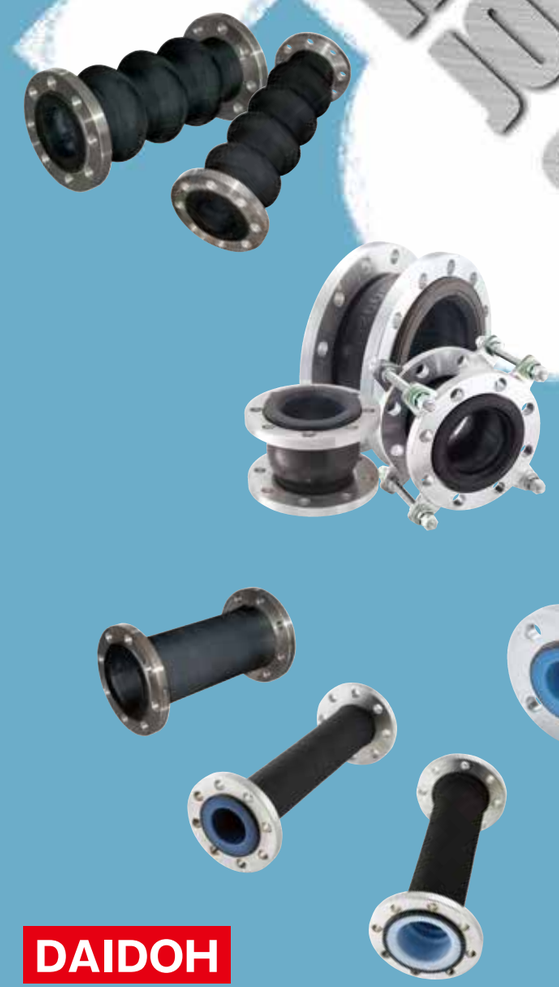
DAIDOH 大同特殊工業株式会社
DAIDOH TOKUSHU KOGYO CO., LTD.

Design & Business Dept.	1-7, 3-Chome, Shimaya, Konohana-ku, 554-0024, Osaka Tel.06-6464-2358　Fax.06-6464-2367
Tokyo Office	3-14, 6-Chome, Minamiooi, Shinagawa-ku, 140-0013, Tokyo Tel.03-5767-5789　Fax.03-5762-0579
Head Office	1-6, 3-Chome, Shimaya, Konohana-ku, 554-0024, Osaka Tel.06-6468-0255　Fax.06-6465-0255
Daito Factory	3-14, Shindensakai-machi, Daito City, 574-0051, Osaka Pref. Tel.072-874-5338　Fax.072-874-5330
Yao Factory	2-41, 3-Chome, Kitakamei-cho, Yao City, 581-0066, Osaka Pref. Tel.072-994-7595　Fax.0729-93-9628

2016.2

RUBBER JOINT and RUBBER FLEXIBLE HOSE



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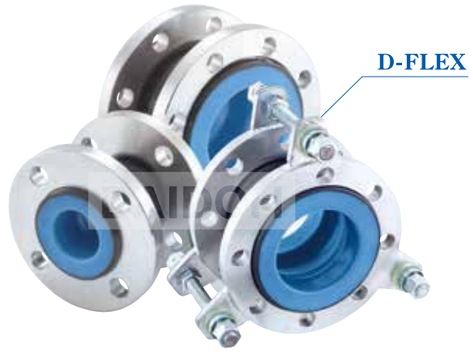
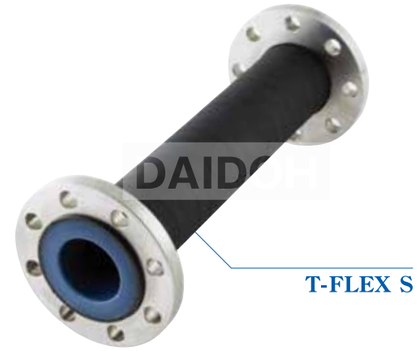




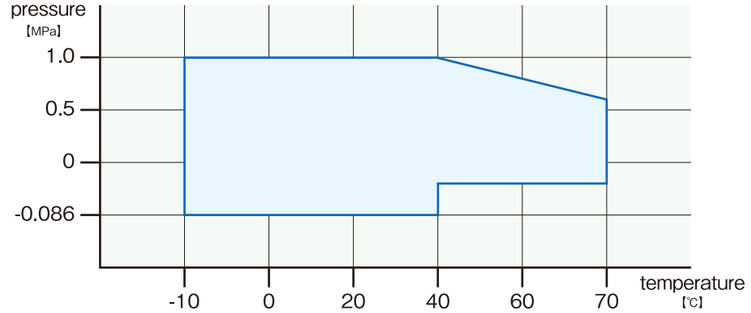
F-FLEX Spherical Rubber Flexible Joint

F-FLEX

Absorption of elasticity and deflection of pipes

Excellent anti-vibration effect and pressure-resistant properties

Pressure / Temperature



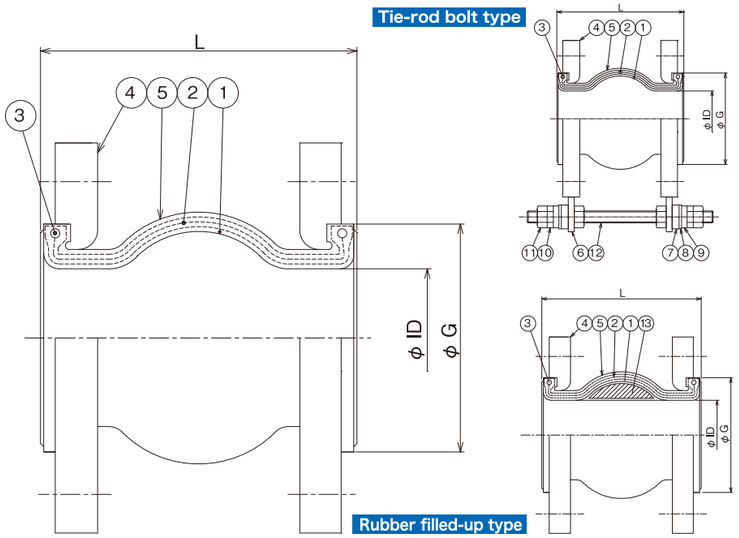
- Please make sure that the highest operating pressure and the highest operating temperature are with in the operating range before use.
- Max. operating pressure : 1.0MPa (Based on the graph of operating range above)
- Max. operating temperature : 70℃ (Based on the graph of operating range above)
- Please use embedded rubber type if the operating pressure is negative (minus pressure).
- Please contact us if gas is flowing through the pipe because the highest operating pressure becomes different.
- Embedded rubber type is recommended when contaminated water or powder flow through the pipe because they tend to accumulate on protruding sections.

(1) This product cannot be used for a hot water pipe. (Please use D-FLEX.)
(2) This product cannot be used for the water of swimming pools. (Please use D-FLEX for pipes of circulation pumps that are used for water in swimming pools.)
(3) This product cannot be used in areas with repeated and frequent pressure changes, such as the delivery side of pressurizing or pressure boosting water pumps.
(4) This product cannot be used with fluids or areas of installation that might lower the elasticity of rubber. Please contact us because use of this product in such conditions needs to be examined.

Handling instructions

- This product generates reactive force due to the load of the inner pressure. Thus, fixing points or supports are required for installed pipes. (Please see p. 26-28.)
- Please see p. 26-28 for other cautions.

Structure



No.	Name	Material
1	Inner rubber	Synthetic rubber
2	Reinforcing cord	Synthetic fiber
3	Reinforcing ring	SWRH
4	Flange	SS400、SUS304 etc.
5	Outer rubber	Synthetic rubber
6	Tie-rod holder	SUS304 etc.
7	Buffer	Urethane etc.
8	Washer	SS400、SUS304 etc.
9	Spherical seat	SS400、SUS304 etc.
10	Spherical nut	SS400、SUS304 etc.
11	Nut	SS400、SUS304 etc.
12	Tie-rod bolt	SS400、SUS304 etc.
13	Fill-up rubber	Synthetic rubber

Please see “Rubber selection guide” in p.25 for selecting the material of inner rubber.

- The standard product uses the JIS10K flange. Flanges with other specification, such as JIS5K, JIS20K, tap water, JPI, ANSI can also be used.
- Besides the standard products SS400 and SUS304, acceptable materials of the flange include SUS316, SUS316L, S25C, and PVC.
- Unichrome plating, hot-dip galvanized materials (Zn plating), and painted materials are acceptable for the SS400 flange.
- Please see “Handling precautions” for PVC flanges. (Please see p. 26-28.)
- Products with tie rod bolts can be produced. (Tie rod bolts for F-FLEX come with spherical washers, spherical nuts, and shock-absorbing materials as standard attachments.)

Size

NB	ϕID [mm]	ϕG [mm]	L [mm]	Tolerance of displacement				Dimensional tolerance for installation			
				expansion [mm]	contraction [mm]	eccentricity [mm]	angular rotation	expansion [mm]	contraction [mm]	eccentricity [mm]	angular rotation
15A	20	50	150	10	15	15	15°	3	5	4	5°
20A	24	57	150	10	15	15	15°	3	5	4	5°
25A	27	65	150	10	15	15	15°	3	5	4	5°
32A	37	71	150	10	20	20	15°	3	5	5	5°
40A	37	71	150	10	20	20	15°	3	5	5	5°
50A	44	87	150	10	20	20	15°	3	5	5	5°
65A	60	106	150	10	20	20	15°	3	5	5	5°
80A	73	115	150	10	20	20	15°	3	5	5	5°
100A	95	149	150	15	20	20	15°	3	5	5	5°
125A	120	174	150	15	20	20	15°	3	5	5	5°
150A	145	210	150	15	20	20	15°	3	5	5	5°
			200	15	25	25	15°	3	5	5	5°
200A	187	260	150	15	20	20	15°	3	5	5	5°
			200	15	25	25	15°	3	5	5	5°
250A	239	320	200	15	25	25	15°	3	5	5	5°
300A	291	367	200	15	25	25	15°	3	5	5	5°
350A	327	410	200	15	25	25	15°	3	5	5	5°

- Please make sure that deflections remain within permissible range during operation.
- Please note that the permissible deflection includes the size tolerance of installation. (Permissible deflection = tolerance of installation + Operating deflection)
- The deflections in the chart indicate independent deflections. Corrections are required when there are multiple deflections. Please see p. 26 for the method of correcting deflections.
- For embedded rubber type, please find a correct value by multiplying the permissible deflection and the installation tolerance value in the size chart above, by 0.5 for compression, eccentricity, and angle deflection, and by 0.6 for extension.
- The ϕG values in the chart indicate the standard sizes when a JIS10K flange is used.

Besides the sizes in the chart above, F-FLEX can be produced from 400A to 500A. Please contact us for detail.

FW-FLEX Two-mound spherical Rubber Flexible Joint

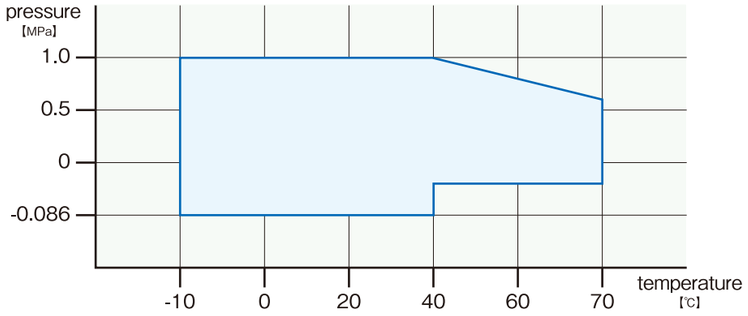
FW-FLEX

Absorption of elasticity and deflection of pipes

Excellent anti-vibration effect and pressure-resistant properties

Two-mound spherical type

Pressure / Temperature



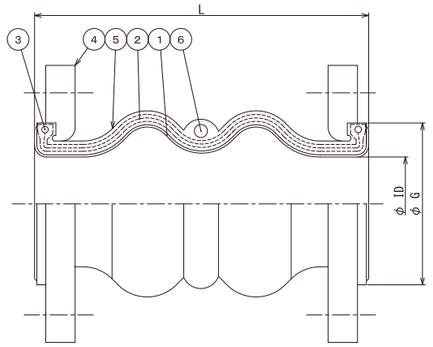
- Please make sure that the highest operating pressure and the highest operating temperature are with in the operating range before use.
- Max. operating pressure : 1.0MPa(Based on the graph of operating range above)
- Max. operating temperature : 70℃(Based on the graph of operating range above)
- Please contact us if gas is flowing through the pipe because the highest operating pressure becomes different.

(1) This product cannot be used for a hot water pipe. (Please use D-FLEX.)
(2) This product cannot be used for the water of swimming pools. (Please use D-FLEX for pipes of circulation pumps that are used for water in swimming pools.)
(3) This product cannot be used in areas with repeated and frequent pressure changes, such as the delivery side of pressurizing or pressure boosting water pumps.
(4) This product cannot be used with fluids or areas of installation that might lower the elasticity of rubber. Please contact us because use of this product in such conditions needs to be examined.

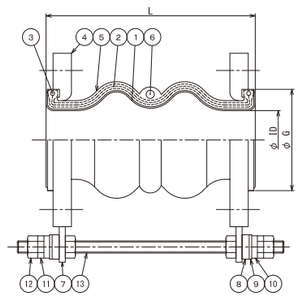
Handling instructions

- This product generates reactive force due to the load of the inner pressure. Thus, fixing points or supports are required for installed pipes. (Please see p. 26-28.)
- Please see p. 26-28 for other cautions.

Structure



Tie-rod bolt type



No.	Name	Material
1	Inner rubber	Synthetic rubber
2	Reinforcing cord	Synthetic fiber
3	Reinforcing ring	SWRH
4	Flange	SS400、SUS304 etc.
5	Outer rubber	Synthetic rubber
6	Reinforcing ring	SWRH
7	Tie-rod holder	SUS304 etc.
8	Buffer	Urethane etc.
9	Washer	SS400、SUS304 etc.
10	Spherical seat	SS400、SUS304 etc.
11	Spherical nut	SS400、SUS304 etc.
12	Nut	SS400、SUS304 etc.
13	Tie-rod bolt	SS400、SUS304 etc.

Please see “Rubber selection guide” in p.25 for selecting the material of inner rubber.

- The standard product uses the JIS10K flange. Flanges with other specification, such as JIS5K, JIS20K, tap water, JPI, ANSI can also be used.
- Besides the standard products SS400 and SUS304, acceptable materials of the flange include SUS316, SUS316L, S25C, and PVC.
- Unichrome plating, hot-dip galvanized materials (Zn plating), and painted materials are acceptable for the SS400 flange.
- Please see “Handling precautions” for PVC flanges. (Please see p. 26-28.)
- Products with tie rod bolts can be produced. (Tie rod bolts for FW-FLEX come with spherical washers, spherical nuts, and shock-absorbing materials as standard attachments.)

Size

NB	φID [mm]	φG [mm]	L [mm]	Tolerance of displacement				Dimensional tolerance for installation			
				expansion [mm]	contraction [mm]	eccentricity [mm]	angular rotation	expansion [mm]	contraction [mm]	eccentricity [mm]	angular rotation
25A	25	58.5	150	10	20	20	20°	3	6	8	10
32A	32	76	175	10	20	20	20°	3	6	8	10
40A	40	76	175	10	20	20	20°	3	6	8	10
50A	50	86	175	10	20	20	20°	3	6	8	10
65A	65	106	175	10	20	20	20°	3	6	8	10
80A	80	120	175	10	20	20	20°	3	6	8	10
100A	100	150	225	15	30	20	20°	3	6	8	10
125A	125	180	225	15	30	20	20°	3	6	8	10
150A	150	212	225	15	30	20	20°	3	6	8	10
200A	200	262	325	15	40	25	20°	3	6	8	10
250A	250	324	325	15	40	25	20°	3	6	10	10
300A	300	372	325	15	40	25	20°	3	6	10	10
350A	350	415	345	15	40	25	20°	3	6	10	10

- Please make sure that deflections remain within permissible range during operation.
- Please note that the permissible deflection includes the size tolerance of installation. (Permissible deflection = tolerance of installation + Operating deflection)
- The deflections in the chart indicate independent deflections. Corrections are required when there are multiple deflections. Please see p. 26 for the method of correcting deflections.
- The φG values in the chart indicate the standard sizes when a JIS10K flange is used.

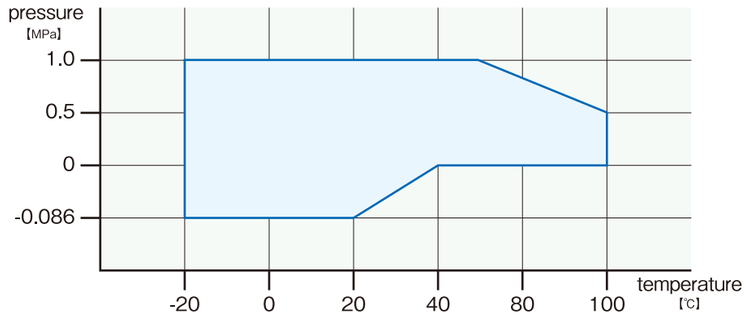
D-FLEX Spherical flexible joint produced by coating the outer surface of fluoropolymer with synthetic rubber

D-FLEX

Excellent heat and chemical resistance due to the use of fluoropolymer at fluid contact portion

Other properties include water repellency, oil repellency, and non-stickiness.

Pressure / Temperature



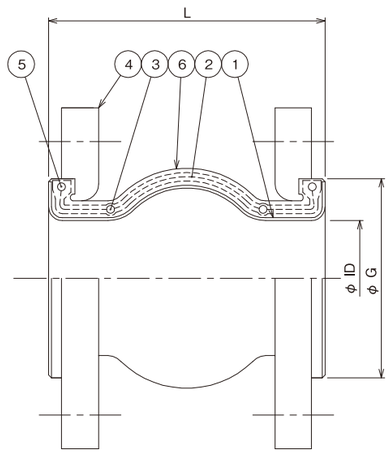
- Please make sure that the highest operating pressure and the highest operating temperature are with in the operating range before use.
- Max. operating pressure : 1.0MPa (Based on the graph of operating range above)
- Max. operating temperature : 100℃ (Based on the graph of operating range above)
- Please contact us if gas is flowing through the pipe because the highest operating pressure becomes different.

(1) This product cannot be used in areas with repeated and frequent pressure changes, such as the delivery side of pressurizing or pressure boosting water pumps.
(2) The sealing performance may be lowered due to the characteristics of the material. Please re-tighten the seal or use a gasket in such cases.

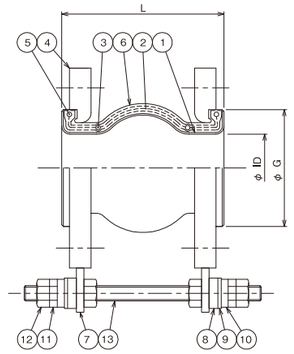
Handling instructions

- This product generates reactive force due to the load of the inner pressure. Thus, fixing points or supports are required for installed pipes. (Please see p. 26-28.)
- Please see p. 26-28 for other cautions.

Structure



Tie-rod bolt type



No	Name	Material
1	Bellows	PTFE
2	Reinforcing cord	Synthetic fiber
3	Reinforcing ring※	SWRH
4	Flange	SS400、SUS304 etc.
5	Reinforcing ring	SWRH
6	Outer rubber	Synthetic rubber
7	Tie-rod holder	SUS304 etc.
8	Buffer	Urethane etc.
9	Washer	SS400、SUS304 etc.
10	Spherical seat	SS400、SUS304 etc.
11	Spherical nut	SS400、SUS304 etc.
12	Nut	SS400、SUS304 etc.
13	Tie-rod bolt	SS400、SUS304 etc.

※Reinforcing rings are not applied to the products of NB 250A and larger.

- The standard product uses the JIS10K flange. Flanges with other specification, such as JIS5K, JIS20K, tap water, JPI, ANSI can also be used.
- Besides the standard products SS400 and SUS304, acceptable materials of the flange include SUS316, SUS316L, S25C, and PVC.
- Unichrome plating, hot-dip galvanized materials (Zn plating), and painted materials are acceptable for the SS400 flange.
- Please see “Handling precautions” for PVC flanges. (Please see p. 26-28.)
- Products with tie rod bolts can be produced. (Tie rod bolts for D-FLEX come with spherical washers, spherical nuts, and shock-absorbing materials as standard attachments.)

Size

NB	φID [mm]	φG [mm]	L [mm]	Tolerance of displacement				Dimensional tolerance for installation			
				expansion [mm]	contraction [mm]	eccentricity [mm]	angular rotation	expansion [mm]	contraction [mm]	eccentricity [mm]	angular rotation
20A	25	57	81	10	13	7	10°	2	2	2	2°
25A	25	65	81	10	13	7	10°	2	2	2	2°
32A	36	73	81	10	13	10	10°	2	2	2	2°
40A	36	73	81	10	13	10	10°	2	2	2	2°
50A	48	87	122	13	16	10	10°	3	3	3	3°
65A	62	108	122	13	16	10	10°	3	3	3	3°
80A	72	118	122	13	16	10	10°	3	3	3	3°
100A	98	150	122	13	16	10	10°	3	3	3	3°
125A	124	174	143	13	16	10	10°	3	3	3	3°
150A	149	206	166	13	16	10	10°	3	3	3	3°
200A	199	257	182	13	16	10	10°	3	3	3	3°
250A	247	314	194	13	16	10	10°	3	3	3	3°
300A	300	375	200	13	16	10	10°	3	3	3	3°
350A	330	410	200	13	16	10	10°	3	3	3	3°

- Please make sure that deflections remain within permissible range during operation.
- Please note that the permissible deflection includes the size tolerance of installation. (Permissible deflection = tolerance of installation + Operating deflection)
- The deflections in the chart indicate independent deflections. Corrections are required when there are multiple deflections. Please see p. 26 for the method of correcting deflections.
- The φG values in the chart indicate the standard sizes when a JIS10K flange is used.

DL-FLEX

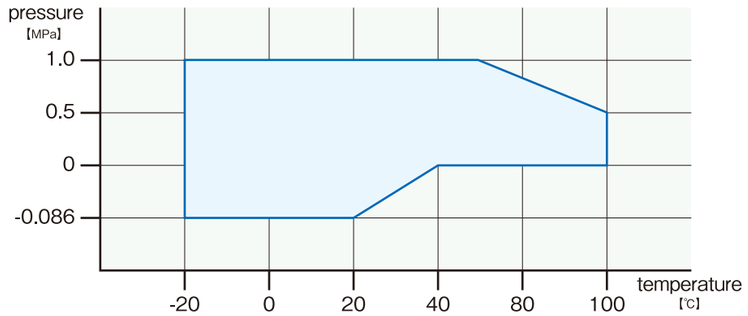
Spherical flexible joint produced by coating the outer surface of fluoropolymer with synthetic rubber

DL-FLEX

Excellent heat and chemical resistance due to the use of fluoropolymer at fluid contact portion

Other properties include water repellency, oil repellency, and non-stickiness.

Pressure / Temperature



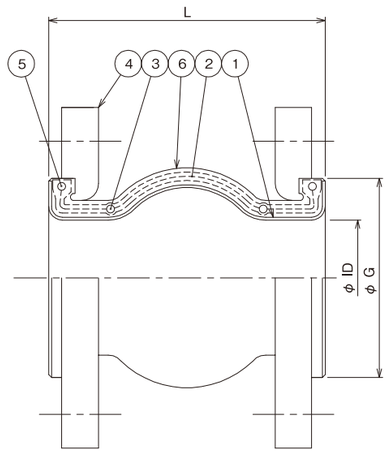
- Please make sure that the highest operating pressure and the highest operating temperature are with in the operating range before use.
- Max. operating pressure : 1.0MPa(Based on the graph of operating range above)
- Max. operating temperature : 100℃(Based on the graph of operating range above)
- Please contact us if gas is flowing through the pipe because the highest operating pressure becomes different.

(1) This product cannot be used in areas with repeated and frequent pressure changes, such as the delivery side of pressurizing or pressure boosting water pumps.
(2) The sealing performance may be lowered due to the characteristics of the material. Please re-tighten the seal or use a gasket in such cases.

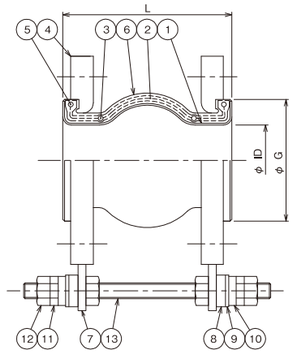
Handling instructions

- This product generates reactive force due to the load of the inner pressure. Thus, fixing points or supports are required for installed pipes. (Please see p. 26-28.)
- Please see p. 26-28 for other cautions.

Structure



Tie-rod bolt type



No	Name	Material
1	Bellows	PTFE
2	Reinforcing cord	Synthetic fiber
3	Reinforcing ring	SWRH
4	Flange	SS400、SUS304 etc.
5	Reinforcing ring	SWRH
6	Outer rubber	Synthetic rubber
7	Tie-rod holder	SUS304 etc.
8	Buffer	Urethane etc.
9	Washer	SS400、SUS304 etc.
10	Spherical seat	SS400、SUS304 etc.
11	Spherical nut	SS400、SUS304 etc.
12	Nut	SS400、SUS304 etc.
13	Tie-rod bolt	SS400、SUS304 etc.

- The standard product uses the JIS10K flange. Flanges with other specification, such as JIS5K, JIS20K, tap water, JPI, ANSI can also be used.
- Besides the standard products SS400 and SUS304, acceptable materials of the flange include SUS316, SUS316L, S25C, and PVC.
- Unichrome plating, hot-dip galvanized materials (Zn plating), and painted materials are acceptable for the SS400 flange.
- Please see “Handling precautions” for PVC flanges. (Please see p. 26-28.)
- Products with tie rod bolts can be produced. (Tie rod bolts for D-FLEX come with spherical washers, spherical nuts, and shock-absorbing materials as standard attachments.)

Size

NB	φID [mm]	φG [mm]	L [mm]	Tolerance of displacement				Dimensional tolerance for installation			
				expansion [mm]	contraction [mm]	eccentricity [mm]	angular rotation	expansion [mm]	contraction [mm]	eccentricity [mm]	angular rotation
15A	20	50	150	10	13	7	10°	2	2	2	2°
20A	25	57		10	13	7	10°	2	2	2	2°
25A	25	65		10	13	7	10°	2	2	2	2°
32A	36	73		10	13	10	10°	2	2	2	2°
40A	36	73		10	13	10	10°	2	2	2	2°
50A	48	87		13	16	10	10°	3	3	3	3°
65A	62	108		13	16	10	10°	3	3	3	3°
80A	72	118		13	16	10	10°	3	3	3	3°
100A	98	150		13	16	10	10°	3	3	3	3°
125A	124	174		13	16	10	10°	3	3	3	3°
150A	149	206		13	16	10	10°	3	3	3	3°

- Please make sure that deflections remain within permissible range during operation.
- Please note that the permissible deflection includes the size tolerance of installation. (Permissible deflection = tolerance of installation + Operating deflection)
- The deflections in the chart indicate independent deflections. Corrections are required when there are multiple deflections. Please see p. 26 for the method of correcting deflections.
- The φG values in the chart indicate the standard sizes when a JIS10K flange is used.

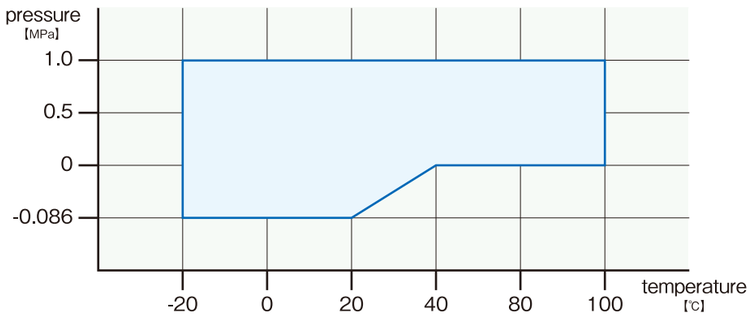
T-FLEX S Cylindrical flexible joint produced by coating the outer surface of fluoropolymer with synthetic rubber

T-FLEX S(straight)

Excellent heat and chemical resistance due to the use of fluoropolymer at fluid contact portion.
Other properties include water repellency, oil repellency, and non-stickiness.

The straight internal structure prevents the accumulation of liquid.

Pressure / Temperature



- Please make sure that the highest operating pressure and the highest operating temperature are with in the operating range before use.
- Max. operating pressure : 1.0MPa(Based on the graph of operating range above)
  Please contact us when using this product under the pressure that exceeds the maximum operating pressure (1.0 MPa) for individual examination of the structure.
- Max. operating temperature : 100℃(Based on the graph of operating range above)
- Please contact us if gas is flowing through the pipe because the highest operating pressure becomes different.

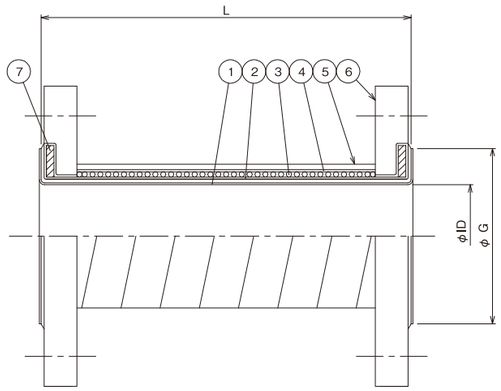
(1) This product cannot be used in areas with repeated and frequent pressure changes, such as the delivery side of pressurizing or pressure boosting water pumps.
(2) The sealing performance may be lowered due to the characteristics of the material. Please re-tighten the seal or use a gasket in such cases.

Handling instructions

- This product generates reactive force due to the load of the inner pressure. Thus, fixing points or supports are required for installed pipes. (Please see p. 26-28.)
- Please see 26-28 for other cautions.

Structure

T-FLEX S(straight)



No.	Name	Material
1	Straight hose	PTFE
2	Reinforcement layer	Synthetic fiber
3	Reinforcement wire	Steel wire
4	Reinforcement layer	Synthetic fiber
5	Outer rubber	Synthetic rubber
6	Flange	SS400、SUS304 etc.
7	End-ring	SS400

- The standard product uses the JIS10K flange. Flanges with other specification, such as JIS5K, JIS20K, tap water, JPI, ANSI can also be used.
- Besides the standard products SS400 and SUS304, acceptable materials of the flange include SUS316, SUS316L and S25C.
- The hot-dip galvanized material (Zn plating) is the standard for the SS400 flange. Painted materials are also available.

Size

NB	L[㎜]		φID [㎜]	φG [㎜]	Official tolerance of displacement		
	official spec	produible length			expansion[㎜]	contraction[㎜]	eccentricity[㎜]
15A	300	200～700	20	53	5	2	20
20A	300	200～700	25	52	5	2	20
25A	300	200～700	25	58	5	2	20
32A	300	200～700	33	66	5	2	15
40A	300	200～700	33	66	5	2	15
50A	500	200～700	48	80	5	3	20
65A	500	200～700	61	100	5	3	20
80A	500	200～700	73	110	5	3	20
100A	700	200～700	102	143	5	3	20
125A	700	200～700	124	164	5	3	15
150A	700	200～700	152	198	5	3	15
200A	700	200～700	198	256	5	3	15
250A	700	200～700	248	305	5	3	15
300A	700	200～700	300	367	5	3	15
350A	700	200～700	332	403	5	3	15

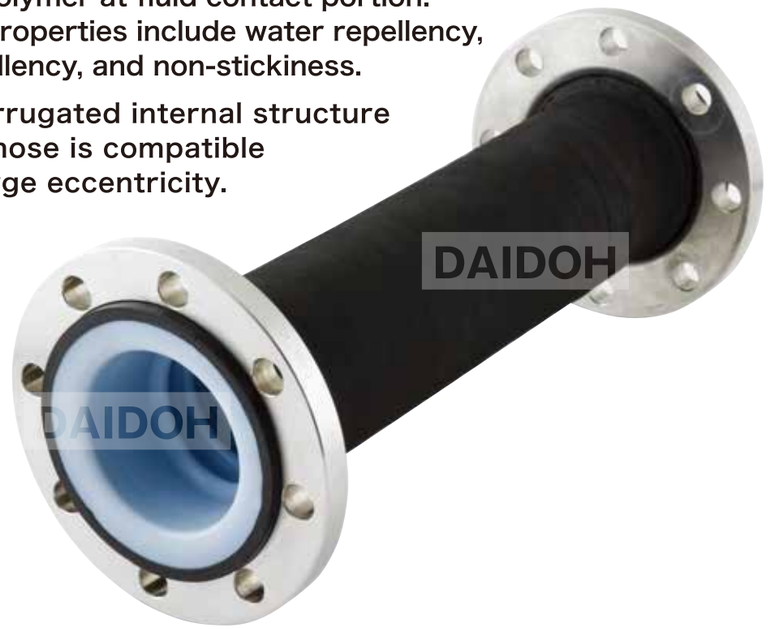
- Please make sure that deflections remain within permissible range during operation.
- The deflections in the chart indicate independent deflections. Corrections are required when there are multiple deflections. Please see p. 26 for the method of correcting deflections.
- The φG values in the chart indicate the standard sizes when a JIS10K flange is used.

T-FLEX C Cylindrical flexible joint produced by coating the outer surface of fluoropolymer with synthetic rubber

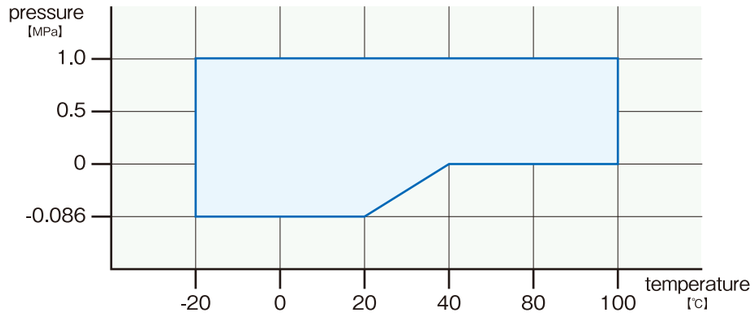
T-FLEX C(Corrugation)

Excellent heat and chemical resistance due to the use of fluoropolymer at fluid contact portion.
Other properties include water repellency, oil repellency, and non-stickiness.

The corrugated internal structure of the hose is compatible with large eccentricity.



Pressure / Temperature



- Please make sure that the highest operating pressure and the highest operating temperature are with in the operating range before use.
- Max. operating pressure : 1.0MPa(Based on the graph of operating range above)
  Please contact us when using this product under the pressure that exceeds the maximum operating pressure (1.0 MPa) for individual examination of the structure.
- Max. operating temperature : 100℃(Based on the graph of operating range above)
- Please contact us if gas is flowing through the pipe because the highest operating pressure becomes different.

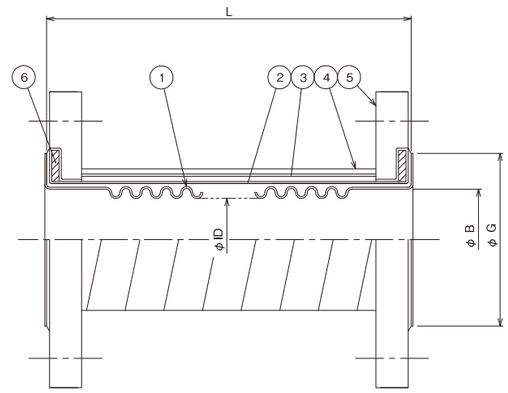
(1) This product cannot be used in areas with repeated and frequent pressure changes, such as the delivery side of pressurizing or pressure boosting water pumps.
(2) The sealing performance may be lowered due to the characteristics of the material. Please re-tighten the seal or use a gasket in such cases.

Handling instructions

- This product generates reactive force due to the load of the inner pressure. Thus, fixing points or supports are required for installed pipes. (Please see p. 26-28.)
- Please see p. 26-28 for other cautions.

Structure

T-FLEX C(Corrugation)



No.	Name	Material
1	Corrugation hose	PTFE
2	Reinforcement layer	Synthetic fiber
3	Reinforcement layer	Synthetic fiber
4	Outer rubber	Synthetic rubber
5	Flange	SS400、SUS304 etc.
6	End-ring	SS400

- The standard product uses the JIS10K flange. Flanges with other specification, such as JIS5K, JIS20K, tap water, JPI, ANSI can also be used.
- Besides the standard products SS400 and SUS304, acceptable materials of the flange include SUS316, SUS316L and S25C.
- The hot-dip galvanized material (Zn plating) is the standard for the SS400 flange. Painted materials are also available.

Size

NB	L[mm]		φID [mm]	φB [mm]	φG [mm]	Tolerance of displacement		
	standard	produible length				eccentricity [mm]	expansion [mm]	contraction [mm]
15A	450	200~700	14	20	53	200	20	20
20A	450	200~700	19	25	52	200	20	20
25A	450	200~700	19	25	58	200	20	20
32A	450	200~700	25	33	66	200	20	20
40A	450	200~700	25	33	66	200	20	20
50A	450	200~700	42	48	80	200	20	20
65A	450	200~700	50	61	100	200	20	20
80A	450	200~700	62	73	110	200	20	20
100A	450	200~700	90	102	143	200	20	20
125A	450	200~700	102	124	164	200	20	20
150A	600	200~700	130	152	198	200	20	20
200A	600	200~700	170	198	256	200	20	20
250A	600	200~700	220	248	305	200	20	20
300A	650	200~700	270	300	367	200	20	20
350A	650	200~700	302	332	403	200	20	20

- Please make sure that deflections remain within permissible range during operation.
- The deflections in the chart indicate independent deflections. Corrections are required when there are multiple deflections. Please see p. 26 for the method of correcting deflections.
- The φG values in the chart indicate the standard sizes when a JIS10K flange is used.

L-FLEX Straight cylindrical Rubber Flexible Joint / Flexible Tube

L-FLEX

Straight and cylindrical flexible tube
Absorbs deflection that is generated by earthquake or uneven cave-in

Feature

- Extremely simple structure without an arched structure
- The internal steel wire inserted in a spiral form creates high pressure resistance and the ability to retain the cross-sectional area.

Usage

Pipes for tap water and sewer | Pipes in sewage treatment plants | Pipes in pump stations | Factories in general

Kind

- For 100mm eccentricity (Ground & Under-ground)
- For 200mm eccentricity (Ground & Under-ground)

Standard issue

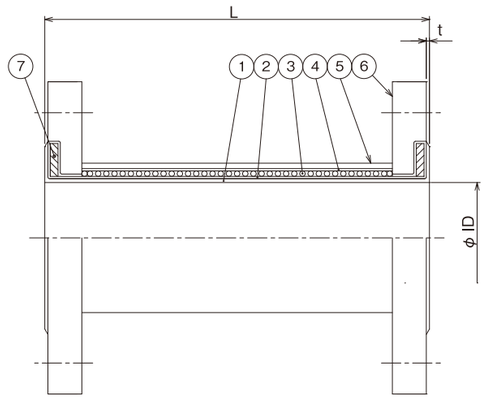
- Max. operating pressure : Please see the maximum operating pressure in the chart on the right.
  Please contact us when using this product under the pressure that exceeds the maximum operating pressure (1.0 MPa) for individual examination of the structure.
- Max. operating temperature : −10℃~60℃
- When applying for under-ground use, please install the joint in depth of 1M ~ 3M. Maximum Car weight is 25 Ton.
- Please contact us if gas is flowing through the pipe because the highest operating pressure becomes different.
- Please use a model with a control unit (tie rod bolt type) to regulate the thrust in the axial direction that is generated by the internal pressure and to prevent excessive deflection.
  Also, please use a model with a control unit (set bolt type) to adjust the face-to-face dimension during installation. (Please see P25.)

(1) This product cannot be used in areas with repeated and frequent pressure changes, such as the delivery side of pressurizing or pressure boosting water pumps.
(2) This product cannot be used with fluids or areas of installation that might lower the elasticity of rubber.
Please contact us because use of this product in such conditions needs to be examined.

Handling instructions

- This product generates reactive force due to the load of the inner pressure. Thus, fixing points or supports are required for installed pipes. (Please see p. 26-28.)
- Please see p. 26-28 for other cautions.

Structure



No.	Name	Material
1	Inner rubber	Synthetic rubber
2	Reinforcement layer	Synthetic fiber
3	Reinforcement wire	Steel wire
4	Reinforcement layer	Synthetic fiber
5	Outer rubber	Synthetic rubber
6	Flange	SS400、SUS304 etc.
7	End-ring	SS400 etc.

Please see “Rubber selection guide” in p.25 for selecting the material of inner rubber.

- The standard product uses the JIS10K flange. Flanges with other specification, such as JIS5K, JIS20K, tap water, JPI, ANSI can also be used.
- Besides the standard products SS400 and SUS304, acceptable materials of the flange include SUS316, SUS316L and S25C.
- Hot-dip galvanization (Zn plating) is the standard for SS400 flange to be used above the ground, and paint consisting of black epoxy resin for underground installation. Painted materials are also available.

Size

NB	ϕID [mm]	L [mm]	For 100mm eccentricity			For 200mm eccentricity			Max. operating pressure		
		producible length	L [mm]	expansion [mm]	contraction [mm]	L [mm]	expansion [mm]	contraction [mm]	inner pressure [Mpa]	vacuum pressure [kPa] ground	vacuum pressure [kPa] under-ground
15A	20	200~1200	350	25	15	450	35	20	1.0	-90	-90
20A	20	200~1200	350	25	15	450	35	20	1.0	-90	-90
25A	25	200~1200	350	25	15	450	35	20	1.0	-90	-90
32A	32	200~1200	350	25	15	450	35	20	1.0	-90	-90
40A	40	200~1200	350	25	15	450	35	20	1.0	-90	-90
50A	50	200~1200	350	25	15	450	35	20	1.0	-90	-90
65A	62	200~1200	350	25	15	450	35	20	1.0	-90	-90
80A	75	200~1200	350	25	35	450	35	45	1.0	-90	-90
100A	100	200~1200	350	25	35	450	35	45	1.0	-90	-90
125A	126	200~1200	400	30	40	500	40	50	1.0	-90	-90
150A	151	200~1200	500	40	50	600	45	60	1.0	-90	-60
200A	202	200~1200	500	40	50	600	45	60	1.0	-90	-50
250A	254	200~1200	500	40	50	700	55	70	1.0	-70	-20
300A	305	200~1200	500	40	50	700	55	70	1.0	-70	-20

- Please contact us for details of individual deflection when using diagonal pipes, since they differ from the above values.
- Please make sure that deflections remain within permissible range during operation.
- The deflections in the chart indicate independent deflections. Corrections are required when there are multiple deflections.
  Please see p. 26 for the method ofcorrecting deflections.

Besides the sizes in the chart above, L-FLEX can be produced from 350A to 600A.
Please contact us for detail.

A-FLEX Rubber Flexible Tube

A-FLEX

Large displacement absorption type for protecting pipes against uneven cave-in caused by earthquake or soft ground, or against themal expansion and contraction caused by temperature change.

Feature

■High pressure resistance

The main unit is reinforced with durable synthetic fibers and steel wires.

■Large eccentricity

The internal arch structure is effective for absorbing uneven settlement that occurs in situations, such as connecting pipes between buildings with different foundations.
High freedom in design due to the short face-to-face dimension.

Usage

Pipes for tap water and sewer | Pipes for general factory facilities | Pipes in pump stations | Pipes in sewage treatment plants

Kind

■For 100mm eccentricity (Ground & Under-ground) 3-mound
■For 200mm eccentricity (Ground & Under-ground) 4-mound
■For low & middle pressure / for high pressure

Standard issue

■Max. operating pressure : Please see the maximum operating pressure in the chart on the right.
The structure designed for underground installation is used for negative pressure.
Please contact us when using this product under the pressure that exceeds the maximum operating pressure for individual examination of the structure.
■Max. operating temperature : −10℃~60℃
■When applying for under-ground use, please install the joint in depth of 1M ~ 3M. Maximum Car weight is 25 Ton.
■Please contact us if gas is flowing through the pipe because the highest operating pressure becomes different.
■Solid type tube with straight inner surface is also avaibable to prevent fluids such as filthy water or powder from settling.
■Please use a model with a control unit (tie rod bolt type) to regulate the thrust in the axial direction that is generated by the internal pressure and to prevent excessive deflection.
Also, please use a model with a control unit (set bolt type) to adjust the face-to-face dimension during installation. (Please see P25.)

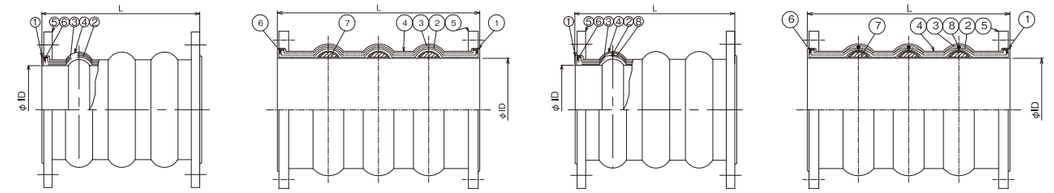
(1) This product cannot be used in areas with repeated and frequent pressure changes, such as the delivery side of pressurizing or pressure boosting water pumps.
(2) This product cannot be used with fluids or areas of installation that might lower the elasticity of rubber.
Please contact us because use of this product in such conditions needs to be examined.

Handling instructions

■This product generates reactive force due to the load of the inner pressure. Thus, fixing points or supports are required for installed pipes. (Please see p. 26-28.)
■Please see p. 26-28 for other cautions.

Structure

Ground use(cavity type) | Ground use(solid type) | Under-ground use(cavity type) | Under-ground use(solid type)



No.	Name	Material	No.	Name	Material
1	Inner rubber	Synthetic rubber	5	Flange	SS400、SUS304 etc.
2	Reinforcement layer	Synthetic fiber	6	End-ring	SS400
3	Reinforcement layer	Synthetic fiber	7	Fill-up rubber	Synthetic rubber
4	Outer rubber	Synthetic rubber	8	Reinforcing ring	SS400

Please see “Rubber selection guide” in p.25 for selecting the material of inner rubber.

■The standard product uses the JIS10K flange. Flanges with other specification, such as JIS5K, JIS20K, tap water, JPI, ANSI can also be used.
■Besides the standard products SS400 and SUS304, acceptable materials of the flange include SUS316, SUS316L and S25C.
■Hot-dip galvanization (Zn plating) is the standard for SS400 flange to be used above the ground, and paint consisting of black epoxy resin for underground installation. Painted materials are also available.

Size

NB	ϕID [mm]	For 100mm eccentricity(3-mound)			For 200mm eccentricity(4-mound)			Max. operating pressure		
								inner pressure [Mpa]		vacuum pressure [kPa]
		L [mm]	expansion [mm]	contraction [mm]	L [mm]	expansion [mm]	contraction [mm]	low·mid pressure	high pressure	under-ground
20A	19	350	24	30	450	24	30	0.50	1.00	-90
25A	25	350	24	30	450	24	30	0.50	1.00	-90
32A	32	350	24	30	450	24	30	0.50	1.00	-90
40A	38	350	40	60	450	40	60	0.50	1.00	-90
50A	51	350	40	60	450	40	60	0.50	1.00	-90
65A	64	350	40	60	450	40	60	0.50	1.00	-90
80A	76	350	40	60	450	40	60	0.50	1.00	-90
100A	102	350	40	60	450	40	60	0.50	1.00	-90
125A	127	350	40	60	450	40	60	0.50	1.00	-90
150A	152	500	40	60	600	40	60	0.50	1.00	-90
200A	203	500	40	60	600	40	60	0.50	1.00	-90
250A	254	500	40	60	600	40	60	0.50	1.00	-90
300A	305	550	40	60	650	40	60	0.50	1.00	-90
350A	356	550	50	70	650	50	70	0.50	1.00	-90
400A	406	550	50	70	650	50	70	0.50	1.00	-90
450A	457	550	50	70	650	50	70	0.50	1.00	-90
500A	508	550	50	70	650	50	70	0.50	1.00	-90
550A	559	550	50	70	650	50	70	0.25	0.75	-90
600A	610	550	50	70	650	50	70	0.25	0.75	-90
650A	660	650	50	70	750	50	70	0.25	0.75	-90
700A	711	650	50	70	750	50	70	0.25	0.75	-90
800A	813	650	50	70	750	50	70	0.25	0.50	-90
900A	914	650	50	70	750	50	70	0.25	0.50	-90
1000A	1016	700	50	70	800	50	70	0.25	0.50	-90

■Solid type is used for all arch structures with 32A or smaller. (Please see p. 25.)
■The deflection for 40A or larger is the value when the arch structure is the cavity type. Please obtain the deflection for the solid type by multiplying the value in the chart above by 0.5 for compression or 0.6 for extension. (The value of the eccentricity remains the same.)
■Please contact us for details of individual deflection when using diagonal pipes, since they differ from the above values.
■Please make sure that deflections remain within permissible deflections during operation.
■The deflections in the chart indicate individual deflections. Corrections are necessary for combined deflections. Please see p. 26 for the method of correction.

K-FLEX Rubber Flexible Tube

K-FLEX

Large displacement absorption type for protecting pipes against uneven cave-in caused by earthquake or soft ground, or against themal expansion and contraction caused by temperature change.

Feature

■High pressure resistance

The main unit is reinforced with durable synthetic fibers and steel wires.

■Large eccentricity

The internal arch structure is effective for absorbing uneven settlement that occurs in situations, such as connecting pipes between buildings with different foundations.
High freedom in design due to the short face-to-face dimension.

Usage

Pipes for tap water and sewer | Pipes for general factory facilities | Pipes in pump stations | Pipes in sewage treatment plants

Kind

■For 100mm eccentricity (Ground & Under-ground) 3-mound ■For 200mm eccentricity (Ground & Under-ground) 4-mound
■For low pressure / for high pressure

Standard issue

■Max. operating pressure : Please see the maximum operating pressure in the chart on the right.
Please use a structure designed for underground installation when the operating negative pressure exceeds the chart on the right. The structure designed for underground installation is operable under the pressure up to −90 kPa.
Please contact us when using this product under the pressure that exceeds the maximum operating pressure for individual examination of the structure.
■Max. operating temperature : −10℃~60℃
■When applying for under-ground use, please install the joint in depth of 1M ~ 3M. Maximum Car weight is 25 Ton.
■Please contact us if gas is flowing through the pipe because the highest operating pressure becomes different.
■Solid type tube with straight inner surface is also avaibable to prevent fluids such as filthy water or powder from settling.
■Please use a model with a control unit (tie rod bolt type) to regulate the thrust in the axial direction that is generated by the internal pressure and to prevent excessive deflection.
Also, please use a model with a control unit (set bolt type) to adjust the face-to-face dimension during installation. (Please see P25.)

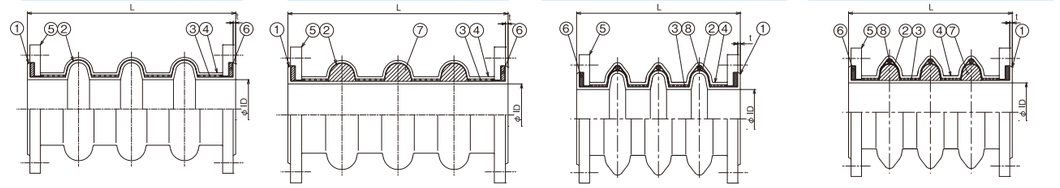
(1) This product cannot be used in areas with repeated and frequent pressure changes, such as the delivery side of pressurizing or pressure boosting water pumps.
(2) This product cannot be used with fluids or areas of installation that might lower the elasticity of rubber. Please contact us because use of this product in such conditions needs to be examined.

Handling instructions

■This product generates reactive force due to the load of the inner pressure. Thus, fixing points or supports are required for installed pipes. (Please see p. 26-28.)
■Please see p. 26-28 for other cautions.

Structure

Ground use(cavity type) | Ground use(solid type) | Under-ground use(cavity type) | Under-ground use(solid type)



No.	Name	Material	No.	Name	Material
1	Inner rubber	Synthetic rubber	5	Flange	SS400、SUS304 etc.
2	Reinforcement layer	Synthetic fiber	6	End-ring	SS400
3	Reinforcement layer	Steel wire or synthetic fiber	7	Fill-up rubber	Synthetic rubber
4	Outer rubber	Synthetic rubber	8	Reinforcing ring	SS400

Please see “Rubber selection guide” in p.25 for selecting the material of inner rubber.

■The standard product uses the JIS10K flange. Flanges with other specification, such as JIS5K, JIS20K, tap water, JPI, ANSI can also be used.
■Besides the standard products SS400 and SUS304, acceptable materials of the flange include SUS316, SUS316L and S25C.
■Hot-dip galvanization (Zn plating) is the standard for SS400 flange to be used above the ground, and paint consisting of black epoxy resin for underground installation. Painted materials are also available.
■Rounding work is done on the inner diameter of the opening of 25A or smaller.

Size

NB	ϕID [mm]	t [mm]	For 100mm eccentricity(3-mound)				For 200mm eccentricity(4-mound)				Max. operating pressure		
											inner pressure [Mpa]		vacuum pressure [kPa]
			L [mm]	expansion [mm]	contraction [mm]	mass [kg]	L [mm]	expansion [mm]	contraction [mm]	mass [kg]	low pressure	high pressure	under-ground
20A	19	2	350	18	22	1.9	450	18	22	2.0	—	1.00	-60
25A	25	2	350	18	22	2.8	450	18	22	3.0	—	1.00	-60
32A	32	2	350	18	22	3.8	450	18	22	4.0	—	1.00	-60
40A	38	2	350	18	22	4.1	450	18	22	4.4	—	1.00	-60
50A	51	3	350	30	45	4.9	450	30	45	5.2	—	1.00	-60
65A	64	3	350	30	45	7.0	450	30	45	7.5	—	1.00	-60
80A	76	3	350	30	45	7.3	450	30	45	7.9	—	1.00	-60
100A	102	3	350	45	60	9.0	450	45	60	9.8	—	1.00	-60
125A	127	3	350	45	60	12.9	450	45	60	14.0	—	1.00	-60
150A	152	3	500	60	60	18.5	600	60	60	19.8	—	1.00	-60
200A	203	3	500	60	60	22.6	600	60	60	24.2	—	1.00	-60
250A	254	3	500	60	60	31.7	600	60	60	33.8	—	1.00	-60
300A	305	3	550	60	60	38.2	650	60	60	40.8	0.50	1.00	-40
350A	350	3	550	60	60	47.7	650	60	60	50.7	0.50	1.00	-40
400A	400	3	550	60	60	64.0	650	60	60	67.6	0.50	1.00	-40
450A	450	3	550	60	60	78.6	650	60	60	82.7	0.50	1.00	-40
500A	500	3	550	60	60	89.2	650	60	60	94.0	0.50	1.00	-40
550A	550	3	550	60	60	110.2	650	60	60	115.3	0.25	0.75	-30
600A	600	3	550	60	60	117.9	650	60	60	123.7	0.25	0.75	-30
650A	650	3	650	60	60	137.5	750	60	60	143.7	0.25	0.75	-30
700A	700	3	650	60	60	162.1	750	60	60	169.0	0.25	0.75	-30
750A	750	3	650	60	60	194.2	750	60	60	201.9	0.25	0.75	-30
800A	800	3	650	60	60	216.4	750	60	60	224.8	0.25	0.50	-30
850A	850	3	650	60	60	225.3	750	60	60	234.2	0.25	0.50	-30
900A	900	3	650	60	60	232.0	750	60	60	241.4	0.25	0.50	-30
1000A	1000	3	650	60	60	282.4	750	60	60	293.2	0.25	0.50	-30

■Solid type is used for all arch structures with 40A or smaller. (Please see p. 25.)
■The deflection for 50A or larger is the value when the arch structure is the cavity type. Please obtain the deflection for the solid type by multiplying the value in the chart above by 0.5 for compression or 0.6 for extension. (The value of the eccentricity remains the same.)
■Please contact us for details of individual deflection when using diagonal pipes, since they differ from the above values.
■Please make sure that deflections remain within permissible deflections during operation.
■The deflections in the chart indicate individual deflections. Corrections are necessary for combined deflections. Please see p. 26 for the method of correction.

N-FLEX Low reactive force type Rubber Flexible Tube

N-FLEX

Flexible tube for low reactive force type
The reactive force during deflection is about half of K-Flex.

Feature

- The low reactive force during deflection does not damage pipes.

Usage

Pipes that require low reactive force	Resin pipes, such as PVC

Kind

- For 100mm eccentricity (Ground & Under-ground) 3-mound
- For 200mm eccentricity (Ground & Under-ground) 4-mound

Standard issue

- Max. operating pressure : Please see the maximum operating pressure in the chart on the right. Please use a structure designed for underground installation when the operating negative pressure exceeds the chart on the right. The structure designed for underground installation is operable under the pressure up to -90 kPa.
- Max. operating temperature : −10℃~60℃
- When applying for under-ground use, please install the joint in depth of 1M ~ 3M. Maximum Car weight is 25 Ton.
- Please contact us if gas is flowing through the pipe because the highest operating pressure becomes different.
- Solid type tube with straight inner surface is also avaibable to prevent fluids such as filthy water or powder from settling.
- Please use a model with a control unit (tie rod bolt type) to regulate the thrust in the axial direction that is generated by the internal pressure and to prevent excessive deflection.
  Also, please use a model with a control unit (set bolt type) to adjust the face-to-face dimension during installation. (Please see P25.)

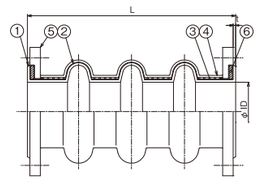
(1) This product cannot be used in areas with repeated and frequent pressure changes, such as the delivery side of pressurizing or pressure boosting water pumps.
(2) This product cannot be used with fluids or areas of installation that might lower the elasticity of rubber. Please contact us because use of this product in such conditions needs to be examined.

Handling instructions

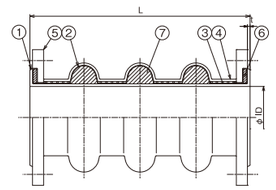
- This product generates reactive force due to the load of the inner pressure. Thus, fixing points or supports are required for installed pipes. (Please see p. 26-28.)
- Please see p. 26-28 for other cautions.

Structure

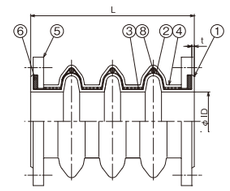
Ground use(cavity type)



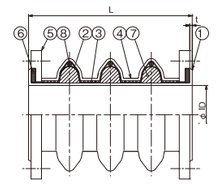
Ground use(solid type)



Under-ground use(cavity type)



Under-ground use(solid type)



No.	Name	Material	No.	Name	Material
1	Inner rubber	Synthetic rubber	5	Flange	SS400、SUS304 etc.
2	Reinforcement layer	Synthetic fiber	6	End-ring	SS400
3	Reinforcement layer	Steel wire or synthetic fiber	7	Fill-up rubber	Synthetic rubber
4	Outer rubber	Synthetic rubber	8	Reinforcing ring	SS400

Please see “Rubber selection guide” in p.25 for selecting the material of inner rubber.

- The standard product uses the JIS10K flange. Flanges with other specification, such as JIS5K, JIS20K, tap water, JPI, ANSI can also be used.
- Besides the standard products SS400 and SUS304, acceptable materials of the flange include SUS316, SUS316L and S25C.
- Hot-dip galvanization (Zn plating) is the standard for SS400 flange to be used above the ground, and paint consisting of black epoxy resin for underground installation. Painted materials are also available.

Size

NB	φID [mm]	t [mm]	For 100mm eccentricity(3-mound)				For 200mm eccentricity(4-mound)				Max. operating pressure	
			L [mm]	expansion [mm]	contraction [mm]	mass [kg]	L [mm]	expansion [mm]	contraction [mm]	mass [kg]	inner pressure [Mpa]	vacuum pressure [kPa]
50A	51	3	350	30	45	4.9	450	30	45	5.2	0.50	-40
65A	64	3	350	30	45	7.0	450	30	45	7.5	0.50	-40
80A	76	3	350	30	45	7.3	450	30	45	7.9	0.50	-40
100A	102	3	350	45	60	9.0	450	45	60	9.8	0.50	-40
125A	127	3	350	45	60	12.9	450	45	60	14.0	0.50	-40
150A	152	3	500	60	60	18.5	600	60	60	19.8	0.50	-40
200A	203	3	500	60	60	22.6	600	60	60	24.2	0.50	-40
250A	254	3	500	60	60	31.7	600	60	60	33.8	0.50	-40
300A	305	3	550	60	60	38.2	650	60	60	40.8	0.25	-30
350A	350	3	550	60	60	47.7	650	60	60	50.7	0.25	-30
400A	400	3	550	60	60	64.0	650	60	60	67.6	0.25	-30
450A	450	3	550	60	60	78.6	650	60	60	82.7	0.25	-30
500A	500	3	550	60	60	89.2	650	60	60	94.0	0.25	-30

- The deflection is the value when the arch structure is the cavity-type. Please obtain the deflection for the solid type by multiplying the value in the chart above by 0.5 for compression or 0.6 for extension. (The value of the eccentricity remains the same.)
- Please contact us for details of individual deflection when using diagonal pipes, since they differ from the above values.
- Please make sure that deflections remain within permissible deflections during operation.
- The deflections in the chart indicate individual deflections. Corrections are necessary for combined deflections. Please see p. 26 for the method of correction.

B-FLEX Rubber Flexible Joint

B-FLEX

Multi-purpose type with arch structure that absorbs the deflection and eccentricity of pipes that are caused by temperature changes

Feature

- The arch structure of the body produces large deflection.
- The low reactive force in the axial direction enables easy installation on pipes.

Usage

Pipes for general factory facilities | Chemical plants | Pipes of pumps and blowers | Pipes for ships and vessels | Sewage treatment plants

Kind

- Single mound type(Ground & Under-ground)
- Two-mound type(Ground & Under-ground)
- For low pressure / for high pressure

Standard issue

- Max. operating pressure : Please see the maximum operating pressure in the chart on the right.
  The structure designed for underground installation is used for negative pressure.
  Please contact us when using this product under the pressure that exceeds the maximum operating pressure for individual examination of the structure.
- Max. operating temperature : −10℃~60℃
- When applying for under-ground use, please install the joint in depth of 1M ~ 3M. Maximum Car weight is 25 Ton.
- Please contact us if gas is flowing through the pipe because the highest operating pressure becomes different.
- Solid type tube with straight inner surface is also avaibable to prevent fluids such as filthy water or powder from settling.
- Please use a model with a control unit (tie rod bolt type) to regulate the thrust in the axial direction that is generated by the internal pressure and to prevent excessive deflection.
  Also, please use a model with a control unit (set bolt type) to adjust the face-to-face dimension during installation. (Please see P25.)

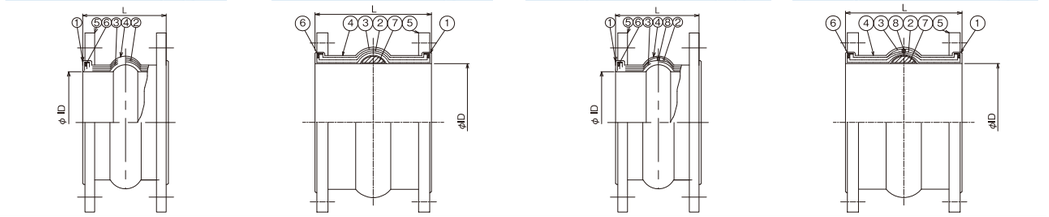
(1) This product cannot be used in areas with repeated and frequent pressure changes, such as the delivery side of pressurizing or pressure boosting water pumps.
(2) This product cannot be used with fluids or areas of installation that might lower the elasticity of rubber.
Please contact us because use of this product in such conditions needs to be examined.

Handling instructions

- This product generates reactive force due to the load of the inner pressure. Thus, fixing points or supports are required for installed pipes. (Please see p. 26-28.)
- Please see p. 26-28 for other cautions.

Structure

Ground use(cavity type) | Ground use(solid type) | Under-ground use(cavity type) | Under-ground use(solid type)



No.	Name	Material	No.	Name	Material
1	Inner rubber	Synthetic rubber	5	Flange	SS400、SUS304 etc.
2	Reinforcement layer	Synthetic fiber	6	End-ring	SS400
3	Reinforcement layer	Synthetic fiber	7	Fill-up rubber	Synthetic rubber
4	Outer rubber	Synthetic rubber	8	Reinforcing ring	SS400

Please see "Rubber selection guide" in p.25 for selecting the material of inner rubber.

- The standard product uses the JIS10K flange. Flanges with other specification, such as JIS5K, JIS20K, tap water, JPI, ANSI can also be used.
- Besides the standard products SS400 and SUS304, acceptable materials of the flange include SUS316, SUS316L and S25C.
- Hot-dip galvanization (Zn plating) is the standard for SS400 flange to be used above the ground, and paint consisting of black epoxy resin for underground installation. Painted materials are also available.

Size

NB	ϕID [mm]	Single mound type				Two-mound type				Max. operating pressure		
		L [mm]	expansion [mm]	contraction [mm]	eccentricity [mm]	L [mm]	expansion [mm]	contraction [mm]	eccentricity [mm]	inner pressure [Mpa] low·mid pressure	inner pressure [Mpa] hight pressure	vacuum pressure [kPa] under-ground
20A	19	150	9	10	20	250	18	23	50	0.50	1.00	-90
25A	25	150	9	10	20	250	18	23	50	0.50	1.00	-90
32A	32	150	9	10	20	250	18	23	50	0.50	1.00	-90
40A	38	150	15	20	20	250	30	45	50	0.50	1.00	-90
50A	51	150	15	20	20	250	30	45	50	0.50	1.00	-90
65A	64	150	15	20	20	250	30	45	50	0.50	1.00	-90
80A	76	150	20	20	20	300	30	45	50	0.50	1.00	-90
100A	102	150	20	20	20	300	30	45	50	0.50	1.00	-90
125A	127	150	20	20	20	300	30	45	50	0.50	1.00	-90
150A	152	200	20	20	20	300	30	45	50	0.50	1.00	-90
200A	203	200	20	20	20	300	30	45	50	0.50	1.00	-90
250A	254	200	20	20	20	300	30	45	50	0.50	1.00	-90
300A	305	200	20	20	20	300	30	45	50	0.50	1.00	-90
350A	356	200	25	25	20	350	40	50	50	0.50	1.00	-90
400A	406	200	25	25	20	350	40	50	50	0.50	1.00	-90
450A	457	200	25	25	20	350	40	50	50	0.50	1.00	-90
500A	508	250	25	25	20	350	40	50	50	0.50	1.00	-90
550A	559	250	25	25	20	400	40	50	50	0.25	0.75	-90
600A	610	250	25	25	20	400	40	50	50	0.25	0.75	-90
650A	660	250	25	25	20	400	40	50	50	0.25	0.75	-90
700A	711	250	25	25	20	400	40	50	50	0.25	0.75	-90
800A	813	300	25	25	20	400	40	50	50	0.25	0.75	-90
900A	914	300	25	25	20	400	40	50	50	0.25	0.50	-90
1000A	1016	300	25	25	20	450	40	50	50	0.25	0.50	-90

- Solid type is used for all arch structures with 32A or smaller. (Please see p. 25.)
- The deflection for 40A or larger is the value when the arch structure is the cavity type. Please obtain the deflection for the solid type by multiplying the value in the chart above by 0.5 for compression or 0.6 for extension. (The value of the eccentricity remains the same.)
- Please contact us for details of individual deflection when using diagonal pipes, since they differ from the above values.
- Please make sure that deflections remain within permissible deflections during operation.
- The deflections in the chart indicate individual deflections. Corrections are necessary for combined deflections. Please see p. 26 for the method of correction.

E-FLEX Rubber Flexible Joint

E-FLEX

Multi-purpose type with arch structure that absorbs the deflection and eccentricity of pipes that are caused by temperature changes

Feature

- The arch structure of the body produces large deflection.
- The low reactive force in the axial direction enables easy installation on pipes.

Usage

Pipes for general factory facilities | Chemical plants | Pipes of pumps and blowers | Pipes for ships and vessels | Sewage treatment plants

Kind

- Single mound type(Ground & Under-ground)
- Two-mound type(Ground & Under-ground)
- For low pressure / for high pressure

Standard issue

- Max. operating pressure : Please see the maximum operating pressure in the chart on the right.
  Please use a structure designed for underground installation when the operating negative pressure exceeds the chart on the right. The structure designed for underground installation is operable under the pressure up to -90 kPa.
  Please contact us when using this product under the pressure that exceeds the maximum operating pressure for individual examination of the structure.
- Max. operating temperature : −10℃~60℃
- When applying for under-ground use, please install the joint in depth of 1M ~ 3M. Maximum Car weight is 25 Ton.
- Please contact us if gas is flowing through the pipe because the highest operating pressure becomes different.
- Solid type tube with straight inner surface is also avaibable to prevent fluids such as filthy water or powder from settling.
- Please use a model with a control unit (tie rod bolt type) to regulate the thrust in the axial direction that is generated by the internal pressure and to prevent excessive deflection.
  Also, please use a model with a control unit (set bolt type) to adjust the face-to-face dimension during installation. (Please see P25.)

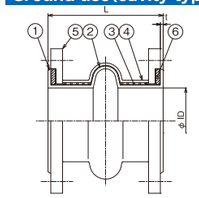
(1) This product cannot be used in areas with repeated and frequent pressure changes, such as the delivery side of pressurizing or pressure boosting water pumps.
(2) This product cannot be used with fluids or areas of installation that might lower the elasticity of rubber.
Please contact us because use of this product in such conditions needs to be examined.

Handling instructions

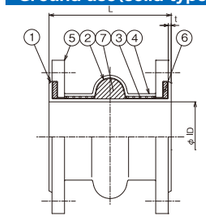
- This product generates reactive force due to the load of the inner pressure. Thus, fixing points or supports are required for installed pipes. (Please see p. 26-28.)
- Please see p. 26-28 for other cautions.

Structure

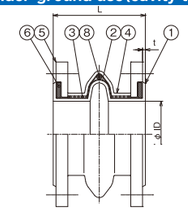
Ground use(cavity type)



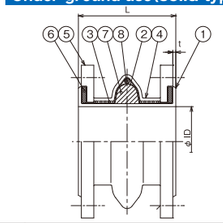
Ground use(solid type)



Under-ground use(cavity type)



Under-ground use(solid type)



No.	Name	Material	No.	Name	Material
1	Inner rubber	Synthetic rubber	5	Flange	SS400、SUS304 etc.
2	Reinforcement layer	Synthetic fiber	6	End-ring	SS400
3	Reinforcement layer	Steel wire or synthetic fiber	7	Fill-up rubber	Synthetic rubber
4	Outer rubber	Synthetic rubber	8	Reinforcing ring	SS400

Please see "Rubber selection guide" in p.25 for selecting the material of inner rubber.

- The standard product uses the JIS10K flange. Flanges with other specification, such as JIS5K, JIS20K, tap water, JPI, ANSI can also be used.
- Besides the standard products SS400 and SUS304, acceptable materials of the flange include SUS316, SUS316L and S25C.
- Hot-dip galvanization (Zn plating) is the standard for SS400 flange to be used above the ground, and paint consisting of black epoxy resin for underground installation. Painted materials are also available.
- Rounding work is done on the inner diameter of the opening of 25A or smaller.

Size

NB	φID [mm]	t [mm]	Single mound type					Two-mound type					Max. operating pressure		
			L [mm]	expansion [mm]	contraction [mm]	eccentricity [mm]	mass [kg]	L [mm]	expansion [mm]	contraction [mm]	eccentricity [mm]	mass [kg]	inner pressure [Mpa] low pressure	inner pressure [Mpa] high pressure	vacuum pressure [kPa]
20A	19	2	150	6	7	20	1.6	250	12	15	40	1.6	—	1.00	-60
25A	25	2	150	6	7	20	2.5	250	12	15	40	2.5	—	1.00	-60
32A	32	2	150	6	7	20	3.3	250	12	15	40	3.3	—	1.00	-60
40A	38	2	150	6	7	20	3.5	250	12	15	40	3.5	—	1.00	-60
50A	51	3	150	10	15	20	4.2	250	20	30	40	4.7	—	1.00	-60
65A	64	3	150	10	15	20	5.9	250	20	30	40	6.4	—	1.00	-60
80A	76	3	150	10	15	20	6.1	250	20	30	40	6.7	—	1.00	-60
100A	102	3	150	15	20	30	7.3	250	30	40	60	8.2	—	1.00	-60
125A	127	3	150	15	20	30	10.9	250	30	40	60	11.9	—	1.00	-60
150A	152	3	200	20	20	30	14.9	300	40	40	60	16.1	—	1.00	-60
200A	203	3	200	20	20	30	17.8	300	40	40	60	19.5	—	1.00	-60
250A	254	3	200	25	25	30	25.7	300	50	50	60	27.8	—	1.00	-60
300A	305	3	200	25	25	30	29.7	300	50	50	60	32.3	0.50	1.00	-40
350A	350	3	250	25	25	30	39.1	400	50	50	60	43.4	0.50	1.00	-40
400A	400	3	250	25	25	30	54.0	400	50	50	60	59.0	0.50	1.00	-40
450A	450	3	250	25	25	30	67.1	400	50	50	60	72.8	0.50	1.00	-40
500A	500	3	250	25	25	30	76.1	400	50	50	60	82.7	0.50	1.00	-40
550A	550	3	250	25	25	30	96.1	400	50	50	60	103.1	0.25	0.75	-30
600A	600	3	300	25	25	30	104.3	500	50	50	60	114.3	0.25	0.75	-30
650A	650	3	300	25	25	30	118.2	500	50	50	60	129.0	0.25	0.75	-30
700A	700	3	300	25	25	30	140.9	500	50	50	60	152.8	0.25	0.75	-30
750A	750	3	300	25	25	30	171.0	500	50	50	60	184.0	0.25	0.75	-30
800A	800	3	300	25	25	30	190.1	500	50	50	60	204.8	0.25	0.50	-30
850A	850	3	300	25	25	30	197.4	500	50	50	60	213.0	0.25	0.50	-30
900A	900	3	300	25	25	30	202.5	500	50	50	60	219.0	0.25	0.50	-30
1000A	1000	3	300	25	25	30	245.0	500	50	50	60	263.7	0.25	0.50	-30

- Solid type is used for all arch structures with 40A or smaller. (Please see p. 25.)
- The deflection for 50A or larger is the value when the arch structure is the cavity type. Please obtain the deflection for the solid type by multiplying the value in the chart above by 0.5 for compression or 0.6 for extension. (The value of the eccentricity remains the same.)
- Please contact us for details of individual deflection when using diagonal pipes, since they differ from the above values.
- Please make sure that deflections remain within permissible deflections during operation.
- The deflections in the chart indicate individual deflections. Corrections are necessary for combined deflections. Please see p. 26 for the method of correction.

Rubber selection guide

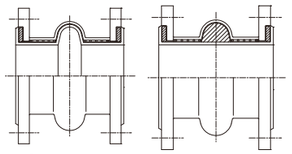
○:Are suitable △:By conditions ×:Cannot be used

Required performance \ Rubber type	**EPDM** Ethylene propylene rubber	**CR** Chloroprene rubber (neoprene)	**NBR** Nitrile-butadiene rubber	**NR** natural rubber
Heat resistance	○	○	△	△
Cold resistance	○	△	△	○
Solvent resistance	×	×	△	×
Oil resistance	×	○	◎	×
Acid resistance	○	○	×	○
Alkaline resistance	◎	◎	△	○
Weather esistance	◎	○	△	△
Abrasion resistance	△	△	○	◎

This chart is a guideline for selecting materials. Please contact us for detail.

Arch structure

This refers to the internal structure of the arch part of expansion joints and flexible tubes.
[Cavity type] with the internal void structure and [solid type] that is filled with soft rubber are available. [Cavity type] is the standard.
[Solid type] is used when fluid contains solids, such as sludge.
※ Please take precautions that the deflection decreases for arches in solid types.
This refers to the bolt used for controlling face-to-face dimension that is attached to expansion joints or flexible tubes.



[Cavity type] [solid type]

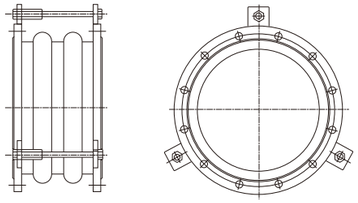
Control unit

Two types of bolts, including [set bolt] and [tie rod bolt] are available for different purposes.
※ Roval paint is used for the stay of the set bolt and tie rod bolt even when a flange with hot-dip galvanization is used.

Set bolt

This is used for adjusting the face-to-face dimension when installing a joint.
Please remove it after installation.

The set bolt is used to shorten the face-to-face dimension to make the installation of rubber joints to pipes easier.
Be sure to remove it after installation. The quantity of the set bolt varies depending on the diameter.

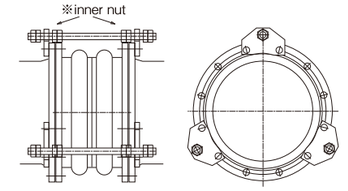


Tie-rod bolt

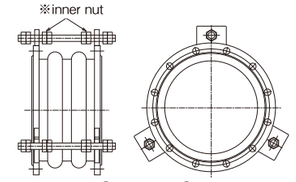
This is used to regulate the force in the axial direction that is generated by the internal pressure and to prevent excessive displacement.
The adapter type (standard) and stay type (individual order) are available.

No of tie-rod bolt varies on NB and pressure.

1. The rubber joint with arch structure generates the force (approximately cross-sectional area times the internal pressure) in the axial direction when pressure is being applied, and the face-to-face dimension increases. Force may be applied to pipes and surrounding devices in such cases. Thus, please provide a thorough support for the pipe or use a tie rod bolt.
2. In addition, a rubber joint may be destroyed when excessive deflection is applied. Thus, please use a tie rod bolt in such cases as well.
3. Please properly set the position of securing the nut of the tie rod bolt for the deflection (compression, extension, and eccentricity).
4. Adapter type requires a longer bolt at the adapter installation part. Please make sure that a proper bolt is provided during preparation.
5. Tie rod bolts are designed to suit actual operating pressure; thus, they may not necessarily match with the highest operating pressure described on the body of a rubber joint.
6. Please take precaution that the nut of a tie rod bolt is secured at a proper position for a deflection, and it may extend to the dimension of the deflection when pressure is being applied and apply pressure on pipes.
※The nut shown in the diagram is an optional part.



[Adaptor type]



[Stay type]

Note for Operation **Flexible Joint, Flexible Tube, Expansion Joint**

In order to use own products properly, please read the following manual carefully before installation.

Note of use

1. Check existence of damage on the body before use.
   Do not use the Joints if any damage is found out on the packing face, inner and outer rubber or Teflon.
2. About the range of use
   Use the Joints within allowable operating range in respects of maximum pressure and temperature.
   In case you use the Joints out of the range, it will cause extraordinary short of usable life, liquid leakage, etc.
3. Correction of deflection
   Allowable deflection on catalog shows individual maximum figure.
   In case of compound deflection, please correct the figure by following formula ;

$$X = X' \times \frac{Y' - Y}{Y'} \times \frac{\theta' - \theta}{\theta'}$$

X: Correction axial movement
X': Allowable axial movement
Y:Actual lateral deflection
Y':Allowable lateral deflection
θ:Actual angular deflection
θ':Allowable angular deflection

4. Before operating, please make sure the valve is open to avoid burst or damage of the Joint.
5. Do not operate(open) the valve suddenly/wildly, to avoid fluid rush.
6. We recommend you to use the Joint with fluid speed not faster than 3m/sec.
7. Do not apply the Joint where pressure changes frequently, such as at delivery side of the pressurizing pump, etc.

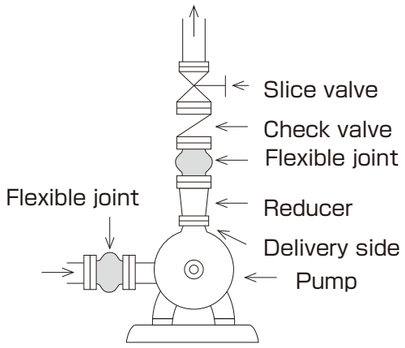
When the flange material is a vinyl chloride		
Size	Maximum operating pressure	Maximum operating temperature
20A～100A	0.5 MPa	55℃
125A～150A	0.25MPa	
200A～300A	0.2 MPa	

Note of storage

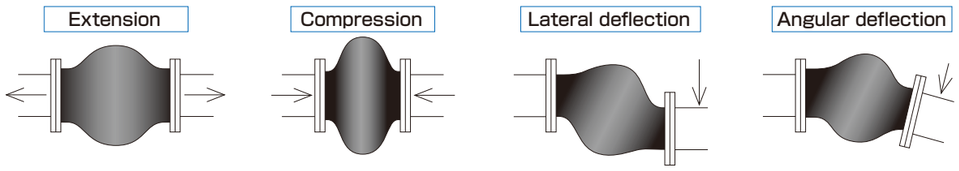
1. Pay attention not to damage the Joints during transportation and storage. If damaged, do not use them.
2. For a long time storage, avoid direct sunshine and store the Joints at cool and dark place.
3. Do not leave the Joints for a long time at the place where temperature is 40℃ or more, or excessively moist place.
4. Pay attention to keep off the Joints from fire.
5. Do not put load on the Joints.
6. Do not store the Joints at the place where organic solvents or oil might adhere.

■Note of installation

1〉As to positioning of Pump, Joint, and other parts, please refer to the sketch.
If Check valve is mistakenly installed between Pump and Joint, the Joint will be damaged by reverse flow pressure.
Install proper Pressure gauges on inlet side pipe before the Joint, and on outlet side pipe between the Joint and Check valve.
And always check loading pressure and its alteration.



2〉Please install the Joint to the pipe in the allowance of the Extension, Compression, Lateral deflection and Angular deflection.



3〉Estimating considerable transformation and deflection of the Joint,
install it keeping enough distance from surrounding equipments especially sharp corners.

4〉When fixing the Joint to pipe, get accurate dimension, positioning and alignment,
in order to avoid unnecessary pressure such as compression, extension, bending, or distortion.

5〉After installation, when you operate welding work near the Joint, put nonflammable protective cover on the Joint.
In case welding heat might transfer to the Joint, remove it from the installation.

6〉When using it outdoors, protect from Ultra-violet rays.

7〉In case the fluid temperature is 60℃ or higher, do not put Joint cover.

8〉Do not paint on the Joint.

9〉When fixing the Joint to Pipe, use hexagonal bolts.
Insert the bolt from Joint Body side and fasten the nut with spring washer. Fasten all the bolts evenly.

10〉The Joint will have reaction force due to inner pressure when operating.
Fix the pipes firmly especially near both ends of the Joint, so that the Joint can work in full performance.

11〉If the pipes cannot be fixed firm enough, you can apply tie-rod.
In this case, allowable deflections might be reduced depending on sizes

12〉If there are burrs, fliers, etc. on the piping or flange to be connected,
there is a possibility of damaging the
products. In the worst case there is a possibility of breakage of the
product or leakage of the fluid, etc.
So, please remove burrs and rolled-up parts before piping.

13〉Please use FF flange to the other piping side as much as possible to avoid damaging the seal face. When you use RF flange unavoidably, please apply a hard gasket like the joint-seat.

■Usable life

Life of the Joint varies by many factors, and cannot be specified exactly.

We set up the Standard Usable Life as follows under normal and average operation:

1〉Standard Usable Life : about 3 to 10 years

2〉Operation condition : ■Max. working temperature・・・Normal temperature (0~40°C)
■Max. working pressure・・・0. 98 MPa (IOkgf/㎠)
■Stop/start frequency・・・10~20 times/day
■Operating hours・・・Less than 10 hours/day
■Installation・・・Properly aligned and reasonable pipe installation with proper firm support.

Standard Usable Life will vary very much depending on installation, deflection load, operating hours, etc.
Therefore please consider it as rough reference.
Further, we would like to to ask you to execute inspection and maintenance, in order to judge the life properly and to avoid any accident.

■Factors to shorten the life

Please note that the life will be shortened by the following cases.

■When operated for a long time at high pressure near max. working pressure.

■When operated for a long time at high temperature near max. working temperature.

■When operated for more than 10 hours a day.

■When operated with big pressure variation.

■In case of outdoors use, when operated for a long time without putting cover.

■When operated at max. allowable angle deflection.

■Inspection for maintenance

Usable life of the Joint differs depending on operation condition.
After the usable life, some improper condition like leakage may happen.
In order to find out abnormal condition in early stage, we would like to ask you to execute inspection and maintenance.

(1)Kinds and time of inspection

1.Completion inspection ------When completed.
Check and record that it is properly installed under reasonable operating condition.

2.Usual inspection------Not less than twice a year.
To find out abnormality earlier and avoid any accident, check the Joint, its operating condition, and installation.

3.Terminal inspection
5 years after completion, check to find any defects which were not found by normal inspection, and confirm endurance of the Joint.

4.Emergency inspection
In case of Earth quake, Fire, or Water flood, immediately inspect the Joint whether any abnormality occurred or not.
Also execute same inspection when any abnormality is found out by Usual inspection.

Temperature, Pressure and Deflection will vary the length of Joint Life.
After the Usable life, some improper condition like leakage may happen.
You are strongly required to carry out the following matters :

1.Usual inspection
Check the Joint at least once in a half year and confirm whether there is any abnormality.

2.Basis of Replacement
If the following abnormality is found out, stop operation and replace the Joint immediately.

(1)Fluid leakage
(2)Damage/Flaw on Joint
(3)Deformation on Joint
(4)Remarkable corrosion on whole round of Flange
(5)Movement exceeding allowable deflection of the Joint during operation

■Guarantee

Guarantee period of this Joint is one year after delivery.

Please note that the following cases are out of guarantee :

1.Accident and damage caused by incorrect installation, incorrect operation, repair,and reconstruction.

2.Accident and damage caused by natural disaster such as Fire or Earthquake.

3.Accident and damage caused by transportation after purchase or improper storage.

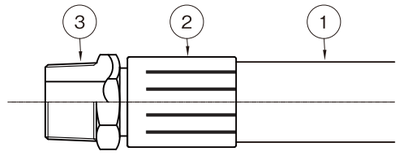
Rubber flexible hose

DG-01 Hex. Nipple(fixed)

Structure
- A nipple is attached on a hose using a press cover (secured type)
- A shape that is secured using a hose band can be produced for low-pressure uses.

Application
- Please take precaution that proper fluid, operating pressure, and operating temperature vary for different types of hoses.
- Please see p.31-32 for selection criteria.

No.	Name	Material
1	Rubber hose	Synthetic rubber(with hard steel wire)
2	Press cover	SS400、SUS304
3	Nipple	SS400、SUS304 etc.



- Available NB : 3A~100A(Please contact us for hose specifications for 80A or larger.)
- Different types of braides can be attached on the exterior of a flexible hose for different purposes, including protection from external damages and insulation.
  - ・Stainless steel wire braid
  - ・Heat reistant glass braid
  - ・Kynol or Kevlar braid

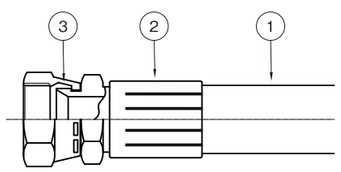
※Stainless wire braides and heat-resistant glass braides can be combined as well.
- Please see p.33-34 for other cautions.

DG-04(counter-seat type) / DG-05 Metal Touch(loose)

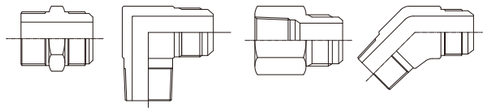
Structure
- Hose fixed with sleeve and cap nut by using press cover. Usually applied with tip adaptor.
- For low pressure application, we can produce hose band fixing type.

Application
- Please take precaution that proper fluid, operating pressure, and operating temperature vary for different types of hoses.
- Please see p.31-32 for selection criteria.

DG-04

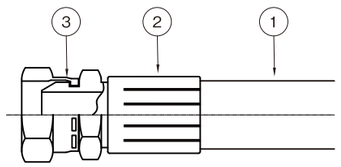


④ Tip adaptor for DG-04

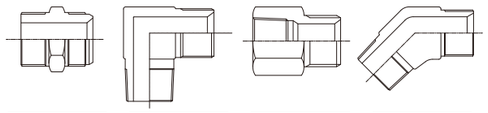


DG-13	DG-33	DG-17	DG-35
Male adaptor	90° Elbow Male adaptor	Female adaptor	45° Elbow Male adaptor

DG-05



④ Tip adaptor for DG-05



DG-09	DG-34	DG-07	DG-36
Male adaptor	90° Elbow Male adaptor	Female adaptor	45° Elbow Male adaptor

No.	Name	Material
1	Rubber hose	Synthetic rubber(with hard steel wire)
2	Press cover	SS400、SUS304
3	Union nut	SS400、SUS304 etc.
4	Tip adaptor	SS400、SUS304 etc.

- Available NB : 3A~80A(Please contact us for hose specifications for 80A or larger.)
- Different types of braides can be attached on the exterior of a flexible hose for different purposes, including protection from external damages and insulation.
  - ・Stainless steel wire braid
  - ・Heat reistant glass braid
  - ・Kynol or Kevlar braid

※Stainless wire braides and heat-resistant glass braides can be combined as well.
- Please see p.33-34 for other cautions.

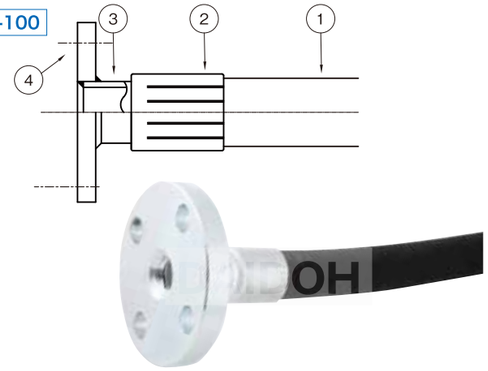
Metal fittings other than the following model numbers can be produced. Please contact us for detail.

DG-100(fixed type) / DG-200(loose type) Flange type

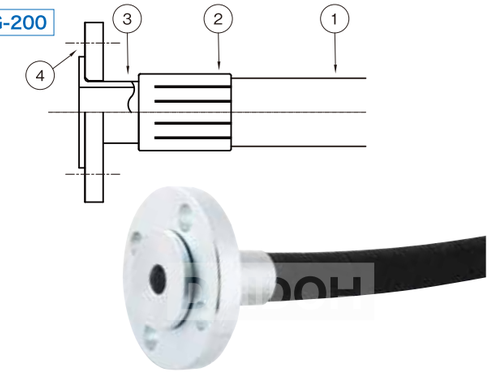
Structure
- A flange complied with JIS standard (e.g. 5K, 10K, 20K, 30K), JPI, ANSI standard (150LB, 300LB) is attached on a hose using a press cover.
- A shape that is secured using a hose band can be produced for low-pressure uses. Please check diameters, for some diameters using bandless types.

Application
- Please take precaution that proper fluid, operating pressure, and operating temperature vary for different types of hoses.
- Please see p.31-32 for selection criteria.

DG-100



DG-200



No.	Name	Material
1	Rubber hose	Synthetic rubber(with hard steel wire)
2	Press cover	SS400、SUS304
3	Pipe end, Lap joint	SS400、SUS304 etc.
4	Flange	SS400、SUS304 etc.

- Available NB : 3A~80A(Please contact us for hose specifications for 80A or larger.)
- Different types of braides can be attached on the exterior of a flexible hose for different purposes, including protection from external damages and insulation.
  - ・Stainless steel wire braid
  - ・Heat reistant glass braid
  - ・Kynol or Kevlar braid

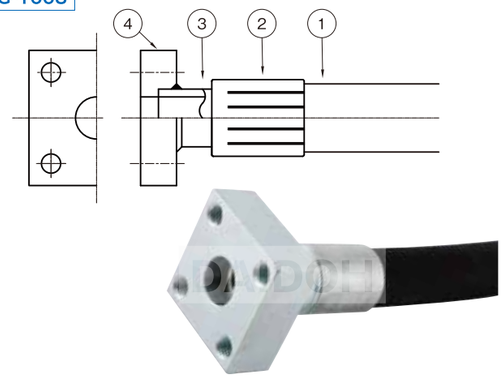
※Stainless wire braides and heat-resistant glass braides can be combined as well.
- Please see p.33-34 for other cautions.

DG-S100(fixed type) / DG-S200(loose type) Angular flange type

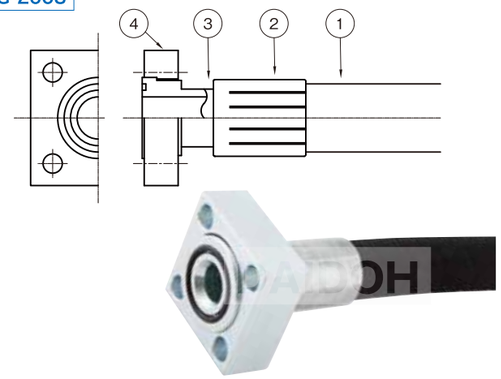
Structure
- Hydraulic 21 MPa (210K) angle flanges or others are attached on a hose using press covers.

Application
- Please take precaution that proper fluid, operating pressure, and operating temperature vary for different types of hoses.
- Please see p.31-32 for selection criteria.

DG-100S



DG-200S



No.	Name	Material
1	Rubber hose	Synthetic rubber(with hard steel wire)
2	Press cover	SS400、SUS304
3	Pipe end, Lap joint	SS400、SUS304 etc.
4	Flange	SS400、SUS304 etc.

- Available NB : 3A~80A(Please contact us for hose specifications for 80A or larger.)
- Different types of braides can be attached on the exterior of a flexible hose for different purposes, including protection from external damages and insulation.
  - ・Stainless steel wire brqid
  - ・Heat reistant glass braid
  - ・Kynol or Kevlar braid

※Stainless wire braides and heat-resistant glass braides can be combined as well.
- Please see p.33-34 for other cautions.

Rubber flexible hose selection criteria

1〉Max. working pressure
Highest operating pressure is the designed pressure (controlled by safety valves, etc.) of the facility or device to which the flexible hose is attached. A flexible hose can be safely used for a long time continuously when it is used under the pressure that is not more than this pressure. Only low pressure (1.5 MPa or less) may be used when the fluid is gas.

2〉Impact pressure
Hydraulic devices in general may generate an impact pressure that exceeds the upper limit of the pressure due to load differences. The waveform of the impact pressure usually includes waveform with peaks (highest operating pressure x 150%) and trapezoidal waveform (highest operating pressure x 133%).

3〉Bending radius
The pressure resistance of a flexible hose is lowered when the hose is bent. Please use it within the designated radius of bending.

4〉Temperature
A flexible hose has a slight influence on the service life of a flexible hose due to the fluid temperature.
Please use this product within the range of the fluid temperature described on the catalog.
Insulation is placed on the outside when the hose is used in the environment with high ambient temperature or thermal radiation, but the effect of the insulation is limited.

5〉Twist
A flexible hose tends to get twisted because of its flexibility; thus, please take precautions to prevent twisting as much as possible in pipe arrangement.
The service life is shortened when a hose is used while being twisted, and it may cause extraordinary damages. Please use a rotating joint when a twist is unavoidable.

6〉Fluid speed
Please determine the flexible hose specifications so that the speed of the fluid running through the flexible hose is kept at 10 m/sec or slower.
Excessive flow speed may cause heating, skiving (scraping of the inner rubber layer), or other conditions.

7〉Outer pressure
The service life of a flexible hose may be lowered, or abnormal damages may occur if a heavy object is dropped on a flexible hose or a strong impact is applied on it.
Also, please study the method of protecting a flexible hose to prevent abrasion or damage caused by coming in contact with other objects.

8〉Fluid
Appropriate fluid varies depending on the series of the flexible hose.
Please check the types and select them appropriately.

Materials of rubber flexible hose and fittings and fluids to be used

The relationship among the hose specifications, materials of metal fittings, and fluids to be used is described below.
Please refer to the chart when selecting a hose.
Please take precautions that conditions vary depending on the temperature and concentration of fluid.
※DH-T is for steam, and DH-W is for water-based hydraulic fluid (water-glycol fluid).
※Please keep the pressure at 1.0 MPa or less when using gases.

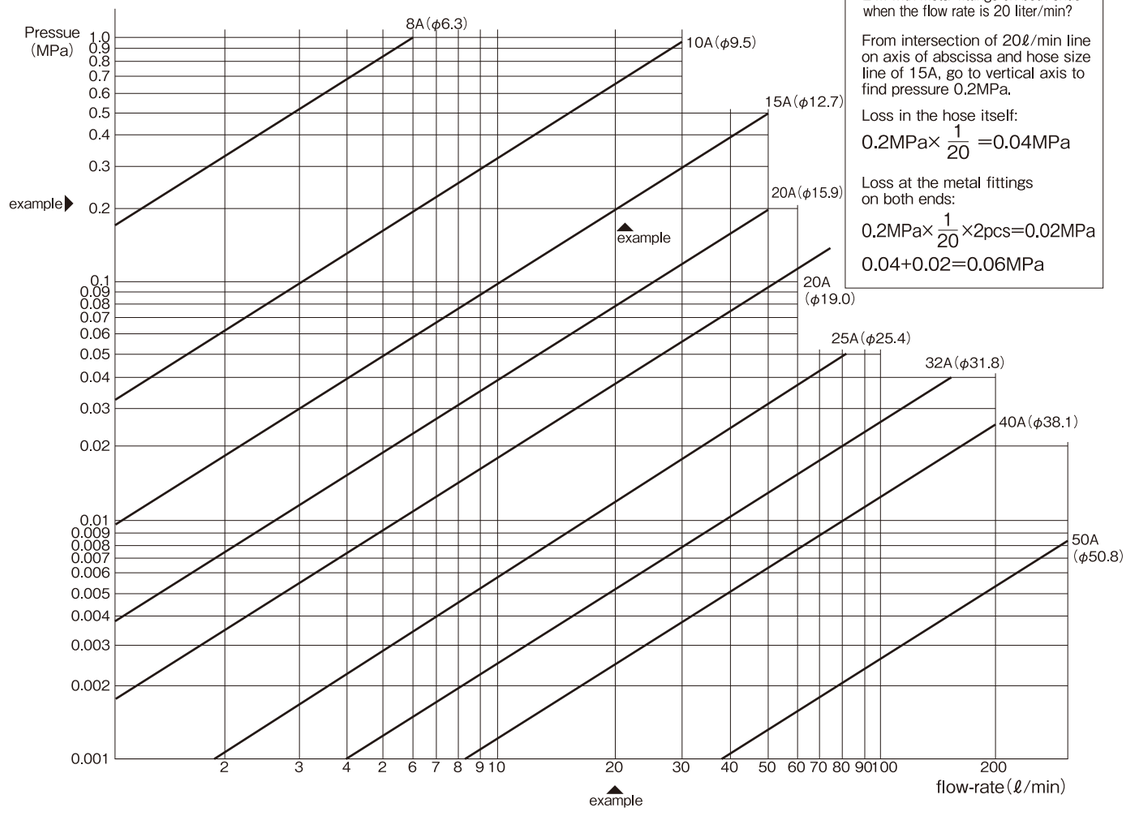
kind of fluid	hose standard		Fitting		
	DH-B DH-D	DH-O	steel	stainless	brass
ASPFALT	○	×	◎	◎	○
ACETALDEYDE	×	◎	–	–	–
ACETONE	×	○	◎	◎	◎
ACETYLENE	△	◎	◎	◎	○
ANILINE	×	◎	◎	◎	×
AMMONIA GAS(cold)	○	◎	◎	◎	×
AMMONIA GAS(hot)	△	○	◎	×	×
LIQUEFIED ANHYDROUS AMMONIA	○	◎	◎	◎	×
SULFUR DIOXIDE	△	◎	○	○	△
ISOOCTANE	◎	×	◎	◎	○
ASTM No.1 OIL	◎	×	◎	◎	○
ASTM No.3 OI	△	×	◎	◎	○
ETHYL ALCOHOL	◎	◎	△	◎	◎
CHLORINE 10% RT	◎	◎	×	×	△
CHLORINE 36% RT	△	◎	×	×	△
LPG	◎	×	◎	◎	○
OLIVE OIL	◎	◎	◎	◎	◎
HYDROGEN PEROXIDE 5% RT	×	◎	×	◎	×
HYDROGEN PEROXIDE 30% RT	×	△	×	◎	×
SEA WATER RT	◎	◎	△	◎	△
SODIUM HYDROXIDE 10% RT	◎	◎	◎	◎	×
SODIUM HYDROXIDE 30% 60℃	◎	◎	◎	◎	×
GASOLINE	×	×	◎	◎	◎
FORMIC ACID 25% RT	×	◎	×	◎	△
FORMIC ACID 50% RT	×	◎	×	◎	△
CRESOL	×	×	–	–	–
CHLOROFORM	×	×	×	◎	×
GREASE	○	×	◎	◎	◎
GLYCERINE	◎	◎	◎	◎	○
KEROSENE	△	×	◎	◎	◎
COKE-OVEN GAS	△	△	◎	◎	△
MINERAL OIL	◎	×	◎	◎	◎
ACETIC ACID 10% RT	△	△	×	◎	×
ACETIC ACID 100% RT	×	×	×	◎	×
ETYL ACETATE	×	○	○	○	○
OXYGEN	×	×	×	◎	◎
CYCLO HEXANE	×	○	–	–	–
CARBON TETRACHLORIDE	×	×	△	○	○
DIETHYLENE GLYCOL	◎	◎	◎	○	○
SODIUM HYPOCHLORITE 5% RT	△	◎	×	○	×
SODIUM HYPOCHLORITE 5% 60℃	×	○	×	○	×
HEAVY OIL(B、C)	○	×	◎	◎	◎
POTASSIUM DICHROMATE 10% RT	◎	◎	◎	◎	◎

kind of fluid	hose standard		Fitting		
	DH-B DH-D	DH-O	steel	stainless	brass
OXALIC ACID	○	◎	△	○	△
NITRIC ACID 10% RT	×	◎	×	◎	×
NITRIC ACID 30% RT	×	○	×	◎	×
LUBRICANT(mineral)	◎	×	◎	◎	◎
STEAM(for ST-hose only)	×	◎	◎	◎	◎
STEARIC ACID	○	○	△	○	△
PETROLEUM	○	×	◎	◎	◎
TAR	○	×	◎	◎	△
CARBONIC ACID	◎	◎	×	○	×
CARBONIC ACID GAS(1.0MPa or below)	△	△	◎	◎	◎
NITROGEN(1.0MPa or below)	△	△	◎	◎	◎
NATURAL GAS(1.0MPa or below)	×	×	◎	◎	○
TRICHLORO ETHYLENE	×	×	△	◎	◎
TOLUENE	×	×	◎	◎	◎
VEGETABLE OIL	◎	◎	◎	◎	◎
NAPHTHA	○	×	◎	○	○
CASTOR OIL	◎	◎	◎	◎	◎
VINEGAR	△	◎	○	◎	○
PICRIC ACID	○	○	△	○	×
BUTANE	○	△	◎	◎	◎
FREON 12	×	×	◎	◎	◎
FREON 22	×	×	◎	◎	◎
PHENOL	×	◎	×	◎	◎
PROPANE	◎	×	◎	◎	◎
FUEL OIL	×	×	◎	◎	◎
BENZENE	×	×	◎	◎	△
BORIC ACID	◎	◎	×	◎	△
FORMALDEHYDE 40% RT	○	◎	○	◎	○
METHYL ALCOHOL	○	◎	△	◎	◎
METHYL ETHYL KETONE	×	○	○	○	○
MONO CHLOROBENZENE	×	×	○	–	–
LACQUER	×	×	△	◎	◎
LARD	◎	◎	◎	◎	◎
SULFURIC ACID 10% RT	○	◎	×	○	×
SULFURIC ACID 30% 60℃	○	◎	×	△	×
HYDROGEN SULFIDE	○	◎	△	○	△
PHOSPHORIC ACID 50% RT	○	◎	○	○	×
PHOSPHORIC ACID 30% 60℃	○	◎	×	○	×

◎ No affection or almost no affection.
○ Slight affection but applicable depending on condition.
△ Rather heavy affection.
× Not applicable.
RT: Room temperature

Flow rate and pressure loss

Pressure loss occurs due to the friction resistance with flow rate inside a pressurized pipe.
The relationship between the fluid flow rate and pressure loss in a hose is described below.



Method for using a graph

Example:
What is the pressure loss in a hose with the size 15A (φ12.7) and length 2 m with metal fittings on both ends when the flow rate is 20 liter/min?

From intersection of 20ℓ/min line on axis of abscissa and hose size line of 15A, go to vertical axis to find pressure 0.2MPa.

Loss in the hose itself:

$0.2\text{MPa} \times \frac{1}{20} = 0.04\text{MPa}$

Loss at the metal fittings on both ends:

$0.2\text{MPa} \times \frac{1}{20} \times 2\text{pcs} = 0.02\text{MPa}$

$0.04+0.02=0.06\text{MPa}$

Design of the hose length and hose layout

1. Please take precautions on the hose length so that it would not create excessive sagging and touch other parts.
2. Please consider the expansion and contraction when the pressure is applied so that tensile force would not be applied on the hose.

Example 1: Straight pipe arrangement (Fig. 1)

free length of hose (L) $L \geqq \ell(1+0.04)$

Example 2: When securing both ends with U-shaped pipes (Fig. 2)

$L=2D+\pi R$

Example 3: When moving only by T at one end with U-shaped pipe (Fig. 3)

$L=2D+\pi R+T$

Straight pipe coefficient

Hose NB	8A (φ6.3)	10A (φ9.5)	15A (φ12.7)	20A (φ15.9)	20A (φ19.0)	25A (φ25.4)	32A (φ31.8)	40A (φ38.1)	50A (φ50.8)
D mm	40	50	60	65	75	90	110	120	140

Fig.1

Fig.2

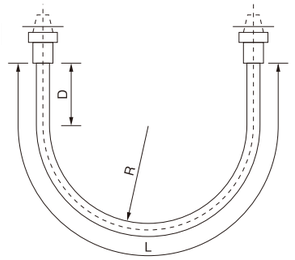
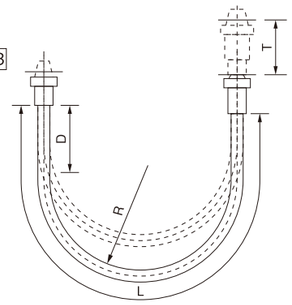


Fig.3



Note for Operation Rubber flexible hose

Please thoroughly read the following “Handling precautions” to fully benefit from the product features and use them safely.

Handling precautions

1 **Please use the product under the pressure not more than the catalog value.**
Using the product under the pressure higher than the catalog value is dangerous because it results in damaging the hose or the removal of joint metal fittings.

2 **Please use the product within the temperature described in the catalog.**
Using the product under the temperature outside of the catalog value is dangerous because it results in damaging the hose or removal of joint metal fittings.

3 **Please use the product for proper fluids described in the catalog.**
Use for inappropriate fluid is dangerous because it deteriorates the inner layer (rubber) and the reinforcement layer (steel wire and fiber) that results in damaging the hose or removal of joint metal fittings.

4 **Please use this product at the smallest bend radius that is described in the catalog or larger.**
Using this product at less than the smallest bend radius is dangerous because it results in damaging the hose.

5 **Please select a compatible joint metal by thoroughly checking the joint parts (threads and shapes) on the other side.**
Attaching incompatible joint metal fittings is dangerous because it results in leaks and removal of joint metal fittings.

6 **Please do not apply negative or external pressure.**
The hose is designed to withstand the internal pressure, and there is a risk of removing or damaging the inner layer when negative pressure or external pressure is applied. The service life of the hose is significantly reduced in such cases.

7 **Do not run electricity.**
Running electricity is dangerous because it may rupture the hose or cause electric shocks.

8 **Do not apply excessive vibration.**
Applying excessive vibration is dangerous because it causes fatigue-based cracks on joint metal fittings that results in leaks and ruptures. (The guideline for vibration acceleration is 8 G or less.)

9 **Please provide some allowance in the hose length to avoid applying tension on the hose.**
Providing no allowance is dangerous since the length changes when pressure is applied, and tensile force is generated and ruptures the hose or results in the removal of joint metal fittings.

Storage precautions

1 **Please apply rust inhibitor when the product is kept in storage for one month or longer.**
Please apply rust proof oil on metal parts, such as joint metal fittings or wrap them by rust proof paper. Corrosion of joint metal fittings causes contamination of fluid or leaks.

2 **Please keep the hose in the suitable environment.**
Keep the hose in storage in dry areas without direct sunlight and the temperature of about -10℃ to +40℃. Direct sunlight and high temperature accelerate the deterioration of rubber and cause cracks. Humidity significantly accelerates the corrosion of metals. Low temperature hardens rubber and may cause damages.

3 **Please do not cause deformation or damage on the hose or joint metal fittings during storage.**
Please keep a hose in storage by keeping it straight. When storing a hose by winding it, make sure that the bend radius would not become less than the designated smallest bend radius. Also, do not place a heavy object on a hose. Deformation or damage of the hose or joint metal results in unexpected rupture or damage.

4 **Please keep inside the hose clean.**
Please seal joint metal fittings by placing caps to prevent foreign objects, such as dirt and dust from entering inside the hose. Foreign objects, such as dust and dirt may contaminate fluid and result in troubles in hydraulic systems and hydraulic circuits.

5 **Please do not keep a hose in storage for more than a year.**
It is impossible to perfectly prevent the deterioration of hoses even if they are poperly packed and stored and the performance of hoses is expected to decrease. Therefore, please implement proper management so that hoses would not be kept in storage for more than a year.

Precautions on installation

1 **Please thoroughly remove foreign objects, such as dirt attached on screws of joint metal fittings.**
Please thoroughly check screws on metal connectors before connecting and thoroughly remove foreign objects, such as dirt adhered on them by using air-blow or cleaning oil (light oil). Adhered dirt may cause fluid leaks.

2 **Please make sure that sealing agent would not enter into the hose.**
To gain better sealing performance, please take precautions to prevent sealing agent from entering or remaining in the hose when sealing agent is used on screws of joint metal fittings.
Such conditions cause clogging of pipes or decrease the flow rate.

3 **Please do not fold a hose.**
Please take precautions to prevent excessive bend in the hose especially near joint metal fittings. Excessive bend and fold are dangerous because the hose may rupture at the bend.
Please do not use a hose that is once folded because the deformation remains in the hose.

4 **Please do not pull a hose.**
Pulling a hose is dangerous because the stress accumulates on the attached section of joint metal fittings and results in rupture or damage.

5 **Please do not twist a hose.**
Twisting a hose is dangerous because it deforms the internal structure of the hose and results in damages and rupture.

6 **Please do not interfere with a hose. Please protect a hose from external damages.**
When there is a possibility that a hose touches other objects (such as mechanical facilities), such condition is dangerous because it may result in rupture of the hose or damages to joint metal fittings caused by external damages.

7 **Please strictly comply with the tightening torque specified in the catalog.**
Inappropriate tightening is dangerous because it fails to provide sufficient sealing and results in fluid leaks and damages to joints. (Please see p. 32.)

Maintenance and inspection

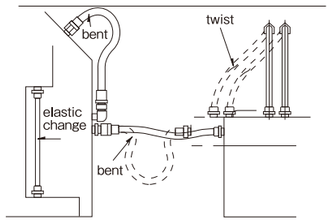
Please inspect hoses based on the chart below either regularly or before starting to work.
Proper inspection and handling enable the prevention of unexpected rupture of hoses and damages to joint metal fittings. Please refer to the chart below for the implementation of inspection.

Category		Main causes	Handling
Oil leak at screw joint		Scratches on the sheet surface or dirt or foreign objects that get caught	Clean the sheet surface.
		Loosened screws or deterioration of O-rings	Re-tighten the screw or replace the O-ring.
		Partial contact of the sheet surface	Re-tighten or replace depending on the degree of the problem.
Oil leak from a flange joint		Loosened pressing bolt	Re-tighten the bolt.
		Deterioration of O-rings/packings	Replace the O-ring/packing.
Oil leak from an assembly between a hose and joint		Deterioration of the hose materials caused by heat, oil, or long-term uses	Replace
		Unreasonable pipe layout	Reevaluate the method of pipe layout to make sure there is no violent bend at a joint assembly.
Deformation	Collapse (dent), kink	External impact	・Remove causes. ・Protect the outer layer of the hose. ・Replace depending on the degree of the problem.
	Swelling	Oil transferred from a joint to which oil is transferred from outside	
External damage (abrasion or cut)		Interfere with other parts. Impact from outside.	
Crack on the outer layer (cracks in various sizes on the outer layer)		Effects of ozone, sunlight, or paint	・Protect the outer layer of the hose. ・Replace depending on the degree of the problem.
Abnormal movement of hose during operation (Extension, contraction, twisting, bend, or kink)		Inappropriate hose length	Replace
		Inappropriate method of pipe layout	Check pipe layout, apply attachment if necessary.
Hardening or softening		Deterioration caused by high or low temperature or oil	Replace when necessary.
Abnormal noise, odor, abnormally high temperature, etc.		Often caused related circuits	Inspect all circuits.
Rust on joints		Sand, dust, adhesion of water drop, industrial water, salty wind	Properly apply rust inhibiting paint while avoiding the outer layer.

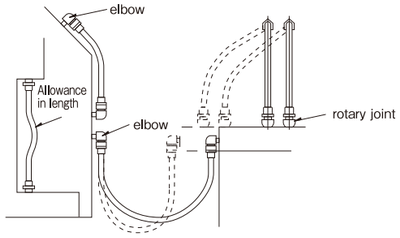
It is preferable to change a hose after using it for more than two years even when there is no abnormality in the above categories.
(See descriptions of JIS B 8360, JIS B 8362, or JIS B 8364.)

Handling of hose

Bad example of layout



Good example of layout



Torque for tightening

Hose size		8A(φ6.3)	10A(φ9.5)	15A(φ12.7)	20A(φ15.9)	20A(φ19.0)	25A(φ25.4)	32A(φ31.8)	40A(φ38.1)	50A(φ50.8)
Thread size	Pipe thread(PF)	1/4	3/8	1/2	3/4	3/4	1	1 1/4	1 1/2	2
	Metric thread(MXP)	14×1.5	18×1.5	22×1.5	27×2	27×2	33×2	42×2	50×2	50×2
	Unified thread(UNF)	7/16-20	9/16-18	3/4-16	—	1 1/16-12	1 5/16-12	—	—	—
Max. tightening torque N・m		25	34	64	132	132	196	225	225	316
Suitable pressure MPa		34.5					27.5	20.5	17.0	10.5

Note: Torque value for Pipe thread is based on JIS B8363.

Warranty

The warranty for this product expires in one year after the product is supplied.

Please take precautions, for the following cases are not covered by the warranty.

1.Accidents and damages caused by wrong installation, wrong uses, repair, or modification
2.Accidents and damages caused by natural disasters, such as fire and earthquake
3.Accidents and damages caused by defects in transportation and storage after purchase