

Notes

- The numerical values indicating the usable range of chemical resistance and liquid pressure and temperature of our company's products listed in this catalog are given as a rough guide to help customers select our products. These values do not guarantee performance, durability, or useful life.
- Please refrain from using our company's products in conditions that deviate from the usable range described in this catalog, as this may place an unexpected load on the product.
- Even in the conditions described in this catalog, it may be necessary to take various countermeasures depending on usage conditions such as thermal expansion/contraction, external pressure, and soil pressure. Please contact our support desk for details.
- If you are thinking about using our company's products in an environment where there is a risk of personal injury or property damage, please make sure to consult with our sales office first.
- The useful life of products depends on a variety of factors. Therefore, please understand that even if you use products within the usable range described in this catalog, the useful life of products may change depending on the balance of multiple use conditions, environment, etc.
- Equipment that uses our company's products must be subject to regular inspections according to conditions of use, in order to prevent damage to the products and accidents caused by or related to the product. Consult with us regarding the period and methods of inspections.
- Please understand that this catalog may be revised without prior notice due to reasons such as product improvement, design changes, or cessation of production. For this reason, please check with us that the catalog is the latest version when selecting a product.

Scope of Warranty

The warranty period for our company's products is one year from the date of delivery. If the product is damaged during the warranty period, we will repair or replace the product at our expense. Repairs and replacements more than one year after delivery will be made at the customer's expense. However, the following cases are not covered by our warranty, and we will not pay compensation for damages caused by damage to the product or accidents caused by or related to the product.

- ① If the use conditions deviate from the usable range of the product described in this catalog.
- ② If our company's products are applied, handled, or installed by inappropriate methods not described in this catalog.
- ③ If the installation method or installation environment of the product is not recognized as normal.
- ④ If the issue is caused by fire, flood, earthquake, lightning, or some other natural disaster.



FUJIKAKO Co.,Ltd

<http://www.fujikako.co.jp>



Head Office Factory	90 Maeda, Fuji-shi, Shizuoka, Japan 〒416-8655	tel.+81-545-61-1370 fax.+81-545-60-6862
Fuji Sales Office	90 Maeda, Fuji-shi, Shizuoka, Japan 〒416-8655	tel.+81-545-87-2773 fax.+81-545-60-5259
Hokuriku Sales Office	90 Maeda, Fuji-shi, Shizuoka, Japan 〒416-8655	tel.+81-545-87-2773 fax.+81-545-60-5259
Hot Spring Equipment Department	90 Maeda, Fuji-shi, Shizuoka, Japan 〒416-8655	tel.+81-545-61-1371 fax.+81-545-60-5259
Yokohama Sales Office	2-1 Suehiro-cho, Tsurumi-ku, Yokohama-shi, Kanagawa, Japan 〒230-8611	tel.+81-6-6398-6031 fax.+81-6-6398-6033
Osaka Sales Office	Shin-Osaka Hankyu Building 5F, 1-1-1 Miyahara, Yodogawa-ku, Osaka-shi, Osaka, Japan 〒532-0003	tel.+81-45-500-6421 fax.+81-45-500-6422

FUJI FW PIPE

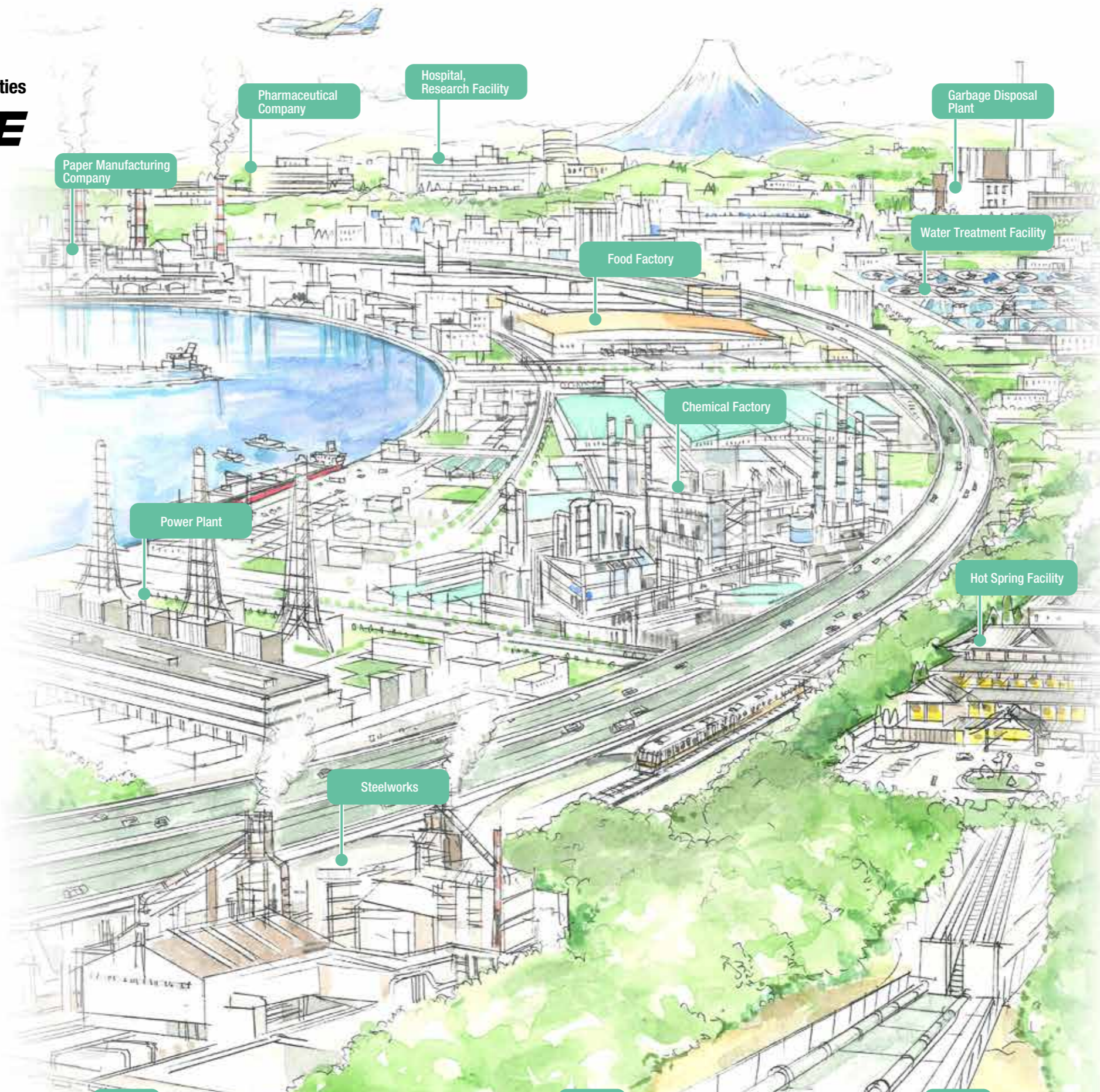
FUJI FW PIPE
PRODUCT CATALOG



Used in various factories and other facilities

FUJI FW PIPE

Example of use on-site



Garbage treatment facility : acid water piping



Thermal power plant : duct piping



Power plant : seawater piping



Waste incineration plant : washing water piping



Water purification plant : chemical liquid piping



Chemical factory : drain pipe (buried)



Chemical factory : chemical liquid piping

FUJI FW PIPE

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FUJI FW PIPE



Fuji FW pipe is a pipe manufactured using the FW (filament winding) molding method that maximizes the strength of the glass fiber, which is a reinforcing material, among the various methods of manufacturing glass fiber reinforced plastics (FRP), **so it features light weight and excellent mechanical strength.** The main body of the pipe is made up of a 2-layer structure consisting of a reinforcing layer and a corrosion-resistant layer, and is resistant to acids, alkalies, salts, and many other corrosive chemicals and gases.



Type of pipe	Max Operating temperature (°C)	Nominal diameter	Max operating pressure (MPa·G)	
			H (thick wall pipe)	L (thin wall pipe)
FW-5100	90	25~600	0.98	0.49
FW-16K (high pressure pipe)	80	25~150	1.57	—

(Note) FW-16K is a made-to-order product. Please contact our sales office for details such as physical properties, standards and installation procedure.

Physical properties

Test item	Test standard	SI unit	Value		
			25A	600A	
Specific gravity	JIS K 7112	—	1.58	1.86	
Tensile strength	JIS K 7013	N/mm ²	Circumferential direction	102.9	195.3
			Axial direction	65.7	71.8
Tensile modulus	JIS K 7013	N/mm ²	Circumferential direction	10,584	16,128
			Axial direction	9,473	13,580
Bending strength	JIS K 7013	N/mm ²	Circumferential direction	114.3	217
			Axial direction	81.7	102.2
Bending elastic modulus	JIS K 7013	N/mm ²	Circumferential direction	7,943	15,200
			Axial direction	8,101	10,976
Axial compressive strength	JIS K 7013	N/mm ²	100	136.9	
Axial compressive modulus	JIS K 7013	N/mm ²	8,052	11,543	
Coefficient of thermal expansion	JIS K 6911	/°C	22.5×10 ⁻⁶	18.8×10 ⁻⁶	
Charpy impact value	JIS K 6911	J/cm ²	14.7		
Water absorption	JIS K 6911	%	0.2		
Specific volume resistance	JIS K 6911	Ω·cm	5×10 ¹³		
Thermal conductivity		W/m·K	0.26		

(Note) 1. All the above values are for FW-5100 H type (thick walled pipe).
 2. The above values are the physical properties including the corrosion-resistant layer, and are different from the values for the reinforcing layer only.
 3. The above values are values at 25°C.
 4. This data shows experimental values and does not guarantee the performance.

Fuji FW Pipe

Features

POINT 1

Light weight and excellent mechanical strength

It boasts outstanding strength compared to other plastic materials, and its light weight makes it easy to handle and transport, enabling labor savings in installation.

	Unit	Fuji FW Pipe	Fuji Pipe 7000	Rigid PVC pipe	High density polyethylene pipe	Stainless steel pipe	Steel pipe
Specific gravity	—	1.58~1.86	1.3~1.45	1.4	0.94~0.96	8.0	7.83
Tensile strength (circumferential)	N/mm ²	102.9~195.3	60.8~65.7	49.0~58.8	19.6~27.4	539.3	424.6
Tensile strength (axial)	N/mm ²	65.7~71.8	—	—	—	—	—
Elongation at break	%	—	0.9~1.1	31	100~500	—	24.7
Bending strength	N/mm ²	81.7~102.2	98.0	—	—	—	—
Charpy impact value	J/cm ²	14.7	3.9~4.9	—	—	—	22.5

(Note) Tensile strength (circumferential) indicates the water pressure in JISK7013.

POINT 2

Excellent corrosion resistance

It is resistant to acids, alkalies, salts, and many other chemicals and gases, and is widely used in places where pressure resistance and chemical resistance are required.

POINT 3

Excellent impact resistance

The Charpy impact value is in the range of 14.7J/cm², which makes it more impact resistant than other plastic materials.

POINT 4

Low thermal expansion

The coefficient of thermal expansion is significantly smaller than that of other plastics, about 1/3 that of PVC pipes and 1/6 that of polyethylene.

	Unit	Fuji FW Pipe	Fuji Pipe 7000	Rigid PVC pipe	High density polyethylene pipe	Stainless steel pipe	Steel pipe
Coefficient of thermal expansion	×10 ⁻⁶ /°C	18.8~22.5	24	60~80	120~130	16.7~17.3	11.7~12.6

POINT 5

No electrolytic corrosion

Glass fiber and polyester resin are used as raw materials, so it has excellent electrical insulation, and electrolytic corrosion will not occur.

POINT 6

Excellent weather resistance

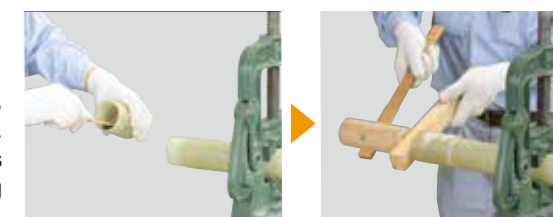
The material does not deteriorate due to ultraviolet light, etc., making it suitable for outdoor use.

POINT 7

Easy to install

The pipe connection method is a taper socket adhesive joint, so there is no need to do a glass tape lamination from above. Since the resin of the same material quality as the pipe is used for the bonding adhesive, it has excellent bonding reliability.

Since various joints are available, quick and reliable construction is possible.



POINT 8

Easy to repair

It can be easily repaired by laminating with glass tape and resin.



Chemical resistance

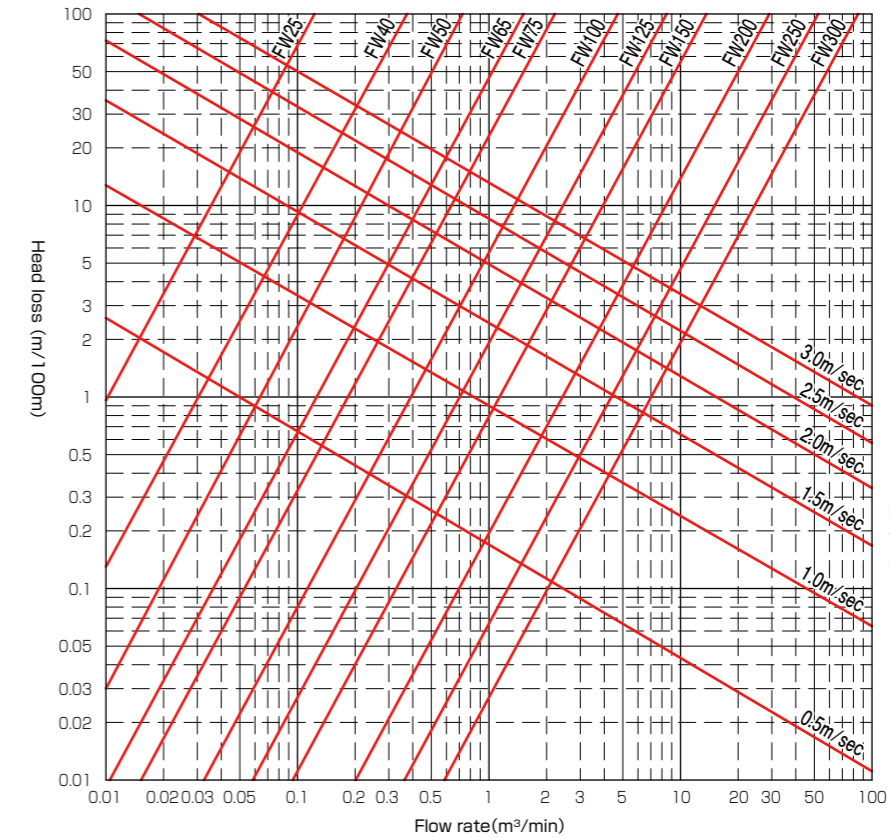
Chemical	Concent ration (%)	Temperature (°C)				
		20	40	60	80	100
Acid						
Sulfuric acid	5	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
	10	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
	30	Hardly affected	Hardly affected	Hardly affected	Partially affected	Unusable
	50	Hardly affected	Hardly affected	Partially affected	Unusable	Unusable
Nitric acid	5	Hardly affected	Hardly affected	Hardly affected	Partially affected	Unusable
	10	Hardly affected	Hardly affected	Partially affected	Unusable	Unusable
	20	Hardly affected	Partially affected	Unusable	Unusable	Unusable
	saturation	Unusable				
Hydrochloric acid	5	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
	10	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
	20	Hardly affected	Hardly affected	Hardly affected	Partially affected	Unusable
	35	Hardly affected	Partially affected	Unusable	Unusable	Unusable
Phosphoric acid	10	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
	30	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
	80	Hardly affected	Hardly affected	Partially affected	Unusable	Unusable
Acetic acid	25	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
	50	Hardly affected	Hardly affected	Hardly affected	Partially affected	Unusable
Chromic acid	10	Hardly affected	Hardly affected	Partially affected	Unusable	Unusable
Oxalic acid	100	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Formic acid	10	Hardly affected	Hardly affected	Partially affected	Unusable	Unusable
Tartaric acid	100	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Alkali						
Sodium hydroxide (caustic soda)	10	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
	20	Hardly affected	Hardly affected	Hardly affected	Partially affected	Unusable
	50	Unusable				
Ammonia water	10	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
	25	Hardly affected	Hardly affected	Partially affected	Unusable	Unusable
	30	Hardly affected	Partially affected	Unusable	Unusable	Unusable
Calcium hydroxide	100	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Gas						
Chlorine (dry / wet)	100	Hardly affected	Hardly affected	Hardly affected	Partially affected	Unusable
Bromine (dry / wet)	100	Hardly affected	Hardly affected	Partially affected	Unusable	Unusable
Hydrogen sulfide (dry / wet)	100	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Sulfur dioxide (dry / wet)	100	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected

■ Hardly affected (recommended range of use)
 ■ Partially affected (can be used conditionally)

Chemical	Concent ration (%)	Temperature (°C)				
		20	40	60	80	100
Organic chemical						
Formalin	37	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Methyl Alcohol	50	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
	100	Unusable				
Ethyl Alcohol	50	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
	100	Unusable				
Glycerine	100	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Ethylene Glycol	100	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Gasoline		Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Benzene	100	Unusable				
Toluene	100	Unusable				
Chloroform	100	Unusable				
Other						
Salt water	saturation	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Sea water	—	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Ammonium sulfate	100	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Ammonium chloride	100	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Aluminum sulfate	100	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Copper sulfate	100	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Calcium chloride	100	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Ferrous chloride	100	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Sodium carbonate	35	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Ammonium carbonate	50	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
	100	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Ammonium nitrate	100	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Silver nitrate	100	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Sodium nitrate	100	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Sodium sulfite	100	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Potassium dichromate	100	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Potassium permanganate	10	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Hydrogen peroxide solution	30	Hardly affected	Hardly affected	Hardly affected	Hardly affected	Hardly affected
Sodium hypochlorite		Please contact us since the values vary depending on the concentration, humidity, PH, flowing state, etc.				

(Note) The chemical resistance in this table is based on the result of an immersion test using a test piece under no-pressure conditions, as well as our delivery record. It is displayed as a guideline for use. If you have any questions, please contact our sales office.

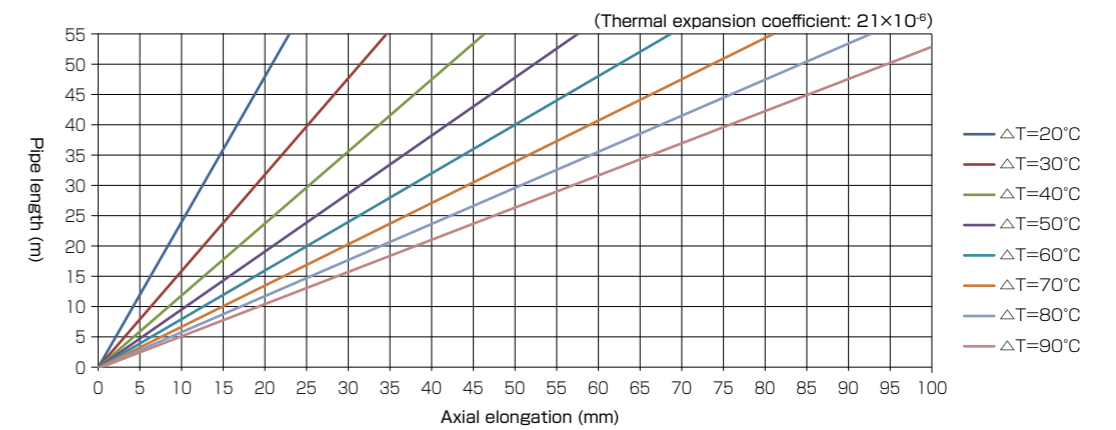
Head loss



Hazen & Williams formula
 $V = 0.84935 \cdot C \cdot R^{0.63} \cdot I^{0.54}$
 $Q = A \cdot V$
 V : Average velocity (m/sec)
 C : Velocity coefficient
 R : Hydraulic mean depth = D/4
 D : Inner diameter (m)
 I : Hydraulic gradient = h/L
 h : Friction head loss for Pipe length L (m)

When C=120

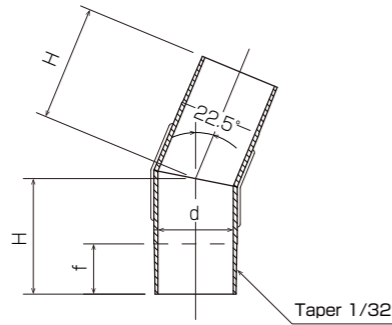
Amount of elongation



Please consider installing expansion joints separately based on the amount of elongation by temperature as a guide. For the expansion joints, consider the usage conditions and use commercially available products such as those made of Teflon or EPT rubber.

STANDARD

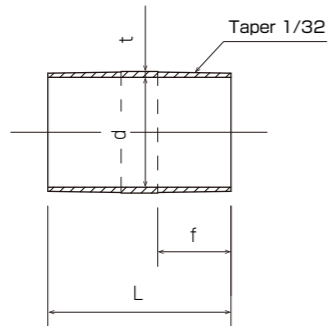
22.5° elbow (miter)



(mm)

Nominal diameter	d	H		f		Reference weight (kg)		Product code	
		(H)	(L)	(H)	(L)	(H)	(L)	(H)	(L)
25	25	59	-	30	-	0.07	-	5433620	-
40	38	71	-	35	-	0.12	-	5433638	-
50	50	83	-	35	-	0.2	-	5433646	-
65	65	90	-	40	-	0.35	-	5433654	-
75	75	113	-	50	-	0.59	-	5433662	-
100	100	147	-	50	-	0.92	-	5433670	-
125	125	157	157	60	60	1.5	1.1	5433688	5433795
150	150	194	194	70	60	2.1	1.6	5433696	5433802
200	200	259	259	95	70	5	2.7	5433703	5433810
250	250	323	323	120	70	8.7	4.2	5433711	5433828
300	300	360	325	145	90	13.5	6.3	5433729	5433836
350	350	415	330	170	100	19.1	8.9	5433737	5433844
400	400	470	380	195	115	28.5	13.7	5433745	5433852
450	450	535	410	220	120	39.1	16.7	5433753	5433860
500	500	600	500	245	150	49.7	21.9	5433761	5433878
600	600	705	630	295	150	82	43	5433779	5433886

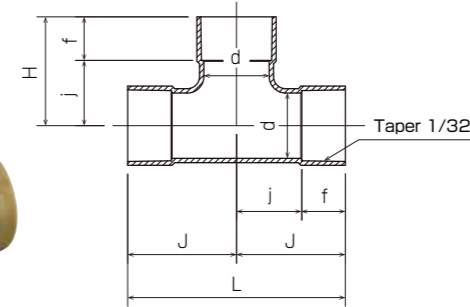
Nipple (NPL)



(mm)

Nominal diameter	d	t		L		f		Reference weight (kg)		Product code	
		(H)	(L)	(H)	(L)	(H)	(L)	(H)	(L)	(H)	(L)
25	25	3	-	85	-	30	-	0.03	-	5433068	-
40	38	3	-	95	-	35	-	0.05	-	5433076	-
50	50	3	-	95	-	35	-	0.07	-	5433084	-
65	65	3	-	105	-	40	-	0.1	-	5433092	-
75	75	4	-	125	-	50	-	0.18	-	5433109	-
100	100	4	-	125	-	50	-	0.23	-	5433117	-
125	125	5	4	145	145	60	60	0.42	0.33	5433125	5433232
150	150	5	4	185	145	70	60	0.64	0.39	5433133	5433240
200	200	6.5	4	235	185	95	70	1.5	0.66	5433141	5433258
250	250	7.5	4	275	185	120	70	2.4	0.82	5433159	5433266
300	300	9	5.5	335	225	145	90	4.3	1.8	5433167	5433274
350	350	9.5	6	385	245	170	100	6	2.4	5433175	5433282
400	400	11	7	435	275	195	115	9	3.6	5433183	5433290
450	450	12	7	485	285	220	120	12.4	4.1	5433191	5433307
500	500	12	7	535	345	245	150	14.8	5.3	5433208	5433315
600	600	14	9	635	345	295	150	24.6	8.8	5433216	5433323

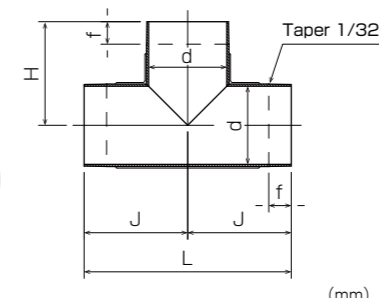
Tee (T)



(mm)

Nominal diameter	d	L		J		H		j	f		Reference weight (kg)		Product code	
		(H)	(L)	(H)	(L)	(H)	(L)		(H)	(L)	(H)	(L)	(H)	(L)
25	25	150	-	75	-	75	-	45	30	-	0.26	-	5433901	-
40	38	180	-	90	-	90	-	55	35	-	0.45	-	5433919	-
50	50	200	-	100	-	100	-	65	35	-	0.65	-	5433927	-
65	65	210	-	105	-	105	-	65	40	-	0.8	-	5433935	-
75	75	250	-	125	-	125	-	75	50	-	1.1	-	5433943	-
100	100	300	-	150	-	150	-	100	50	-	1.7	-	5433951	-
125	125	370	370	185	185	185	185	125	60	60	2.8	2.1	5433969	5434074
150	150	440	420	220	210	220	210	150	70	60	4.3	3	5433977	5434082
200	200	550	500	275	250	275	250	180	95	70	8.8	5.9	5433985	5434090
250	250	690	590	345	295	345	295	225	120	70	16.5	10.5	5433993	5434107
300	300	830	720	415	360	415	360	270	145	90	26.4	15.6	5434008	5434115

Nominal diameter ≥ 350



(mm)

Nominal diameter	d	L	J	H	f	Reference weight (kg)	Product code
350	350	950	475	475	100	25.1	5434123
400	400	1060	530	530	115	36.8	5434131
450	450	1130	565	565	120	51.7	5434149
500	500	1300	650	650	150	63.5	5434157
600	600	1400	700	700	150	117.8	5434165

This document provides an overview of the installation process. Refer to the installation manual for details.

Adhesive bonding material

Adhesive

Set included items: Resin
Accelerator
Filler (thixotropic agent)
Catalyst (curing agent)



FBA-02	
1kg set	
5kg set	
15kg set	

(Note) The resin, accelerator, filler, and catalyst can also be ordered separately.

Glass tape



Width (W) × Length (m)	Product Code
75W×150m	0157414
100W×150m	0157422

Roving cloth



Width (W) × Length (m)	Product Code
100W×50m	159314
150W×50m	159315
200W×50m	159316
250W×50m	159313
300W×50m	159317
350W×50m	159310
400W×50m	159318
500W×50m	159319
600W×50m	159320

Glass mat



Width (W) × Length (m)	Product Code
100W×79m	159265
150W×79m	159267
200W×79m	159269
250W×79m	159271
300W×79m	159273

Tapering tools

Taper cutting machine

Manual taper cutting machine



Model	Nominal diameter used	Radius of gyration (mm)	*Weight (kg)	Product Code
25~50A	25-40-50	200	10	9210100
50~100A	50-65-75-100	260	18	
100~150A	100-125-150	320	37	
150~200A	150-200	440	60	
200~250A	200-250	520	65	

(Note) 25 - 50A and 50 - 100A are available for sale. Please contact us if you would like to purchase it.

Electric taper cutting machine



Model	Nominal diameter used	Dimensions (cm)	*Weight (kg)	Voltage used (V)	Product Code
50~125A	50-65-75-100-125	85×85×75	150	100	9210150
100~200A	100-125-150-200	90×90×85	190	100	
200~350A	200-250-300-350	100×100×120	280	200	
400~600A	400-450-500-600	2/1.1 ①110×110×150 ②95×95×110	900	200	

(Note) 1. This is the total weight of the main unit and accessories.
2. Please prepare a forklift for unloading at the time of delivery.
3. It is available for sale. Please contact us if you would like to purchase it.

Driving jig (for sale)

45°Elbow driving jig



Nominal diameter	Product code
25	1271451
40	1271453
50	1271455
65	1271457
75	1271459
100	1271461
125	1271463
150	1271465
200	1271467
250	1271469

90°Elbow driving jig



Nominal diameter	Product code
25	1271451
40	1271453
50	1271455
65	1271457
75	1271459
100	1271461
125	1271463
150	1271465
200	1271467
250	1271469

On-site installation tools (example)

① **Cutting tools**

- High speed cutting machine
- Hacksaw
- Grinder

② **Tapering tools**

- Manual taper cutting machine (25A - 250A) *Lease available
- Electric taper cutting machine (50A - 600A) *Lease available

③ **Surface grinding tools**

- File
- Sandpaper (#40 - 50)

④ **Driving tools**

- Wooden hammer (rubber hammer, plastic hammer)
- Lever block or chain block (≥150A)
- Driving jig
- Nylon sling

⑤ **Adhesive tools**

- Adhesive mixing container
- Brush for applying adhesive
- Waste cloth (cotton cloth)
- Solvent (acetone or denatured alcohol)
- Thermometer (100°C)
- Heating tools (hand heater, dryer, etc.)
- Measuring cup

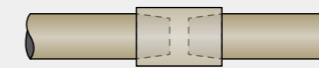
Etc.

Type of joining method

Taper adhesive joint

P17

Main materials: socket + resin
Specifications: 1/32 taper connection



① Preparation

② Cutting

③-1 Tapering

③-2 Beveling

④ Adhesive preparation

⑤ Adhesive application

⑥ Insertion

⑦ Driving

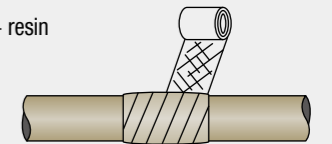
⑧ Finishing

Butt & strap joint

P19

Main materials: glass substrate + resin

- glass mat,
- roving cloth,
- glass tape



Specifications: FRP lamination
*For repair and line adjustment

① Preparation

② Sanding and beveling

③ Resin putty preparation

④ Resin putty application

⑤ Adhesive preparation

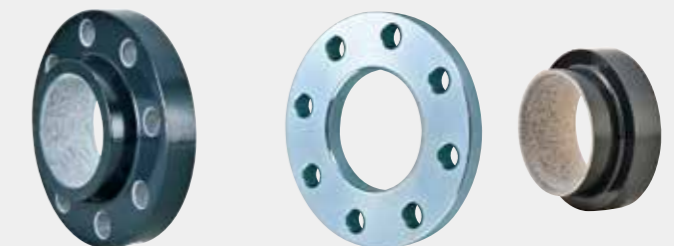
⑥ Glass substrate lamination

⑦ Finishing

Flange joint

P20

Main materials: Socket flange or core ring/steel flange
Specifications: Bolt and nut tightening



INSTALLATION PROCEDURE

Taper adhesive joint

Check the QR code for the video of the installation procedure.



Joining procedure

① Prepare jigs and tools necessary for joining.



② Cut the pipe to the required length using a hacksaw, high-speed cutting machine or grinder.

③ Do tapering using a lathe or taper cutting machine.

For how to use the taper cutting machine, please refer to the installation manual and instruction manual.

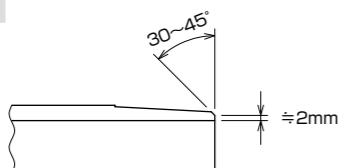


Standard driving allowance

H pipe (thick wall pipe)				L pipe (thin wall pipe)			
Nominal diameter	Taper length (mm)	Standard driving allowance (mm)		Nominal diameter	Taper length (mm)	Standard driving allowance (mm)	
		Socket	Socket flange			Socket	Socket flange
25	30	7 ±2	7 +2 -0	125	60	12 +3 -2	8 ±2
40	35	7 ±2	7 +2 -0	150	60	15 +3 -2	9 ±2
50	35	8 ±2	8 ±2	200	70	17 +3 -2	9 ±2
65	40	10 ±2	8 ±2	250	70	18 +4 -2	12 ±2
75	50	10 +3 -2	8 ±2	300	90	22 ±4	15 ±5
100	50	12 +3 -2	9 ±2	350	100	22 ±4	-
125	60	12 +3 -2	9 ±2	400	115	22 ±4	-
150	70	15 +3 -2	12 ±2	450	120	22 ±4	-
200	95	17 +3 -2	12 ±2	500	150	22 ±4	-
250	120	18 +4 -2	13 ±2	600	150	22 ±4	-
300	145	22 ±4	15 ±5				
350	170	22 ±4	15 ±5				
400	195	22 ±4	15 ±5				
450	220	22 ±4	15 ±5				
500	245	22 ±4	15 ±5				
600	295	22 ±4	15 ±5				

(Note) If the driving allowance is wide (the taper is tight), do processing again. If the driving allowance becomes narrow (taper is loose), do not use that taper. Do taper processing again.

④ Use a lathe or sander to bevel the cut surface of the reinforcing layer.



⑤ Weigh the required amount of resin and put it into the container for adhesive preparation.

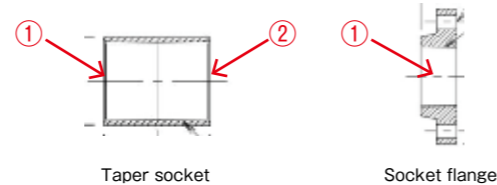


Approximate amount of adhesive used

H pipe (thick wall pipe)			L pipe (thin pipe)		
Nominal diameter	Number of joints per kg of adhesive	Amount of resin used per joint (g)	Nominal diameter	Number of joints per kg of adhesive	Amount of resin used per joint (g)
25	200	5	125	40	25
40	180	6	150	35	29
50	150	7	200	25	40
65	110	9	250	18	56
75	70	14	300	10	100
100	60	17	350	8	125
125	40	25	400	6	167
150	30	33	450	5	200
200	20	50	500	4	250
250	10	100	600	3	333
300	6	167			
350	4	250			
400	4	250			
450	3	333			
500	2	500			
600	2	500			

(Note) 1. The number of joints and the amount of resin used will vary slightly depending on the skill level of the installer and other conditions, but please do not do construction beyond the number of joints shown in this table.

2. Taper sockets : count joints as two Socket flange and core ring; count joints as 1



Add the accelerator to adhesive resin and stir well.



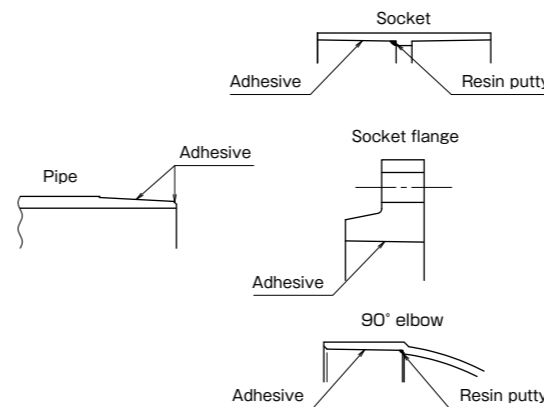
Add the filler to prevent the adhesive from flowing, and mix while checking the viscosity.



Add the catalyst (curing agent) immediately before use and mix thoroughly.



⑥ Apply the prepared adhesive to the tapered part of the socket, the tapered part of the pipe and the end.



(Note) 1. If there is water, oil, or dirt on the tapered part, please clean it with acetone (or denatured alcohol) before applying the adhesive.
2. In addition to adhesive, apply resin putty to the locations shown in the above figure to protect the beveled portion. (See page 19 for how to mix resin putty)

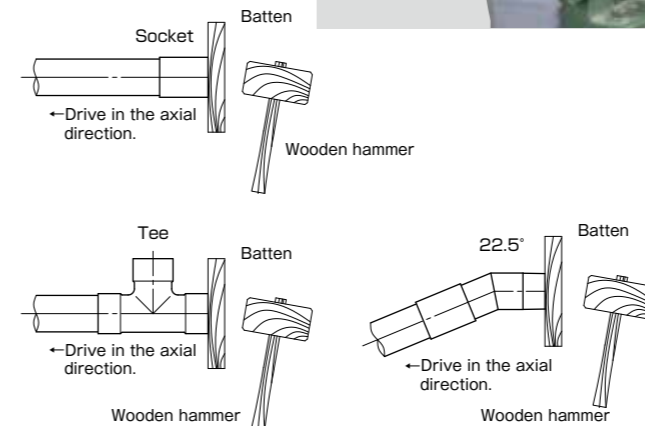
⑦ Insert the socket into the pipe while rotating it.



⑧ Driving

• Taper socket, core ring, tee, 22.5° elbow

Apply a batten to the end of the pipe and drive it along the pipe axial direction using a wooden hammer or the like.



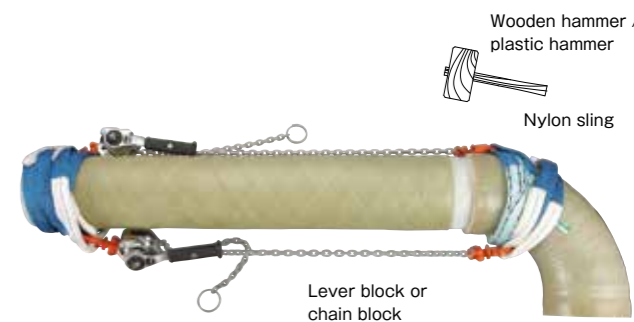
• 90°, 45° smooth elbow

Use a driving jig (our product) instead of a batten, and then drive it in with a wooden hammer or the like.



• Large diameter (≥150A)

Wrap a nylon sling around the body and drive it in using a lever block (chain block) and together with a wooden hammer or the like.



⑨ Finishing

- After driving, check that the adhesive protrudes around the entire circumference of the joint edge. If the adhesive does not protrude at all, please try again. Use a spatula or the like to remove the protruding adhesive.
- Before the adhesive cures, make sure there are no holes in any tapers you have hammered. Parts that have already been driven in may also have holes due to the impact of driving other parts.
- Avoid rough handling until the adhesive has cured, and be careful not to cause the adhesive surface to shift or peel off.
- If any protrusions remain on the gasket surface, use sandpaper to smooth them out.

INSTALLATION PROCEDURE

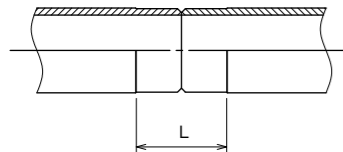
Butt & strap joint

Joining procedure

① Prepare jigs and tools necessary for joining.

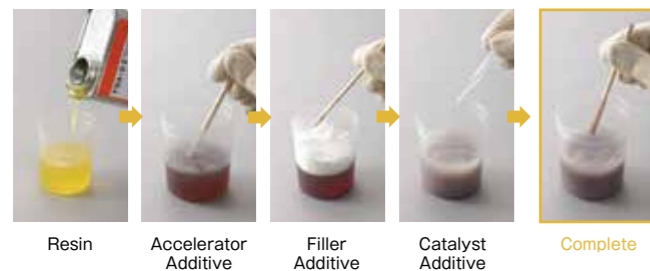


② Sand the end surface of the pipe enough that the luster of the pipe is lost. After sanding, bevel the pipe ends. After that, clean the sanded part with acetone (or denatured alcohol) so that there is no moisture, oil or dirt.

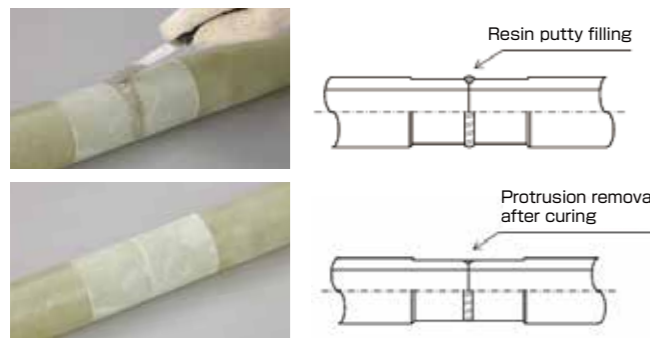


(Note) L: Layer width (see Table of Procedure ⑥) + 50 mm

③ Mix the resin putty for temporary attachment. After adding the accelerator to the resin and stirring it well, mix in the filler to adjust the hardness of the putty. Add the catalyst (curing agent) immediately before temporary attachment and stir again.



④ Align and fix the joining surfaces of both pipes to be butted together, and then evenly fill the entire circumference of the beveled portion with resin putty. After curing the resin putty, remove the protrusions of the resin putty with a sander or the like.



⑤ Prepare the adhesive used for laminating the glass substrate. Weigh out the required amount of resin into the adhesive mixing container, add the accelerator and mix thoroughly.

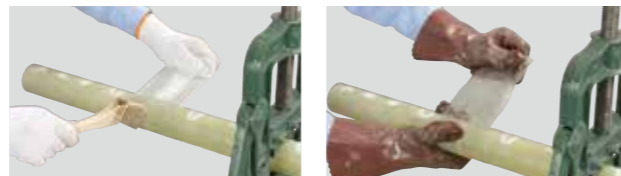


Add the catalyst (curing agent) immediately before laminating the glass substrate and stir thoroughly.



(Note) Do not mix accelerator and catalyst at the same time.

⑥ Apply adhesive to the sanded surface and laminate the prepared glass tape while impregnating it with adhesive.



(Note) If there is moisture, oil, or dirt on the sanded area, clean it with acetone (or denatured alcohol) before applying the adhesive.

Glass substrate number of laminations (H pipe)

Nominal diameter	Lamination width (mm)	GM (ply)	RC (ply)	GT (ply)	Winding length						Adhesive Weight (g)
					Width (W)	Length (m)	Width (W)	Length (m)	Width (W)	Length (m)	
25	75	-	-	10	-	-	-	-	75	1.1	10
40	100	-	-	15	-	-	-	-	100	2.4	30
50	100	-	-	20	-	-	-	-	100	4.1	50
65	100	-	-	25	-	-	-	-	100	6.4	80
75	100	-	-	28	-	-	-	-	100	8.2	100
100	150	2	3	4	100	0.8	150	1.2	100	2.3	200
125	150	2	4	4	100	1	150	1.9	100	2.9	280
150	150	2	6	4	100	1.1	150	3.4	100	3.3	410
200	200	2	8	4	100	1.5	200	5.8	100	5.4	810
250	250	2	10	4	100	1.8	250	9	100	7.8	1,440
300	300	2	12	4	150	2.2	300	13	100	12.9	2,490
350	350	2	14	4	150	2.6	350	17.6	100	16.6	3,780
400	400	2	17	6	150	2.9	400	24.4	100	36.1	5,940
450	450	2	19	6	200	3.2	450	30.2	100	46.7	8,250
500	500	2	21	6	200	3.6	500	37	100	56.4	11,000
600	600	2	26	8	300	4.3	600	55	100	118	19,840

Glass substrate number of laminations (L pipe)

Nominal diameter	Lamination width (mm)	GM (ply)	RC (ply)	GT (ply)	Winding length						Adhesive Weight (g)
					Width (W)	Length (m)	Width (W)	Length (m)	Width (W)	Length (m)	
125	150	2	3	4	100	0.9	150	1.4	100	2.7	230
150	150	2	3	4	100	1.1	150	1.7	100	3.3	280
200	150	2	4	4	100	1.4	150	2.8	100	4.2	400
250	150	2	5	4	100	1.8	150	4.3	100	5.2	570
300	200	2	7	4	100	2.1	200	7.3	100	7.6	1,050
350	200	2	8	4	100	2.5	200	9.6	100	8.9	1,340
400	300	2	8	4	150	2.8	300	11	100	16.4	2,310
450	300	2	9	4	150	3.1	300	13.9	100	18.3	2,820
500	350	2	10	4	150	3.4	350	17	100	22.6	3,840
600	350	2	13	4	150	4.1	350	26.4	100	27	5,720

(Note) 1. GM...Glass mat RC...Roving cloth GT...Glass tape
2. Add the appropriate amount of accelerator and catalyst for the required resin.
3. For the order of lamination of the glass substrate, please refer to the installation manual.

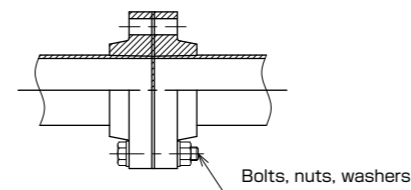
⑦ If you want to improve the weather resistance, apply top coat resin after curing the resin. Check the construction manual for the top coat resin materials and compounding methods. Perform the second lamination after confirming that the resin in the first lamination has been cured.

Flange joint

Type	Socket flange	Core ring + Iron flange
Exterior		
Nominal diameter	25~300A	25~600A
Features	·Non-corrosive ·Light weight	Easily adjusted with the adjoining part to the mating flange
Mating flange	Flat face flange	·Raised face flange ·Flat face flange

Socket flange

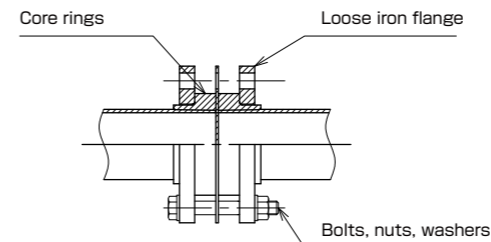
The structure has a Socket flange made of the same material as the pipe and is tightened with bolts and nuts. As with taper joints, after filling the pipe end and the inside of the Socket flange with adhesive, tap with a batten before driving.



(Note) 1. On joints, use a rubber gasket with a JIS hardness of 55 to 70 and a thickness of 3 to 6 mm to ensure good sealing performance. We also recommend using a gasket with a seal ring that can ensure stable sealing performance with a small tightening pressure.
2. Bolt tightening torque should be 2.5 kgf-m or less for 25 - 100A and 4.0 kgf-m or less for 125 - 300A.
3. Always use washers when tightening bolts.
4. Be careful not to tighten unevenly.

Core ring + Iron flange

Tighten with bolts and nuts using core rings and iron flanges. Like the socketed flange joint, it can be removed.



(Note) 1. On joints, use a rubber gasket with a JIS hardness of 55 to 70 and a thickness of 3 to 6 mm to ensure good sealing performance.
2. Be careful not to tighten unevenly.
3. Be careful not to overtighten. The bolt tightening torque varies depending on the design conditions, but usually 98 N-m (10 kg-m) is sufficient. Detailed values are calculated upon request. Please contact us for details.

Curing of adhesive

Resin curing

Adhesives vary in time to harden depending on the temperature and their compounding ratio. The hardening process is roughly divided into the following two stages.

1st stage (gelation) → 2nd stage (secondary curing)

The second stage (secondary curing) is completed, and the performance as an adhesive is exhibited for the first time.

First stage

— Compounding ratio of adhesive and gelation time (usable time) — (per 100g of resin)

温度 (°C)	FBA-02		
	促進剤 (g)	触媒 (g)	ゲル化時間 (分)
10	1.0	3.0	60
	1.0	2.0	90
15	1.0	2.5	30
	1.0	1.5	80
20	1.0	2.0	30
	1.0	1.5	50
25	0.5	1.5	80
	1.0	1.5	30
30	0.5	1.2	80
	0.5	1.5	30
35	0.3	1.2	70
	0.3	1.5	30
40	0.3	1.2	50
	0.1	1.2	90

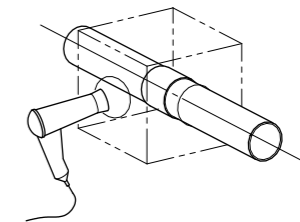
(Note) Applicable adhesive FBA-02: for Fuji Pipe 7000, Fuji FW Pipe

2nd stage: Estimated time to complete secondary curing

Air temperature (°C)	Necessary Time	
	Gelation time 40 minutes or less	Gelation time 40 minutes or more Gelation time 100 minutes or less
10	40 hours ~	60 hours ~
20	6 hours ~	24 hours ~
30	4 hours ~	24 hours ~

Heating temperature (°C)	Necessary Time	
	Necessary Time	
60	60 minutes	
80	30 minutes	

(Note) 1. How to confirm completion of secondary curing: The surface of the adhesive must not be sticky even when it is wiped with acetone.
2. Heating tools: dryers, floodlights, etc.



INSTALLATION PROCEDURE

Pipe support

Pipe support interval

Nominal diameter	type	Liquid piping								Gas piping			
		Liquid specific gravity = 1.0				Liquid specific gravity = 1.2				(Pipe weight only)			
		25°C	50°C	80°C	100°C	25°C	50°C	80°C	100°C	25°C	50°C	80°C	100°C
25	H	2.0	1.8	1.4	1.0	2.0	1.8	1.4	1.0	2.5	2.2	1.8	1.3
40	H	2.3	2.1	1.6	1.2	2.2	2.0	1.6	1.1	3.0	2.7	2.1	1.6
50	H	2.5	2.3	1.8	1.3	2.4	2.2	1.7	1.2	3.4	3.1	2.4	1.8
65	H	2.7	2.4	1.9	1.4	2.6	2.3	1.8	1.3	3.9	3.5	2.8	2.0
75	H	3.0	2.8	2.2	1.6	2.9	2.7	2.1	1.5	4.2	3.8	3.0	2.2
100	H	3.3	3.0	2.4	1.7	3.2	2.9	2.3	1.7	4.8	4.4	3.5	2.5
125	H	3.7	3.4	2.7	2.0	3.6	3.3	2.6	1.9	5.4	5.0	3.9	2.9
	L	3.5	3.2	2.5	1.8	3.4	3.1	2.4	1.8	5.4	4.9	3.9	2.8
150	H	3.9	3.6	2.8	2.1	3.8	3.4	2.7	2.0	5.9	5.4	4.3	3.1
	L	3.7	3.4	2.6	1.9	3.5	3.2	2.5	1.8	5.9	5.4	4.2	3.1
200	H	4.6	4.2	3.3	2.4	4.4	4.0	3.2	2.3	6.9	6.3	5.0	3.6
	L	4.0	3.6	2.9	2.1	3.8	3.5	2.7	2.0	6.8	6.2	4.9	3.6
250	H	5.0	4.6	3.6	2.6	4.8	4.4	3.5	2.5	7.7	7.1	5.6	4.1
	L	4.2	3.8	3.0	2.2	4.0	3.7	2.9	2.1	7.6	6.9	5.5	4.0
300	H	5.6	5.1	4.0	2.9	5.3	4.9	3.9	2.8	8.5	7.8	6.1	4.5
	L	4.9	4.4	3.5	2.6	4.7	4.3	3.4	2.5	8.4	7.7	6.1	4.4
350	H	5.9	5.4	4.2	3.1	5.7	5.2	4.1	3.0	9.2	8.4	6.6	4.8
	L	5.2	4.7	3.7	2.7	5.0	4.6	3.6	2.6	9.1	8.3	6.6	4.8
400	H	6.3	5.8	4.6	3.3	6.1	5.6	4.4	3.2	9.8	9.0	7.1	5.2
	L	5.6	5.1	4.1	3.0	5.4	4.9	3.9	2.8	9.7	8.9	7.0	5.1
450	H	6.7	6.1	4.8	3.5	6.4	5.9	4.6	3.4	10.4	9.5	7.5	5.5
	L	5.8	5.3	4.2	3.1	5.6	5.1	4.0	2.9	10.3	9.4	7.4	5.4
500	H	6.9	6.3	5.0	3.6	6.6	6.0	4.8	3.5	11.0	10.0	7.9	5.8
	L	6.0	5.4	4.3	3.1	5.7	5.2	4.1	3.0	10.9	9.9	7.8	5.7
600	H	7.5	6.9	5.4	4.0	7.2	6.6	5.2	3.8	12.1	11.0	8.7	6.4
	L	6.7	6.1	4.8	3.5	6.4	5.9	4.6	3.4	12.0	10.9	8.6	6.3

(Note) 1. Support the pipes at intervals equal to or less than the above values.
 2. The value is set so that the amount of deflection is 10 mm or less under the conditions of simple support at both ends and uniform load distribution.
 3. Continuous beam piping can be supported at intervals 1.2 times the above value.
 4. If there is vibration, please support slightly shorter than the above value.

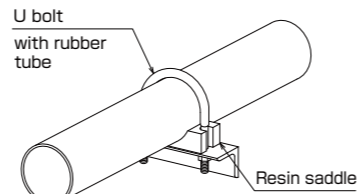
Support method

It is necessary to support or fasten the pipe as a countermeasure against vibration and thermal stress. As a support method, provide a saddle support of at least 120° at the bottom of the pipe, and use a cushioning material such as a rubber sheet so as not to damage the pipe.

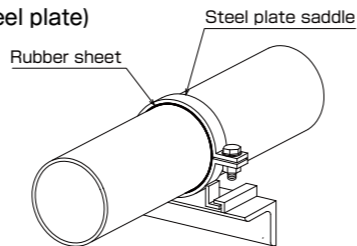
Pipe Support Saddle

Sliding Support Saddle

FUF (≤250A made of resin)

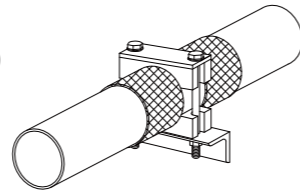


FBF (≥300A made of steel plate)

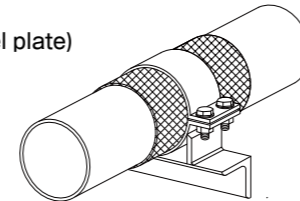


Fixed Support Saddle

FUA (≤75A made of resin)

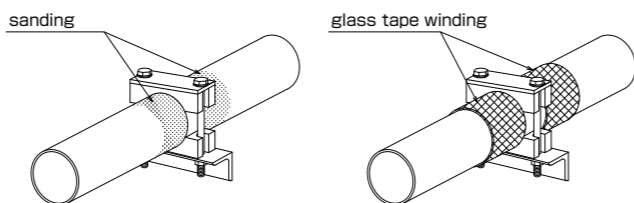


FBA (≥100A made of steel plate)



When using a fixed support saddle

- Tighten firmly with saddles from the top and bottom of the pipe.
- In order to create a flange-like protrusion that adheres to both ends of the support, sand the ends without leaving any residue, then laminate the glass tape after referring to the description on page 19.



(Note) For details of various pipe support saddles, please refer to the attached "Pipe Support Saddle (Fastening) Catalog".

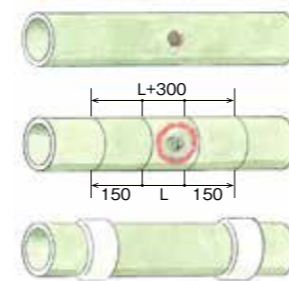
Repair method

① Surface treatment of the repaired part

- If there is water or oil on the part to be repaired, remove it with a waste cloth.
- If you use water-soluble chemicals, be sure to wash with water and then dry.
- Be sure to sand the part to be laminated.

② Damage status and repair method

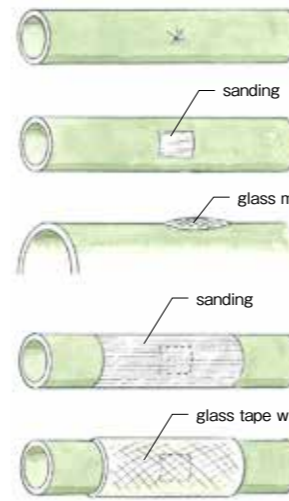
If there is a hole in the pipe



Mark the damaged area with red ink or red marker and wipe the surface once. (The damaged part will be marked and a trace will remain.)

Circle the damaged area, cut the length of L + 300 mm shown in the figure, and join a new pipe with glass tape on both ends (see page 19).

If there is a crack or peeling (damage to the surface)



Mark the damaged area with red ink or red marker and wipe the surface once. (The damaged part will be marked and a trace will remain.)

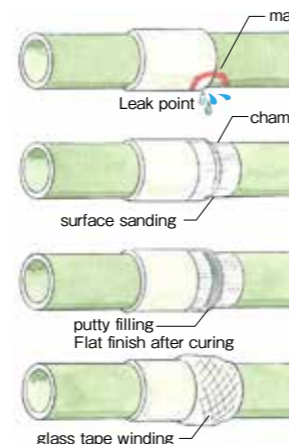
Remove damaged areas by sanding and allow them to dry.

Laminate the glass mat to the original thickness on the recessed part by sanding and cure it.

Depending on the pipe size, sand the pipe surface as shown.

After cleaning the sanding part, laminate according to the method of glass tape bonding (page 19).

If there is a leakage from adhesive joints



Mark the leaked area and let it dry.

Chamfer the steps and sand the surface.

Fill the uneven part with resin putty (see page 19), and after the resin putty hardens, sand it until it is smooth.

Laminate all around according to the method of glass tape bonding (page 19).

Handling of products

● Handling pipe materials

[Transportation]

- Do not throw, drop, roll, drag, or do other things that may damage the pipe.
- Use cushioning material as necessary during transportation to prevent damage to piping materials.
- Protect the cut surface of the pipe and the gasket surface of the flange with a plastic cap or vinyl sheet to prevent damage and dirt.
- When securing or hoisting the product, use a fiber belt such as a nylon sling, and hoist the pipe at two points that divide the length of the pipe into approximately three equal parts. When using steel wires, be sure to insert cushioning materials where they come into contact with the product.

[Storage]

- To prevent damage, store in a place where there is no risk of impact from the outside.
- Cover the product with a sheet to protect it from ultraviolet light, wind and rain, and to prevent dirt, oil, etc. from adhering to it.
- Since it is a combustible material, store it in a place where there is no danger of fire spreading.
- Store pipes and joints on sleepers or pallets, not directly on the ground. When using sleepers, be sure to provide 2 or more support points and stack them in 3 levels or less.

[Installation]

- Follow the contents of the Installation manual.
- Do not place a heavy load on the pipe, such as a construction ladder or scaffold.
- Make sure that the adhesive surface is free of water, oil, dust, and other contaminants. Clean the adhesive surface with acetone (or denatured alcohol) if it is dirty.
- After installation, avoid rough handling until the adhesive has cured, and be careful not to cause the adhesive surface to shift or peel off. (There is no problem with normal hand-held transportation.) Curing is complete when the excess resin protruding from the joint is wiped off with acetone and is no longer sticky.
- Do not put your body weight or other heavy loads on the pipes.

● Handling of adhesives

- Please use our recommended products for adhesive resins, accelerators, catalysts (curing agents), and fillers.
- Please follow the instructions in the construction manual and the instruction manual attached to the adhesive set.
- Since the adhesive is flammable, handle it with caution against fire.
- Since the catalyst (curing agent) is particularly prone to decompose, store it in a place where there is no risk of impact or fire. It is dangerous to switch to a metal container, so do not do this.
- If the accelerator and catalyst (curing agent) are mixed at the same time, they may react rapidly and possibly ignite. Add the accelerator to the resin and mix well before adding the catalyst.
- The resin, accelerator and catalyst (curing agent) are all skin irritants, so eye and skin contact should be avoided. Any adhesive that gets on your skin should be wiped off immediately with a cloth and washed with soap and plenty of water. If swallowed, immediately spit it out and seek medical attention.

● Handling of on-site installation tools

- Please use the taper cutting machine according to the contents of the instruction manual.
- When using an electric taper cutting machine, etc., be sure to power it with a grounded outlet and do not work with wet hands.

● Pressure test for piping system

- Pressure testing should be performed after confirming that the resin has completely hardened.
- As a general rule, pressure testing shall be water pressure testing only.
- Keep the test pressure within 1.5 times the normal pressure. Use clean water as the test fluid and measure the pressure inside the pipe with two or more pressure gauges. When applying pressure, be sure to bleed air sufficiently.
- If an air tightness test must be done pneumatically, the pressure should be within [0.049 MPa·G (0.5 kgf/cm²·G)].
- If this rule is not observed, there is a risk of a serious accident occurring due to an explosion that originates from a defective construction site.