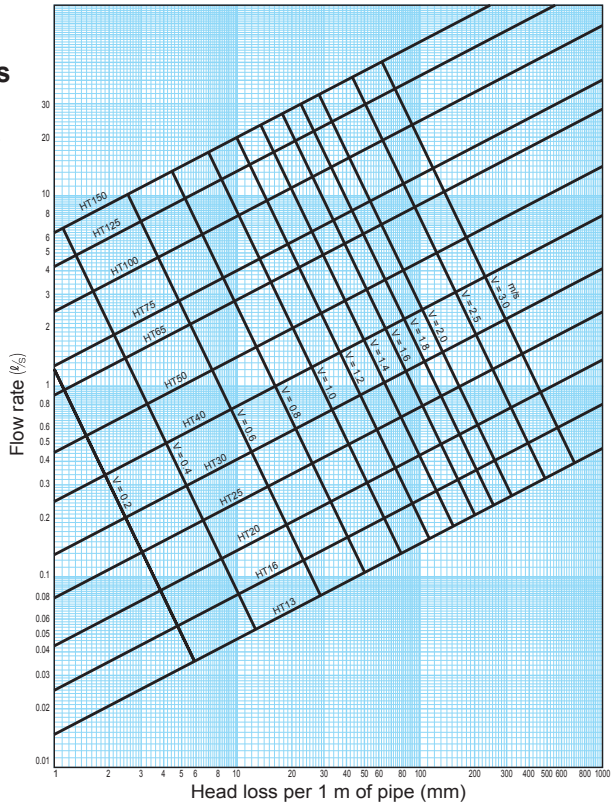
1.2 Head Loss in Pipeline

(1) Friction head loss in straight pipe sections

Use the following Darcy-Weisbach Equation to calculate the friction head loss in a straight pipe section.

$$h = \lambda \frac{\ell}{d} \cdot \frac{V^2}{2g}$$

h : Friction head loss in straight pipe section (m)
λ : Friction loss coefficient (0.02)
ℓ : Pipeline length (m)
d : Pipe inside diameter (m)
V : Pipe flow velocity (m/sec)
g : Gravitational acceleration (9.8 m/sec²)



(2) Head loss in fitting (reference)

The head loss in a fitting can be determined by calculation according to the shape of the fitting. For the calculation, a fitting is usually converted to a straight-pipe-equivalent length and added as an extension pipe to the straight pipe section to determine head loss.

Straight-pipe-equivalent lengths for the calculation of head loss in fittings

Unit : m

Fitting \ Nominal Dia.	13	16	20	25	30	40	50	65	75	100
Elbow	0.2	0.3	0.4	0.5	0.5	0.7	0.9	1.2	1.4	1.8
90° Bend	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.4	0.5	0.6
45° Bend	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.4
Same-diameter tee	0.2	0.3	0.4	0.5	0.5	0.7	0.9	1.2	1.4	1.8
Same-diameter tee	0.7	0.8	1.0	1.3	1.5	2.0	2.5	3.3	3.8	5.0
Reducer (1: 0.5)	—	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5
Gate valve (fully open)	0.1	0.1	0.2	0.2	0.2	0.3	0.4	0.4	0.5	0.7
Stop valve (fully open)	5.5	5.5	7.6	9.1	12.1	13.6	18.2	21.2	26.0	36.0

1.3 Temperature Drop and Thermal Insulation

HT pipes offer excellent thermal insulation performance, so no insulation measure is necessary for short-distance hot water supply pipes. However, to reduce the electricity/gas expenses, use commercially available easy-to-install heat insulation covers on heating/cooling equipment pipes.
Use the following formula to calculate the temperature drop in HT pipes used for hot water supply.

$$t_o = t_a + (t_i - t_a)\, e^{-\left(\frac{2\pi L}{R \cdot Cp \cdot Q}\right)}$$

t_o : Water temperature at pipe outlet (°C)
t_a : Outdoor air temperature (°C)
t_i : Water temperature at pipe inlet (°C)
e : Base of natural logarithm (2.71828)
L : Pipe length (m)
R : Heat transfer resistance (h·m·°C/Kcal)
Cp : Specific heat of water (1 Kcal/kg·°C)
Q : Water flow rate (kg/h)

Use the following formula to calculate heat transfer resistance R. Note that heat transfer resistance R varies depending on whether thermal insulation is installed or not.

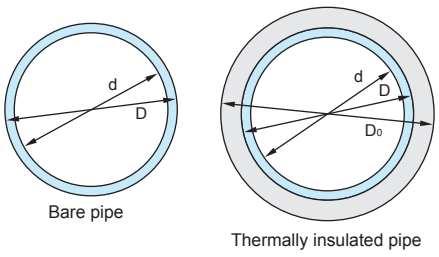
(1) For exposed bare pipes

$$R = \frac{2}{h_a \cdot D} + \frac{1}{\lambda} \ell_n \frac{D}{d} + \frac{2}{h_w \cdot d}$$

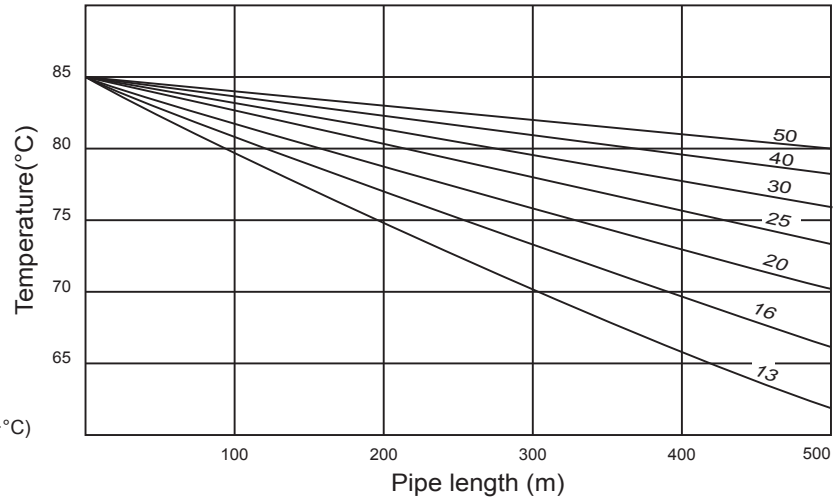
(2) For exposed thermally insulated pipes

$$R = \frac{2}{h_a \cdot D_o} + \frac{1}{\lambda_o} \ell_n \frac{D_o}{D} + \frac{1}{\lambda} \ell_n \frac{D}{d} + \frac{2}{h_w \cdot d}$$

h_a : Coefficient of heat transfer to outside air (10 Kcal/h·m²·°C)
h_w : Heat transfer coefficient of water in pipe (Min. 3,000 Kcal/h·m²·°C)
d : HT pipe inside diameter of (m)
D : HT pipe outside diameter (m)
D_o : Outside diameter of thermally insulated pipe (m)
λ : Thermal conductivity of HT pipe (0.12 Kcal/h·m·°C)
λ_o : Thermal conductivity of thermal insulation material (Kcal/h·m·°C)



Example of temperature drop in exposed bare pipe



Conditions: Pipe inlet temperature at 85°C, outside air temperature at 0°C, pipe flow velocity at 1.5 m/s

Thermal transfer coefficient of thermal insulation materials

Unit : cm

Thermal Insulation Material	Thermal Conductivity (Kcal/h·m·°C)
Magnesium carbonate	0.040~0.048
Diatomaceous earth	0.053~0.097
Rock wool	0.046~0.056
Cow fur felt	0.046~0.047
Hemp felt	0.046~0.050
Carbonized cork	0.043~0.046
Glass fiber	0.039~0.057
Polyurethane foam	0.027~0.047

1.4 Thermal Expansion and Contraction and Thermal Stress

(1) Thermal expansion and contraction

The linear expansion coefficiency α of a HT pipe is usually 7 x 10^{-5}/°C, which is 4 to 6 times higher than that of a steel pipe or copper pipe. The amount of expansion and contraction resulting from a change in the temperature inside the pipe can be obtained with the following formula. According to the formula, the amount of expansion and contraction per 1 m of pipe resulting from a temperature change of 10°C is 0.7 mm.

$$\Delta \ell = \alpha \cdot \ell \cdot \Delta t$$

$\triangle \ell$: Amount of expansion and contraction (cm)
α : Linear expansion coefficient (7 x 10^{-5}/°C)
ℓ : Pipe length (cm)
$\triangle t$: Temperature difference (°C)

(2) Thermal stress

When the HT pipe movement in the axial direction is restricted and the temperature increases, compressive stress generates. When the temperature decreases, tensile stress generates. The thermal stress values can be obtained with the following formula. By multiplying a thermal stress value by the cross-sectional area of the pipe, the amount of expansion and contraction force that is generated due to the heat and acts on the pipe body can be obtained.

$$\sigma = \alpha \cdot E \cdot \Delta t$$

σ : Thermal stress (kN/cm²)
E : Elastic modulus of pipe (kN/cm²)

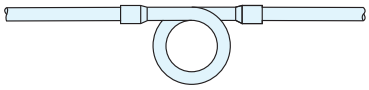
1.5 Pipe Expansion and Contraction Protection

Since HT pipes have a higher linear expansion coefficient than metal pipes, it is important to protect HT pipes against thermal expansion and contraction when designing pipe installation.
By either using expansion fittings or using a special piping method, thermal expansion and contraction can be absorbed for the protection of pipes, fittings and equipments.

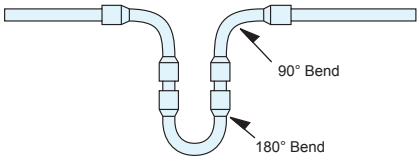
(1) Types of expansion and contraction protection

Expansion fittings

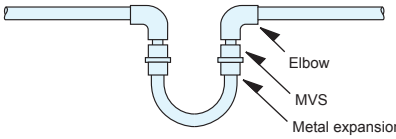
Loop Bend (nominal diameter: 13 to 50 mm)



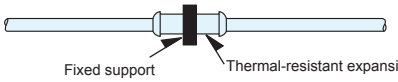
U-shape expansion pipe loop (nominal diameter: 13 to 50 mm)



Metal expansion pipe loop (nominal diameter: 13 to 25 mm)



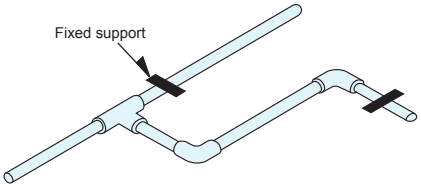
Thermal-resistant expansion joint (nominal diameter: 20 to 25 mm)



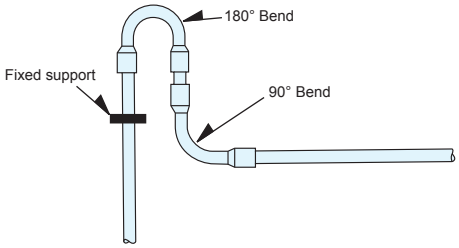
Do not use this expansion joint in a concealed location.
It is difficult to conduct maintenance of the joint installed in a concealed location.

Piping method

Pipe loop formed with elbows (for branching)



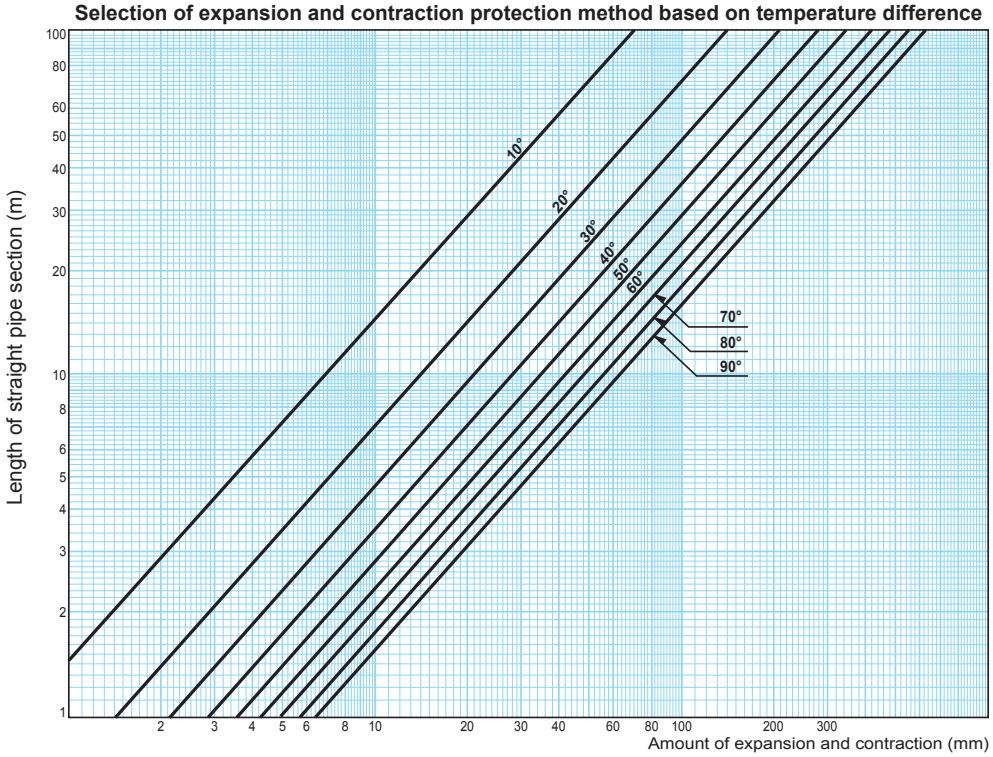
Pipe loop formed with Bend (nominal diameter: 13 to 50 mm)



(2) Selection of expansion and contraction protection method

The amount of expansion and contraction absorbed varies depending on the type of expansion and contraction protection method, such as installation of expansion fittings or use of a special piping method. Select the most suitable expansion and contraction protection method to use based on the difference between the temperature at the time of pipe installation and the temperature during hot water supply or between the temperature at the time of pipe installation and the temperature during the cold season as well as the length of the straight pipe section and by referring to the diagram below.

Selection of expansion and contraction protection method based on temperature difference



Thermal-resistant expansion joint, 1 piece			2 pieces	3 pieces
90° Bend, 1 piece	Loop Bend, 1 piece	2 pieces	3 pieces	4 pieces
	U-shape expansion fitting, 1 piece	2 pieces	3 pieces	
180° Bend, 1 piece				

Note Secure one side of the 90° Bend at a location 50 cm away using a fixed support.
180° Bend is combined with a 90° Bend.

Supporting length per expansion fitting

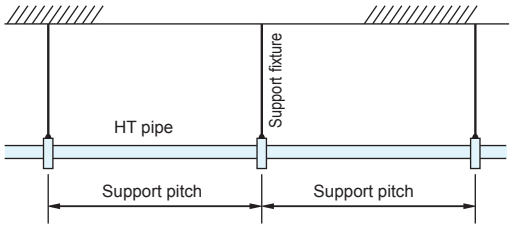
Unit : m

Expansion fitting \ Temperature difference (°C)	80	60	40
Thermal-resistant expansion joint	12.0	16.0	25.0
90° Bend	1.7	2.3	3.5
180° Bend	3.6	5.0	7.2
Loop Bend	5.0	6.8	10.0
U-shape expansion pipe loop	7.0	9.5	14.0

1.6 Pipe Supports

(1) Maximum support pitch

The elastic modulus of HT pipe decreases as the temperature increases. To ensure the pipeline reliability, make the support pitch less than the value shown in the table.

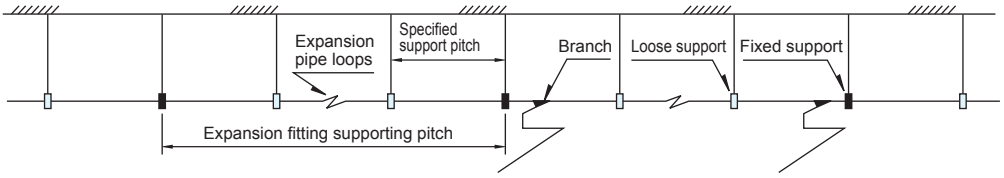


Unit : cm

Nominal Dia.(mm)	Maximum operating temperature 85°C
13	55
16	60
20	65
25	70
30	75
40	85
50	95
65	95
75	110
100	120

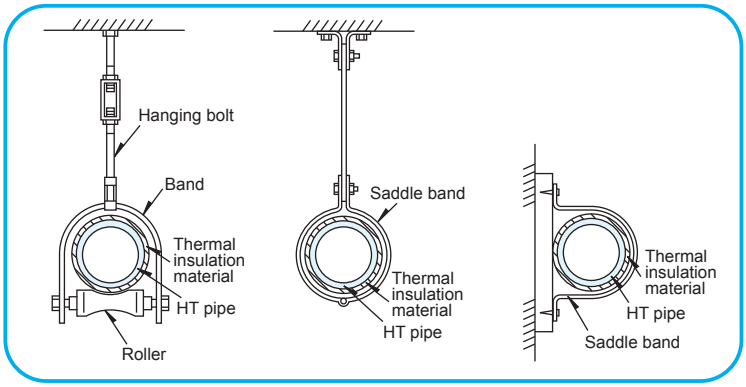
(2) Support method

Either loose supports, which allow the movement of the pipe in the axial direction, or fixed supports, which constrict the pipe movement, are used to support HT pipes. Although loose supports are used in general, always use fixed supports at interval locations equal to the supporting pitch required for each expansion fitting determined based on the temperature difference, at locations near branching sections, and at elbows.



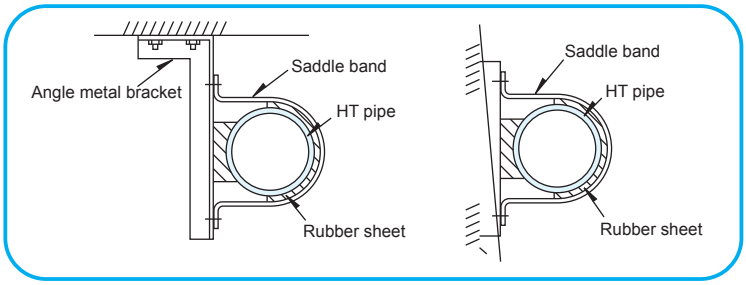
Examples of loose support

When using loose supports, provide Min. 10 cm space between the joint and supporting fixture in order to prevent the joint from contacting the support fixture when the pipe expands.



Examples of Fixed support

When installing a pipe to a fixed support, use a saddle band with wider than the pipe outside diameter. If a U-bolt is used, local stress will be generated and cause pipe deformation.
Also, place a rubber sheet between the pipe and saddle band and secure the pipe directly in place, and then cover the pipe with a thermal insulation material if necessary.



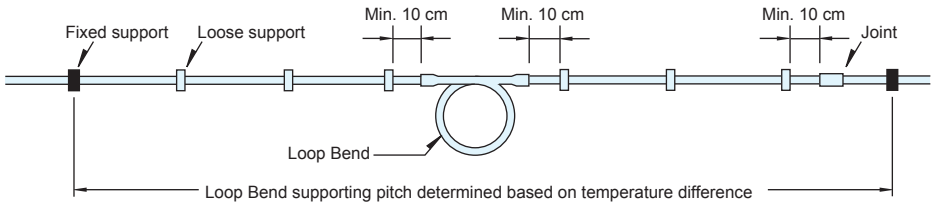
⚠ The rubber sheets used must not contain any plasticizer.

1.7 Standard Piping Diagrams

(1) Examples of expansion and contraction protection

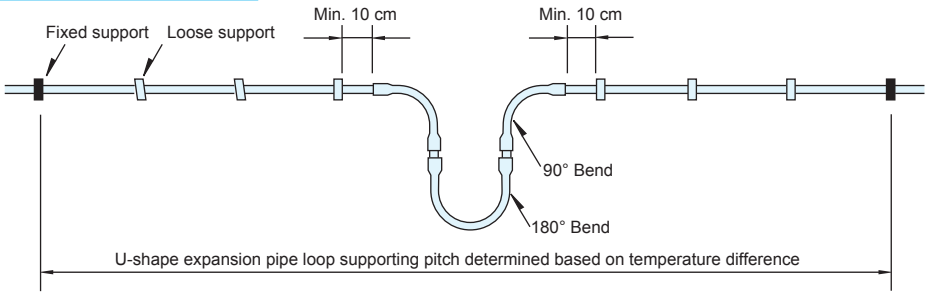
* Depending on the conditions of construction site, the most suitable method may not be indicated. Consult our company for details.

A Loop Bend



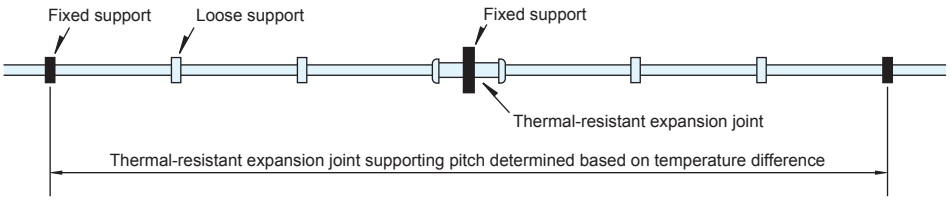
- The pitch of loose supports must be less than the maximum support pitch determined based on the operating temperature.
- Position the loop bend section horizontal or downward. If the loop bend is installed upward, air will be trapped inside the pipe.
- This method cannot be used for riser pipes.

B U-shape expansion pipe loop



- Position the U-shape expansion pipe loop section horizontal or downward.
- This method can be used for riser pipes.

C Thermal-resistant expansion joint

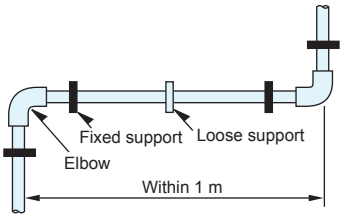


- Do not use thermal-resistant expansion joints in concealed locations such as above ceiling or under floor because it will be difficult to maintain the joints installed in concealed places.
- Be sure to secure the thermal-resitant expansion joints firmly in place.
- The pipe butt gap in the thermal-resistant expansion joint must be as follows: $\frac{\theta_1-\theta_2}{\theta} \times 50+10$ (mm); where θ is the maximum temperature difference in the pipe, θ1 is the temperature of hot water, and θ2 is the temperature of the pipe at the time of installation.

(2) Examples of pipe installation at bending section

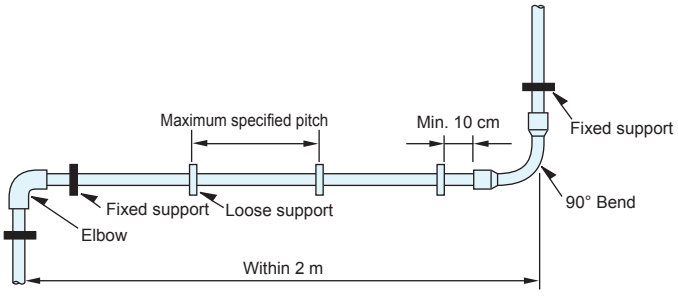
A Elbow

- Be sure to use fixed supports at locations near the elbows.
- When using two elbows at the bending section, the distance between the elbows must not exceed 1 m.
- When connecting a joint or securing the pipe in place, do not apply any twisting, bending or pulling force. If excessive force is applied to the pipe, especially under low temperatures, damage can occur to the pipe or joint.



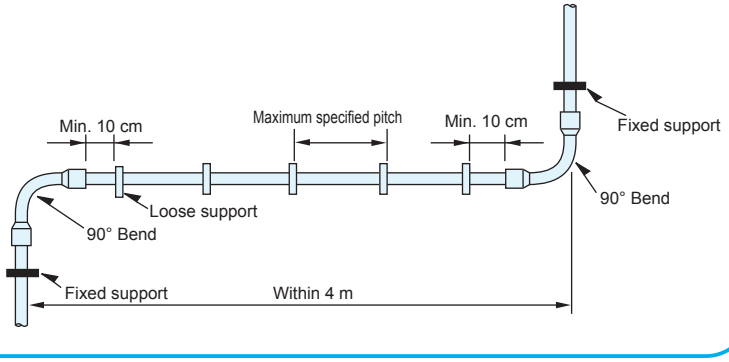
B Elbow + Bend

- Secure the pipe at locations near both sides of the elbow and at a location near one side of the 90° Bend as shown in the diagram.
- The distanace between the elbow and 90° Bend must be less than 2 m.



C Bend

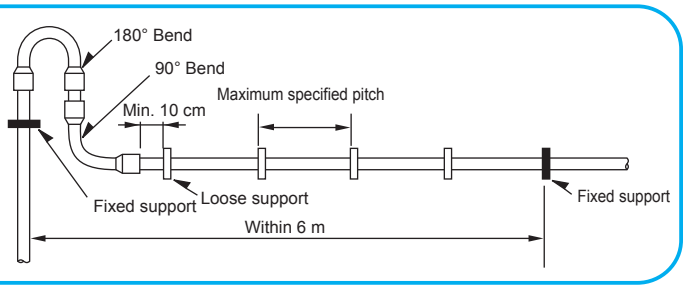
- Use a fixed support on a location near one side of the 90° Bend as shown in the diagram.
- The distance between the Bends must be less than 4 m.
- If the distance between the Bends exceeds 4 m for unavoidable reasons, form a loop bend, U-shape expansion pipe loop, etc.



D 180° Bend

- Use a fixed support at a location near one side of the 180° Bend as shown in the diagram.
- When providing expansion and contraction protection by combining a 180° Bend and a 90° Bend, the distance between the fixed supports must not exceed 6 m.

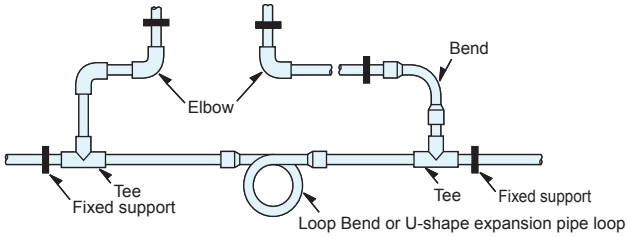
* Regarding the maximum support pitch, refer to "(1) Maximum support pitch" above.



(3) Examples of pipe branching

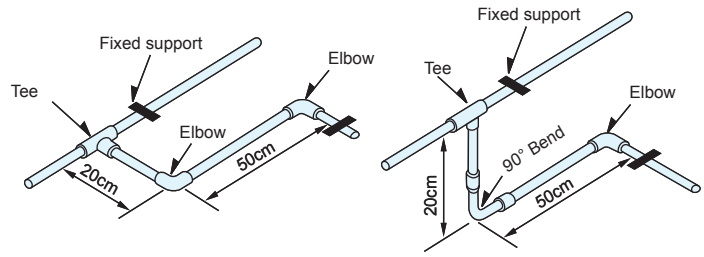
A Method of braching pipe from main pipe

- Use a fixed support at a location near the branching section.
- If a fixed support cannot be used, connect the branching pipe at a location near a fixed support and route it to the water supply point.



B Branching pipe installation

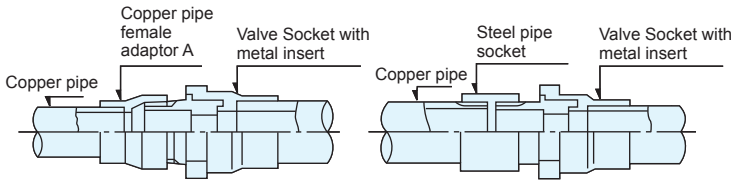
- When two elbows are used, install the pipes on the same plane in order to prevent excessive force from being applied to the pipes or joints.
- A continuously bending section is subject to vibration caused by water hammer. Install a fixed support within 1 m from the branching point.
- When a swing pipe is provided by using fittings at two or more locations, use 90° Bends instead of elbows.
- A continuously bending section is subject to vibration caused by water hammer. Install a fixed support within 1 m from the branching point.



(4) Accessories and connection examples

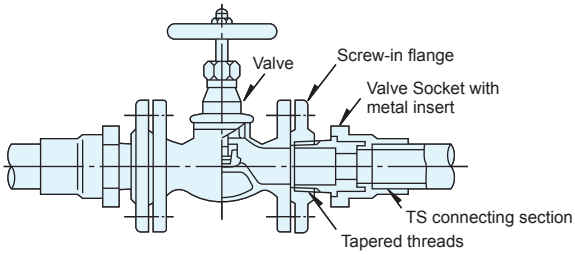
A Connection to copper/steel pipe

- Use a valve socket with metal insert (HT-MVS), and use a copper pipe female adaptor when connecting to a copper pipe and use a steel pipe socket when connecting to a steel pipe.
  Do not connect a steel pipe with tapered threads to a hydrant socket with metal insert (MWS) or hydrant elbow with metal insert (MWL).



B Connection to valve

- Use a valve socket with metal insert when connecting to a screw-in valve.
- To connect to a flanged valve, use a screw-in flange and connect in the same way as with a screw-in valve



2. Installation Design for Drain and Vent Pipes

2.1 Installation design

(1) Pipeline must be protected against expansion and contraction

A PVC-U pipe expands and contracts by about 0.07 mm per meter when the temperature changes by 1°C.
If there is a large temperature difference in the ambient temperature or in the water flowing in the installed drain pipeline, the pipe must be protected against expansion and contraction. Pipes are in a fully expanded condition when they are installed during the mid-summer. Therefore, when the pipes installed in summer contract during the winter and large force is applied to the fittings. This causes breakage in some cases. Be sure to include expansion fittings when designing pipe installation.

(2) Drain water temperature must be lower than 60°C.

Make sure that the temperature of drain water is lower than 60°C. For drain pipelines for high-temperature miscellaneous waste water, avoid draining high-temperature water or take a measure to reduce the water temperature below 60°C. (* As a general rule, take a measure to reduce the water temperature to lower than 45°C before drainage.)

(3) DV fittings must not be used on pressurized pipelines.

DV fittings are designed for use on drain or vent pipes. Do not use DV fittings on pressurized pipelines. Using DV fittings on a pressurized pipe may cause water leakage or damage to fittings.

III. Bonding Techniques

1. Bonding HI-TS and TS Products

Cutting the pipe

1 Draw a cut line.

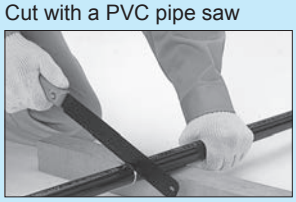
Draw a cut line around the pipe, using a wide piece of thick paper or tape.

2 Cut the pipe.

Cut with a power disc saw

Cut with a disc sander

Cut with a PVC pipe saw



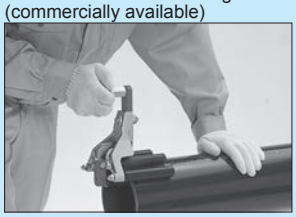
Cut the pipe along the cut line at right angles to its longitudinal axis.

Chamfering

Chamfer with a disc sander

Chamfer with a rasp

Chamfer with a Chamfering tool (commercially available)



Chamfer with a reamer (commercially available)

The edge should be chamfered as the table below.

Drawing a marker line for inserting the pipe

After chamfering the pipe edge, draw a marker line around the inserting end of the pipe with a marker pen to show the insertion length.
Draw the line all around the pipe as possible.

●Zero point and bonding length
(for nominal diameters 50 and more)

The position where the pipe stops after lightly pushing the inserting end into the socket

The position of the marker line is obtained by adding the zero point length to the bonding length in the table on the right, and should be marked with a marker pen.

⚠ For nominal diameters 40 and less, insert the pipe up to the stopper located in the socket.

Bonding lengths for nominal diameters 50 and more

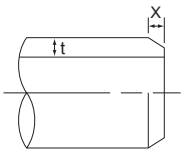
Units: mm

Nominal Dia.	Bonding length	Nominal Dia.	Bonding length
50	20	300	100
75	25	350	120
100	30	400	135
125	35	450	150
150	45	500	170
200	70	600	200
250	85		

Typical insertion lengths for nominal diameters 40 and less

Units: mm

Nominal Dia.	13	16	20	25	30	40
Fitting insertion length	26	30	35	40	44	55



Chamfer dimension Units: mm

Nominal Dia.	30 and more	40-65	75-150	200 and less
Chamfer dimension	1	2	5	10

⚠ If a pipe and a joint are bonded together without the edges chamfered, a film is formed back in the inserted end and the pipe line may become clogged.

Bonding (for nominal diameters 40 and less)

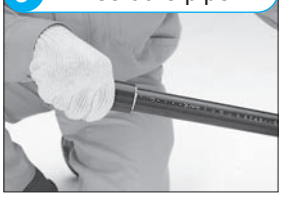
1 Clean the surface.

Clean the inner surface of the fitting and the outer surface of the inserting end of the pipe with a dry cloth.

2 Apply the adhesive.

Apply the adhesive evenly and thinly in the circumferential direction around the inner surface of the fitting first and then the outer surface of the inserting end of the pipe.

3 Insert the pipe.



Insert the pipe straight into the fitting up to the marker line without a pause immediately after applying the adhesive. Hold the fitting and the pipe together for at least 30 seconds.

4 Bonding completion.

After bonding the pipe to the fitting, remove any adhesive coming out of the joint surface immediately. Do not apply unreasonable force to the joint.

Bonding (for nominal diameters 50 and more)

1 Clean the surface.

Clean the inner surface of the fitting and the outer surface of the inserting end of the pipe with a dry cloth. Position the wire and fastener in advance.

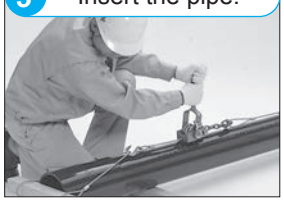
⚠ Sand, water or oil on the surface to be bonded may cause faulty bonding.

2 Apply the adhesive.

Apply the adhesive evenly and thinly in the circumferential direction around the inner surface of the fitting first and then the outer surface of the inserting end of the pipe.

⚠ In the summer two persons should work together as much as possible to work quickly and prevent the adhesive from drying during this process.

3 Insert the pipe.



Insert the pipe straight into the fitting up to the marker line without a pause, immediately after applying the adhesive. Hold the fitting and the pipe together.

⚠ Do not hammer the pipe into the fitting. This may damage the pipe.

4 Bonding completion.

After bonding the pipe to the fitting, remove any adhesive coming out of the joint surface immediately. Do not apply unreasonable force to the joint.

⚠ After the bonding work, ventilate the work area to remove any solvent gas.

Typical holding time required to bond TS products

Nominal Dia.	50 and less	65 to 150	200 and more
Typical holding time	At least 30 sec.	At least 60 sec.	At least 1 min. in summer At least 3 min. in winter

Reference

2. Bonding HT-TS Products

1 Cutting the pipe

Determine the cutting length of the pipe, considering the insertion length of the fitting. When drawing a cut line, wrap a wide piece of paper around the pipe to ensure that the cut surface will be at right angles to the longitudinal axis of the pipe. Draw the line all around the pipe with a felt-tip pen.
Use a saw with fine teeth. Cut the pipe shallowly all around the circumference rotating the pipe.

2 Chamfering

Chamfer the pipe to remove burrs and shavings produced by the cutting work on the inner and outer edges, using a chamfering tool or a rasp.
Always chamfer the cut surface. Otherwise, when the pipe is inserted, the adhesive on the surface of the fitting will be removed by the cut edge, leading to potential pipe clogging.

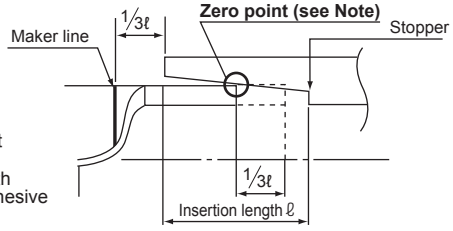
3 Drawing a marker line

Measure the joint length of the fitting. Draw a marker line around the inserting end of the treated pipe.

Note: The insertion length of the fitting varies with the product types. Always measure the length of the fitting and draw a marker line.

For nominal diameters 50 and more, the position of the marker line should be obtained by adding one-third of the insertion length ℓ to the zero point length.

●Zero point and bonding length



Note: The zero point indicates the insertion length before the adhesive is applied.

4 Cleaning

Clean the inner surface of the fitting and the outer surface of the inserting end of the pipe with a dry cloth. Dirty surface may cause leakage or the disconnection of the pipe and fitting.
Wipe off any oil with a small amount of acetone or alcohol. Be careful not to touch the bonding surfaces with oily or wet gloves.

5 Applying the adhesive

Always use Tough dyne HT. Do not use other adhesives.
Apply the adhesive evenly and thinly around the inner surface of the fitting first and then the outer surface of the inserting end of the pipe. Do not apply the adhesive excessively to the inner surface of the fitting.
Excessive adhesive will be pushed into the pipe when the pipe is inserted, which leads to potential cracking (solvent cracking).

●**Amount of adhesive to apply (reference)**

g/surface

Nominal Dia.	13	16	20	25	30	40	50	65	75	100	125	150
Amount	0.6	0.8	1.1	1.6	2.1	3.3	4.8	6.6	8.1	13	20	30

Notes: 1. The above values are for use on each of the inserting surface of the pipes and the surface of the socket.
2. Prepare 20 to 30% more required amount of adhesive, taking into account the expected loss in actual use.

6 Bonding the pipe to the fitting

Push the pipe into the fitting tightly. Check the positions and orientations of the pipe and the fitting, and align their axes so that there is no twisting. Insert the pipe straight into the fitting up to the marker line without a pause. Hold the fitting and the pipe together for the time shown in the table below.
After bonding the pipe to the fitting, immediately remove any adhesive coming out of the joint surface .

●**Typical holding time**

Nominal Dia.	Time
50 and less	At least 30 sec.
65 -150	At least 60 sec.

Due to the tolerance of the fitting, the pipe may not be inserted in to the marker line. If this is the case, stop inserting the pipe there. Do not hammer the pipe into the fitting. The fitting will be subject to large load and may crack.

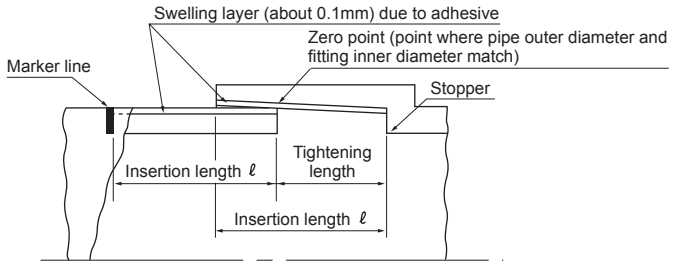
7 Treatment after bonding

During the bonding work, open both ends of the pipe to remove the solvent vapor of the adhesive from the pipe by natural ventilation or using a blower.
Do not move the bonded pipe and fitting for 15 to 30 minutes. If a bending or tension force is applied to the joint immediately after bonding, the bonded surfaces will be separated.
After the bonding work, fix the pipe and provide protection against expansion.
Check any parts that came into contact with chemicals, such as creosote, to prevent accidents after start of use.

3. Bonding DV Products

3.1 Bonding DV products

DV joint



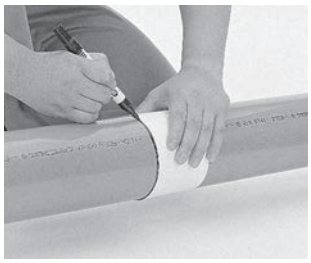
- Most PVC drain pipes can be joined together using DV fittings. This technique is generally called TS connection, which a pipe is bonded to a DV fitting with a tapered inserted end, using the swelling of the PVC pipe due to the adhesive as well as the elasticity of the pipe.

- When a PVC adhesive is applied to a pipe and fitting, a 0.1 mm thick swelling layer is formed on the surface. These layers facilitate the insertion of the pipe into the fitting. After insertion, the swelling layers of the pipe and the fitting mix and melt to combine the bonding surfaces, resulting in excellent water tightness.
- The insertion lengths of DV fittings are shorter than those of pressure pipe fittings, and the taper angles are smaller than those of pressure pipe fittings (for nominal diameter up to 150 mm). These allow a pipe to be inserted right up to the stopper, forming a flat joint surface. The inner corners of elbows and Y-fittings are round enough to ensure a smooth flow of effluent.

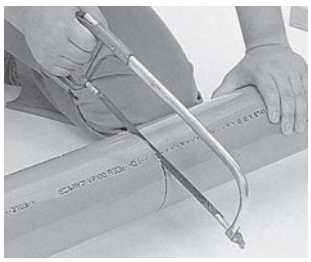
⚠ Note: DT fittings are designed for drain and vent applications, and should not be used for pressure pipe applications.

3.2 Cutting and chamfering

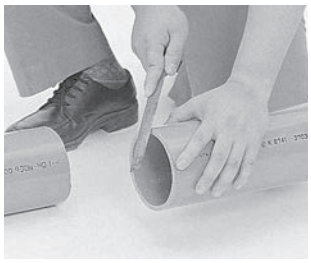
(1) Determine the cutting length of the pipe, considering the insertion length of the fitting. Draw a cut line all around the pipe with an oil-based pen to ensure that the pipe will be cut at right angles to the longitudinal axis of the pipe. Use a wide piece of paper or tape when drawing the line.



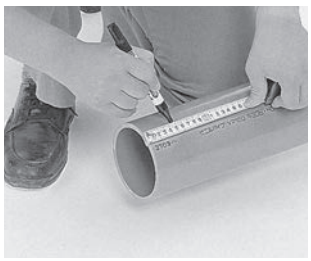
(2) Use a saw with fine teeth. Cut the pipe evenly and shallowly all around the circumference along the cut line rotating the pipe.



(3) Remove burrs and shavings on the cut surface. Chamfer the outer circumference with a chamfering tool (about 1 mm size) or a rasp.

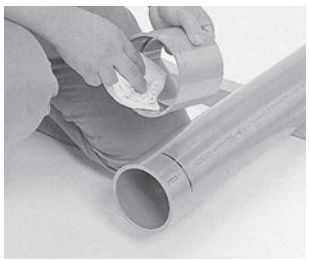


(4) After chamfering the pipe end, measure the insertion length of the fitting and draw a marker line with an oil-based pen.

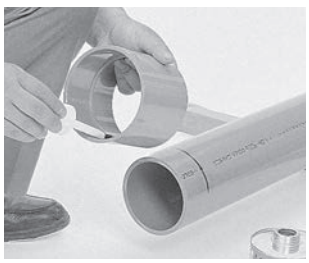


3.3 Bonding

(1) Clean the inner surface of the fitting and the outer surface of the inserting end of the pipe with a dry cloth. Wipe off any oil on the pipe with thinner. Make sure that the pipe end has been treated and a marker line indicating the insertion length has been drawn on the pipe.

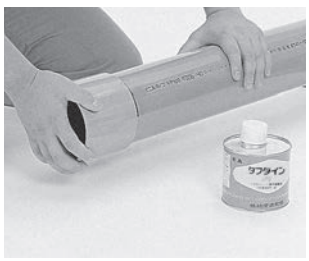


(2) Apply the adhesive thinly and evenly to the inner surface of the fitting first and then the outer surface of the inserting end of the pipe. For pipes with large nominal diameters, put the adhesive into a larger can and use a larger brush to work efficiently. An animal hair brush should be used. A plastic brush will melt, which reduces the adhesion of the adhesive.



(3) After applying the adhesive, immediately push the pipe into the fitting lightly, and align their axes so that there is no twisting. Then, insert the pipe straight into the fitting to the marker line without a pause. For pipes with larger nominal diameters, two persons should work together to ensure that the pipe is inserted in the fitting to the stopper. Do not hammer in the pipe.

(4) Always keep the force holding the fitting and the pipe together applied for a while after bonding them. Otherwise, the pipe may be disconnected from the fitting due to the tapered inner surface of the fitting. The holding time varies with the amount of adhesive applied, dimensional tolerance and temperature. Typical holding times are shown in the table below. Remove any adhesive coming out the joint surface immediately.



Typical holding time for DV fittings

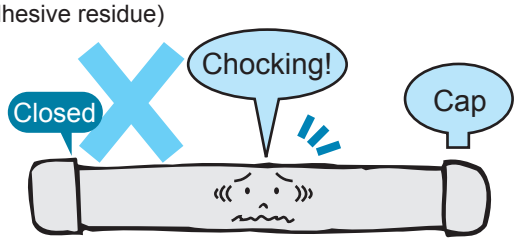
Nominal Dia.	150 and less	200 and more
Holding time	At least 30 sec. in summer At least 60 sec. in winter	At least 1 min. in summer At least 3min. in winter

Note: For nominal diameters 200 and more, Tough dyne Yellow, a high-viscosity, slow drying adhesive for large pipes, is typically used. Therefore, the holding time becomes longer.

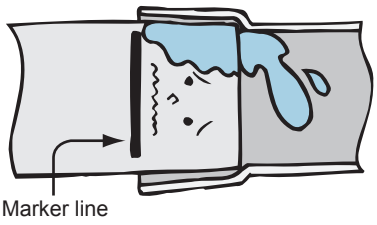
IV. Preventing Solvent Cracking

Solvent cracking is a phenomenon which hairline cracks occurs when a solvent is added to objects.
The hairline cracks would grow larger after starting the service and increase the possibility of leakage. For PVC-U or PVC-C pipes, the possibility of leakage increases particularly when the following factors occur.
When all these factors are combined, the possibility increases furtherer.

Pipe clogging after bonding
(adhesive residue)

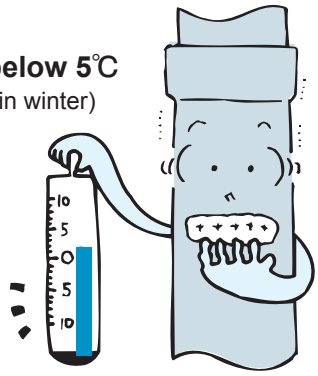


Presence of solvent
Adhesive coming out of the inner surface of the pipe due to excessive adhesive applied or the presence of chemicals that have adverse effects (such as preservatives) on the surface



Unreasonable stress being applied
(Thermal stress, pipe flattening, pipe bending)

Low temperature below 5℃
(Particularly piping work in winter)

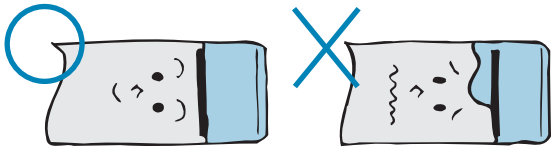


Preventing solvent cracking

During bonding work

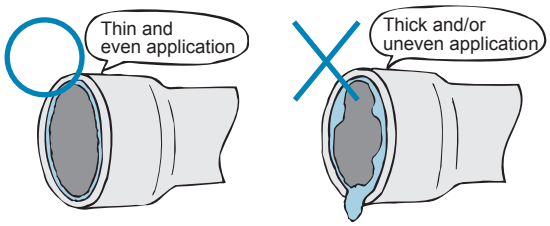
Position to apply the adhesive on the outer surface of the pipe

⚠ Do not apply the adhesive beyond the marker line.



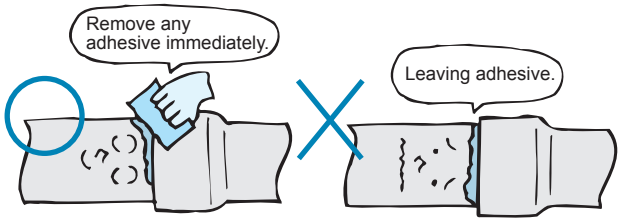
Adhesive coming out to the pipe inner surface

⚠ **Apply the adhesive thinly and evenly to the inner surface of the TS fittings.**



Removing excessive adhesive

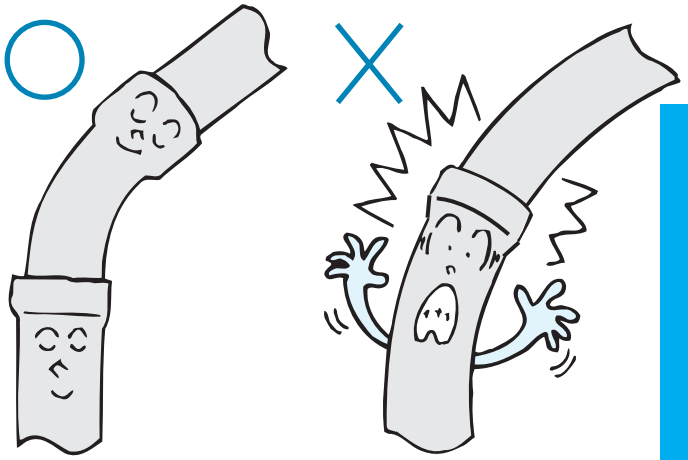
⚠ After inserting the pipe into the fitting, remove adhesive coming out of the joint surface with a cloth.



During piping work

Use bends

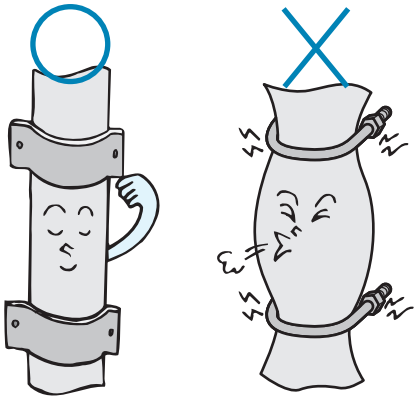
⚠ Use bends at pipe corners. Do not bend the pipe.



Reference

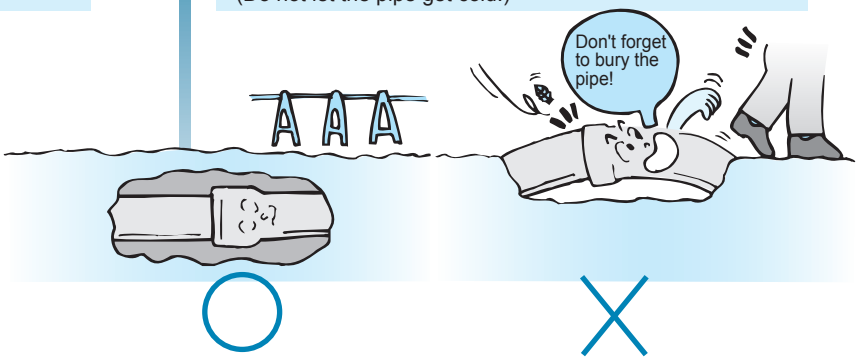
Pipe supports

⚠ When supporting the pipe with saddle bands, use wide fastener bands. Do not use U-bolts. Be careful not to tighten the bands excessively.



Backfilling

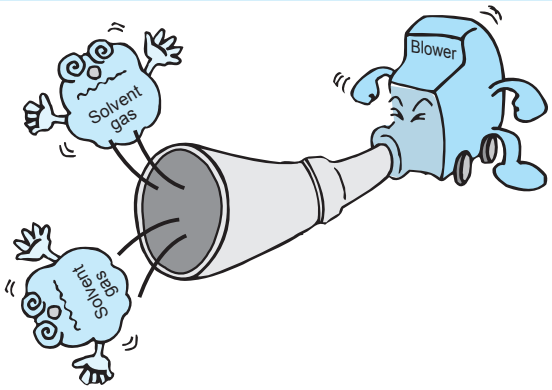
⚠ Backfill the pipe as quickly as possible to prevent thermal stress due to temperature differences or external impact. (Do not let the pipe get cold.)



Removing the solvent gas after bonding work

Ventilation

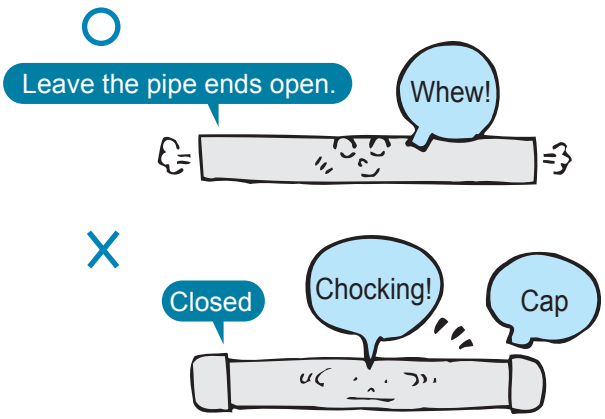
⚠ After bonding work, remove the solvent gas using a blower (low pressure type) or other means.



Washing with water avoiding water pressure in the pipe

⚠ Pour water into the pipe 30 minutes after the bonding work for nominal diameter 50 and less and one hour after the bonding work for nominal diameters 65 and more. Do not make any water pressure in the pipe.

Opening the pipe ends

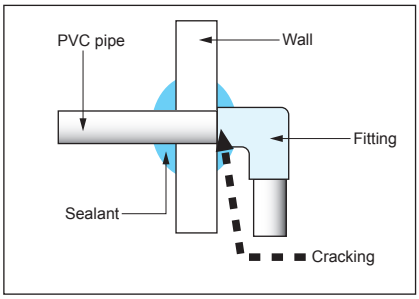


⚠ Do not close the pipe ends. Leave them open to remove the adhesive vapor.

Other important information

There is a recently developed technique which installs a PVC-U or PVC-C pipe through an interior wall and then the gap between the pipe and the wall is filled with a sealant. Some sealants contain a plasticizer, such as DOP and phthalate ester, or a solvent such as xylene and toluene, which may cause solvent cracking to PVC pipes. Usually, these plasticizers and solvents are contained in polyurethane sealants but not in silicon sealants.

However, plasticizers and solvent may be added to silicon sealants to improve their performance in the future. It is advisable to contact the sealant manufacturer for details.



V. User Instructions

This section is about do's and don'ts in order to make the most of the performance of Kubota ChemiX PVC-U or PVC-C pipes and fittings. Please read carefully and use the instructions in the safety manual where appropriately.

●Please observe the following instructions.
Classes of actions are represented by the following graphic symbols.

- ⚠ indicates that the action needs to be taken carefully.
- ⃠ indicates that the action is prohibited.
- ❗ indicates that the action must be taken.

1. Instructions for the treatment of left-over material and scraps

No on-site burning

Do not burn PVC pipes and fittings on site. Toxic chlorine gas will be released into the air, by burning.

Laws and regulations

Left-over and scrapped PVC pipes and fittings should be treated according to local laws and regulations. Do not crush leftovers and scraps with a hammer. Crushed pieces may fly away.

2. Carrying instructions

Wear gloves

Wear rubber-coated gloves with a firm grip to prevent injury.

Careless handling is dangerous

Large PVC pipes are heavy. Also, PVC pipes which are bundled together can be heavier than expected. Handle them with care to prevent injury. Careless handling is dangerous.

Do not step on pipes

Do not step on pipes. The surface of PVC pipes is slippery, which may lead to an accident.

Use a cushion

Place cushions between pipes and the truck bed and on the parts of a pipe that are secured with a rope to prevent scratches and deformation.

Careful handling

When loading and unloading the PVC pipes from truck, do not throw or drag PVC pipes into the truck. Handle with care to prevent scratches and damage to the pipes and injury.

Prevent collasping during transport

Take measures to stop ropes from becoming loose or coming off to prevent pipes from falling off the truck.

Carefully lift and lower pipes

If a truck with a hoist is used, balance the load when lifting to prevent injury.

3. Storage instructions

When storing pipes horiz ntally indoors

When storing PVC-U or PVC-C pipes, pile them in a crisscross pattern or in a staggered pattern to prevent them from warping or deforming. Put stoppers at the pipe ends to prevent the pile from collapsing.

When storing pipes outdoors

When storing pipes outdoors, put a simple roof over the storage area or an opaque sheet on the pipes to block direct sunlight. When a sheet is used, provide a good air flow.

Storing pipes vertically

When there is no choice but to store pipes vertically, take measures to prevent them from falling over, such as securing them with ropes.

Storing fittings

Fittings should be stored indoors with the pipes. When there is no choice but to store them outdoors, put a sheet over them to protect from sunlight. Always put a cover on fittings with a rubber ring to protect from direct sunlight which will degrade the performance quality of rubber rings.

4. Installation instructions

Pipes and fittings should be installed using the standard installation techniques recommended by Kubota ChemiX, in order to ensure work safety and the performance of pipe lines. If installation conditions do not allow this, please contact us.

Using the proper tools

Select tools with the proper specifications for tasks such as cutting, drilling and joining. Read and ensure that you fully understand the instruction manuals of the tools before using.

Ventilation after bonding work

After bonding work, ventilate the bonded pipe well. Do not close the bonded pipe. Otherwise, solvent cracking or a bad odor may result. Solvent cracking is a phenomenon which hairline cracks occur in a PVC-U or PVC-C pipe due to residual solvent vapor in the adhesive. Residue of bad odor in drinking-water pipes affects the smell and taste of the water. It should be noted that, particularly in the winter, solvents do not easily evaporate and tend to remain in the pipe.

Caution against the use of organic chemicals

PVC-U or PVC-C pipes and fittings can be eroded by organic chemicals, and should not be allowed to come into contact with creosote (wood preservative), termite and other pesticides or paint. If soil contaminated by these chemicals is expected along the pipe line route, take measures to protect against contamination by avoiding contaminated areas when installing the pipe line.

Treatment for thermal expansion and contraction

For pipes bonded to fittings, expansion fittings should be used to prevent pipes from becoming disconnected from their fittings or damaged due to thermal expansion and contraction.

Do not bend pipes

Do not bend pipes. Otherwise, the strain will remain, causing potential pipe rupture. If curved pipes are required, always use bends.

About thrust protection

For buried pipes subject to hydrostatic pressure, thrust protection should be provided to prevent the pipes from becoming disconnected from their fittings at corners and branches. The standard installation technique recommended by the Japan PVC Pipe and Fittings Association and Kubota ChemiX should be used.

Do not heat pipes on site

Do not heat pipes on site. Pipes may become scorched or burnt, resulting in reduced strength.

About protective insulation cover

Avoid installing pipes near steam and hot-water pipes in order to prevent deformation and damage due to high temperatures. If this is not possible, put a protective insulation cover around the pipe.

Public space used for pipes

When pipes are buried under public roads, follow the burying standards or instructions provided by the road administrator. For siphon pipes across a river and pipes buried under railways, follow the instructions provided by the respective administrators.

Squeeze-off tools

Squeeze-off tools for polyethylene pipes should not be used to repair small water pipes. The ductility of PVC-U or PVC-C pipes is smaller than that of polyethylene pipes. If water sealing work is carried out with squeeze-off tools, whitening due to plastic deformation may occur to the pipe which lead to damage in the future.

Freeze protection

In cold regions, pipes should be buried 20 cm deeper than the maximum freeze depth. Thermal insulation should be wrapped around the exposed part of a vertical water pipe to protect against freezing.

Cutting small pipes

Do not use a pipe cutter to cue small pipes. The cutter may cause chippings or deformation to the cut section of the pipe.

Joining a hydrant

Since a hydrant has parallel pipe threads, water cannot be sealed by inserting the threads into the female threads of a water fitting with sealing tape. When joining a hydrant to a water fitting, place a gasket between the hydrant flange (the face with the gasket on) and the water fitting.

Do not thread PVC pipes and fittings

Do not thread PVC-U or PVC-C pipes and fittings directly. These pipes have a large notch effect, and their strength decreases if cracks or notches are made.

Use of lubricant specifically designed for joining fittings with a rubber ring

A lubricant specifically designed for rubber rings should be used to joint fittings with a rubber ring to a pipe. Do not use adhesive or oil. It may damage the rubber ring.

Insertion force joining pipes to TS fittings

When joining a pipe to a TS fitting, unreasonable stress may be applied to the fitting depending on the dimensional combination of the pipe and the fitting if the pipe is inserted up to the stopper in the fitting. In terms of the relation between the bonding length and the pressure resistance, it has been confirmed that a practically sufficient hydrostatic resistance can be achieved by inserting the pipe up to one-third of the insertion length of the fitting from the insertion length position without any adhesive applied (zero point position).
In order to prevent the bonded pipe from becoming disconnected from the fitting due to the elasticity of the pipe, the insertion force should be applied for over 30 seconds for nominal diameters 50 and less and for over 60 seconds for nominal diameters 65 and more.

Joining steel pipes to fittings with a tapered female thread

Do not insert the tapered male threads of a metal pipe into a hydrant fitting. The joint may be damaged. Normally, a metal socket should be joined to the tapered male thread of the metal pipe. Then, a valve socket should be joined to the metal socket. When strength is required for the inserted section, a valve socket with a metal male thread should be joined to the metal socket.

5. Instructions for handling PVC adhesive

Do not use adhesives for other applications

PVC and plastic adhesives were developed to bond PVC pipes to PVC fittings, and should not be used for other applications.

Use of appropriate adhesives

There are three types of adhesive: one for HI products, one for HT products and one for other products. The adhesives are designed to provide appropriate joint strength to pipes and fittings. Therefore, it is necessary to use the adhesive appropriate for the type of pipe.

If adhesive enters the eye

If adhesive enters the eye, do not rub the eye. Seek medical attention immediately

Storage according to laws and regulations

Adhesives are hazardous substances under the Fire Defense Law. Follow applicable laws, regulations and municipal ordinances when storing adhesives.

Ventilation and fire prevention

When using an adhesive, ventilation should be provided to prevent intoxication. Also fire sources should be kept away from organic solvents.

Use of gloves

Wear gloves to protect against skin irritation and sores. Do not touch the adhesive directly. If the adhesive touches the skin, wash it off with soap and water immediately.

Washing hands and gargling

After using the adhesive, wash your hands and gargle well.

Store in a cool and dark place away from fire sources

Adhesives contain organic solvents. After using the adhesive close the lid of the can securely and store it in a cool and dark place indoors. Be sure to keep away from fire sources.

Do not use old and expired adhesives

Do not use an old and expired adhesive that has jelled or that has no pungent solvent odor. Do not thin the adhesive with thinner. This will decrease the adhesion, leading to the pipe disconnection from the fitting and causing leakage.

About Us

Japanese Leading Plastic Pipe Manufacturer with a History of more than 65 Years

Our history began in 1954, when Kubota Tekko K.K. (present Kubota Corporation) started to manufacture PVC pipes in Sakai, Osaka.
Other than PVC-U products, we are now developing products with various materials such as, PVC-C, HPPE, MDPE, LLDPE, XPE, and PB. We provide in the wide range of markets, water work systems, sewer systems, agricultural water systems, water supply and drainage for building applications, power and communication cable protection, and gas plumbing.
Today, as the Japanese leading plastic pipe manufacturer, we are supplying more than 10,000 items. With a nationwide sales network, we have the largest share in the Japanese PVC pipe market.

Note: The information in this brochure may be revised any time without notice due to product improvements. Values without tolerances are baseline values.
Note: The color in the pictures may differ slightly from the actual color of the product due to printing limitations.

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