



ORK

EXPANSION JOINTS

ORK OSAKA
RASENKAN
KOGYO CO.,LTD.
SINCE 1912

Expansion joints

Expansion joints are joints which absorb axial displacement of piping caused by changes in temperature, lateral displacement and angular displacement. The expansion joints are used in various facilities, such as petrochemical complexes, electric power plants, steel plants and chemical plants. Combinations of expansion joints can be used as earthquake-proof piping for seismic isolated structures.

Types of expansion joints

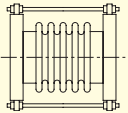
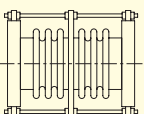
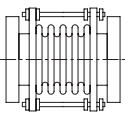
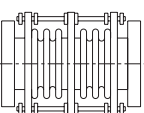
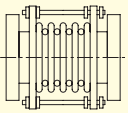
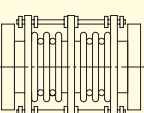
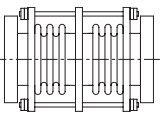
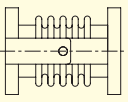
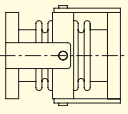
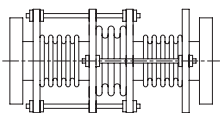
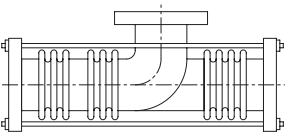
Tables of dimensions and performance

Examples of application

Earthquake-proof piping



Types of bellows expansion joints

Type		Outline drawing	Displacement			
			Axial	Lateral	Angular	
Free type	Single		○	△	○	
	Double		○	△	×	
Guide rod type	Single		○	△	○	
	Double		○	×	×	
Reinforced type	Single		○	△	○	
	Double		○	×	×	
Universal type			△	○	×	
Hinge type			×	×	○	
Gimbal type			×	×	○	
Straight pipe pressure balanced type			○	×	×	
Bent pipe pressure balanced type			○	○	×	

	Pressure	Thrust		Reference
	Low	Occurs	Basic type bellows expansion joints. These joints are used mainly for low-pressure piping. If the displacement is large, double joints are used. The thrust force generated by internal pressure and the displacement reaction force are applied to the fixed point.	P58 »
	Low	Occurs		P59 »
	Medium	Occurs	The displacement is restricted by the guide rod to prevent application of displacement exceeding the design value to the expansion joint. If the displacement is large, double joints are used. The thrust force generated by internal pressure and the displacement reaction force are applied to the fixed point. The guide rod has sufficient strength against thrust force in case of damage to the fixed point.	P60 »
	Medium	Occurs		P61 »
	High	Occurs	Control rings are set in the roots of the bellows to use the bellows for high-pressure piping. The displacement is restricted by the guide rod to prevent application of displacement exceeding the design value to the expansion joint. If the displacement is large, double joints are used. The thrust force generated by internal pressure and the displacement reaction force are applied to the fixed point. The guide rod has sufficient strength against thrust force in case of damage to the fixed point.	P62 »
	High	Occurs		P63 »
	High	None	Expansion joints are used to absorb lateral displacement. Larger displacement can be absorbed by increasing the distance between two bellows. Since the thrust force generated by internal pressure is restrained by the tie rod, only the displacement reaction force is applied to the fixed point. Specially designed joints can also absorb the axial displacement. However, in this case, since the thrust force generated by internal pressure cannot be restrained by the tie rod, the thrust force and the displacement reaction force are applied to the fixed point.	P64 »
	High	None	Expansion joints for absorption of angular displacement. The hinge type joints can be used to absorb angular displacement only in one direction. The gimbal type joints can absorb angular displacement in all directions. Since the thrust force generated by internal pressure is restrained by the expansion joint parts, only the displacement reaction force is applied to the fixed point. Normally, some joints are combined to absorb axial displacement and lateral displacement.	P65 »
	High	None		
	High	None	The joints are provided with displacement absorbing bellows and balanced bellows, so that the thrust force generated by internal pressure is countered in the expansion joints. Although only the displacement reaction force is applied to the fixed point, it is larger because the joints have a larger number of bellows. This type of joints is suitable for large-diameter piping with larger thrust force generated by internal pressure. They are used on straight zones (straight pipe pressure balanced type) and corners (bent pipe pressure balanced type) of piping in high places where fixed points with sufficient strength cannot be obtained.	P66 »
	High	None		

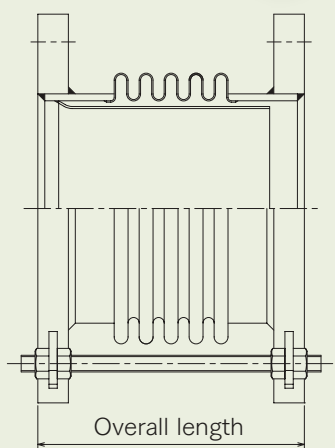
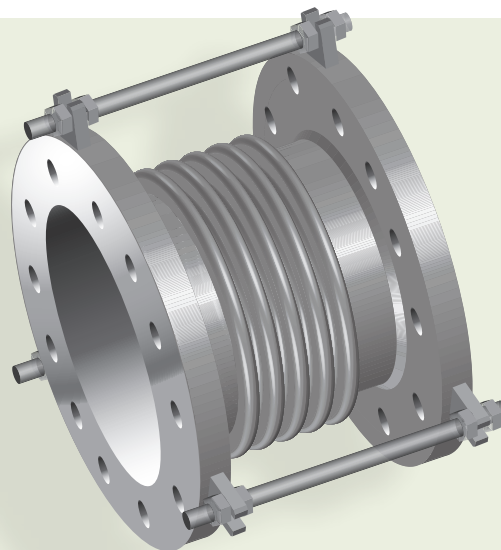
Tables of dimensions and performance

1 Single free type

■ Standard specifications for bellows

SUS304, SUS316L

※Bellows can be fabricated with other materials.



■ Standard dimensions

Nominal diameter (A)	Model No.	Design pressure (MPa)	Inner diameter (mm)	Outer diameter (mm)	Thickness (mm)	Number of convolution	Overall length (mm)	Axial displacement (mm)	Spring rate Per convolution (N/mm • cov.)
50	1F-50	0.2	50	80	0.8	10	210	±12.6	2260.8
65	1F-65	0.2	64	100	0.8	10	230	±17.3	1697.8
80	1F-80	0.2	78	114	1.0	15	340	±21.4	3864.2
100	1F-100	0.2	100	135	1.0	15	340	±20.5	5086.5
125	1F-125	0.2	128	168	1.0	15	420	±27.6	4103.2
150	1F-150	0.2	152	205	1.0	12	470	±39.4	2010.0
200	1F-200	0.2	201	270	1.2	12	630	±53.0	2145.5
250	1F-250	0.2	251	335	1.5	12	720	±61.7	2959.0
300	1F-300	0.2	301	395	1.5	12	840	±77.1	2455.4
350	1F-350	0.2	340	410	1.5	12	580	±43.9	6566.4
400	1F-400	0.2	385	465	1.5	10	590	±48.0	4863.7
450	1F-450	0.2	435	515	1.5	10	590	±48.0	5433.9
500	1F-500	0.2	485	575	1.5	9	610	±54.5	4178.1
550	1F-550	0.2	535	625	1.5	9	610	±54.5	4571.2
600	1F-600	0.2	585	685	1.5	8	620	±59.3	3593.9

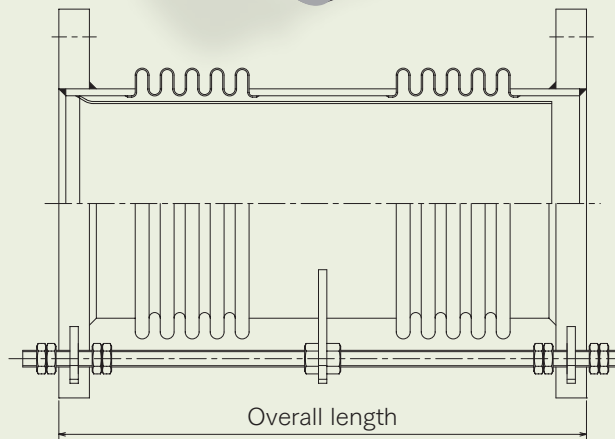
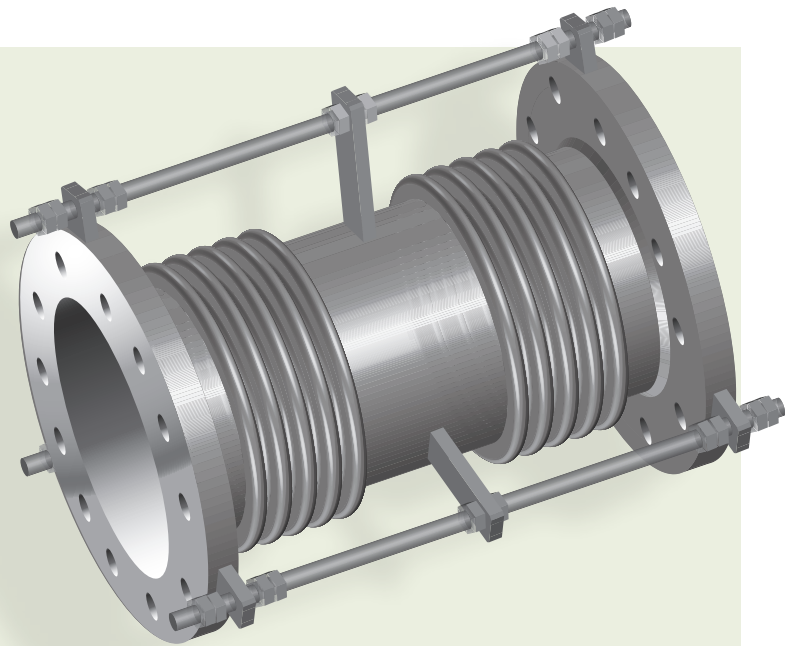
※The overall length is the minimum length of bellows using JIS 10K flanges.

※Design conditions: Bellows material: SUS304, Temperature: 300°C, Life: 3000 times or more

2 Double free type

■ Standard specifications for bellows
SUS304, SUS316L

※Bellows can be fabricated
with other materials.



■ Standard dimensions

Nominal diameter (A)	Model No.	Design pressure (MPa)	Inner diameter (mm)	Outer diameter (mm)	Thickness (mm)	Number of convolution	Overall length (mm)	Axial displacement (mm)	Spring rate Per convolution (N/mm • cov.)
50	2F-50	0.2	50	80	0.8	10+10	390	±25.3	2260.8
65	2F-65	0.2	64	100	0.8	10+10	430	±34.6	1697.8
80	2F-80	0.2	78	114	1.0	15+15	620	±42.9	3864.2
100	2F-100	0.2	100	135	1.0	15+15	630	±41.1	5086.5
125	2F-125	0.2	128	168	1.0	15+15	760	±55.2	4103.2
150	2F-150	0.2	152	205	1.0	12+12	840	±78.8	2010.0
200	2F-200	0.2	201	270	1.2	12+12	1060	±106.1	2145.5
250	2F-250	0.2	251	335	1.5	12+12	1230	±123.5	2959.0
300	2F-300	0.2	301	395	1.5	12+12	1410	±154.3	2455.4
350	2F-350	0.2	340	410	1.5	12+12	1030	±87.9	6566.4
400	2F-400	0.2	385	465	1.5	10+10	1040	±96.0	4863.7
450	2F-450	0.2	435	515	1.5	10+10	1040	±96.0	5433.9
500	2F-500	0.2	485	575	1.5	9+9	1070	±109.0	4178.1
550	2F-550	0.2	535	625	1.5	9+9	1080	±109.0	4571.2
600	2F-600	0.2	585	685	1.5	8+8	1100	±118.6	3593.9

※The overall length is the minimum length of bellows using JIS 10K flanges.

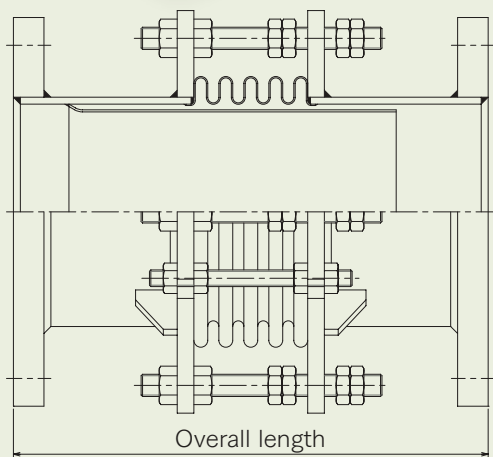
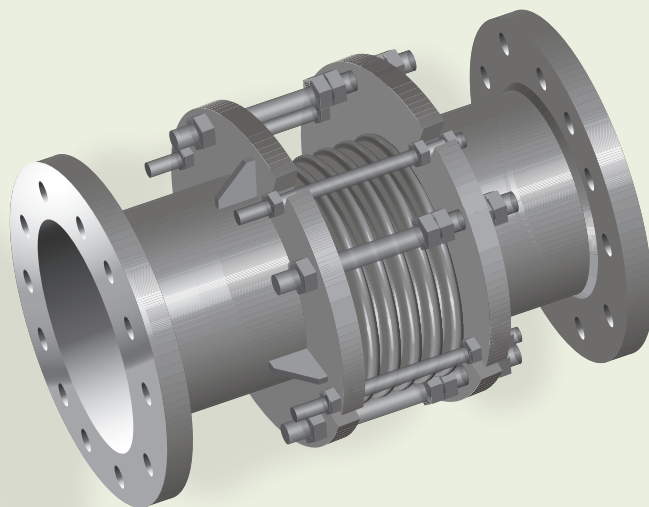
※Design conditions: Bellows material: SUS304, Temperature: 300°C, Life: 3000 times or more

3 Single guide rod type

■ Standard specifications for bellows

SUS304, SUS316L

※Bellows can be fabricated with other materials.



■ Standard dimensions

Nominal diameter (A)	Model No.	Design pressure (MPa)	Inner diameter (mm)	Outer diameter (mm)	Thickness (mm)	Number of convolution	Overall length (mm)	Axial displacement (mm)	Spring rate Per convolution (N/mm • cov.)
50	1G-50	0.5	50	80	0.8	10	360	±12.1	2260.8
65	1G-65	0.5	64	100	0.8	10	390	±16.2	1697.8
80	1G-80	0.5	78	114	1.0	15	500	±20.6	3864.2
100	1G-100	0.5	100	135	1.0	15	500	±19.8	5086.5
125	1G-125	0.5	128	168	1.0	15	610	±26.2	4103.2
150	1G-150	0.5	152	205	1.2	12	610	±31.0	3546.3
200	1G-200	0.5	201	270	1.5	12	690	±40.1	4291.8
250	1G-250	0.5	251	335	2.0	13	850	±47.9	7247.5
300	1G-300	0.5	301	395	2.0	12	930	±55.0	5991.8
350	1G-350	0.5	340	410	1.5	12	820	±40.8	6566.4
400	1G-400	0.5	385	465	2.0	10	840	±34.4	11925.7
450	1G-450	0.5	435	515	2.0	10	840	±34.4	13322.1
500	1G-500	0.5	485	575	2.0	9	900	±38.9	10203.7
550	1G-550	0.5	535	625	2.0	9	910	±38.9	11162.7
600	1G-600	0.44	585	685	2.0	8	930	±42.8	8749.4

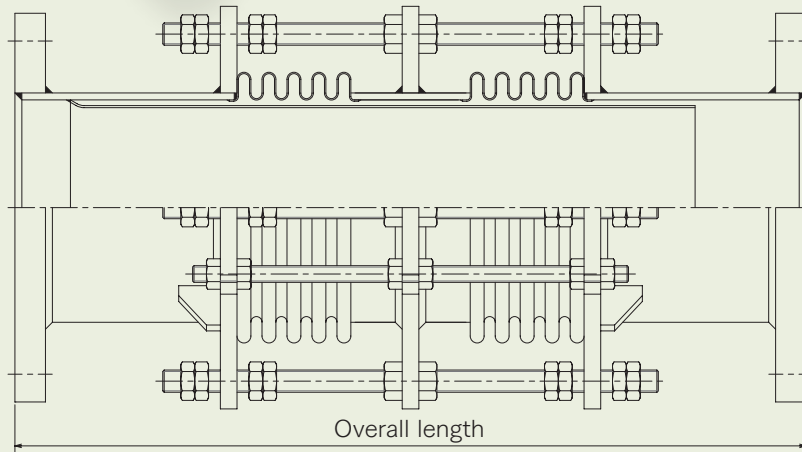
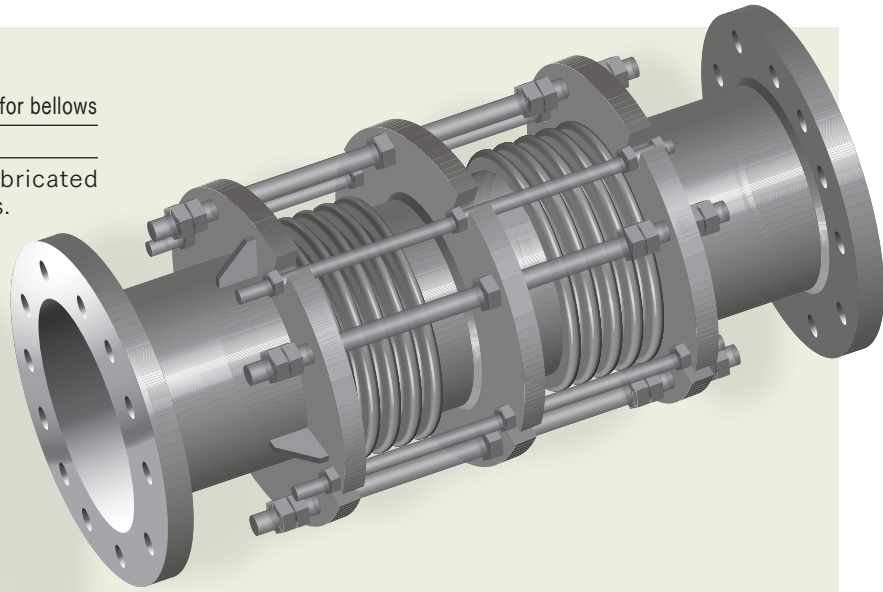
※The overall length is the minimum length of bellows using JIS 10K flanges.

※Design conditions: Bellows material: SUS304, Temperature: 300°C, Life: 3000 times or more

4 Double guide rod type

■ Standard specifications for bellows
SUS304, SUS316L

※Bellows can be fabricated
with other materials.



■ Standard dimensions

Nominal diameter (A)	Model No.	Design pressure (MPa)	Inner diameter (mm)	Outer diameter (mm)	Thickness (mm)	Number of convolution	Overall length (mm)	Axial displacement (mm)	Spring rate Per convolution (N/mm • cov.)
50	2G-50	0.5	50	80	0.8	10+10	570	±24.2	2260.8
65	2G-65	0.5	64	100	0.8	10+10	610	±32.4	1697.8
80	2G-80	0.5	78	114	1.0	15+15	850	±41.2	3864.2
100	2G-100	0.5	100	135	1.0	15+15	850	±39.6	5086.5
125	2G-125	0.5	128	168	1.0	15+15	1030	±52.4	4103.2
150	2G-150	0.5	152	205	1.2	12+12	1050	±62.0	3546.3
200	2G-200	0.5	201	270	1.5	12+12	1190	±80.2	4291.8
250	2G-250	0.5	251	335	2.0	13+13	1480	±95.9	7247.5
300	2G-300	0.5	301	395	2.0	12+12	1620	±110.0	5991.8
350	2G-350	0.5	340	410	1.5	12+12	1390	±81.7	6566.4
400	2G-400	0.5	385	465	2.0	10+10	1390	±68.9	11925.7
450	2G-450	0.5	435	515	2.0	10+10	1390	±68.9	13322.1
500	2G-500	0.5	485	575	2.0	9+9	1490	±77.9	10203.7
550	2G-550	0.5	535	625	2.0	9+9	1520	±77.9	11162.7
600	2G-600	0.44	585	685	2.0	8+8	1550	±85.7	8749.4

※The overall length is the minimum length of bellows using JIS 10K flanges.

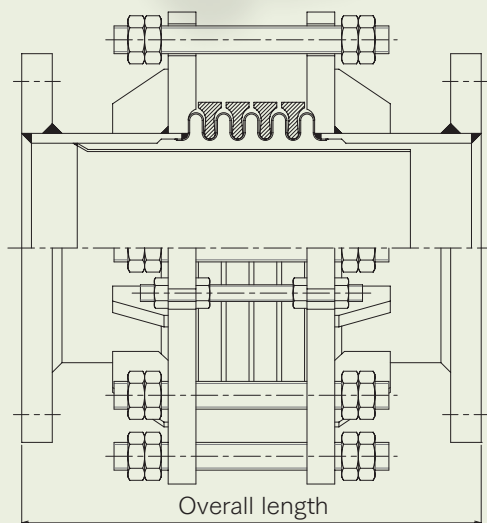
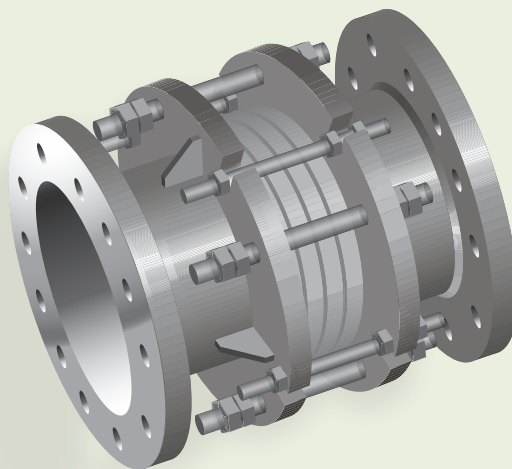
※Design conditions: Bellows material: SUS304, Temperature: 300°C, Life: 3000 times or more

5 Single reinforced type

■ Standard specifications for bellows

SUS304, SUS316L

※Bellows can be fabricated with other materials.



■ Standard dimensions

Nominal diameter (A)	Model No.	Design pressure (MPa)	Inner diameter (mm)	Outer diameter (mm)	Thickness (mm)	Number of convolution	Overall length (mm)	Axial displacement (mm)	Spring rate Per convolution (N/mm • cov.)
50	1C-50	1.0	50	80	0.8	10	390	±13.3	2178.6
65	1C-65	1.0	64	100	0.8	10	400	±18.3	1640.2
80	1C-80	1.0	78	114	1.0	15	540	±23.4	3577.6
100	1C-100	1.0	100	135	1.0	15	550	±22.1	4778.0
125	1C-125	1.0	128	168	1.0	15	650	±29.5	3892.7
150	1C-150	1.0	152	205	1.0	12	690	±40.8	2010.0
200	1C-200	1.0	201	270	1.2	12	820	±55.5	2145.5
250	1C-250	1.0	251	335	1.5	12	940	±64.4	2959.0
300	1C-300	1.0	301	395	1.5	12	1090	±81.8	2455.4
350	1C-350	1.0	340	410	1.5	12	910	±48.7	6079.3
400	1C-400	1.0	385	465	1.5	10	910	±53.2	4549.6
450	1C-450	1.0	435	515	1.5	10	920	±53.2	5082.9
500	1C-500	1.0	485	575	1.5	9	940	±60.9	3939.2
550	1C-550	1.0	535	625	1.5	9	950	±60.9	4309.8
600	1C-600	1.0	585	685	1.5	8	980	±66.9	3409.5

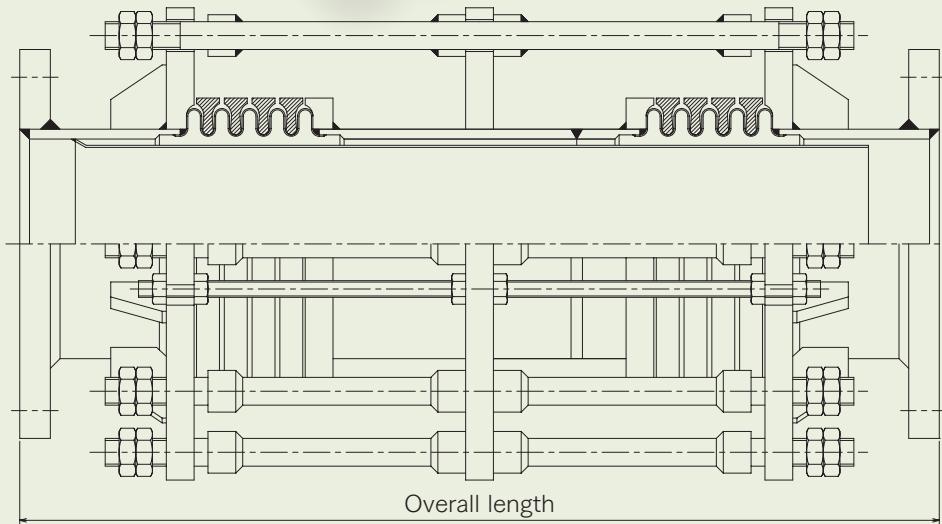
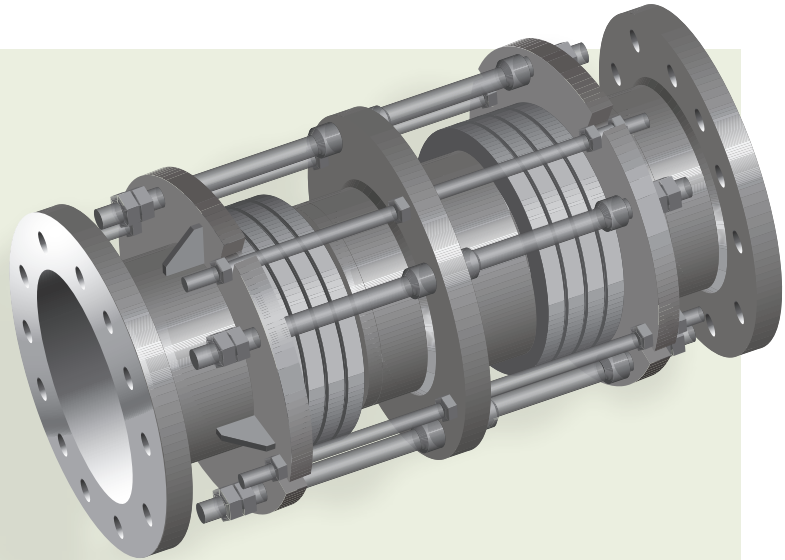
※The overall length is the minimum length of bellows using JIS 10K flanges.

※Design conditions: Bellows material: SUS304, Temperature: 300°C, Life: 3000 times or more

6 Double reinforced type

■ Standard specifications for bellows
SUS304, SUS316L

※Bellows can be fabricated
with other materials.



■ Standard dimensions

Nominal diameter (A)	Model No.	Design pressure (MPa)	Inner diameter (mm)	Outer diameter (mm)	Thickness (mm)	Number of convolution	Overall length (mm)	Axial displacement (mm)	Spring rate Per convolution (N/mm • cov.)
50	2C-50	1.0	50	80	0.8	10+10	650	±26.6	2178.6
65	2C-65	1.0	64	100	0.8	10+10	700	±36.6	1640.2
80	2C-80	1.0	78	114	1.0	15+15	990	±46.9	3577.6
100	2C-100	1.0	100	135	1.0	15+15	990	±44.2	4778.0
125	2C-125	1.0	128	168	1.0	15+15	1160	±59.1	3892.7
150	2C-150	1.0	152	205	1.0	12+12	1160	±81.7	2010.0
200	2C-200	1.0	201	270	1.2	12+12	1390	±111.1	2145.5
250	2C-250	1.0	251	335	1.5	12+12	1600	±128.9	2959.0
300	2C-300	1.0	301	395	1.5	12+12	1860	±163.6	2455.4
350	2C-350	1.0	340	410	1.5	12+12	1600	±97.4	6079.3
400	2C-400	1.0	385	465	1.5	10+10	1580	±106.5	4549.6
450	2C-450	1.0	435	515	1.5	10+10	1590	±106.5	5082.9
500	2C-500	1.0	485	575	1.5	9+9	1650	±121.8	3939.2
550	2C-550	1.0	535	625	1.5	9+9	1670	±121.8	4309.8
600	2C-600	1.0	585	685	1.5	8+8	1700	±133.9	3409.5

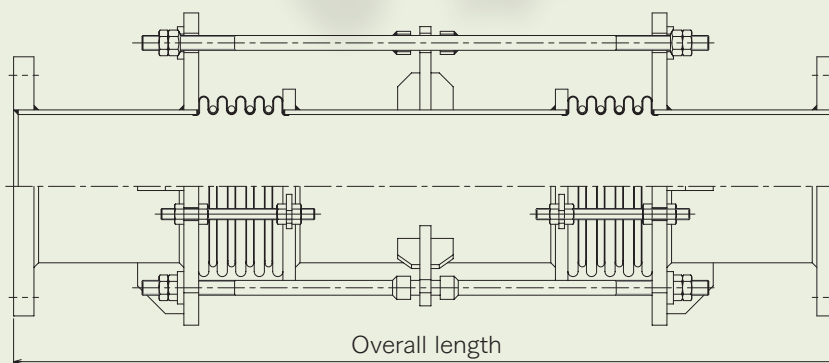
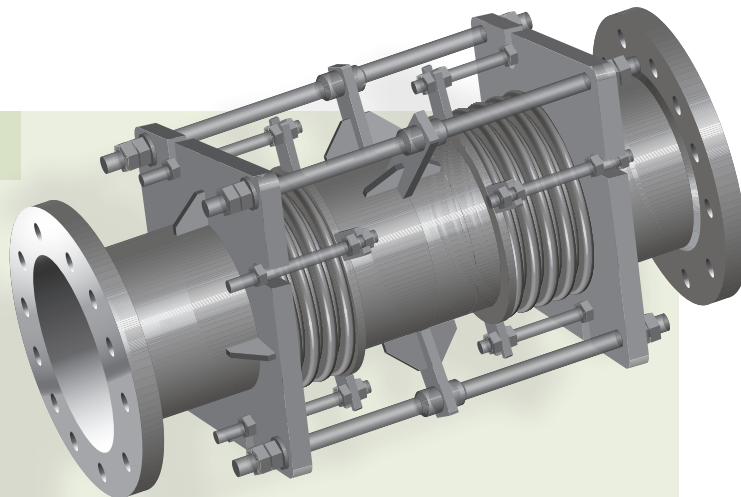
※The overall length is the minimum length of bellows using JIS 10K flanges.

※Design conditions: Bellows material: SUS304, Temperature: 300°C, Life: 3000 times or more

7 Universal type

■ Standard specifications for bellows
SUS304, SUS316L

※Bellows can be fabricated with other materials.



■ Standard dimensions

Nominal diameter (A)	Model No.	Design pressure (MPa)	Inner diameter (mm)	Outer diameter (mm)	Thickness (mm)	Lateral displacement (mm)	Overall length (mm)	Spring rate to lateral direction (N)
50	3C-50	1.0	50	80	0.8	50	890	71.3
						100	1470	35.4
						200	2620	17.8
65	3C-65	1.0	64	100	0.8	50	900	83.6
						100	1470	42.6
						200	2620	21.3
80	3C-80	1.0	78	114	1.0	50	930	248.5
						100	1500	127.1
						200	2650	63.6
100	3C-100	1.0	100	135	1.0	50	970	499.3
						100	1540	254.3
						200	2690	127.1
125	3C-125	1.0	128	168	1.0	50	1030	592.7
						100	1600	314.4
						200	2750	160.3
150	3C-150	1.0	152	205	1.0	50	1030	468.4
						100	1600	242.4
						200	2750	121.9
200	3C-200	1.0	201	270	1.2	50	1090	885.2
						100	1670	447.1
						200	2810	227.7
250	3C-250	1.0	251	335	1.5	50	1170	1857.3
						100	1740	964.5
						200	2890	484.6
300	3C-300	1.0	301	395	1.5	50	1260	2133.3
						100	1830	1119.7
						200	2980	564.8
350	3C-350	1.0	340	410	1.5	50	1260	6032.5
						100	1830	3183.4
						200	2980	1613.3
400	3C-400	1.0	385	465	1.5	50	1280	5886.4
						100	1850	3089.6
						200	3000	1558.5
450	3C-450	1.0	435	515	1.5	50	1280	8208.9
						100	1850	4308.6
						200	3000	2173.3
500	3C-500	1.0	485	575	1.5	50	1290	8032.2
						100	1870	4125.7
						200	3020	2089.6
550	3C-550	1.0	535	625	1.5	50	1310	10519.0
						100	1890	5403.1
						200	3040	2736.6
600	3C-600	1.0	585	685	1.5	50	1360	9777.4
						100	1940	5084.6
						200	3080	2608.8

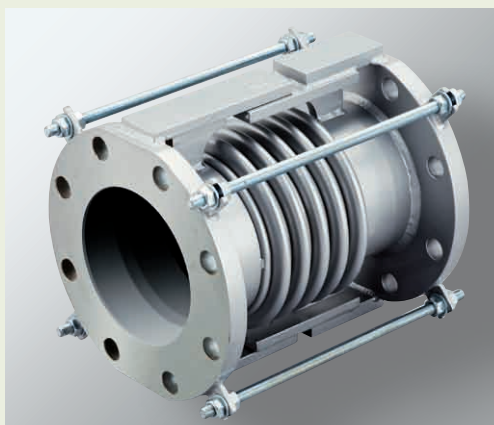
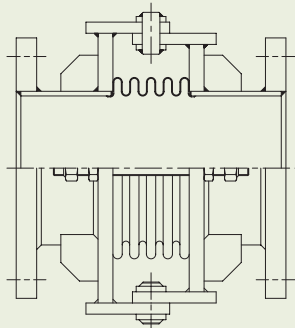
※The overall length is the minimum length of bellows using JIS 10K flanges.

※Design conditions: Bellows material: SUS304, Temperature: 300°C, Life: 3000 times or more, Number of convolutions: 5 conv. + 5 conv.

8 Hinge type

■ Standard specifications for bellows
SUS304, SUS316L

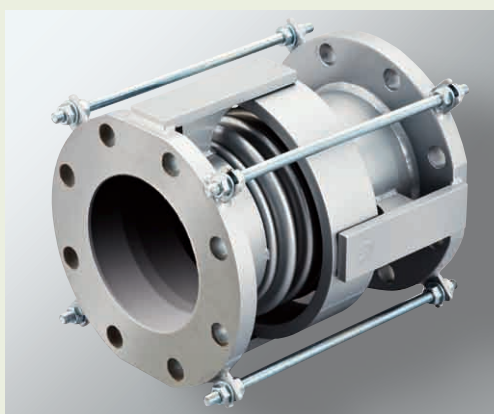
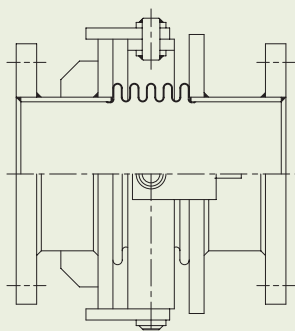
※Bellows can be fabricated with other materials.



9 Gimbal type

■ Standard specifications for bellows
SUS304, SUS316L

※Bellows can be fabricated with other materials.



■ Standard dimensions

Nominal diameter (A)	Design pressure (MPa)	Inner diameter (mm)	Outer diameter (mm)	Thickness (mm)	Number of convolution	Overall length (mm)	Angular displacement (°)	Moment (N・m)
50	1.0	50	80	0.8	5	250	±5	20.6
65	1.0	64	100	0.8	5	250	±5	24.6
80	1.0	78	114	1.0	5	300	±5	73.5
100	1.0	100	135	1.0	5	250	±5	146.5
125	1.0	128	168	1.0	5	300	±5	188.7
150	1.0	155	195	1.0	5	300	±5	310.8
200	1.0	200	250	1.2	5	400	±5	580.9
250	1.0	250	310	1.5	5	450	±5	1271.6
300	1.0	300	370	1.5	5	500	±5	1342.9
350	1.0	340	410	1.5	5	500	±5	1880.9
400	1.0	385	465	1.5	5	580	±5	1806.0
450	1.0	435	515	1.5	5	580	±5	2518.9
500	1.0	485	575	1.5	5	620	±5	2428.7
550	1.0	535	625	1.5	5	620	±5	3180.3
600	1.0	585	685	1.5	5	670	±5	3014.9

※The overall length is the minimum length of bellows using JIS 10K flanges.

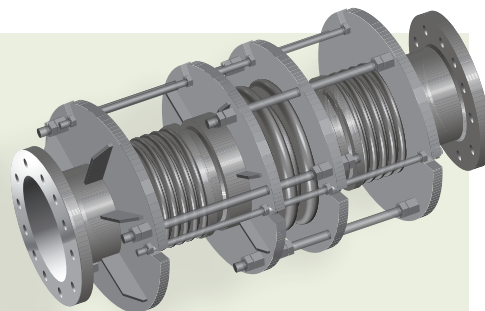
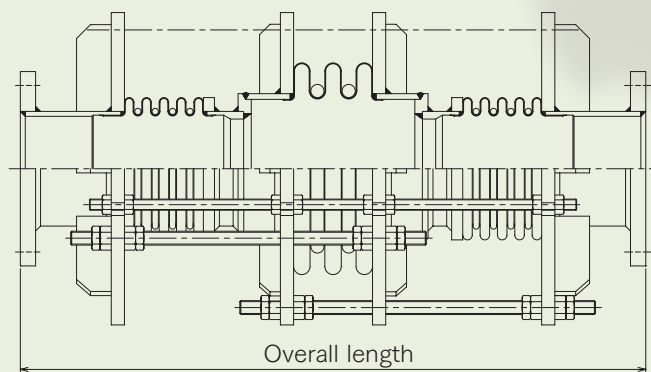
※Design conditions: Bellows material: SUS304, Temperature: 300°C, Life: 3000 times or more

10 Straight pipe pressure balanced type

■ Standard specifications for bellows

SUS304, SUS316L

※Bellows can be fabricated with other materials.



■ Standard dimensions

Nominal diameter (A)	Design pressure (MPa)	Axial displacement (mm)	Straight pipe pressure balanced type		Reference: When single reinforced type (5 convolutions) is used	
			Overall length (mm)	Force applied to fixed point (N)	Overall length (mm)	Force applied to fixed point (N)
300	2.0	26.0	1090	53000	615	205000
400	2.0	26.0	1210	69000	655	309000
500	2.0	28.5	1270	74000	700	466000
600	2.0	32.0	1370	84000	770	658000

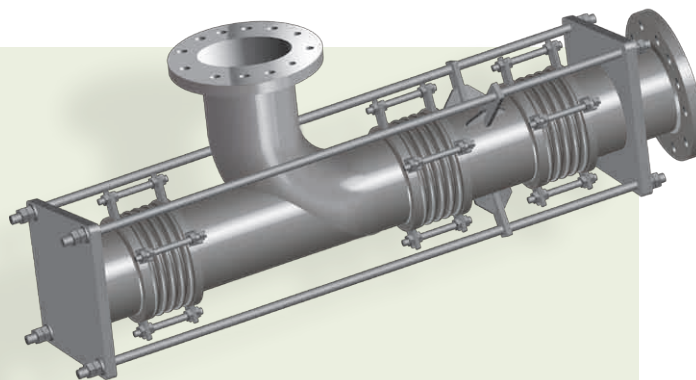
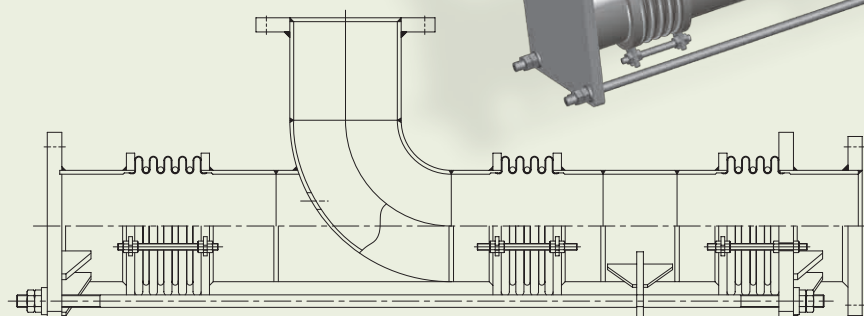
※This table shows examples and the values are shown for your reference.

11 Bent pipe pressure balanced type

■ Standard specifications for bellows

SUS304, SUS316L

※Bellows can be fabricated with other materials.



■ Standard dimensions

Nominal diameter (A)	Design pressure (MPa)	Axial displacement (mm)	Lateral displacement (mm)	Bent pipe pressure balanced type		Reference: When double reinforced type (5 convolutions + 5 convolutions) is used	
				Overall length (mm)	Force applied to fixed point (N)	Overall length (mm)	Force applied to fixed point (N)
300	2.0	26.5	50.0	2100	22000	1200	198000
400	2.0	21.5	50.0	2720	32000	1500	296000
500	2.0	20.0	50.0	2930	33000	1500	452000
600	2.0	19.5	50.0	3230	37000	1500	643000

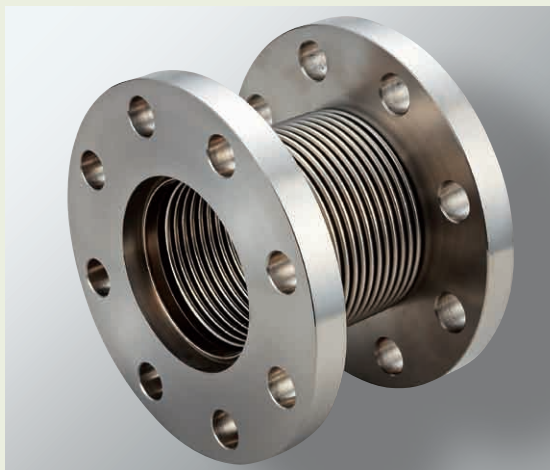
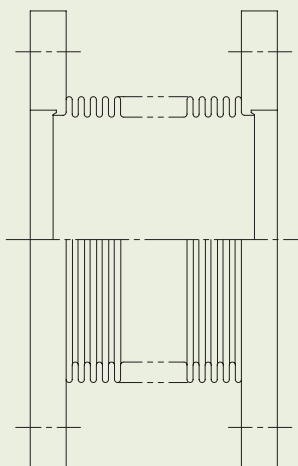
※This table shows examples and the values are shown for your reference.

12 Low-reaction type bellows

■ Standard specifications for bellows

SUS304, SUS316L

※Bellows can be fabricated with other materials.



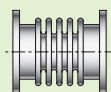
■ Standard dimensions

Nominal diameter (A)	Model No.	Design pressure (MPa)	Inner diameter (mm)	Outer diameter (mm)	Thickness (mm)	Spring rate Per convolution (N/mm • cov.)
50	1S-50	0.1	51	65	0.20	338.4
65	1S-65	0.1	63	83	0.25	323.6
80	1S-80	0.1	80	103	0.25	264.7
100	1S-100	0.1	104	127	0.25	304.9
125	1S-125	0.1	126	151	0.30	493.9
150	1S-150	0.1	150	175	0.30	571.4
200	1S-200	0.1	205	230	0.30	754.4
250	1S-250	0.1	254	290	0.30	278.1
300	1S-300	0.1	305	340	0.30	341.8

※Design conditions: Bellows material: SUS316L, Temperature: 300°C

13 Examples of application

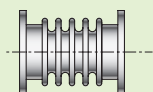
Basic motions of bellows expansion joints



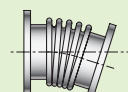
Neutral



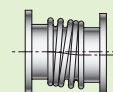
Contraction



Expansion



Bending

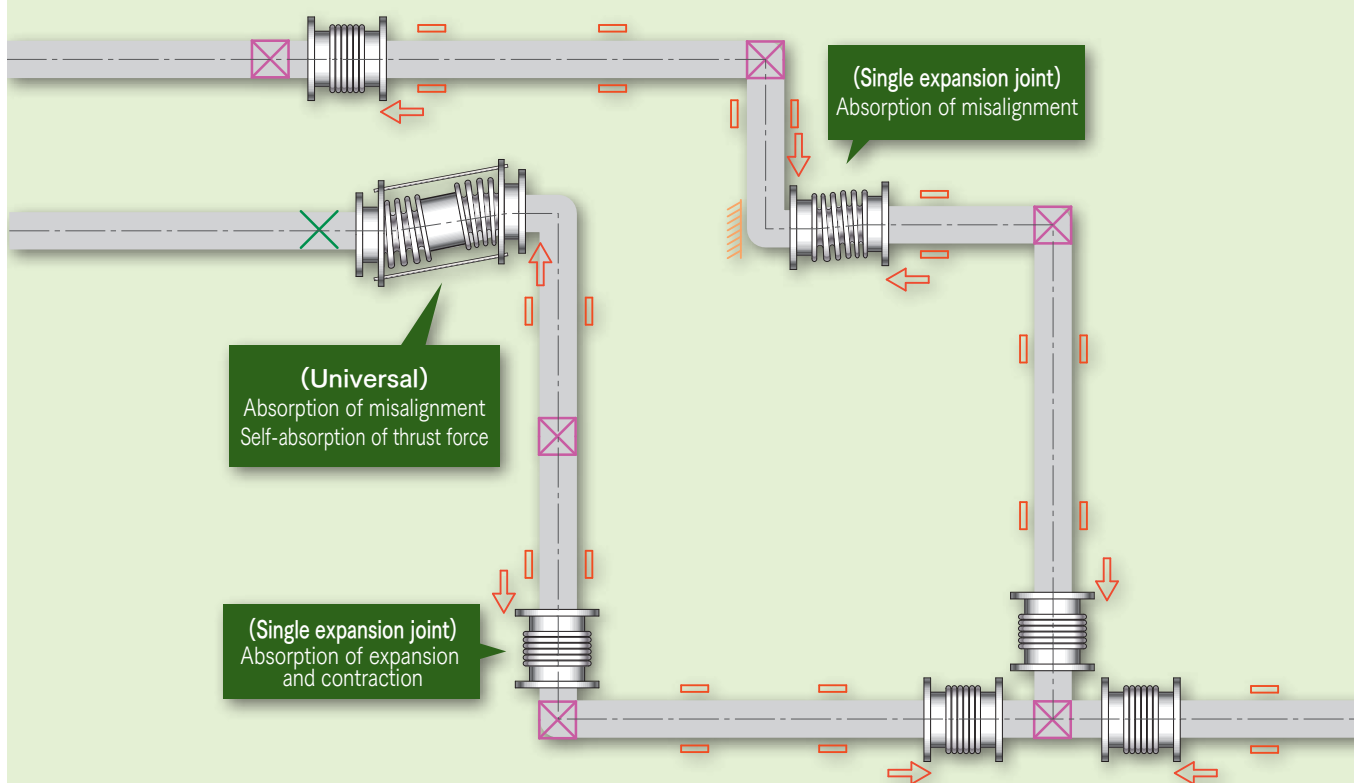


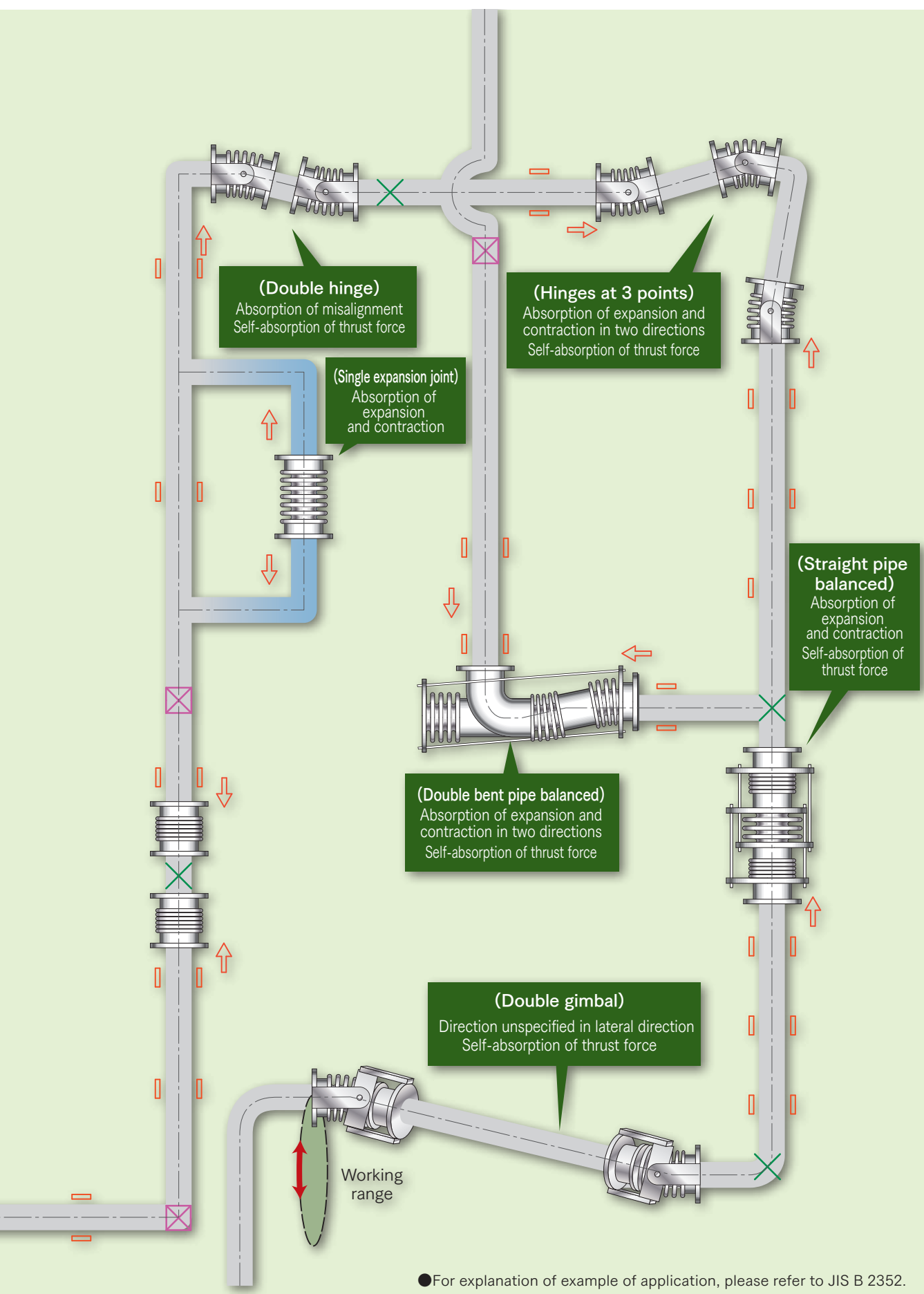
Misalignment

Examples of application of bellows expansion joints

Terms and symbols

Term	Description	Symbol
Main anchor	Must be resistant to the expansion joint thrust force and the spring reaction force.	
Slide anchor	Must be resistant to the expansion joint thrust force and the spring reaction force but does not restrain the force in the sliding direction.	
Intermediate anchor	Must be resistant to the spring reaction force of expansion joint.	
Guide	Pipe guide device for transmitting smoothly the necessary force for centering of expansion joint and pipe and movement in the axial direction to the anchor	
Direction of expansion of pipe		

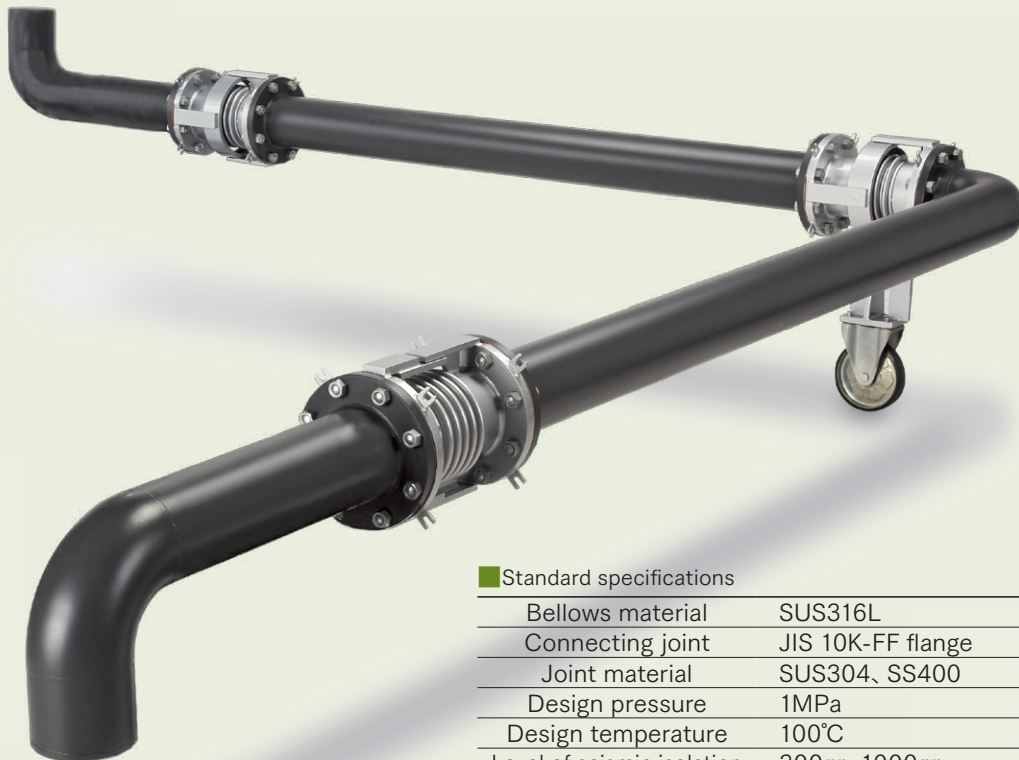




Earthquake-proof piping

14 Dodge³ Joint[®]

Dodge³ Joint is a revolutionary earthquake-proof piping system which has three kinds of bellows, i.e. the hinge, gimbal and self-propelled gimbal bellows, at three points on L-shaped piping and absorbs three-dimensional relative displacement caused in a seismic isolation layer.



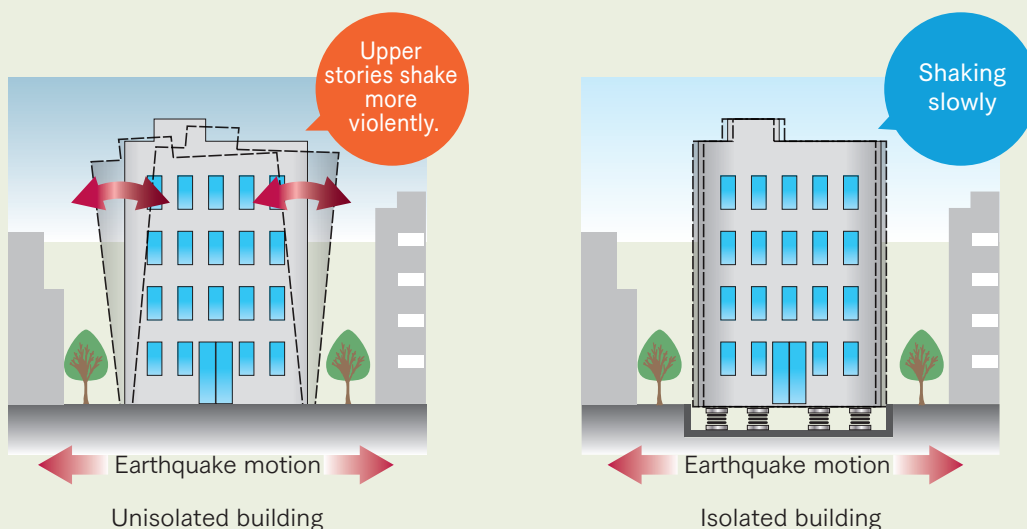
Standard specifications

Bellows material	SUS316L
Connecting joint	JIS 10K-FF flange
Joint material	SUS304, SS400
Design pressure	1MPa
Design temperature	100°C
Level of seismic isolation	300mm~1000mm

※Piping systems with self-propelled gimbal bellows suspended from ceiling can be fabricated depending on the building structure. For more information, please contact us.

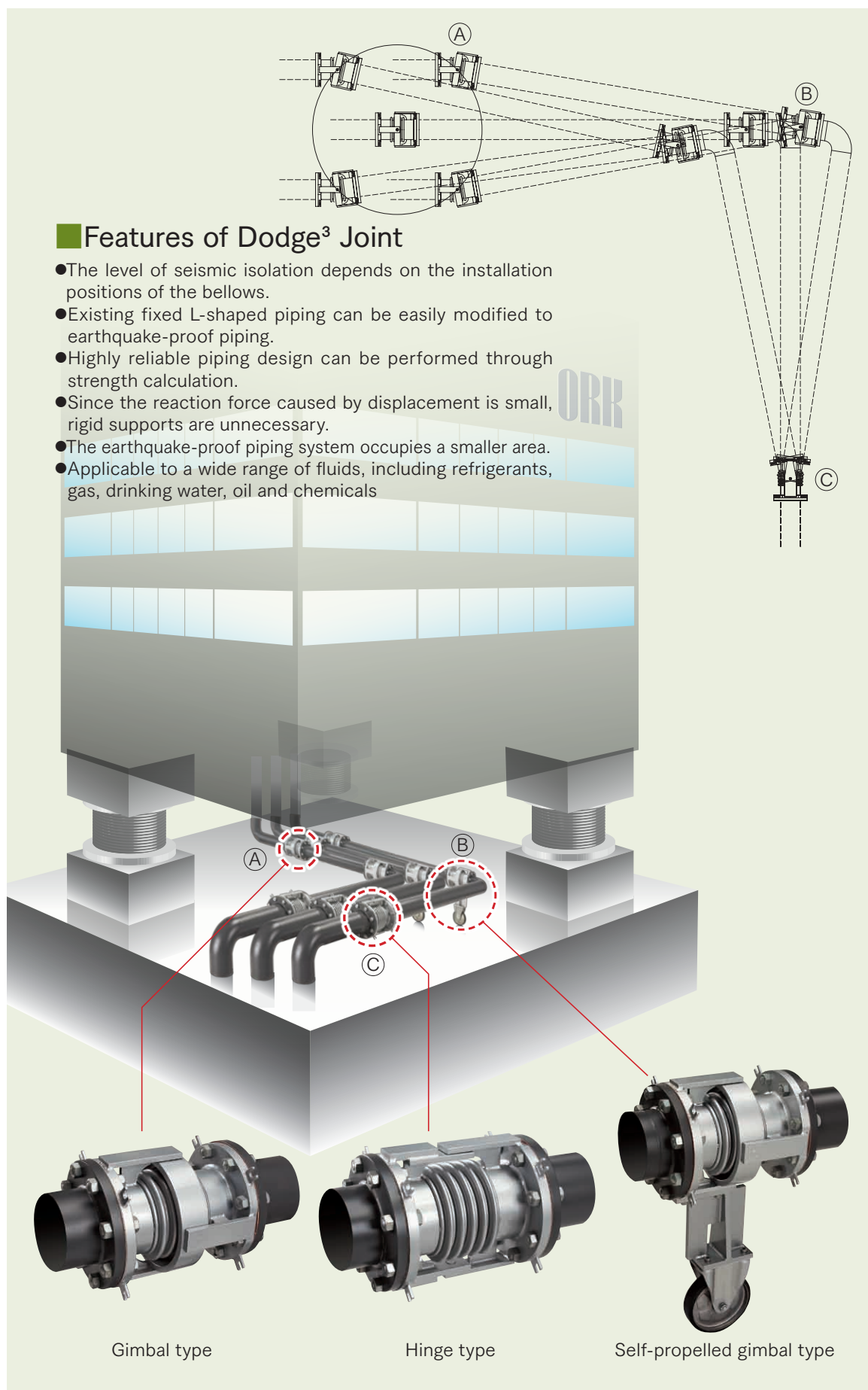
Seismic isolated structure

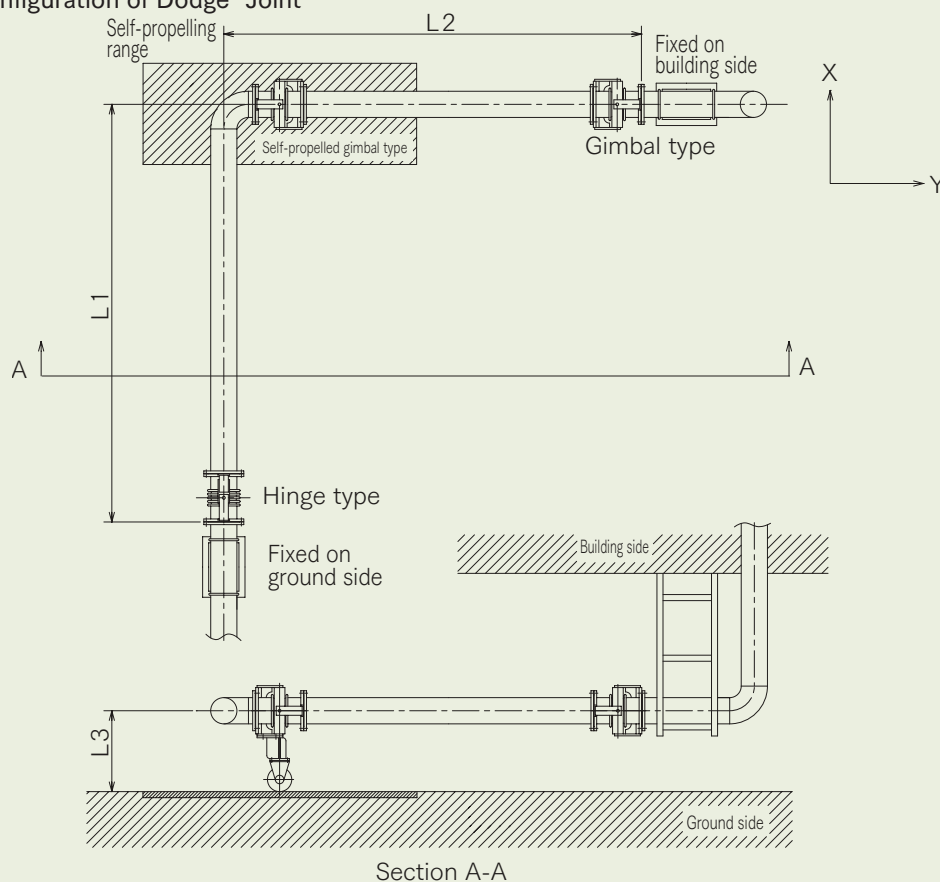
The seismic isolated structure refers to a construction method which isolates the building from the ground through seismic isolation devices to prevent transmission of ground vibrations caused by earthquake energy directly to the building. In buildings constructed by the seismic isolation method, significant relative displacement is generated in the seismic isolation layer between the building and the ground by the earthquake energy. Therefore, the lifeline utilities of the buildings must be provided with piping systems which can absorb the relative displacement.



Unisolated building

Isolated building



15 Dodge³ Joint■ Basic configuration of Dodge³ Joint■ Basic configuration of Dodge³ Joint

Nominal diameter	L1/L2 (mm)	L3 (mm)	reaction force F_x^{*1} (N)	reaction force F_y^{*1} (N)	weight of system ^{*2} (kg)
Seismic isolation of 500 mm	50A	2675	37.3	36.3	73
	65A	2685	45.1	43.1	101
	80A	2715	137.3	130.4	126
	100A	2750	141.2	133.4	174
	125A	2820	311.9	293.2	270
	150A	2850	469.7	439.3	350
	200A	2990	1216.0	1123.8	576
	250A	3185	2408.5	2211.4	898
	300A	3290	2811.6	2563.5	1214
Seismic isolation of 700 mm	50A	3585	26.5	25.5	85
	65A	3595	32.4	31.4	118
	80A	3625	98.1	94.1	147
	100A	3660	101.0	96.1	206
	125A	3730	221.6	210.8	316
	150A	3770	334.4	316.8	412
	200A	3910	863.0	811.0	678
	250A	4135	1708.3	1596.5	1048
	300A	4240	1992.7	1850.5	1424

※1 The maximum reaction force is shown.

※2 The weight of system is the own weight of Dodge³ Joint (including three bellows and intermediate pipes connecting the bellows).

※For other system specifications, please consult us.

※Detailed design materials and description on seismic isolation level are available. Please consult us.