

Underground Cable Installation

KOTA-KUN & SUPER-EFLEX

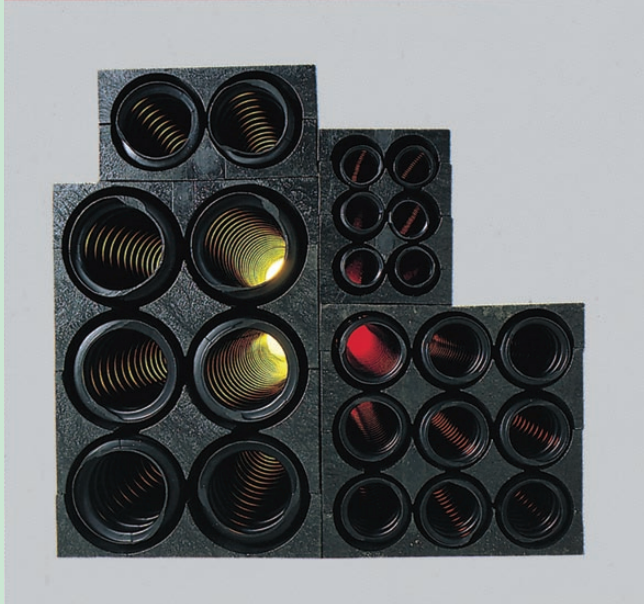


KOTA-KUN



100% reuse rate for plastics:
R-PP, PP, etc.

Certification number: 01118065



Awarded an encouraging prize from the Chairman of the Japan Electrical Construction Association Inc. at the products contest in the Electrical Construction Equipment and Materials Fair 2000. Registered in the New Technology Information System (NETIS) sponsored by the Ministry of Land, Infrastructure and Transport. Registration number is KT-990542.

FURUKAWA FK SYSTEM
**MULTI-HOLE PIPE OF
SYNTHETIC RESIN**

KOTA-KUN

A NEW MULTI-HOLE PIPE OF UNIT-TYPE PURSUING WORK LABORSAVING AND COST REDUCTION

FURUKAWA FK SYSTEM MULTI-HOLE PIPE OF SYNTHETIC RESIN KOTA-KUN

The information box project, the so-called C·C-Box Project, is being promoted by the Ministry of Land, Infrastructure and Transport, aimed at “promotion of underground laying of electric cables” as well as “early realization of advanced information society.” To respond to such demands of the times, Furukawa Electric has developed a multi-hole pipe of synthetic resin as a cable duct material using recycled plastics. We hope the customer will make use of our materials system for underground cable laying that we have developed in pursuit of work laborsaving, shortening of work periods and cost reduction.



FEATURES

● Excellent Withstand Load

- Shallow burial method is possible.
- Withstand load of the T25 class is provided when buried at 20cm beneath a roadway.
- Stress at the joint is dispersed due to stacking in a staggered configuration.



Crossing across the roadway of a national road

● Excellent Workability

- Assembly work on site is simple.
- Heavy machinery is not necessary due to the lightweight.
- Multi-line, multi-tier laying is easy.
- Jointing work of inner tube is not necessary.



Laying work without using heavy machinery

● Compact Size and Excellent Impact Resistance

- Excavation volume is minimized.
- Produced soil can be used for backfilling.



Backfilling with produced soil

● Easy Line Feeding

- Long, continuous cable feeding is possible.
- Intervals between manholes and/or hand-holes can be lengthened.



Long, continuous laying

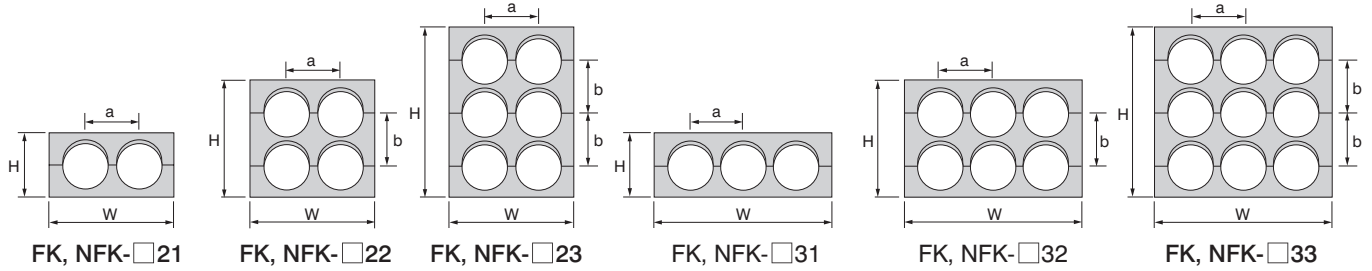
● Use of Recycled Plastics

- Global environment conservation is promoted.
- Effective use of resources.



STANDARD DIMENSIONS

The standard length is 1m for both FK and NFK.



Product No.	Size	Inner pipe: $\phi 50$					Inner pipe: $\phi 65$					Inner pipe: $\phi 80$					Inner pipe: $\phi 100$					Inner pipe: $\phi 125$					Inner pipe: $\phi 150$				
		Dimensions (approx. mm)				Mass (approx. kg)	Dimensions (approx. mm)				Mass (approx. kg)	Dimensions (approx. mm)				Mass (approx. kg)	Dimensions (approx. mm)				Mass (approx. kg)	Dimensions (approx. mm)				Mass (approx. kg)					
		H	w	a	b		H	w	a	b		H	w	a	b		H	w	a	b		H	w	a	b		H	w	a	b	
FK-□21 NFK-□21	100				11	120	230	100	100	14	140				18	180				24	218				40	230				43	
FK-□22 NFK-□22	180	200	80	80	18	(240)	—	—	—	(28)	258	272	119	118	32	335	333	149	155	42	403	405	186	185	68	445	475	215	215	80	
FK-□23 NFK-□23	260				26	(360)	(230)	(100)	(100)	(42)	376				45	490				60	588				96	660				117	
FK-□31 NFK-□31	100				14	—	—	—	—	—	140				25	180				34	218				57	230	690	215	215	62	
FK-□32 NFK-□32	180	280	80	80	24	—	—	—	—	—	258	391	119	118	43	335	485	149	155	60	403	590	186	185	97	(460)	—	—	—	(123)	
FK-□33 NFK-□33	260				34	—	—	—	—	—	376				61	490				85	588				137	(690)	(690)	(215)	(215)	(185)	

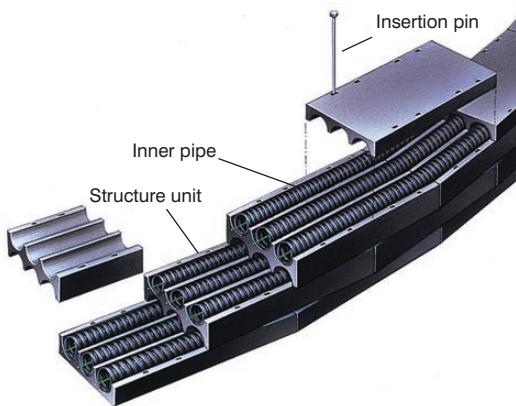
Note 1: FK uses inner pipes of normal type, and NFK flame-resistant type.

Note 2: The □ marks in the Product No. are to be filled with the numerals representing the size of inner pipes: 05 for $\phi 50$, 06 for $\phi 65$, 08 for $\phi 80$, 10 for $\phi 100$, 12 for $\phi 125$ and 15 for $\phi 150$.

Note 3: Only single-tier type is available for two-line type of $\phi 65$ and three-line type of $\phi 150$. For design and installation of two tiers and more, combination of single-tier type is needed.

STRUCTURE

Furukawa FK system is comprised of structure unit (KOTA-KUN), inner pipe and insertion pin for fixing. Both normal type (FK) and flame-resistant type (NFK) are available with inner pipes ranging from $\phi 50$ to $\phi 150$.



● Structure unit



● Inner pipe



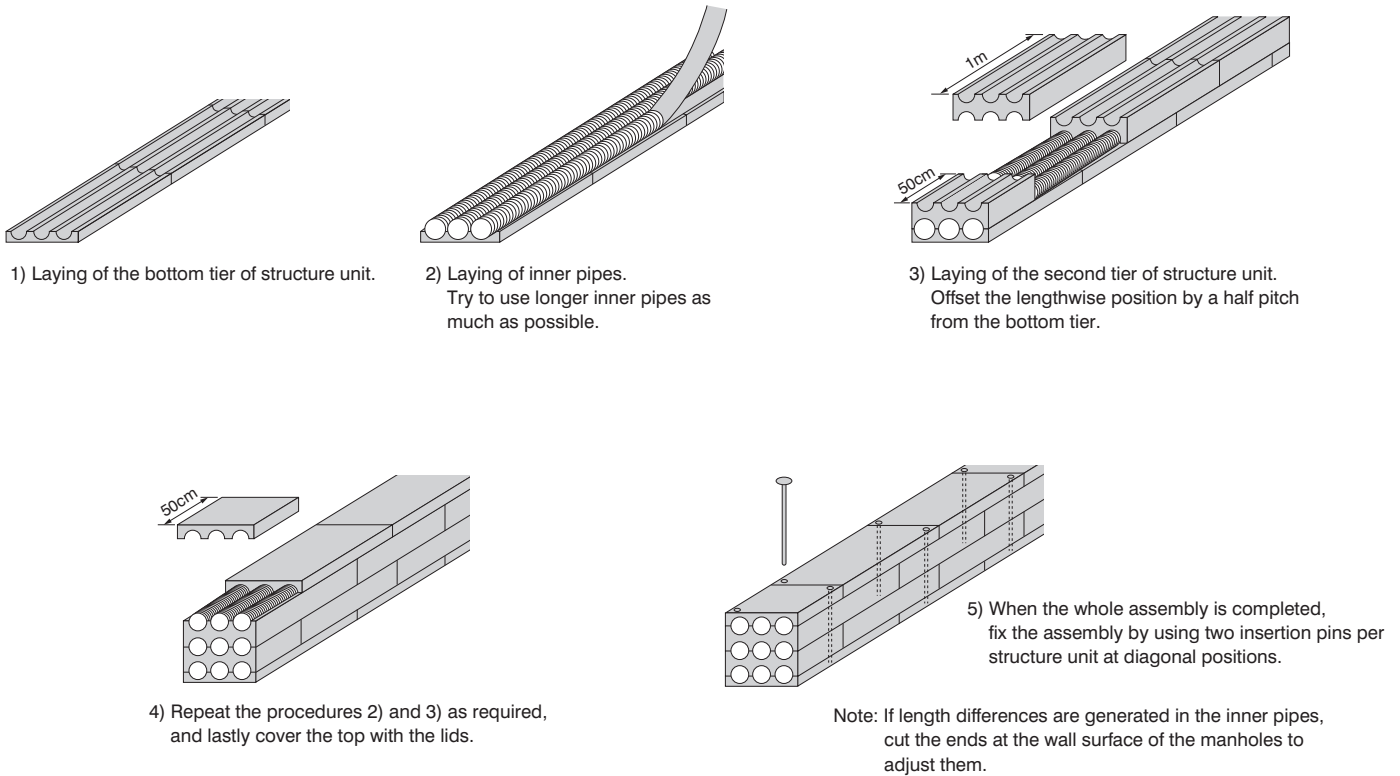
● Insertion pin (two pins/m)



STANDARD INSTALLATION METHOD

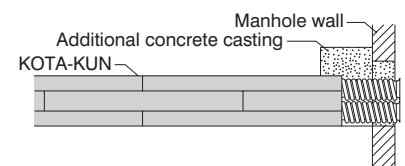
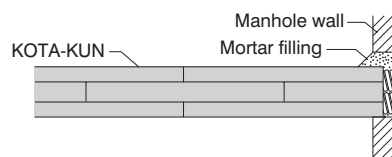
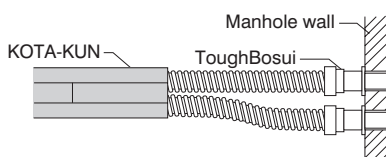
Excavate the route according to the design, and pack the soil floor to remove irregularities.

Installation Procedure



Processing of Manhole Wall

1. ToughBosui (refer to page 6) can be used at the manhole walls to carry out both fixing and waterproofing simultaneously, making the duct system ready for backfilling.
2. The structure unit should partly enter the manhole wall before mortar is applied to fill the gap, so as to make the duct system more resistant against shear loads due to possible uneven settlement, earthquake, etc.
3. When a holder plate having a suitable number of holes for inner pipes is set up at the inside of the wall, multi-tier, multi-line duct laying can be carried out speedily.



PRACTICAL INSTALLATION EXAMPLES OF KOTA-KUN

Example of Road Crossing

An example of installation work to cross a national road with busy traffic. Backfilling by using the produced soil and minimizing the excavation volume enable a short-period laying work.



Example of Long-Length Installation

It is possible to minimize the number of pipe joints by using inner pipes of long-length.



Example of Installation at River Terrace

Due to the route straightness compared with conventional ducts, inner pipes can be smoothly fed through.



Example of Detouring around Obstacles

By offsetting the position of the structure units, obstacles can be detoured in the directions either horizontal or vertical.

■ Making a detour over an obstacle



Example of Laying at Dam Site

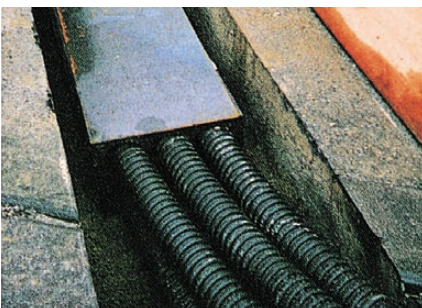
The duct system is applicable to concrete casting sites.



■ Making a horizontal detour around an obstacle

Example of Information Box Installation

■ At a bridge site



■ Underground installation crossing a road

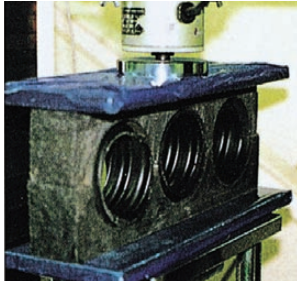
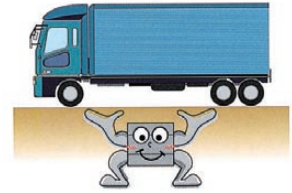


■ Shallow burial underneath a road



Compression Strength

KOTA-KUN has a sufficient compression strength against the T25 loads enabling shallow burying without using concrete reinforcement.



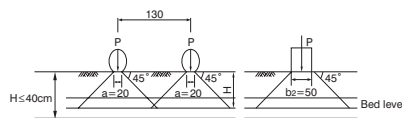
© Compression test of KOTA-KUN has been carried out in compliance with the Design Guidelines for Common Cable Tunnel, whereby the T25 load is calculated, and is multiplied with a safety factor of three.

Distributed live load L for T25 loading

1. Distributed load for a burying depth of 40cm or lower is expressed by the following equation.

$$L = \frac{P}{(2H+a) \cdot (2H+b_2)}$$

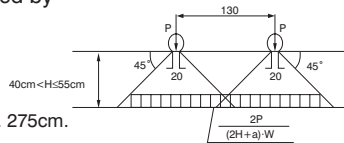
where: P = the load on single rear wheel x (1 + impact coefficient),
H is the burying depth,
a is the ground contact length of a wheel and
b₂ is the ground contact width of rear wheel.



2. Distributed load for a burying depth exceeding 40cm and not more than 55cm is expressed by the following equation.

$$L = \frac{2P}{(2H+a) \cdot W}$$

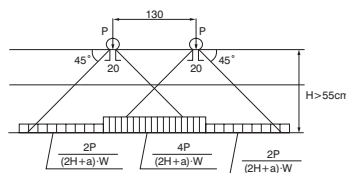
where: w is the width occupied by a vehicle, i.e. 275cm.



3. Distributed load for cases where the burying depth exceeds 55cm and loads from adjacent axles overlap is expressed by the following equation.

$$L = \frac{4P}{(2H+a) \cdot W}$$

where: a is the ground contact length of a wheel.



- Load calculation in compliance with the Design Guidelines for Common Cable Tunnel

Dead load	
Material	Load per 1-m depth (N/cm ²)
Concrete	2.30
Asphalt	2.25
Crushed stone	2.06
Backfilling sand	1.86

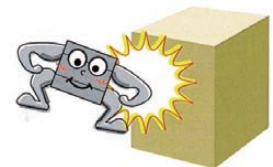
Type		Impact coefficient
Roadway	Covered depth less than 1m	0.4
	Covered depth 1m or more	0.3
Sidewalk (considering vehicles)		0.1

- Results of compression tests for φ80 × two lines

Burying depth (cm)	Total load (N/cm ²)	Compression load (safety factor: 3) (N/cm ²)	Deformation ratio of inner dia. of inner pipe (%)	
			Temperature: 20°C	Temperature: 60°C
20	13.0	39.1	0	—
25	10.3	30.9	0	—
30	8.3	25.0	0	—
40	6.0	17.9	0	—
50	5.0	15.3	0	0
55	4.9	14.7	0	0
56	8.6	25.9	0	0
60	8.2	24.7	0	0

Impact Resistance

KOTA-KUN using recycled plastics has an excellent impact resistance, so that, unlike concrete products, it never cracks or chips. Moreover, its lightweight permits ease of handling on site.



Chemical Resistance

KOTA-KUN made mainly from polyethylene has an excellent chemical resistance, making it best suited for piping in the premises of factories.



Earthquake Resistance

KOTA-KUN protects cables against earthquakes by dispersing shearing loads when stacked in a staggered configuration.



SUPER-EFLEX



SUPER-EFLEX

DUCT OF THE NEW ERA FOR UNDERGROUND BURYING OF HIGH-VOLTAGE CABLES

REINFORCED FLEXIBLE PROTECTIVE PIPE OF SYNTHETIC RESIN

SUPER-EFLEX

Cable duct in compliance with JIS C 3653

SUPER-EFLEX, a reinforced flexible protective pipe of synthetic resin, can solve diversified problems posed by the high-voltage cable works in urban areas taking advantage of its high strength, flexibility and corrosion resistance. SUPER-EFLEX of Furukawa Electric is now highlighted as a protective pipe of the new era for underground burying of high-voltage cables. It is made heat-resistant, impact-resistant rigid polyvinyl chloride, and is provided with flame resistance in compliance with Appendix 1 of JIS C 3653.



FEATURES

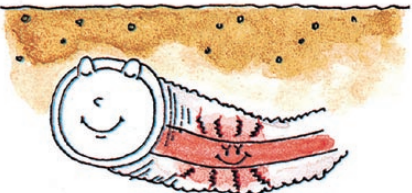
● Excellent Mechanical Strength

Due to its corrugated structure, the compression strength is superior to that of EFLEX.



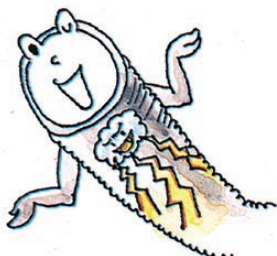
● Excellent Heat Resistance

A sufficient strength as underground duct is provided with against temperature rises due to heat radiation from high-voltage cables.



● Electrical Characteristics

Its electrical insulation is excellent.



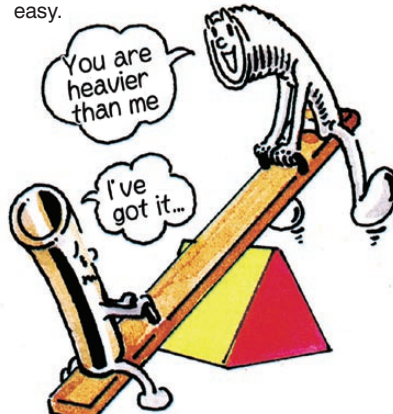
● Excellent Corrosion Resistance

It is sufficiently resistant against chemicals such as acids and alkalis as well as other corrosive substances, raising no concerns about corrosion.



● Lightweight

Its lightweight in comparison to steel pipes makes transportation and laying easy.



● Excellent Feed-through Property

Due to its corrugated structure with smooth inner surface, cables can be easily fed through with a small friction. Accordingly, manhole intervals can be lengthened.



● Excellent Installation Property

Due to its lightweight, long continuous length and flexibility, laying work can be done easily and efficiently, and work periods can be shortened.



● Flame Resistance

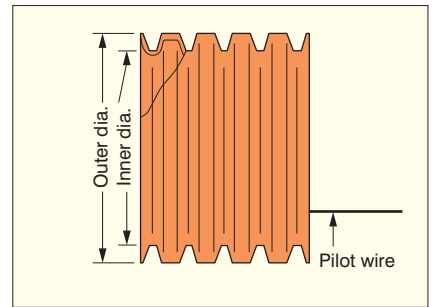
In terms of flame resistance, it is equivalent to the flame resistant pipe with self-extinguishing property specified in the Clauses 139 and 140 of the Interpretation of Technical Standards for Electric Facilities of Japan, so that SUPER-EFLEX can be laid without allowing for spacing in between.

SUPER-EFLEX

SFP-□



SUPER-EFLEX is a corrugated pipe with high, independent corrugations offering a high strength and high flexibility. Five sizes of $\phi 80$, $\phi 100$, $\phi 130$, $\phi 150$ and $\phi 200$ are available.



Item Product No.	Inner dia. (approx. mm)	Outer dia. (approx. mm)	Nominal mass (approx. kg/m)	Standard length (m)
SFP-80	83	107	1.8	50
SFP-100	103	134	2.5	20
SFP-130	132	171	4.0	20
SFP-150	150	193	4.8	20
SFP-200	202	258	8.0	10

⚠ Notes

- Can not be used for exposed piping outdoors.
- Use a cover sheet when storing the products outdoors.
- Do not store the products outdoors for a long period.
- Do not drop the products from an elevated place nor give a strong shock.

STRAIGHT JOINT

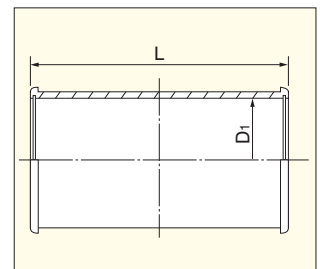
SFS-□C C type



Photograph of SFS-100C

This is used for mutual jointing of SUPER-EFLEX.

Product No.	D ₁ (approx. mm)	D ₂ (approx. mm)	L (approx. mm)
SFS-80C	113	132	215
SFS-100C	141	161	260
SFS-130C	178	196	285
SFS-150C	200	220	300



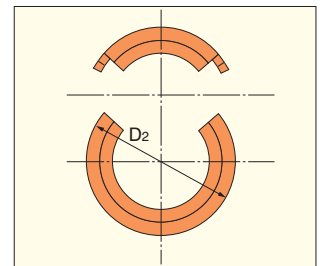
Attachment of gasket



Insertion of socket



Fixing of O ring

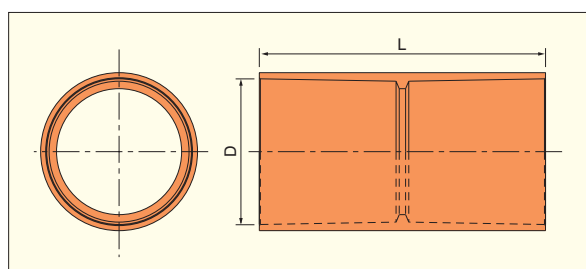


SFS-□S Adhesion Type



Photograph of SFS-100S

This is a sleeve joint for mutual jointing of SUPER-EFLEX using adhesive for PVC pipes.



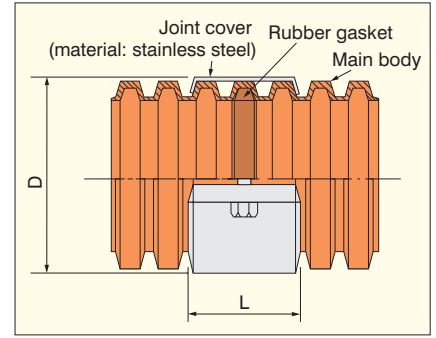
Product No.	Inner dia. D (approx. mm)	Length L (approx. mm)
SFS-80S	108	250
SFS-100S	137	270
SFS-130S	174	390
SFS-150S	198	313
SFS-200S	263	345

SFS-□ Mechanical Type



This is used for mutual jointing of SUPER-EFLEX.

Product No.	Outer dia. D (approx. mm)	Length L (approx. mm)
SFS-80	109	53
SFS-100	136	61
SFS-130	173	72
SFS-150	195	88
SFS-200	261	103



Note: The end of SUPER-EFLEX should be cut perpendicularly at the peak of a corrugation.

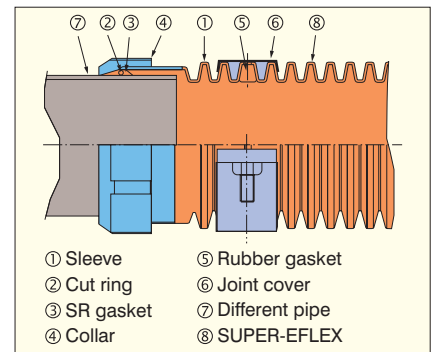
JOINT FOR DISSIMILAR PIPES

SFT-□M-□ Mechanical Type



Photograph of SFT-100M-1

This is a mechanical joint for jointing SUPER-EFLEX with either steel pipe, cable conduit, or PVC pipe.



Note: The end of SUPER-EFLEX should be cut perpendicularly at the peak of a corrugation.

SUPER-EFLEX	Product No.	Nominal size or outer dia. (in parenthesis) of mating pipe					
		Steel pipe (SGP)	Cable conduit		PVC pipe (VP)	HIT pipe	HIVP*
			Heavy walled, with lining	Heavy walled			
φ100	SFT-100M-1	100 (114.3)	104 (114.6)	104 (113.4)	100 (114)	100 (114)	—
φ150	SFT-150M-1	150 (165.2)	—	—	150 (165)	—	—
	SFT-150M-2	125 (139.8)	—	—	125 (140)	—	—
	SFT-150M-4	—	—	—	—	150 (170.5)	150 (170.5)

*The same nominal size may include different actual sizes. Confirm the actual size.

* For power cables, orange colored.

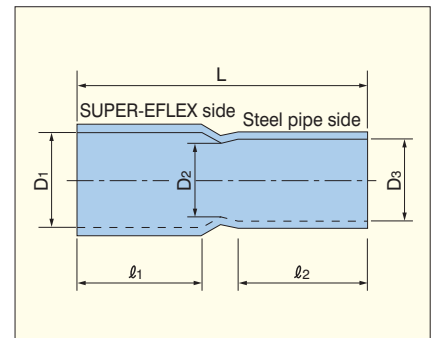
SFT-□E-□ Epoxy Adhesion Type (for Steel Pipe)



Photograph of SFT-100E-1

* Epoxy adhesive is included in a joint set.

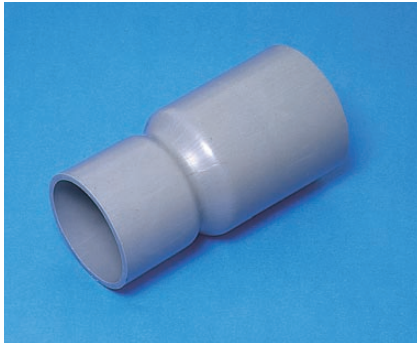
This is a sleeve joint for jointing SUPER-EFLEX with steel pipes using epoxy adhesive.



SUPER-EFLEX	Product No.	D ₁ (approx. mm)	D ₂ (approx. mm)	D ₃ (approx. mm)	l ₁ (approx. mm)	l ₂ (approx. mm)	L (approx. mm)	Nominal size or outer dia. (in parenthesis) of mating pipe
								Steel pipe (SGP)
φ100	SFT-100E-1	136	100	117	154	160	372	100 (114.3)
φ150	SFT-150E-2	197	190	219	216	200	484	200 (216.3)

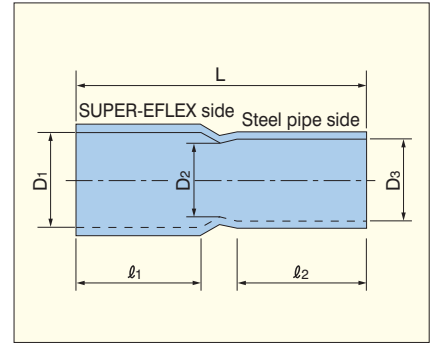
*The same nominal size may include different actual sizes. Confirm the actual size.

SFT-□S-□ Polyvinyl Chloride Adhesion Type (for PVC Pipe)



Photograph of SFT-100S-1

This is a sleeve joint for joining SUPER-EFLEX with PVC pipes using polyvinyl chloride adhesive.



SUPER-EFLEX	Product No.	D ₁ (approx. mm)	D ₂ (approx. mm)	D ₃ (approx. mm)	l ₁ (approx. mm)	l ₂ (approx. mm)	L (approx. mm)	Nominal size or outer dia. (in parenthesis) of mating pipe	
								PVC pipe (VP)	HIT pipe
φ100	SFT-100S-1	136	100	115	154	84	235	100 (114)	100 (114)
φ150	SFT-150S-1	197	150	166	221	132	430	150 (165)	—
	SFT-150S-2	197	160	172	221	132	430	—	150 (170.5)
φ200	SFT-200S-1	263	200	218	222	200	520	200 (216)	—

*The same nominal size may include different actual sizes. Confirm the actual size.

SFT-□-□ Putty Type



Photograph of SFT-80-1

This is a sleeve joint for joining SUPER-EFLEX with dissimilar pipes using epoxy putty. Specify the type and size of the dissimilar pipe when ordering.

- ① Sleeve joint
- ② Epoxy putty
- ③ EFLEX VUL-CO tape
- ④ PVC tape

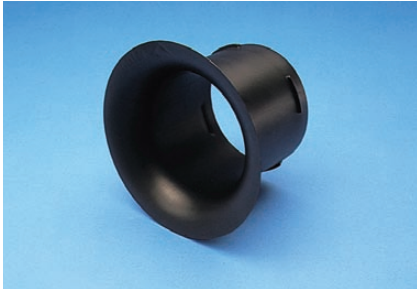
SUPER-EFLEX	Product No. (approx. inner dia. of dissimilar pipe side in mm)	Nominal size or outer dia. (in parenthesis) of mating pipe										
		Steel pipe	Cable conduit	PVC pipe		Water-proof cast iron pipe	Asbestos pipe (ACP)	Polycon pipe (PFP)	High-strength corrugated pipe	EFLEX	Hume pipe (HP)	FRP pipe
		(SGP)	Heavy walled	HIVP	VP							
φ80	SFT-80-1 (95)	80 (89.1)	82 (87.9)	75 (89)	75 (89)							80 (86.3)
	SFT-80-2 (108)					75 (99)				80 (102)		
	SFT-80-3 (120)							75 (111)				
	SFT-80-4 (100)						75 (95)	75 (95)				
	SFT-80-5 (70)									50(65)		
φ100	SFT-100-1 (125)	100 (114.3)	104 (113.4)	100 (114)	100 (114)							
	SFT-100-2 (130)					100 (124)	100 (122)	100 (120)				
	SFT-100-3 (155)								100 (145)		100 (150)	
	SFT-100-4 (140)								100 (130)			
	SFT-100-5 (110)											100 (106.3)
φ130	SFT-130-1 (150)	125 (139.8)			125 (140)			125 (145)				
	SFT-130-2 (160)			130 (147.5)		130 (154)	130 (155)				100 (150)	
	SFT-130-3 (185)							130 (177)			130 (175)	
	SFT-130-4 (170)								125 (160)			
	SFT-130-5 (140)											130 (136.3)
φ150	SFT-150-1 (175)	150 (165.2)			150 (165)							
	SFT-150-2 (185)					150 (174)	150 (177)	150 (174)				
	SFT-150-3 (215)								150 (202)		150 (202)	
	SFT-150-4 (200)								150 (189)			
φ200	SFT-200-1 (225)	200 (216.3)			200 (216)							
	SFT-200-2 (240)					200 (224)	200 (231)	200 (230)				
	SFT-200-3 (268)								200 (258)			
	SFT-200-4 (260)								200 (253)	200 (254)		

Ask for information on the joints for dissimilar pipes not listed here. Delivery time is two to three weeks.

*The same nominal size may include different actual sizes. Confirm the actual size.

Bell-mouth (Drive-in type)

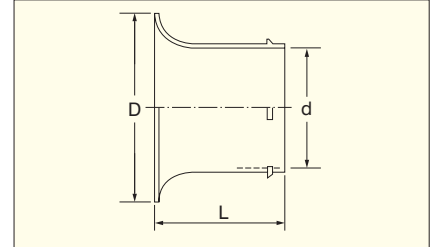
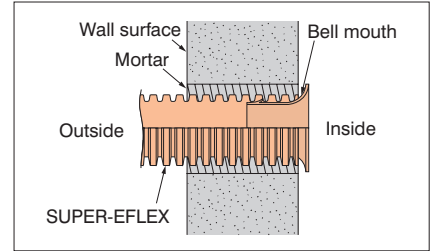
SFM-□



Photograph of SFM-100

Product No.	D (approx. mm)	d (approx. mm)	L (approx. mm)
SFM-80	110	75	85
SFM-100	144	93	100
SFM-130	186	123	130
SFM-150	200	140	150
SFM-200	280	191	200

This is used on the pipe end at man-holes or hand holes for the purpose of damage protection during cable feed-in as well as appearance improvement.



Long Bell Mouth (Adhesion type)

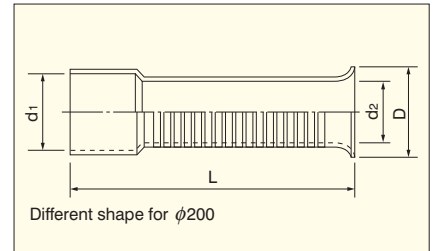
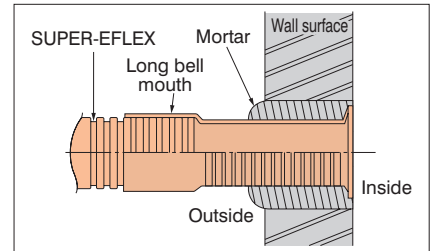
SFM-□LR SFM-□LS



Photograph of SFM-100LR

Product No.	d ₁ (approx. mm)	d ₂ (approx. mm)	D (approx. mm)	L (approx. mm)
SFM-80LR	108	83	117	350
SFM-100LR	137	104	148	350
SFM-130LR	174	134	179	350
SFM-150LR	198	154	208	350
SFM-200LS	263	202	263	350

This is used for attachment of pipes on the manholes or hand holes. Use the LS type (surface coated with sand) for $\phi 200$ mm pipe. The L type of 500mm in length (surface coated with sand, made-to-order) and the LS type for $\phi 80$ mm~ $\phi 150$ mm are also available.



⚠ Avoid adherence of org , attention must be paid to sealing materials and primers because these often contain organic solvents.

Cap for Spare Pipe

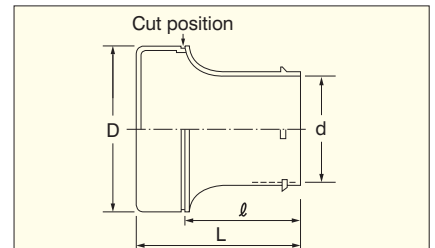
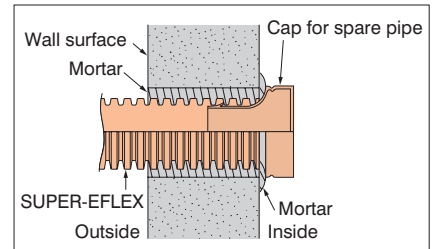
SFC-□ Cap for Spare Pipe



Photograph of SFC-100

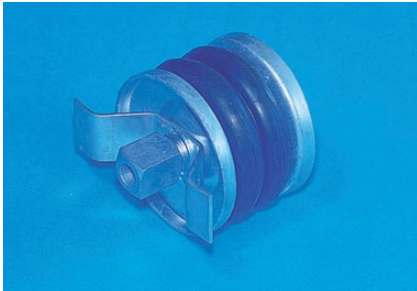
Product No.	D (approx. mm)	d (approx. mm)	ℓ (approx. mm)	L (approx. mm)
SFC-80	115	75	85	125
SFC-100	150	93	100	140
SFC-130	190	123	135	170
SFC-150	205	140	150	200
SFC-200	295	191	200	260

This is a cap for spare pipes to prevent entry of sand and dust. This can be used as a bell mouth if its end is cut off.



Waterproof Plug

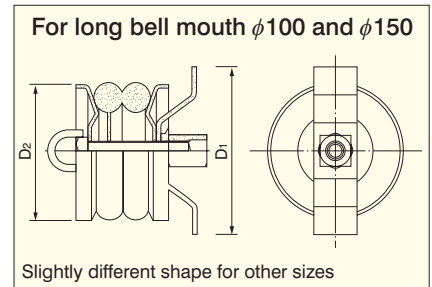
FW-□



Photograph of FW-125A

This is used to prevent entry of water and foreign materials into spare pipes.

Product No.	Applicable bell mouth		Dimensions	
	Bell mouth	Long bell mouth	D ₁ (approx. mm)	D ₂ (approx. mm)
FW-80A	SFM-80	—	86	70
FW-80B	—	SFM-80LR	86	78
FW-100A	SFM-100	—	125	88
FW-125A	—	SFM-100LR	125	98
FW-130A	SFM-130	—	145	122
FW-150A	SFM-150	SFM-130LR	145	128
FW-150B	—	SFM-150LR	180	148
FW-200A	—	SFM-200LS	210	198



⚠ Before insertion, plump the rubber gasket part close to the inner diameter of the bell mouth.

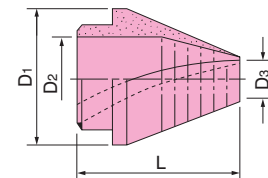
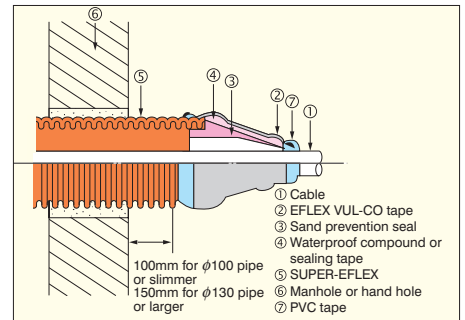
Waterproofing Materials for Pipe End

SFB-□ (for single line laying)
SFFB-□ (for multi line laying)



Photograph of SFB-100

After cables are fed into SUPER-EFLEX, the pipe ends have to be sealed using these materials against entry of earth and water. Specify the material set for multi lines in case the cable used is triplex type or multi cables en bloc.



Product No.		D ₁ (approx. mm)	D ₂ (approx. mm)	D ₃ (approx. mm)	L (approx. mm)
Single line	Multi line				
SFB-80	SFFB-80	105	69	20	118
SFB-100	SFFB-100	140	80	30	120
SFB-130	SFFB-130	170	104	45	150
SFB-150	SFFB-150	195	130	70	160
SFB-200	SFFB-200	240	170	90	165

Spacer for SUPER-EFLEX

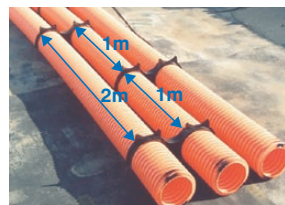
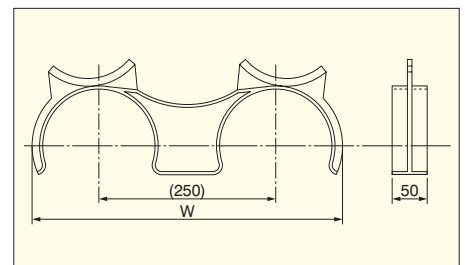
FVPS-□



Photograph of FVPS-100

This spacer allows for multi-tier laying of pipes without undue slackening. It enables the same en bloc laying and en bloc backfilling as for straight pipes, effectively shortening the installation time especially in multi-tier laying.

Product No.	W (approx. mm)
FVPS-100	395
FVPS-130	426
FVPS-150	447



The spacing is 1.5m for two-line laying. In case of three-line laying or more, the spacing between adjacent spacers should be 1m in a staggered configuration, but it should be not more than 2m on any single line.

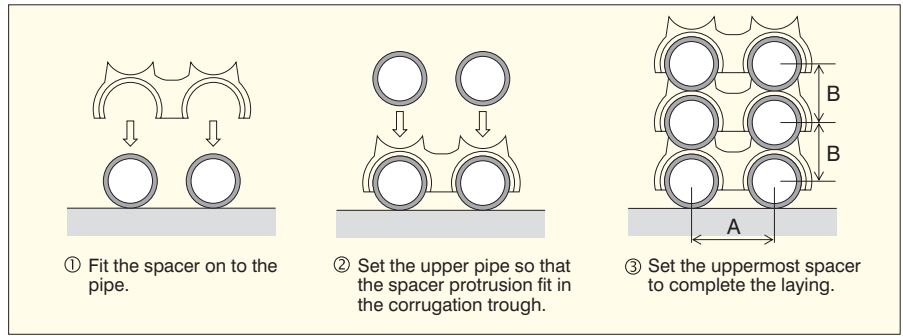
● Spacer spacing for three-line laying

Installation Method of Spacer

* Use the C-type straight joint.

Distances between cross-sectional centers

Pipe size	A (approx. mm)	B (approx. mm)
φ100	250	137
φ130	250	175
φ150	250	198



PERFORMANCE OF SUPER-EFLEX

Material Properties

Material properties of heat-resistant, impact-resistant polyvinyl chloride are shown here.

Item	Physical property	Test method
Color	Orange	
Specific gravity	1.43	Sink-Float method
Tensile strength (N/mm ²)	49.0 {5.0kgf/mm ² }	JIS K 6742 15°C
Bending strength (N/mm ²)	68.6 {7.0kgf/mm ² }	JIS K 6711 20°C 65%RH
Flexural modulus (10 ³ N/mm ²)	2.45 {2.5×10 ³ kgf/mm ² }	JIS K 6911 20°C 65%RH
Charpy impact toughness (10 ⁻³ J/mm ²)	17.6 {18kgf·cm/cm ² }	JIS K 7111 20°C

Chemical Resistance

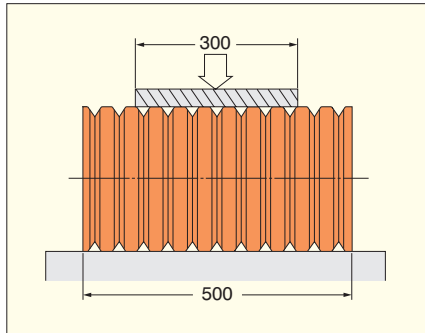
Chemical	Temperature (°C)			Chemical	Temperature (°C)		
	20	40	60		20	40	60
Hydrochloric acid 35%	⊙	⊙	⊙	Seawater	⊙	⊙	⊙
Sulfuric acid 60%	⊙	⊙	⊙	Formalin	⊙	⊙	○
Nitric acid 70%	⊙	⊙	○	Benzene	×	×	×
Acetic acid, lower than 95%	⊙	⊙	○	Acetone	×	×	—
Sodium hydrate	⊙	⊙	⊙	Gasoline	△	△	△
Ammonia water	⊙	⊙	⊙	Ethanol	⊙	⊙	○

⊙: absolutely not corroded, ○: practically not corroded, △: slightly corroded, ×: unusable

Product Performance

1. Compression Performance

Deformation ratio of the pipe under a compression load of 122.5kN/m² (12.5t/m²) is shown in the Table.



Product No.	Test load (N)	Deformation ratio
SFP-80	3920 {400kgf}	≤2.5%
SFP-100	5586 {570kgf}	≤2.5%
SFP-130	6272 {640kgf}	≤2.5%
SFP-150	7154 {730kgf}	≤2.5%
SFP-200	9212 {940kgf}	≤2.5%

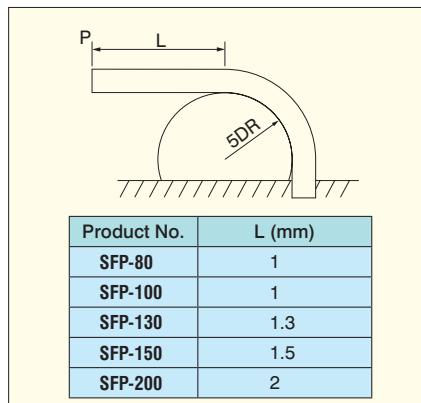
2. Tensile Strength

Tensile strength of the pipe under axial tension is shown in the Table.

Product No.	Tensile strength (N)
SFP-80	≥2940 {300kgf}
SFP-100	≥3920 {400kgf}
SFP-130	≥4900 {500kgf}
SFP-150	≥5880 {600kgf}
SFP-200	≥7840 {800kgf}

3. Bending Performance

Bending moment needed to bend a pipe to 5DR x 90degree is shown in the Table, whereby the pipe is fixed on one end and the load is applied at a specified position as shown. (where: D is the inner diameter of pipe)

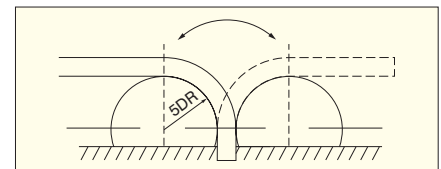


Test results

Product No.	Bending moment (approx. N·m)
SFP-80	93 {9.5kgf·m}
SFP-100	93 {9.5kgf·m}
SFP-130	157 {16kgf·m}
SFP-150	216 {22kgf·m}
SFP-200	470 {48kgf·m}

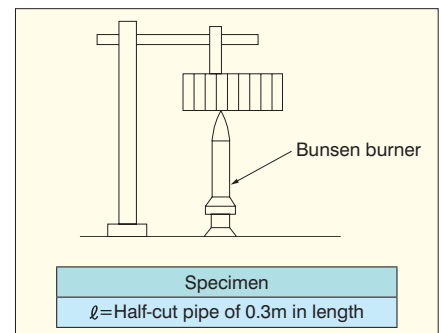
4. Bendability

No abnormalities are found when a pipe is bent three times in reversed directions around a bender frame having a radius of 5DR. (where: D is the inner diameter of pipe)



5. Flame Resistance (Self-extinguishing)

When a half-cut pipe is fixed horizontally and a gas burner specified in JIS C 8430 is used to burn the center, either the inner or the outer surface, it extinguishes by itself not later than 1min after the burner is taken away.



6. Friction Coefficient

0.35 or less.



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