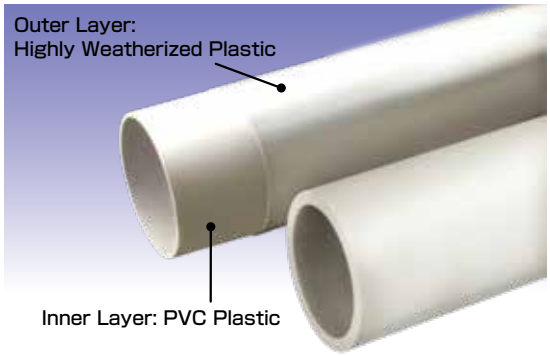
ESLON™ UVS-VP

Outer layer coated with UV resistant weatherproofed plastic achieves high weather resistance for outdoor use.

Reducing the material's susceptibility to UV-degradation increases the product's lifespan.

Highly weatherized plastic and PVC layer creates a durable body that is resistant to peeling. This eliminates the need to maintain the coating.



Recommended solvent cements

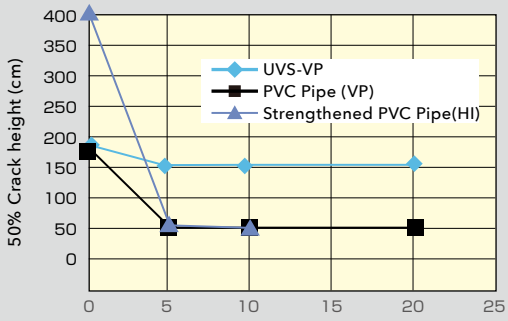
NO.100S

Primer P-810

*Refer to page 60 to confirm usability with other solvent cements.

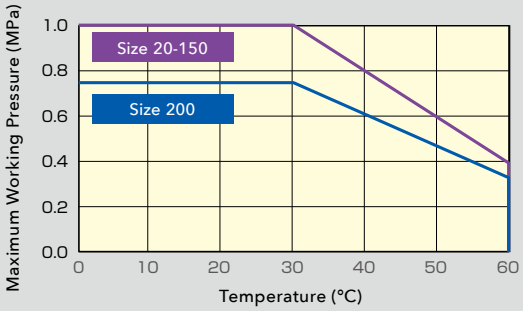
Weatherproof Test (Impact Strength)

Outdoor exposure tests (equivalent to 20 years of exposure) showed an impact strength reduction of approximately 15%.



<Test method> Diameter Size: 50A,
Weight: 3kg flat shape,Temperature: 0°C

Maximum Working Pressure

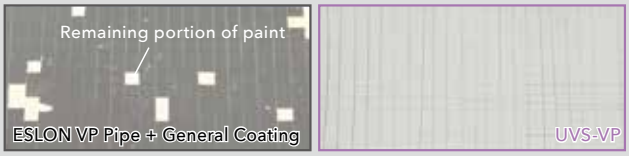


Weatherproof Test (Exterior)

Material degradation and exterior discoloring were reduced.

Peeling Test*

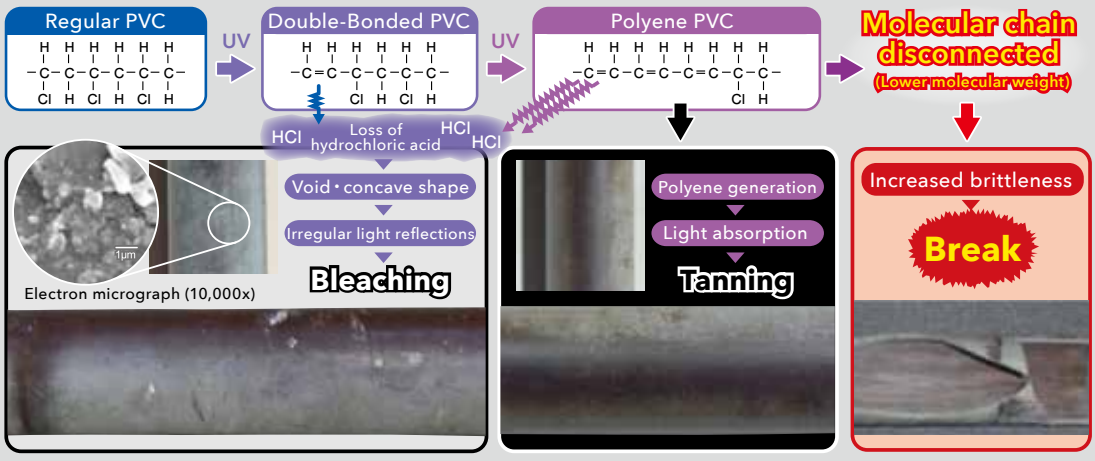
Demonstrates that the weatherproof layer is resistant to peeling.
<Notches are made in the sample, and tape is applied and peeled off 5 times>



Significant peeling　　Absolutely no peeling

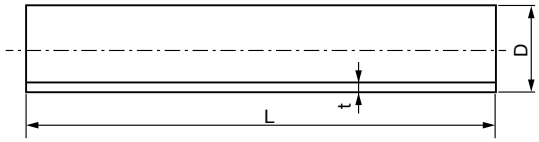
*Reference: JIS K5600-5-6 Crosscut Method Evaluation

UV Degradation Mechanism of PVC exposured Pipe



UVS-VP SPECIFICATIONS

Pipe



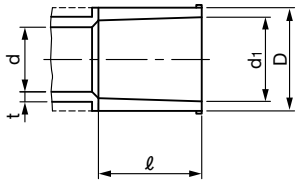
⚠ Important Notes

Please don't use it for water pipe.

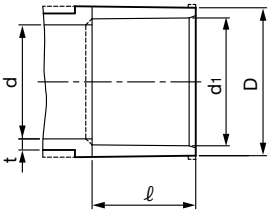
Unit:mm

Size	D	t	L	Weight (kg/m)	Item No.
20	26	2.7	4000±10	0.310	UV204S
25	32	3.1		0.448	UV254S
40	48	3.6		0.791	UV404S
50	60	4.1		1.122	UV504S
65	76	4.1		1.445	UV654S
75	89	5.5		2.202	UV754S
100	114	6.6		3.409	UV1H4S
125	140	7.0		4.464	UV1Q4S
150	165	8.9		6.701	UV1F4S
200	216	10.3		10.129	UV2H4S

Socket Dimension



20～50A

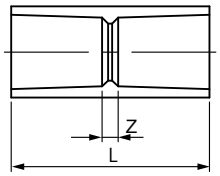


65～200A

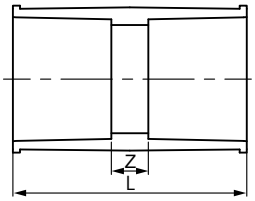
Unit:mm

Size	D	t	d1	ℓ	d
20	33	3.5	26.45	35	20
25	40	4.0	32.55	40	25
40	57	4.5	48.70	55	40
50	70	5.0	60.80	63	51
65	87	6.6	76.60	61	67
75	102	8.0	89.60	64	77
100	130	10.0	114.70	84	100
125	157	11.0	140.85	104	125
150	186	13.0	166.00	132	146
200	243	13.0	217.40	145	196

Coupling



20～50A

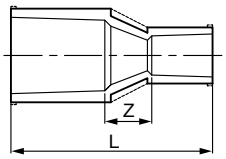


65～200A

Unit:mm

Size	L	Z (Ref.)	Weight (kg/pc)	Item No.
20	77	7	0.040	UVS20
25	87	7	0.061	UVS25
40	117	7	0.142	UVS40
50	133	7	0.210	UVS50
65	145	23	0.366	UVS65
75	155	27	0.515	UVS75
100	200	32	1.077	UVS1H
125	240	24	1.715	UVS1Q
150	300	36	2.846	UVS1F
200	300	10	3.557	UVS2H

Reducing Coupling

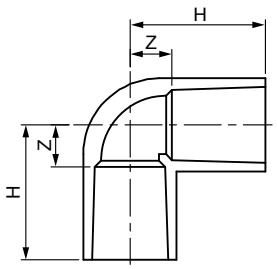


Unit:mm

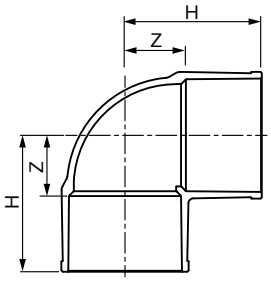
Size	L	Z (Ref.)	Weight (kg/pc)	Item No.
25×20	84	9	0.053	UVS251
40×20	113	23	0.095	UVS404
40×25	114	19	0.110	UVS403
50×20	116	18	0.160	UVS505
50×25	140	37	0.180	UVS504
50×40	136	18	0.185	UVS501
65×50	149	25	0.336	UVS651

Size	L	Z (Ref.)	Weight (kg/pc)	Item No.
75×50	165	38	0.450	UVS752
75×60	159	34	0.487	UVS751
100×75	190	42	0.890	UVS1H1
125×100	229	41	1.531	UVS1Q1
150×100	295	79	2.348	UVS1F2
150×125	272	36	2.369	UVS1F1
200×150	368	91	3.947	UVS2H1

90° Elbow



20～50A

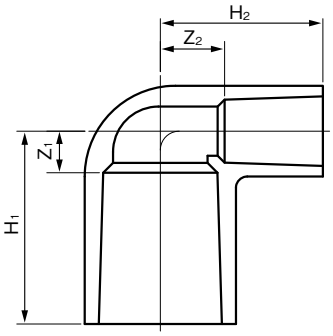


65～200A

Unit：mm

Size	H	Z (Ref.)	Weight (kg/pc)	Item No.
20	50.0	15	0.050	UVL20
25	58.0	18	0.076	UVL25
40	82.0	27	0.201	UVL40
50	96.0	33	0.309	UVL50
65	110.0	49	0.536	UVL65
75	120.0	56	0.803	UVL75
100	155.0	71	1.653	UVL1H
125	187.0	83	2.760	UVL1Q
150	230.0	98	4.584	UVL1F
200	261.5	116	6.600	UVL2H

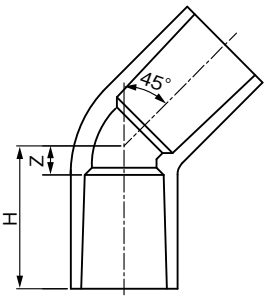
Reducing Elbow



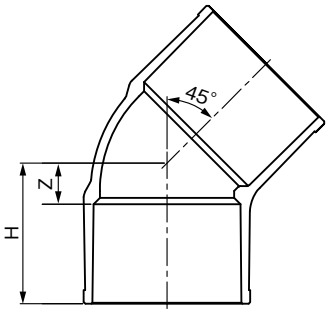
Unit：mm

Size	H_1	Z_1 (Ref.)	H_2	Z_2 (Ref.)	Weight (kg/pc)	Item No.
25×20	55	15	53	18	0.064	UVL251

45° Elbow



20～50A

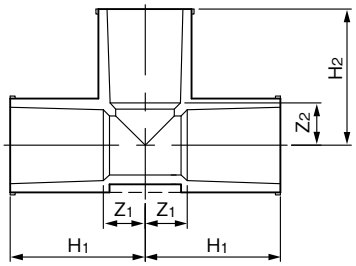


65～200A

Unit：mm

Size	H	Z (Ref.)	Weight (kg/pc)	Item No.
20	44	9	0.039	UV4L20
25	51	11	0.068	UV4L25
40	69	14	0.142	UV4L40
50	81	18	0.245	UV4L50
65	94	33	0.515	UV4L65
75	98	34	0.660	UV4L75
100	123	39	1.262	UV4L1H
125	149	44	1.970	UV4L1Q
150	184	51	3.445	UV4L1F
200	205	60	5.600	UV4L2H

Tee

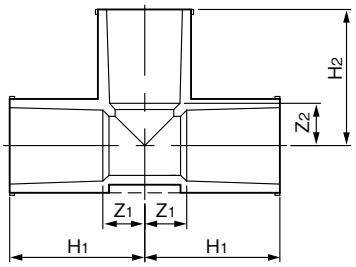


Unit：mm

Size	H_1 ／ H_2	Z_1 ／ Z_2 (Ref.)	Weight (kg/pc)	Item No.
20	50	15	0.070	UVT20
25	58	18	0.119	UVT25
40	82	27	0.276	UVT40
50	96	34	0.443	UVT50
65	110	49	0.769	UVT65
75	120	56	1.158	UVT75
100	152	68	2.254	UVT1H
125	187	83	3.980	UVT1Q
150	230	98	6.365	UVT1F
200	267	122	8.189	UVT2H

Reducing Tee

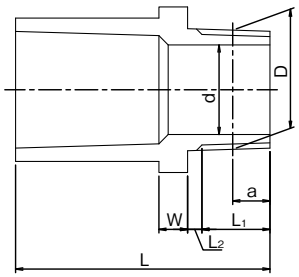
Unit：mm

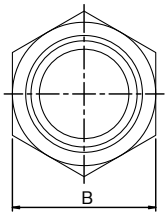


Size	H_1	H_2	Z_1 (Ref.)	Z_2 (Ref.)	Weight (kg/pc)	Item No.
25×20	55	53	15	18	0.091	UVT251
40×20	70	62	17	27	0.182	UVT404
40×25	73	67	18	27	0.208	UVT403
50×20	78	68	15	33	0.280	UVT505
50×25	81	73	18	33	0.283	UVT504
50×40	90	88	27	33	0.345	UVT501
65×50	101	104	40	41	0.616	UVT651
75×25	93	88	29	48	0.670	UVT756
75×40	100	102	36	47	0.816	UVT753
75×50	105	110	41	47	0.907	UVT752
75×65	113	117	49	56	1.012	UVT751
100×50	125	122	41	59	1.486	UVT1H3
100×75	140	132	56	68	1.818	UVT1H1
125×100	173	167	69	83	3.317	UVT1Q1
150×75	195	158	63	94	4.246	UVT1F3
150×100	208	182	76	98	4.954	UVT1F2
150×125	217	201	85	97	5.125	UVT1F1
200×75	201	180	56	116	5.575	UVT2H4
200×100	218	200	73	116	6.500	UVT2H3
200×150	245	257	100	125	8.400	UVT2H1

Male Adapter (Production to order)

Unit:mm

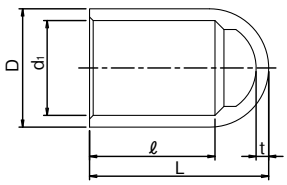




Size	d	Threaded section						L2	W	L	B	Weight (kg/pc)	Item No.
		Nominal	Standard outer dia. D1	Number of screw threads (per 25.4 mm)	Standard dia. position a	Tolerance for a	Effective thread length L1						
20	18	R3/4	26.441	14	9.53	±1.81	17	3.5	8	64	33	0.023	UVVS20
25	23	R1	33.249	11	10.39	±2.31	19	4.0	8	71	40	0.047	UVVS25
40	37	R1·1/2	47.803	11	12.70	±2.31	22	5.0	10	92	57	0.100	UVVS40
50	48	R2	59.614	11	15.88	±2.31	26	5.0	12	106	70	0.168	UVVS50
65	63	R2·1/2	75.184	11	17.50	±6.90	30	6.0	14	119	91	0.272	UVVS65
75	74	R3	87.884	11	20.60	±6.90	34	6.0	16	128	108	0.402	UVVS75
100	96	R4	113.03	11	25.40	±6.90	40	7.0	18	157	135	0.765	UVVS1H

Cap (Production to order)

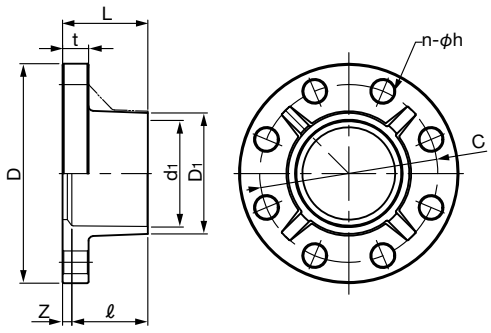
Unit:mm



Size	D	d1	L	ℓ	t	Weight (kg/pc)	Item No.
20	33.0	26.45	50.0	35.0	3.5	0.025	UVC20
25	40.0	32.55	58.5	40.0	4.0	0.039	UVC25
40	57.0	48.70	82.0	55.0	4.5	0.091	UVC40
50	70.0	60.80	96.5	63.0	5.0	0.146	UVC50
75	102.0	89.60	105.0	64.0	8.0	0.442	UVC75
100	130.0	114.70	138.0	84.0	10.0	0.775	UVC1H

Flange

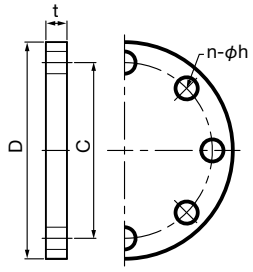
Unit：mm



Size A	Size B	d1	ℓ	D1	L	Z	C	D	t	n-φh	Weight (kg/pc)	Item No.
20	3/4	26.5	35	35	40	5	75	100	14	4-15	0.150	UVF20
25	1	32.6	40	42	45	5	90	125	14	4-19	0.235	UVF25
40	1-1/2	48.7	55	61	61	6	105	140	16	4-19	0.360	UVF40
50	2	60.8	63	73	70	7	120	155	20	4-19	0.520	UVF50
65	2-1/2	76.6	61	88	70	9	140	175	22	4-19	0.710	UVF65
80	3	89.6	64	102	72	8	150	185	22	8-19	0.745	UVF80
100	4	114.7	84	132	90	6	175	210	22	8-19	1.140	UVF1H
125	5	140.9	104	158	114	10	210	250	24	8-23	1.670	UVF1Q
150	6	166.0	132	186	142	10	240	280	26	8-23	2.530	UVF1F
200	8	217.5	155	238	166	11	290	330	28	12-23	3.620	UVF2H

Blind Flange (Production to order)

Unit：mm



Size A	Size B	D	t	C	n-φh	Applicable Bolt		Weight (kg/pc)	Item No.
20	3/4	100	14	75	4-15	M12	50	0.229	UFSB20
25	1	125	14	90	4-19	M16	55	0.310	UFSB25
40	1-1/2	140	16	105	4-19	M16	60	0.335	UFSB40
50	2	155	16	120	4-19	M16	70	0.417	UFSB50
65	2-1/2	175	18	140	4-19	M16	75	0.606	UFSB65
80	3	185	18	150	8-19	M16	75	0.651	UFSB80
100	4	210	18	175	8-19	M16	80	0.856	UFSB1H
125	5	250	20	210	8-23	M20	80	1.345	UFSB1Q
150	6	280	22	240	8-23	M20	85	1.884	UFSB1F
200	8	330	22	290	12-23	M20	90	2.605	UFSB2H

Use Case

ESLON UVS-VP BASIC PHYSICAL PROPERTIES · HEAD LOSS

Basic Physical Properties

Test item		Standards	Units	ESLON UVS-VP	PVC pipe	Notes
Mecha-nical	Tensile strength (yield strength)	JIS K 6815	MPa	48 ~ 52	48 ~ 52	
	Elongation rate		%	100 ~ 200	100 ~ 200	Elongation at break
	Young's modulus	JIS K7113	MPa	2600 ~ 2900	2600 ~ 2900	
	Poisson's ratio		—	0.38	0.38	
	Charpy impact strength	JIS K 7111	kJ/m^2	3 ~ 7	3 ~ 7	
Ther-mal	Specific heat	JIS K 7123	J/（g·K）	0.8 ~ 2.0	0.8 ~ 2.0	
	Thermal conductivity	Temperature gradient method	W/（m·K）	0.128 ~ 0.163	0.128 ~ 0.163	
	Vicat softening temperature	JIS K 7206	℃	79 ~ 83	79 ~ 83	5 kg load
	Linear expansion coefficient	ASTM D 696	℃$^{-1}$	6 ~ 8×10^{-5}	6 ~ 8×10^{-5}	
Electrical	Volume resistivity	ASTM D 257	Ω·cm	0.2 ~ 0.3×10^{15}以上	0.2 ~ 0.3×10^{15}以上	
	Dialectric strength	ASTM D 149	kV/mm	40kV/mm and up	40kV/mm and up	
Weather	Discoloration (ΔE)	Color difference	ΔE	5≧	20≦	Metal weathering test Equivalent of 10 years

Head Loss

ESLON UVS-VP has an inner layer made from PVC plastic, making it resistant to rust and corrosion. The smooth surface makes it difficult for scaling to occur, giving the material a long lifespan. The friction head loss caused by the flow of water is determined by the total number of deformations in the straight pipe, fittings, and valves.

1) Straight pipe head loss

Friction head loss for straight pipe is determined via the Darcy-Weisbach method (1). Using this formula, the friction head loss for VP UVS-VP pipe is Δh Pa/ m(mAq/m).

$$\Delta h = \lambda \cdot (L/d) \cdot (V^2/2g) \cdots\cdots\cdots\cdots (1)$$

λ: Pipe friction coefficient (0.02) L: Pipe length (m) d: Pipe inner diameter (m)
V: Inner pipe flow speed (m/sec) g: Gravitational acceleration (=9.8 m/sec²)

Flow speed for each pipe can be determined using Q (ℓ/min) with

$$Q=60 \cdot 1000 \cdot \pi \cdot (d/2)^2 \cdot V.$$

Table-1 Unit Conversion Table

m^3/min	m^3/sec	ℓ /sec	ℓ /min
1	0.01667	16.67	1000
60	1	1000	60000
0.06	0.001	1	60
0.001	1.667×10^{-5}	0.01667	1

2) Friction head loss from deformations

Head loss for elbow, tee, and valves are determined via formula (2) and table 2.

$$h=f \cdot V^2/2g \cdots\cdots\cdots\cdots (2)$$

h: head loss (m) V: inner pipe flow speed (m/sec) f: head loss coefficient (according to table 2) g: Gravitational acceleration (=9.8 m/sec²)

In general, the pipe's friction head loss of pipes is determined by using the equivalent lengths in table-3 and adding to the length of straight pipe.

Table-2
Head loss coefficient based on shape of fittings

FITTINGS TYPES	Shape		f
Elbow	45°		0.4
	90°		1.0
Tee	If direct flow		0.35
	Split	If turning 90°	1.2
		If the end is divided into both left/right	1.2
Reducer	(Varies depending on diameter)		0.1 ~ 0.5

Table-3 Equivalent pipe length of fittings and valves

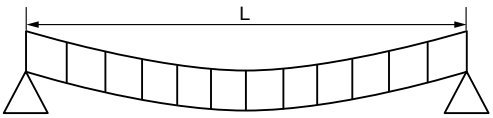
Size (mm)	Equivalent length of fittings(m)※1				Equivalent length of valves (m)※2			
	90° Elbow	45° Elbow	90° Tee (Pipe Junction)	90° Tee (Straight)	Gate valve	Globe valve	Angle valve	Check valve
20	0.88	0.35	1.06	0.31	0.15	6.0	3.6	1.6
25	1.14	0.46	1.37	0.40	0.18	7.5	4.5	2.0
40	1.97	0.79	2.36	0.69	0.30	13.5	6.6	3.1
50	2.61	1.04	3.13	0.91	0.39	16.5	8.4	4.0
65	3.59	1.43	4.30	1.26	0.48	19.5	10.2	4.6
75	4.23	1.69	5.07	1.48	0.63	24.0	12.0	5.7
100	5.70	2.28	6.84	1.99	0.81	37.5	16.5	7.6
125	7.40	2.96	8.88	2.59	0.99	42.0	21.0	10.0
150	8.85	3.54	10.62	3.10	1.20	49.5	24.0	12.0
200	12.33	4.93	14.80	4.32	1.40	70.0	33.0	15.0

*1 Calculated as 1.5m/sec velocity
*2 Citations: Handbook of Air Conditioning Public Health Engineering If foot valve and angle value are the same, and check valve is swing type.

ESLON UVS-VP SUPPORT SPACING · SUPPORT METHOD

Support Interval

Deflection from weight of horizontally placed pipes is calculated using the model in the figure below.



Uniformly distributed load: W

In this instance, deflection amount (δ) is calculated using the formula below.
δ =(5WL⁴)/(384EI)
δ: Deflection (cm) L: Support interval (cm)
W: Unit length/weight (kg/cm) E: Young's modulus (27,500kgf/cm²)
I: Cross section second moment (cm⁴)
= π ((outer diameter of pipe)⁴-(inner diameter of pipe)⁴)/64

Support interval for 3mm and 1mm deflection shown in the following table.

Support Interval for Deflection Across Size

Deflection \ Size	20	25	40	50	65	75	100	125	150	200
1mm	0.8m	0.9m	1.0m	1.2m	1.3m	1.4m	1.5m	1.7m	1.8m	1.9m
3mm	1.1m	1.2m	1.4m	1.5m	1.7m	1.8m	2.1m	2.2m	2.4m	2.5m

<Note> Suspended Support Interval for Horizontal Pipe
Public Building Construction Standards and Specifications, Ministry of Land, Infrastructure and Transport (Machinery and Equipment Work Edition)

Size	15	20	25	32	40	50	65	80	100	125	150	200	250	300
Vinyl or polyethylene pipe	Under 1.0m								Under 2.0m					

Standard Specification for Air-Conditioning and Plumbing Works from The Society of Heating, AirConditioning and Sanitary Engineers of Japan

Size	15	20	25	32	40	50	65	80	100	125	150	200	250	300
PVC pipe	Under 0.8m	Under 1.0m				Under 1.2m	Under 1.5m				Under 2.0m			

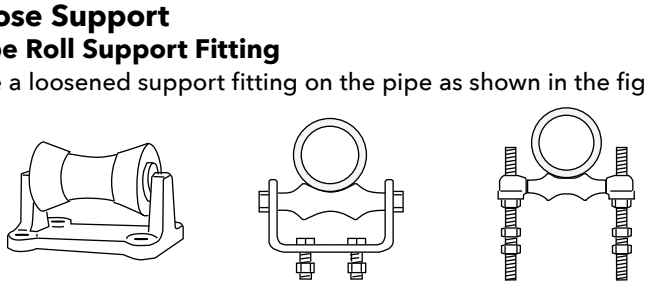
Support Method

There are two support methods: loose support (free-moving) and fixed support. Note that if the support fitting area is tightened too hard, the surface of the pipe may suffer from tensile stress, which may lead to environmental stress cracking (ESC). Due to this, you should be cautious when carrying out each application, clearly distinguishing between the two support methods.

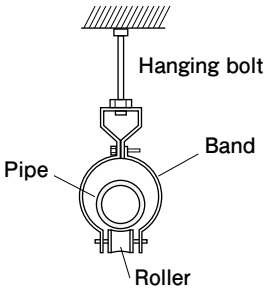
■ Loose Support

(1) Pipe Roll Support Fitting

Use a loosened support fitting on the pipe as shown in the figure below.

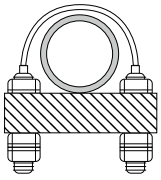


Pipe roll

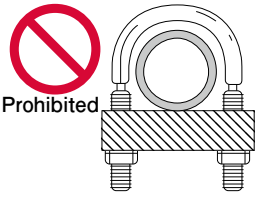


(2) U-band

Be sure to select a u-band that has an inner diameter larger than the pipe's outer diameter. Use two nuts positioned above and below the support jig, and place the u-band in a position suspended slightly above the top of the pipe. Avoid placing pressure onto the support area of the pipe with a single nut. Note that u-bolts should not be used as they concentrate stress.



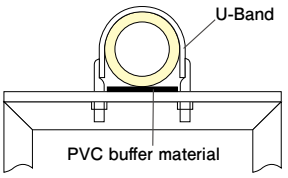
U-band usage example



U-bolt prohibited usage example

■ Fixed Support

For fixed support, use a u-band and a PVC buffer material at the base of the pipe. Be careful not to overtighten the u-band nut in order to avoid flattening the pipe. Do not use a u-bolt, as overtightening will concentrate stress and may break the pipe.



<Note> Fixed support from u-band

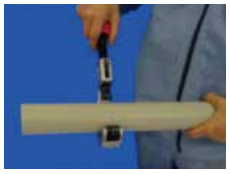
APPLYING ESLON UVS-VP

Installation Method

1 Cutting Pipe

Cut the pipe at a right angle facing the tube axis.

Bond strength is decreased with diagonal or non-complete cuts.

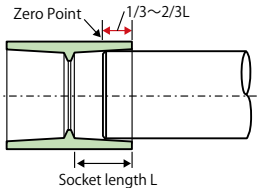


2 Deburring & Bevelling

Lightly chamfer around the cut pipe using a chamfering tool. Create a smooth pipe tip with no burrs or flash.

3 To Determine Zero Point

Lightly insert the pipe into the fitting socket. Check that the pipe stops (zero point) at a position between 1/3 to 2/3 the length (L1) of the socket.



4 Marking Insertion Line

For sizes under 40, mark an insertion line from where the end of the pipe reaches the length of the socket. For sizes over 50, mark an insertion line, adding 1/3 the length of the socket to the zero point (from the tip of the pipe).

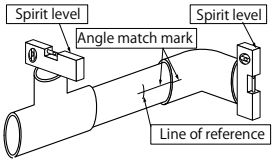
Size	20	25	40	50	65	75	100	125	150	200
L	35	40	55	63	61	64	84	104	132	145
1/3L	—	—	—	21	20	21	28	35	44	48

*For TS Flange 200A, L=155, 1/3L=52

5 Preparation for Inserting

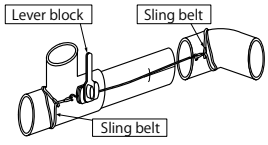
1) Match Angles

Temporarily insert the pipe into the fitting. Use a spirit level to adjust to the target angle. Then mark a line on both the pipe and fitting using an oil-based felt pen. This will serve as your target for insertion.



2) Equip Insertion Fixture (Size 65 and Up)

For sizes 65 and up, coat with solvent cement, then set up an insertion jig to allow for swift insertion.



6 Cleaning Pipe and Fittings

Use a dry shop cloth to cleanly wipe off dirt adhered to the connection area (on the inside of the fitting socket and outside of the pipe).

7 Applying Primer

Apply a coat to the pipe and the connection side of the fitting with ESLON P-810 Primer for UVS-VP.

8 Applying Solvent Cement

Apply a coat to the pipe and the connection side of the fitting with ESLON NO.100S Solvent Cement.

9 Inserting

After applying solvent cement, match the marked lines, quickly insert the pipe to the marking, and hold in place. Hold for the target time shown in the below figure. Do not let the pipe and fitting come apart.

Temperature (season)	Size	
	20 ~ 50	65 ~ 200
Summertime	More Than 30 Seconds	More Than 1 Minute
Wintertime		More Than 2 Minutes

10 Wipe Off Protruding Solvent Cement

Wipe off solvent cement protruding from the connection area with a shop cloth.

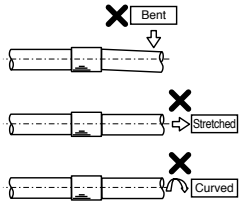
- Get rid of any protruding solvent cement. Leftover organic solvents may lead to cracks and leaks when using the pipe/fitting.

11 Cure

After connecting the pipe, leave in place until the solvent cement dries. Avoid putting any force on the connection area.

Water pressure testing and use may commence once curing is complete.

Standard cure time after connection is over 24 hours at room temperature. Note that cure time increases to over 48 hours during wintertime (low temperatures).



12 Inspection

After connecting the pipes, perform a water pressure check under normal usage conditions. Confirm whether there are any leaks.

- Wait at least 24 hours after final connection before adding additional pressure for water testing.
- When adding pressure, be sure to remove all air from the pipes before increasing the water pressure.
- Dot not add pressure using air. If there are any cracks in the pipe or fitting, the air will expand, causing a violent explosion and possibly resulting in injury.
- Do not use gas leak detection spray, as it may penetrate into the pipe material.