



ORK

**VACUUM FLEXIBLE HOSES
AND BELLOWS**

ORK OSAKA
RASENKAN
KOGYO CO.,LTD.
SINCE 1912

Vacuum flexible hoses and bellows

The vacuum technology is widely used in the semiconductor, LCD, LED, space development, accelerator and food industries and is one of the indispensable technologies in these days. Our flexible hoses and bellows for vacuum use are manufactured in a clean environment so that they can be used in these vacuum technology fields.

Flexible hoses

Bellows

Joints and piping parts

Special models



Flexible hoses

1 Megaflex® /Megaflex (with inner surface polished)

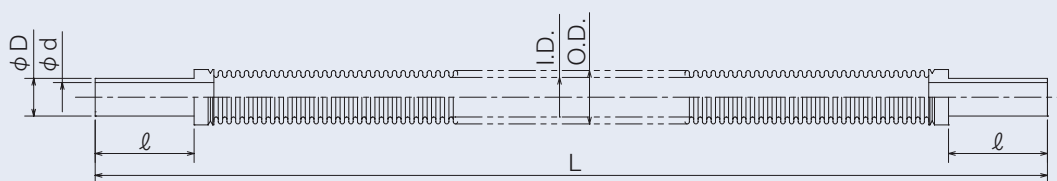
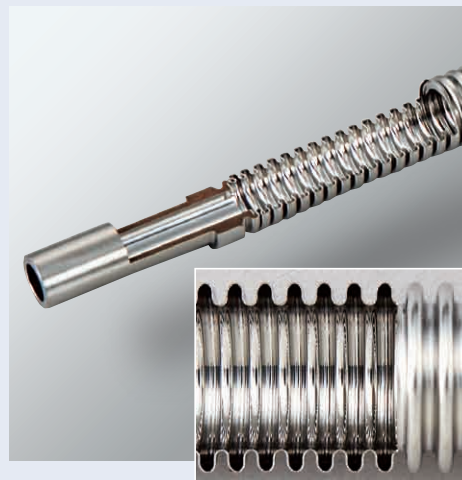
Recently, the scale of integration in the semiconductor industry has been remarkably increased, and requirements for cleanliness of semiconductor manufacturing equipment have become considerably strict. Particularly, on process gas piping systems, super clean pipes made of vacuum double-melted materials are used to improve the cleanliness. The flexible hoses with inner surface polished, Megaflex, have been developed to meet the requirements for higher cleanliness and gained absolute confidence and appreciation in the semiconductor field for many years.

Standard specifications

Material	Hose SUS316L Tube end SUS316L(Vacuum double-melted material)
Working pressure	Vacuum ~0.5MPa
Allowable leak rate	$1.33 \times 10^{-10} \text{Pa} \cdot \text{m}^3/\text{sec}$ or less

Features

- Since an ultra-low Mn vacuum double-melted material is used for the tube end, the corrosion resistance of the welded zone is very high.
- Inner surface roughness: Rz 0.7 μm or less
- The remarkably smooth inner surface is hardly covered with particles and generates almost no particles.
- Products exposed to precision cleaning in clean room

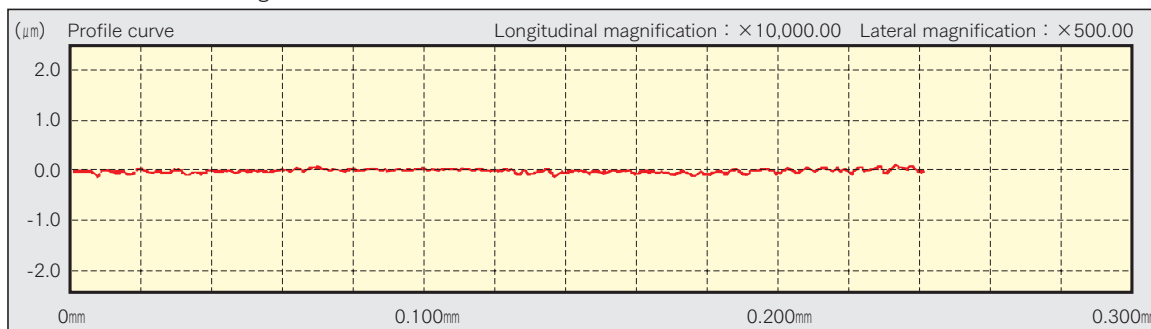


Standard dimensions

Nominal diameter (A)	Joint standard	Model No.	I.D.	O.D.	D	d	l	L	Min. bending radius (mm)	
									Constant bending	Repeated bending
8	1/4"	ORV-8PM-20	5.5	8.5	6.35	4.5	20	200	30	125
		ORV-8PM-30						300		
		ORV-8PM-40						400		
10	3/8"	ORV-10PM-20	10.0	13.5	9.52	7.4	25	200	45	180
		ORV-10PM-30						300		
		ORV-10PM-40						400		
15	1/2"	ORV-15PM-20	12.0	16.0	12.7	10.3	30	200	45	185
		ORV-15PM-30						300		
		ORV-15PM-40						400		

Hose inner surface roughness (actual measurement)

Ra:0.02μm Rz:0.2μm



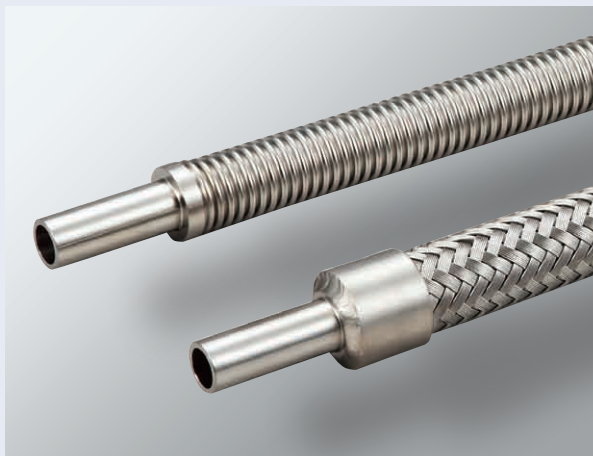
2 Tube end type

Standard specifications

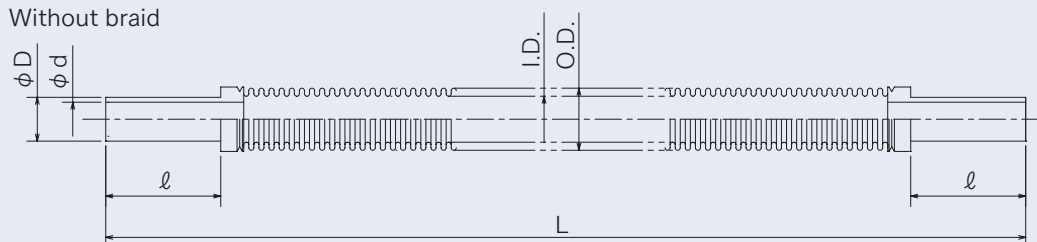
Material	Hose SUS316L
	Tube end SUS316L
	Braid SUS304
Working pressure	See the tables.
Allowable leak rate	1.33×10^{-10} Pa · m ³ /sec or less

Remarks

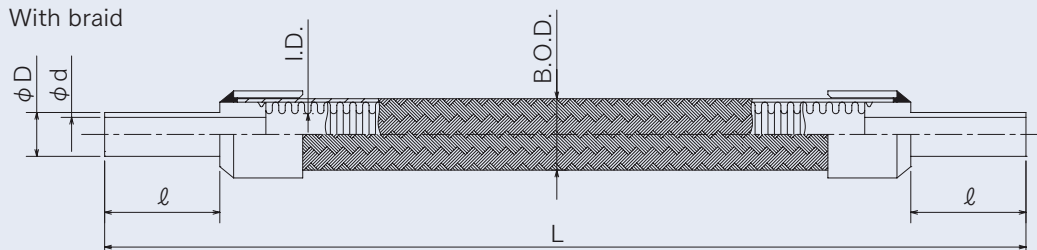
- 3/4" (ORV-20PS) and 1" (ORV-25PS) Hose can be fabricated.
(For the allowable pressure on the pressing side, please consult us.)



Without braid



With braid



Standard dimensions of hoses without braid

Nominal diameter (A)	Joint standard	Model No.	I.D.	O.D.	D	d	l	L	Working pressure (MPa)	Min. bending radius (mm)	
										Constant bending	Repeated bending
8	1/4"	ORV-8PS-cm	5.5	8.5	6.35	4.5	20	70~3000	Vacuum~0.5	30	125
10	3/8"	ORV-10PS-cm	10.0	13.5	9.52	7.4	25	80~3000	Vacuum~0.5	45	180
15	1/2"	ORV-15PS-cm	12.0	16.0	12.7	10.3	30	90~3000	Vacuum~0.5	45	185

※Specify the length in the model number in cm. Example : ORV-8PS-20

Standard dimensions of hoses with braid

Nominal diameter (A)	Joint standard	Model No.	I.D.	B.O.D.	D	d	l	L	Working pressure (MPa)	Min. bending radius (mm)	
										Constant bending	Repeated bending
8	1/4"	ORVB-8PS-cm	5.5	10.0	6.35	4.5	20	120~3000	Vacuum~4.0	30	125
10	3/8"	ORVB-10PS-cm	10.0	15.0	9.52	7.4	25	120~3000	Vacuum~3.0	45	180
15	1/2"	ORVB-15PS-cm	12.0	17.5	12.7	10.3	30	120~3000	Vacuum~2.0	45	185

※Specify the length in the model number in cm. Example : ORVB-8PS-20

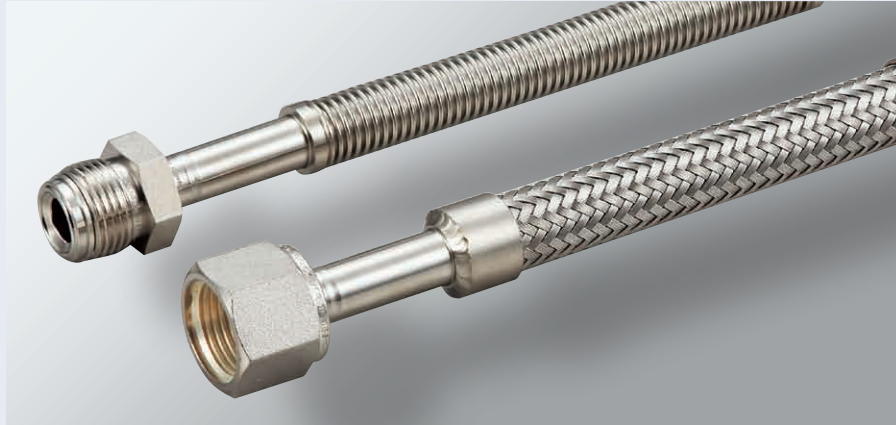
3 Tube end type (metal seal type)

Standard specifications

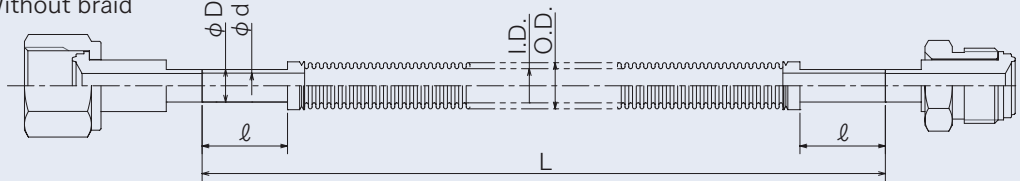
Material	Hose SUS316L
	Tube end SUS316L
	Braid SUS304
Working pressure	See the tables.
Allowable leak rate	1.33×10^{-10} Pa · m ³ /sec or less

Remarks

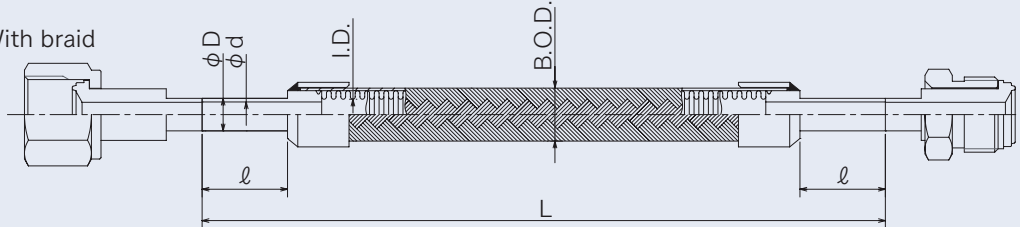
- These models are tube end type provided with metal seal type joints.
- Please specify the joint model.



Without braid



With braid



Standard dimensions of hoses without braid

Nominal diameter (A)	Joint standard	Model No.	I.D.	O.D.	D	d	l	L	Working pressure (MPa)	Min. bending radius (mm)	
										Constant bending	Repeated bending
8	1/4"	ORV-8PS-cm-joint model	5.5	8.5	6.35	4.5	20	70~3000	Vacuum~0.5	30	125
10	3/8"	ORV-10PS-cm-joint model	10.0	13.5	9.52	7.4	25	80~3000	Vacuum~0.5	45	180
15	1/2"	ORV-15PS-cm-joint model	12.0	16.0	12.7	10.3	30	90~3000	Vacuum~0.5	45	185

※Specify the length in the model number in cm. Example : ORV-8PS-20-joint model

※As the joint model, specify the model number given by the manufacturer.

Standard dimensions of hoses with braid

Nominal diameter (A)	Joint standard	Model No.	I.D.	B.O.D.	D	d	l	L	Working pressure (MPa)	Min. bending radius (mm)	
										Constant bending	Repeated bending
8	1/4"	ORVB-8PS-cm-joint model	5.5	10.0	6.35	4.5	20	120~3000	Vacuum~4.0	30	125
10	3/8"	ORVB-10PS-cm-joint model	10.0	15.0	9.52	7.4	25	120~3000	Vacuum~3.0	45	180
15	1/2"	ORVB-15PS-cm-joint model	12.0	17.5	12.7	10.3	30	120~3000	Vacuum~2.0	45	185

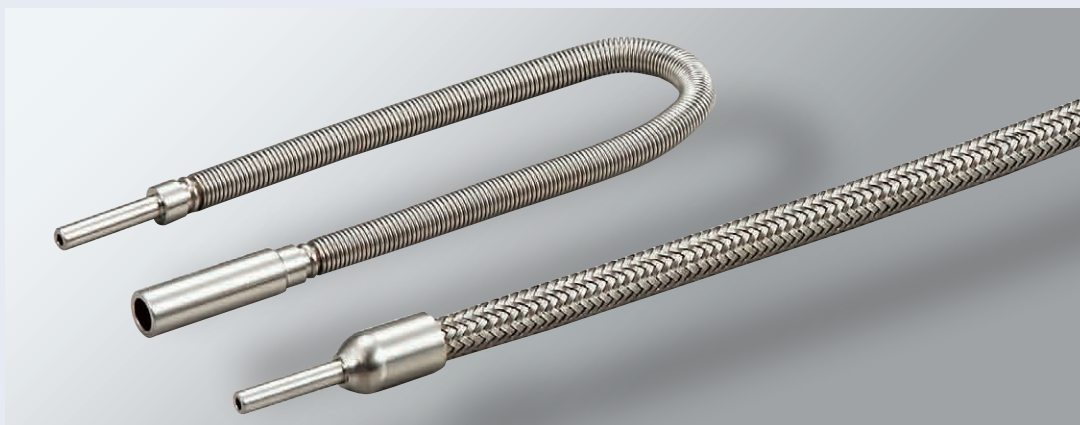
※Specify the length in the model number in cm. Example : ORVB-8PS-20-joint model

※As the joint model, specify the model number given by the manufacturer.

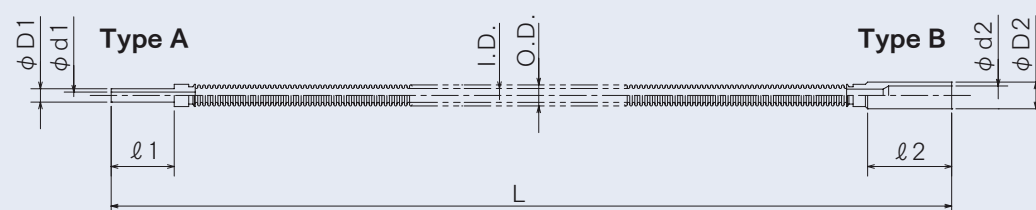
4 3A Super Mini Flex

Standard specifications

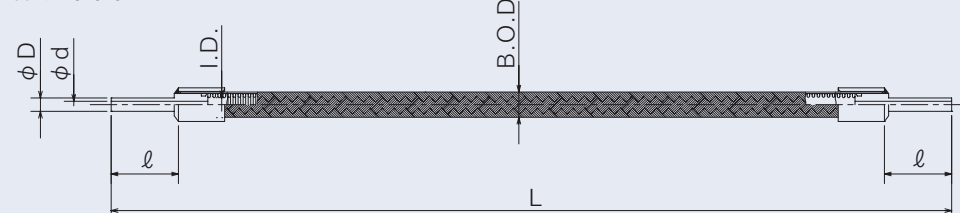
Material	Hose SUS316L
	Tube end SUS316L
	Braid SUS304
Working pressure	See the tables.
Allowable leak rate	1.33×10^{-10} Pa · m ³ /sec or less



Without braid



With braid



Standard dimensions of hoses without braid

Nominal diameter (A)	Joint standard	Model No.	I.D.	O.D.	D ₁	d ₁	l ₁	D ₂	d ₂	l ₂	L	Working pressure (MPa)	Min. bending radius (mm)	
													Constant bending	Repeated bending
3	1/8"	ORV-3PS-cm-A(B)	3.3	5.0	3.18	1.6	15	6.35	4.5	20	100~2000	Vacuum~0.5	10	75

※Specify the length in the model number in cm. Example : ORV-3PS-20-A

※Specify type A or B joint. Joints having other shapes can be fabricated.

Standard dimensions of hoses with braid

Nominal diameter (A)	Joint standard	Model No.	I.D.	B.O.D.	D	d	l	L	Working pressure (MPa)	Min. bending radius (mm)	
										Constant bending	Repeated bending
3	1/8"	ORVB-3PS-cm-A	3.3	6.0	3.18	1.6	15	100~2000	Vacuum~3.78	10	75

※Specify the length in the model number in cm. Example : ORVB-3PS-20-A

※Only type A is available.

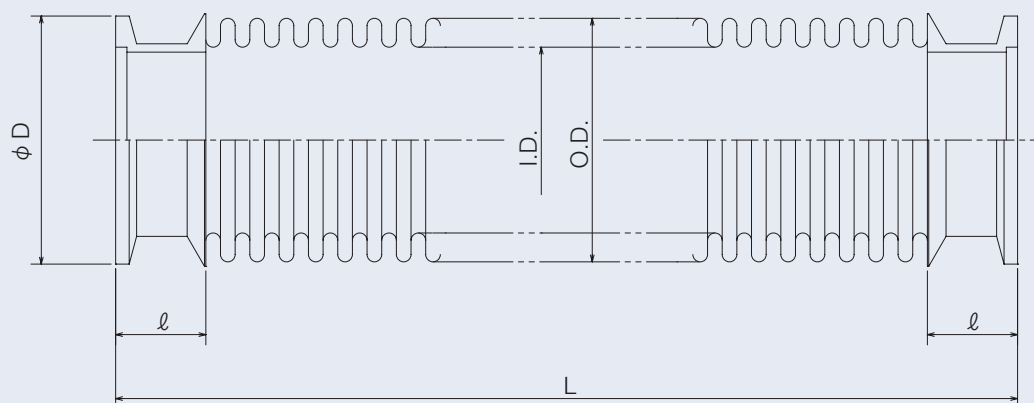
5 NW flange type

Standard specifications

Material	Hose SUS304, SUS316L NW flange SUS304, SUS316L
Working pressure	Vacuum~atmospheric pressure
Allowable leak rate	1.33×10^{-10} Pa · m ³ /sec or less

Remarks

- Hoses of sizes of NW125 or more can be fabricated.
- Hoses with braid can be fabricated.
(Model No. ORVB-)
- For the allowable pressure on the pressing side, please consult us.
- Hoses having length not shown in the L column can be fabricated.



Standard dimensions

Nominal diameter (A)	Joint standard	Model No.	I.D.	O.D.	D	ℓ	L	Min. bending radius (mm)	
								Constant bending	Repeated bending
15	NW10	ORV-10C-cm	12.0	16.0	30	20	100~2000	45	185
20	NW16	ORV-16C-cm	21.5	29.5	30	20	100~2000	50	210
25	NW25	ORV-25C-cm	26.5	36.0	40	20	100~2000	70	240
40	NW40	ORV-40C-cm	41.2	54.0	55	20	100~2000	100	330
50	NW50	ORV-50C-cm	50.5	65.0	75	20	100~2000	130	365
65	NW63	ORV-63C-cm	65.0	82.0	87	20	100~2000	170	545
80	NW80	ORV-80C-cm	77.5	98.0	114	25	100~2000	200	600
100	NW100	ORV-100C-cm	102.0	127.0	134	25	100~2000	240	750

※Specify the length in the model number in cm. Example : ORV-80C-20

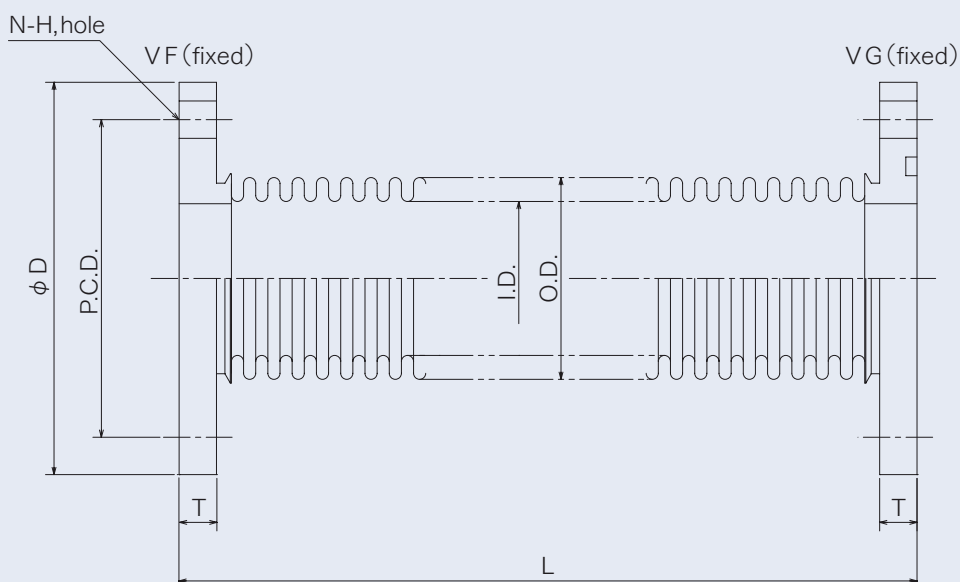
6 JIS flange type

Standard specifications

Material	Hose SUS304, SUS316L Flange SUS304, SUS316L
Working pressure	Vacuum~atmospheric pressure
Allowable leak rate	1.33×10^{-10} Pa · m ³ /sec or less

Remarks

- Hoses with braid can be fabricated.
(Model No. ORVB-)
- For the allowable pressure on the pressing side, please consult us.
- Hoses having length not shown in the L column can be fabricated.



Standard dimensions

Nominal diameter (A)	Joint standard	Model No.	I.D.	O.D.	D	T	P.C.D.	N-H	L	Min. bending radius (mm)	
										Constant bending	Repeated bending
20	VG20/VF20	ORV-20F-cm	21.5	29.5	80	8	60	4-10	100~2000	50	210
25	VG25/VF25	ORV-25F-cm	26.5	36.0	90	8	70	4-10	100~2000	70	240
40	VG40/VF40	ORV-40F-cm	41.2	54.0	105	10	85	4-10	100~2000	100	330
50	VG50/VF50	ORV-50F-cm	50.5	65.0	120	10	100	4-10	100~2000	130	365

※Specify the length in the model number in cm. Example : ORV-20F-20

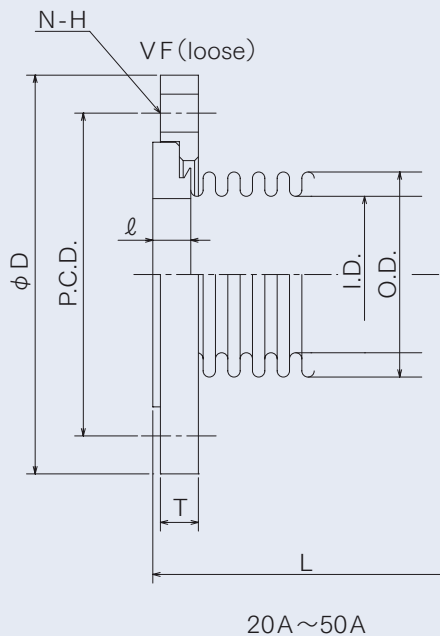
7 JIS flange(VF loose) type

Standard specifications

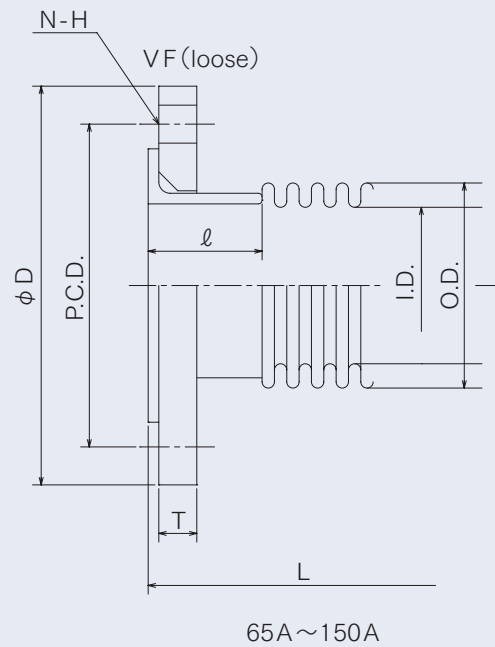
Material	Hose SUS304, SUS316L Flange SUS304, SUS316L
Working pressure	Vacuum~atmospheric pressure
Allowable leak rate	1.33×10^{-10} Pa · m ³ /sec or less

Remarks

- Hoses with braid can be fabricated.
(Model No. ORVB-)
- For the allowable pressure on the pressing side, please consult us.
- Hoses having length not shown in the L column can be fabricated.



20A~50A



65A~150A

Standard dimensions

Nominal diameter (A)	Joint standard	Model No.	I.D.	O.D.	D	T	P.C.D.	N-H	ℓ	L	Min. bending radius (mm)	
											Constant bending	Repeated bending
20	VG20/VF20	ORV-20FL-cm	21.5	29.5	80	8	60	4-10	9	100~2000	50	240
25	VG25/VF25	ORV-25FL-cm	26.5	36.0	90	8	70	4-10	9	100~2000	70	250
40	VG40/VF40	ORV-40FL-cm	41.2	54.0	105	10	85	4-10	10	100~2000	100	365
50	VG50/VF50	ORV-50FL-cm	50.5	65.0	120	10	100	4-10	10	100~2000	130	350
65	VG65/VF65	ORV-65FL-cm	65.0	82.0	145	10	120	4-12	50	200~2000	170	545
80	VG80/VF80	ORV-80FL-cm	77.5	98.0	160	12	135	4-12	50	200~2000	200	600
100	VG100/VF100	ORV-100FL-cm	102.0	127.0	185	12	160	8-12	50	200~2000	240	750
125	VG125/VF125	ORV-125FL-cm	127.0	152.0	210	12	185	8-12	50	200~2000	300	930
150	VG150/VF150	ORV-150FL-cm	150.0	180.0	235	12	210	8-12	50	200~2000	350	970

※Specify the length in the model number in cm. Example : ORV-20FL-20

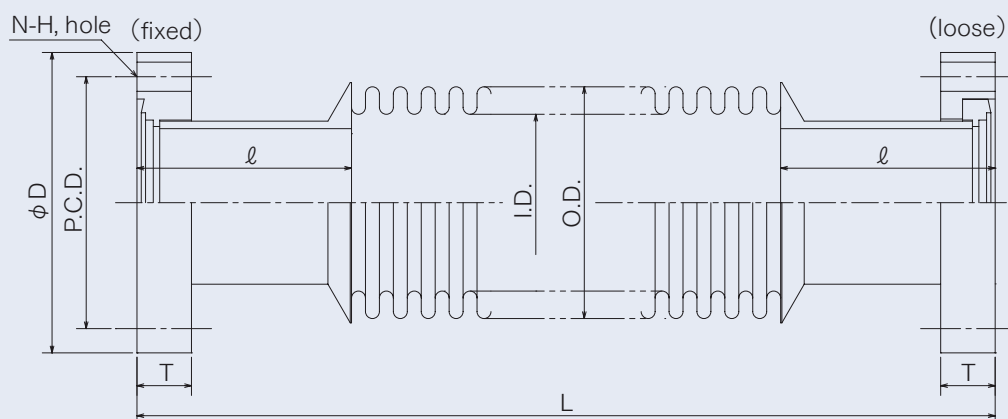
8 Conflat flange type

Standard specifications

Material	Hose SUS304, SUS316L
	Flange SUS304, SUS316L
Working pressure	Vacuum~atmospheric pressure
Allowable leak rate	1.33×10^{-10} Pa · m ³ /sec or less

Remarks

- Hoses with braid can be fabricated.
(Model No. ORVB-)
- For the allowable pressure on the pressing side, please consult us.
- Hoses having length not shown in the L column can be fabricated.



Standard dimensions

Nominal diameter (A)	Joint standard	Model No.	I.D.	O.D.	D	T	P.C.D.	N-H	ℓ	L	Min. bending radius (mm)	
											Constant bending	Repeated bending
20	ICF34	ORV-20CF-cm	21.5	29.5	34	7.5	27.0	6-4.5	25	200~1000	50	210
25	ICF70	ORV-25CF-cm	26.5	36.0	70	12.7	58.7	6-6.8	30	200~1000	70	240
32	ICF70	ORV-32CF-cm	33.5	44.0	70	12.7	58.7	6-6.8	30	200~1000	80	280
40	ICF70	ORV-40CF-cm	41.2	54.0	70	12.7	58.7	6-6.8	50	200~1000	100	330
50	ICF114	ORV-50CF-cm	50.5	65.0	114	17.5	92.1	8-8.5	50	200~1000	130	365

※Specify the length in the model number in cm. Example : ORV-20CF-20

※Specify the flange type, fixed or loose.

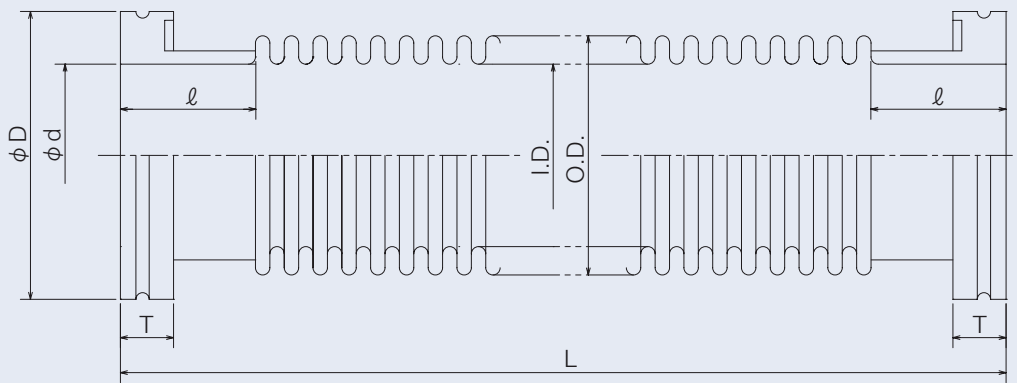
9 ISO-MF flange type

Standard specifications

Material	Hose SUS304, SUS316L Flange SUS304, SUS316L
Working pressure	Vacuum~atmospheric pressure
Allowable leak rate	1.33×10^{-10} Pa · m ³ /sec or less

Remarks

- Hoses with braid can be fabricated.
(Model No. ORVB-)
- For the allowable pressure on the pressing side, please consult us.
- Hoses having length not shown in the L column can be fabricated.



Standard dimensions

Nominal diameter (A)	Joint standard	Model No.	I.D.	O.D.	D	T	d	l	L	Min. bending radius (mm)	
										Constant bending	Repeated bending
65	ISO-MF63	ORV-63MF-cm	65.0	82.0	95	12	70.2	25	200~2000	170	545
80	ISO-MF80	ORV-80MF-cm	77.5	98.0	110	12	83.2	25	200~2000	200	600
100	ISO-MF100	ORV-100MF-cm	102.0	127.0	130	12	102.2	25	200~2000	240	750
125	ISO-MF125	ORV-125MF-cm	127.0	152.0	155	12	127.2	25	200~2000	300	930
150	ISO-MF160	ORV-160MF-cm	151.0	180.0	180	12	153.2	30	200~2000	350	970

※Specify the length in the model number in cm. Example : ORV-63MF-20

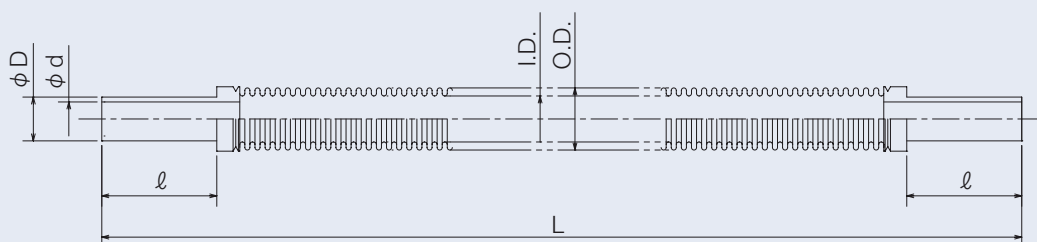
10 Tube end type (equivalent to HASTELLOY C-22)

■ Features

- Nickel alloy (equivalent to HASTELLOY C-22) excelling in corrosion resistance is used for the thin-walled flexible hoses.

■ Standard specifications

	Hose Nickel alloy
Material	(equivalent to HASTELLOY C-22)
	Tube end SUS316L, Nickel alloy
Working pressure	Vacuum~0.5MPa
Allowable leak rate	1.33×10^{-10} Pa · m ³ /sec or less



■ Standard dimensions

Nominal diameter (A)	Joint standard	Model No.	I.D.	O.D.	D	d	l	L	Min. bending radius (mm)	
									Constant bending	Repeated bending
8	1/4"	ORV-8PH-cm	5.5	8.5	6.35	4.5	20	70~3000	40	130
10	3/8"	ORV-10PH-cm	10.0	13.5	9.52	7.4	25	80~3000	50	190
15	1/2"	ORV-15PH-cm	12.0	16.0	12.7	10.3	30	90~3000	50	200

※Specify the length in the model number in cm. Example : ORV-8PH-20

11 NW flange type (equivalent to HASTELLOY C-22)

Features

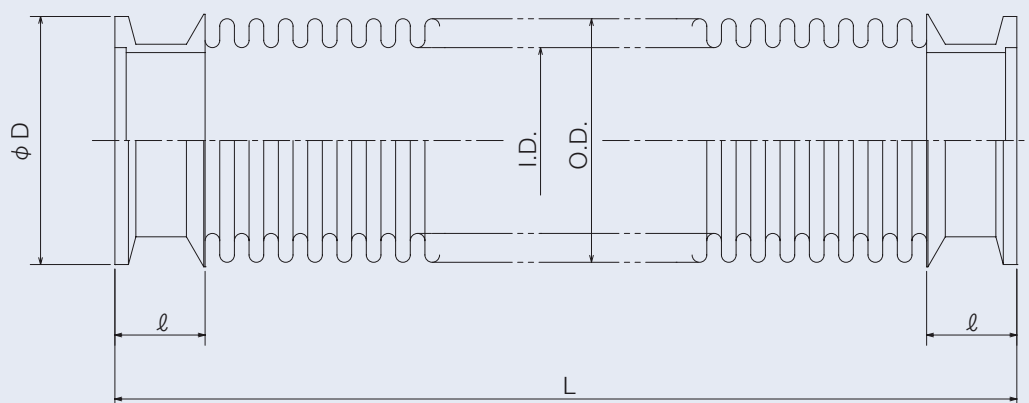
- Nickel alloy (equivalent to HASTELLOY C-22) excelling in corrosion resistance is used for the thin-walled flexible hoses.

Standard specifications

Material	Hose Nickel alloy (equivalent to HASTELLOY C-22) NW flange SUS316L, Nickel alloy
Working pressure	Vacuum~atmospheric pressure
Allowable leak rate	1.33×10^{-10} Pa · m ³ /sec or less

Remarks

- For the allowable pressure on the pressing side, please consult us.



Standard dimensions

Nominal diameter (A)	Joint standard	Model No.	I.D.	O.D.	D	ℓ	L	Min. bending radius (mm)	
								Constant bending	Repeated bending
15	NW10	ORV-10C-cm-C22	12.0	16.0	30	20	100~2000	50	200
20	NW16	ORV-16C-cm-C22	21.5	28.5	30	20	100~2000	60	240
25	NW25	ORV-25C-cm-C22	26.5	35.0	40	20	100~2000	70	250
40	NW40	ORV-40C-cm-C22	41.2	51.5	55	20	100~2000	80	330
50	NW50	ORV-50C-cm-C22	50.5	62.5	75	20	100~2000	90	390

※Specify the length in the model number in cm. Example : ORV-10C-20-C22

12 NW flange type (coated models)

■ Features

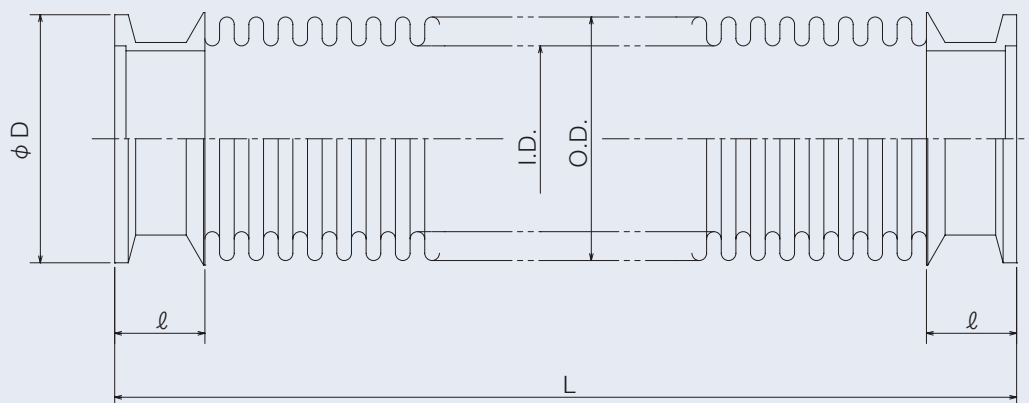
- Since the surface is coated with a special material, the surface excels in corrosion resistance. The coating is effective particularly against chlorine corrosive gas.
- The coating is performed by Clean S treatment (Showa Denko).

■ Standard specifications

Material	Hose SUS304, SUS316L NW flange SUS304
Working pressure	Vacuum~atmospheric pressure
Allowable leak rate	1.33×10^{-10} Pa · m ³ /sec or less

■ Remarks

- For the allowable pressure on the pressing side, please consult us.



■ Standard dimensions

Nominal diameter (A)	Joint standard	Model No.	I.D.	O.D.	D	ℓ	L	Min. bending radius (mm)	
								Constant bending	Repeated bending
15	NW10	ORV-10C-cmCS	12.0	16.0	30	20	100~1000	45	185
20	NW16	ORV-16C-cmCS	21.5	29.5	30	20	100~1000	50	210
25	NW25	ORV-25C-cmCS	26.5	36.0	40	20	100~1000	70	240
40	NW40	ORV-40C-cmCS	41.2	54.0	55	20	100~1000	100	330
50	NW50	ORV-50C-cmCS	50.5	65.0	75	20	100~1000	130	365

※Specify the length in the model number in cm. Example : ORV-10C-20CS

13 Heat Flex

■ Features

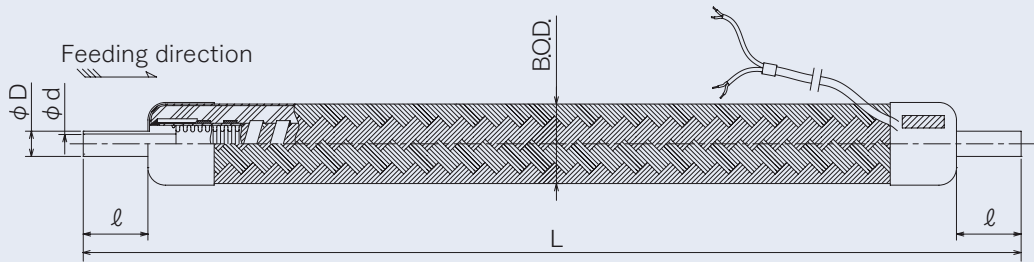
- The uniform temperature distribution ensures stable insulation and heating.
- The inner hose and tube end made of SUS316L realize excellent heat resistance and corrosion resistance and ensure complete airtightness (He test: 1.33×10^{-10} Pa · m³/sec). The hoses are suitable for feeding H₂ and He gas.
- The bending radius is small, and the flexibility is high.
- The hoses are provided with built-in thermal fuses to prevent overheating.

■ Standard specifications

Supply voltage	AC100V
Working pressure	Vacuum ~ 2.8MPa
Working temperature	MAX 200°C
Temperature sensor	CA (K) type thermocouple
Lead wire length	2000mm(standard)

■ Remarks

- Hoses for supply voltage other than 100 V can be fabricated.
- Hoses for working temperature of higher than 200° C can be fabricated.
- Hoses using CC (T) type thermocouples as temperature sensors can be fabricated.



■ Standard dimensions

Nominal diameter (A)	Joint standard	Model No.	D	d	(B.O.D.)	l	L	Min. bending radius (mm)	Power consumption per m
8	1/4"	HFB-8PS-cm	6.35	4.5	23	20	500~2000	60	120W
10	3/8"	HFB-10PS-cm	9.52	7.4	33	25	500~2000	90	130W
15	1/2"	HFB-15PS-cm	12.7	10.3	45	30	500~2000	90	150W

※Specify the length in the model number in cm. Example : HFB-8PS-75

14 Transfer tubes (vacuum insulation double-layer flexible hoses)

■ Features

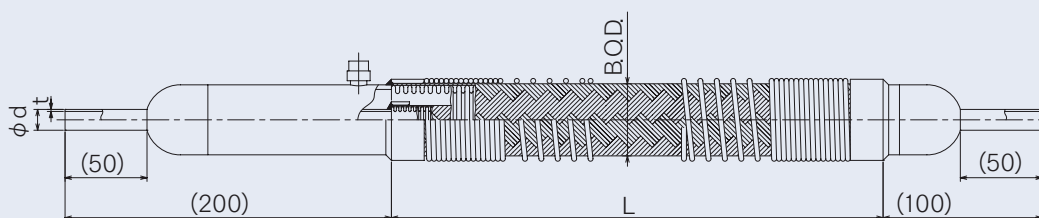
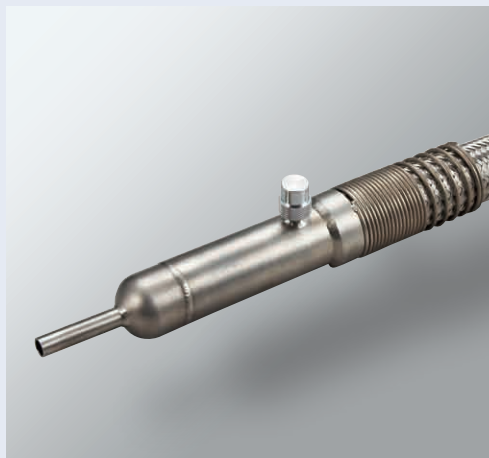
- Remarkably high flexibility
- The excellent heat insulating performance minimizes evaporation of the internal fluid.

■ Standard specifications

Material	Inner hose SUS316L	
	Outer hose SUS304	
Working pressure	MAX	1.0MPa
Working temperature	MIN	-200°C
Allowable leak rate	$1.33 \times 10^{-10} \text{ Pa} \cdot \text{m}^3/\text{sec}$ or less	

■ Remarks

- Hoses for working pressure of higher than 1 MPa can be designed and fabricated.
- Hoses having length not shown in the L column can be fabricated.



■ Standard dimensions

Nominal diameter (A)	Joint standard	Model No.	d	t	(B.O.D.)	L	Min. bending radius (mm)
8	1/4"	ORV-8TR-cm	6.35	1.0	35.5	1000~3000	250
10	3/8"	ORV-10TR-cm	9.52	1.0	44.0	1000~3000	300
15	1/2"	ORV-15TR-cm	12.7	1.2	44.0	1000~3000	300

※Specify the length in the model number in cm. Example : ORV-10TR-200

Bellows

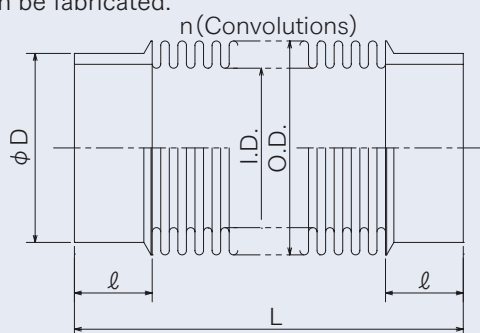
15 Tube end type

Standard specifications

Material	Bellows SUS316L Tube end SUS316L
Working pressure	Vacuum~atmospheric pressure
Allowable leak rate	1.33×10^{-10} Pa·m ³ /sec or less

Remarks

- For the allowable pressure on the pressing side, please consult us.
- Bellows having length not shown in the L column can be fabricated.



Standard dimensions

Nominal diameter (A)	Joint standard	Model No.	I.D.	O.D.	t	n (Convolutions)	D	l	L
20	15A	ORV-15PB-8	20.5	28.5	0.15	18	21.7	20	80
20	20A	ORV-20PB-8	20.5	28.5	0.15	18	27.2	20	80
25	25A	ORV-25PB-8	26.0	37.0	0.15	13	34.0	20	80
40	32A	ORV-32PB-10	41.0	55.0	0.15	13	42.7	20	100
40	40A	ORV-40PB-10	41.0	55.0	0.15	13	48.6	20	100
50	50A	ORV-50PB-10	51.0	65.0	0.2	13	60.5	20	100
65	65A	ORV-65PB-12	63.0	83.0	0.25	16	76.3	20	120
80	80A	ORV-80PB-15	80.0	103.0	0.25	18	89.1	25	150
100	100A	ORV-100PB-15	104.0	127.0	0.25	15	114.3	25	150
150	150A	ORV-150PB-15	150.0	175.0	0.3	13	165.2	25	150
200	200A	ORV-200PB-15	205.0	230.0	0.3	13	216.3	25	150

t is the bellows wall thickness.

Performance table

Nominal diameter (A)	Joint standard	Model No.	Displacement(mm)		Spring rate(N/mm)	
			Axial direction	Lateral direction	Axial direction	Lateral direction
20	15A	ORV-15PB-8	±4.5	±2.5	19.3	10.8
20	20A	ORV-20PB-8	±4.5	±2.5	19.3	10.8
25	25A	ORV-25PB-8	±6.5	±2.5	13.2	13.1
40	32A	ORV-32PB-10	±10.5	±4.0	9.0	9.5
40	40A	ORV-40PB-10	±10.5	±4.0	9.0	9.5
50	50A	ORV-50PB-10	±8.5	±2.5	26.1	40.4
65	65A	ORV-65PB-12	±14.5	±5.0	20.3	27.6
80	80A	ORV-80PB-15	±21.0	±7.5	14.8	19.0
100	100A	ORV-100PB-15	±19.0	±5.5	20.4	41.7
150	150A	ORV-150PB-15	±17.0	±3.0	44.0	188.9
200	200A	ORV-200PB-15	±17.0	±2.5	58.0	423.1

The displacement values in each of the axial direction and lateral direction are shown.

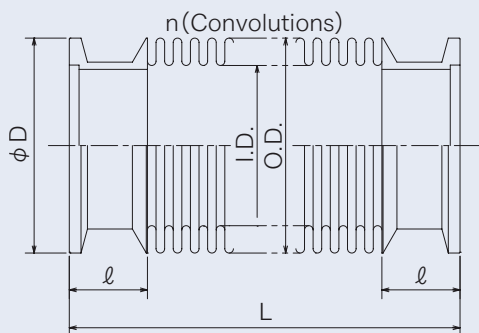
16 NW flange type

■ Standard specifications

Material	Bellows SUS316L
	NW flange SUS316L
Working pressure	Vacuum~atmospheric pressure
Allowable leak rate	1.33×10^{-10} Pa · m ³ /sec or less

■ Remarks

- For the allowable pressure on the pressing side, please consult us.
- Bellows having length not shown in the L column can be fabricated.



■ Standard dimensions

Nominal diameter (A)	Joint standard	Model No.	I.D.	O.D.	t	n (Convolutions)	D	l	L
20	NW16	ORV-16CB-8	20.5	28.5	0.15	18	30	20	80
25	NW25	ORV-25CB-8	26.0	37.0	0.15	13	40	20	80
40	NW40	ORV-40CB-10	41.0	55.0	0.15	13	55	20	100
50	NW50	ORV-50CB-10	51.0	65.0	0.2	13	75	20	100
65	NW63	ORV-63CB-12	63.0	83.0	0.25	16	87	20	120
80	NW80	ORV-80CB-15	80.0	103.0	0.25	18	114	25	150
100	NW100	ORV-100CB-15	104.0	127.0	0.25	15	134	25	150
150	NW160	ORV-160CB-15	150.0	175.0	0.3	13	190	25	150
200	NW200	ORV-200CB-15	205.0	230.0	0.3	13	252	25	150

t is the bellows wall thickness.

■ Performance table

Nominal diameter (A)	Joint standard	Model No.	Displacement(mm)		Spring rate(N/mm)	
			Axial direction	Lateral direction	Axial direction	Lateral direction
20	NW16	ORV-16CB-8	±4.5	±2.5	19.3	10.8
25	NW25	ORV-25CB-8	±6.5	±2.5	13.2	13.1
40	NW40	ORV-40CB-10	±10.5	±4.0	9.0	9.5
50	NW50	ORV-50CB-10	±8.5	±2.5	26.1	40.4
65	NW63	ORV-63CB-12	±14.5	±5.0	20.3	27.6
80	NW80	ORV-80CB-15	±21.0	±7.5	14.8	19.0
100	NW100	ORV-100CB-15	±19.0	±5.5	20.4	41.7
150	NW160	ORV-160CB-15	±17.0	±3.0	44.0	188.9
200	NW200	ORV-200CB-15	±17.0	±2.5	58.0	423.1

The displacement values in each of the axial direction and lateral direction are shown.

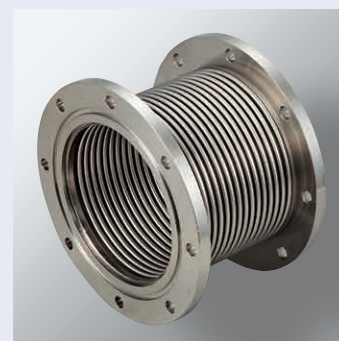
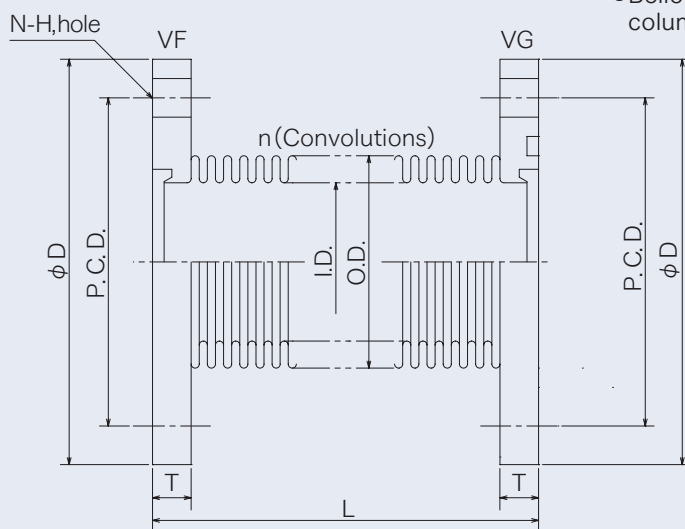
17 JIS flange type

■ Standard specifications

Material	Bellows SUS316L
	Flange SUS304
Working pressure	Vacuum~atmospheric pressure
Allowable leak rate	1.33×10^{-10} Pa · m ³ /sec or less

■ Remarks

- Bellows with stud bolt for preventing looseness can be fabricated.
- Bellows of 350 A or more can be fabricated.
- For the allowable pressure on the pressing side, please consult us.
- Bellows having length not shown in the L column can be fabricated.



■ Standard dimensions

Nominal diameter (A)	Joint standard	Model No.	I.D.	O.D.	t	n (Convolutions)	D	T	P.C.D.	N-H	L
25	VG25/VF25	ORV-25B-8	26.0	37.0	0.15	22	90	8	70	4-10	80
40	VG40/VF40	ORV-40B-10	41.0	55.0	0.15	19	105	10	85	4-10	100
50	VG50/VF50	ORV-50B-10	51.0	65.0	0.2	19	120	10	100	4-10	100
65	VG65/VF65	ORV-65B-10	63.0	83.0	0.25	17	145	10	120	4-12	100
80	VG80/VF80	ORV-80B-12	80.0	103.0	0.25	18	160	12	135	4-12	120
100	VG100/VF100	ORV-100B-12	104.0	127.0	0.25	15	185	12	160	8-12	120
125	VG125/VF125	ORV-125B-12	126.0	151.0	0.3	14	210	12	185	8-12	120
150	VG150/VF150	ORV-150B-15	150.0	175.0	0.3	18	235	12	210	8-12	150
200	VG200/VF200	ORV-200B-15	205.0	230.0	0.3	16	300	16	270	8-15	150
250	VG250/VF250	ORV-250B-15	254.0	290.0	0.3	9	350	16	320	12-15	150
300	VG300/VF300	ORV-300B-20	305.0	340.0	0.3	12	400	16	370	12-15	200

t is the bellows wall thickness.

■ Performance table

Nominal diameter (A)	Joint standard	Model No.	Displacement(mm)		Spring rate(N/mm)	
			Axial direction	Lateral direction	Axial direction	Lateral direction
25	VG25/VF25	ORV-25B-8	±11.0	±7.5	7.8	2.7
40	VG40/VF40	ORV-40B-10	±15.5	±9.0	6.1	3.1
50	VG50/VF50	ORV-50B-10	±12.5	±6.0	17.9	13.0
65	VG65/VF65	ORV-65B-10	±15.5	±5.5	19.1	23.1
80	VG80/VF80	ORV-80B-12	±21.0	±7.5	14.8	19.0
100	VG100/VF100	ORV-100B-12	±19.0	±5.5	20.4	41.7
125	VG125/VF125	ORV-125B-12	±18.0	±4.0	35.3	100.4
150	VG150/VF150	ORV-150B-15	±23.0	±6.5	31.8	71.2
200	VG200/VF200	ORV-200B-15	±21.5	±4.0	47.2	226.9
250	VG250/VF250	ORV-250B-15	±24.5	±3.5	30.9	229.5
300	VG300/VF300	ORV-300B-20	±33.0	±5.5	28.5	145.1

The displacement values in each of the axial direction and lateral direction are shown.

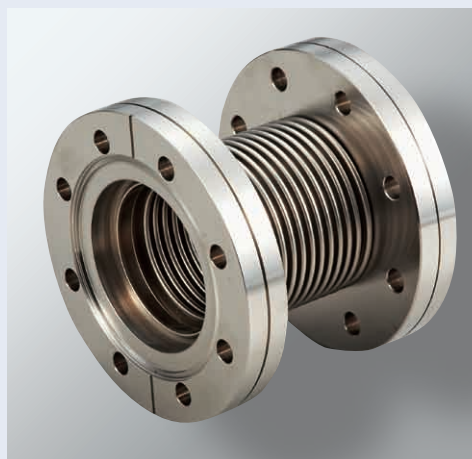
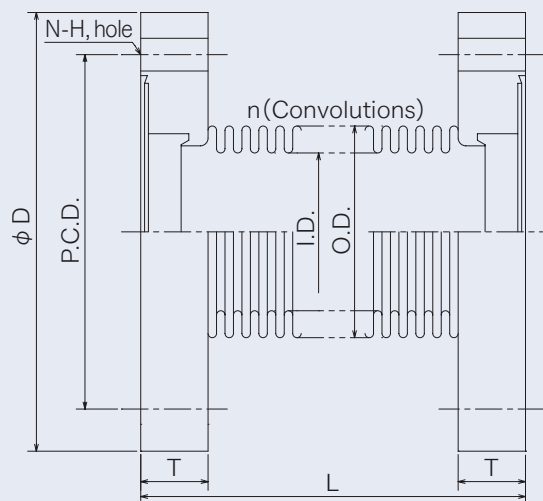
18 Conflat flange type

Standard specifications

Material	Bellows SUS316L Flange SUS304L, SUS316L
Working pressure	Vacuum~atmospheric pressure
Allowable leak rate	1.33×10^{-10} Pa · m ³ /sec or less

Remarks

- Bellows of 150 A or more can be fabricated.
- For the allowable pressure on the pressing side, please consult us.
- Bellows having length not shown in the L column can be fabricated.



Standard dimensions

Nominal diameter (A)	Joint standard	Model No.	I.D.	O.D.	t	n (Convolutions)	D	T	P.C.D.	N-H	L
25	ICF70	ORV-25CFB-8	26.0	37.0	0.15	19	70	12.7	58.7	6-6.8	80
50	ICF114	ORV-50CFB-10	51.0	65.0	0.2	15	114	17.5	92.1	8-8.5	100
80	ICF152	ORV-80CFB-12	80.0	103.0	0.25	15	152	20	130.2	16-8.5	120
125	ICF203	ORV-125CFB-12	126.0	151.0	0.3	11	203	22	181	20-8.5	120

t is the bellows wall thickness.

Performance table

Nominal diameter (A)	Joint standard	Model No.	Displacement(mm)		Spring rate(N/mm)	
			Axial direction	Lateral direction	Axial direction	Lateral direction
25	ICF70	ORV-25CFB-8	±9.5	±5.5	9.1	4.2
50	ICF114	ORV-50CFB-10	±9.5	±3.5	22.6	26.4
80	ICF152	ORV-80CFB-12	±17.5	±5.0	17.7	32.8
125	ICF203	ORV-125CFB-12	±14.0	±2.5	44.9	206.8

The displacement values in each of the axial direction and lateral direction are shown.

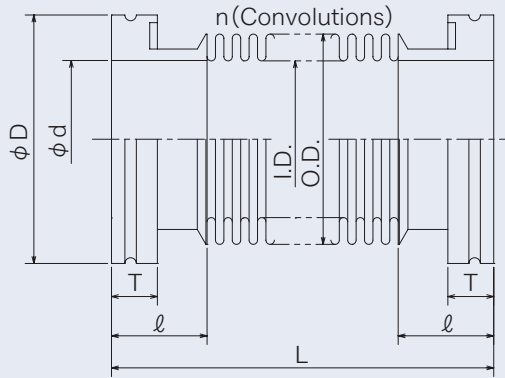
19 ISO-MF flange type

Standard specifications

Material	Bellows SUS316L Flange SUS304, SUS316L
Working pressure	Vacuum~atmospheric pressure
Allowable leak rate	1.33×10^{-10} Pa · m ³ /sec or less

Remarks

- For the allowable pressure on the pressing side, please consult us.
- Bellows having length not shown in the L column can be fabricated.



Standard dimensions

Nominal diameter (A)	Joint standard	Model No.	I.D.	O.D.	t	n (Convolutions)	D	T	d	l	L
65	ISO-MF63	ORV-63MFB-12	63.0	83.0	0.25	14	95	12	70.2	25	120
80	ISO-MF80	ORV-80MFB-12	80.0	103.0	0.25	12	110	12	83.2	25	120
100	ISO-MF100	ORV-100MFB-12	104.0	127.0	0.25	10	130	12	102.2	25	120
150	ISO-MF160	ORV-160MFB-20	150.0	175.0	0.3	18	180	12	153.2	30	200
200	ISO-MF200	ORV-200MFB-20	205.0	230.0	0.3	18	240	12	213.2	30	200

t is the bellows wall thickness.

Performance table

Nominal diameter (A)	Joint standard	Model No.	Displacement(mm)		Spring rate(N/mm)	
			Axial direction	Lateral direction	Axial direction	Lateral direction
65	ISO-MF63	ORV-63MFB-12	±12.5	±3.5	23.2	41.2
80	ISO-MF80	ORV-80MFB-12	±14.0	±3.0	22.1	64.0
100	ISO-MF100	ORV-100MFB-12	±12.5	±2.0	30.5	140.7
150	ISO-MF160	ORV-160MFB-20	±23.5	±6.5	31.8	71.2
200	ISO-MF200	ORV-200MFB-20	±24.0	±5.0	41.9	159.3

The displacement values in each of the axial direction and lateral direction are shown.

■ Features

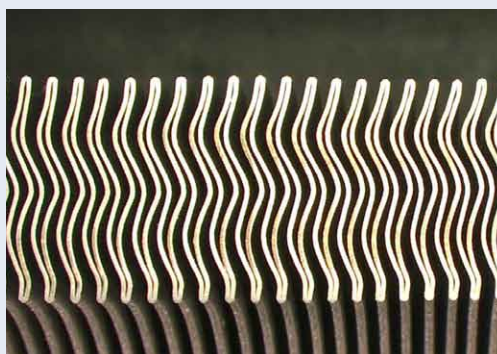
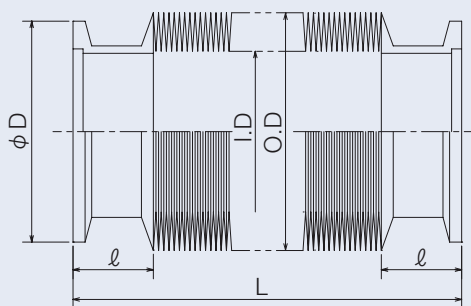
- Excellent flexibility
- The shape of conventional welded bellows is realized by integral forming.

■ Standard specifications

Material	Bellows SUS316L NW flanges SUS316L
Working pressure	Vacuum ~ 0.1MPa
Allowable leak rate	1.33×10^{-10} Pa · m ³ /sec or less

■ Remarks

- Flanges other than NW flanges can be fitted.
- Bellows having length not shown in the L column can be fabricated.



Cross-sectional shape

■ Standard dimensions

Nominal diameter (A)	Joint standard	Model No.	I.D.	O.D.	t	n (Convolutions)	D	l	L
20	NW16	ORV-16C-PU-10	20.5	31.5	0.15	60	30	20	100
25	NW25	ORV-25C-PU-10	26.0	37.5	0.15	60	40	20	100
32	NW40	ORV-32C-PU-10	33.0	49.0	0.15	46	55	20	100
40	NW40	ORV-40C-PU-10	41.0	59.0	0.15	46	55	20	100
50	NW50	ORV-50C-PU-10	50.0	70.0	0.2	46	75	20	100
80	NW80	ORV-80C-PU-12	78.0	104.0	0.2	46	114	25	120
100	NW100	ORV-100C-PU-12	101.0	132.0	0.25	40	134	25	120

t is the bellows wall thickness.

■ Performance table

Nominal diameter (A)	Joint standard	Model No.	Axial displacement / Life cycle (mm/times or more)		Axial displacement / Life cycle (mm/times or more)		Spring rate (N/mm)
20	NW16	ORV-16C-PU-10	+0, -30	1×10^3	+0, -15	1×10^5	2.6
25	NW25	ORV-25C-PU-10	+0, -30	1×10^3	+0, -15	1×10^5	2.3
32	NW40	ORV-32C-PU-10	+0, -30	1×10^4	+0, -15	1×10^5	2.0
40	NW40	ORV-40C-PU-10	+0, -30	1×10^4	+0, -15	1×10^5	1.7
50	NW50	ORV-50C-PU-10	+0, -30	1×10^4	+0, -15	1×10^6	3.1
80	NW80	ORV-80C-PU-12	+0, -30	1×10^5	+0, -15	1×10^6	2.1
100	NW100	ORV-100C-PU-12	+0, -30	1×10^6	+0, -15	1×10^6	3.8

Joints and piping parts

Set of joints and pipes

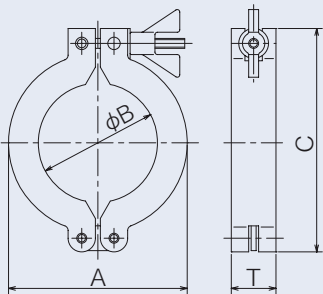


3
FLEXIBLE HOSE
& BELLOWS
TOTAL LINE UP CATALOGUE

Flexible
hoses

Bellows

21 NW clamp



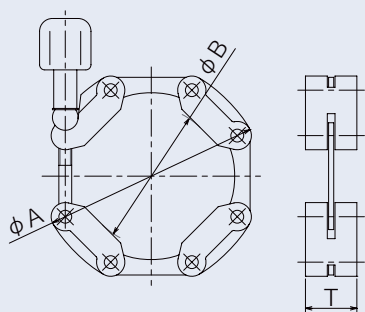
Material : A ℓ +SUS

Standard dimensions

Model No.	A	B	C	T
NW10/16CL	42	20	61	17
NW25CL	52	30	72	17
NW40CL	70	44	90	17
NW50CL	94	62	123	25

Special
models

22 NW chain clamp Small-diameter

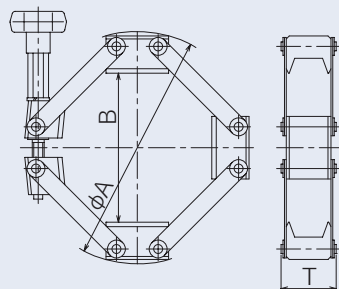


Material : A ℓ +SUS

Standard dimensions

Model No.	A	B	T
NW10/16CLH	60	22	20
NW25CLH	70	32	20
NW40CLH	85	47	20
NW50CLH	105	67	20
NW63CLH	120	79	20

23 NW chain clamp Large-diameter

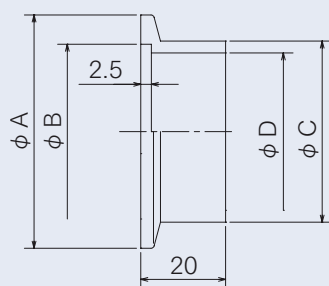


Material : A ℓ +SUS

Standard dimensions

Model No.	A	B	T
NW80CL	165	100	37
NW100CL	185	122	37

24 NW short flange Small-diameter

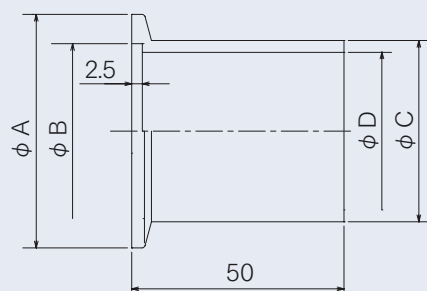


Material : SUS304,SUS316L

Standard dimensions

Model No.	A	B	C	D
NW10F	30	12.2	13.8	10
NW16F	30	17.2	21.7	17.5
NW25F	40	26.2	27.2	23
NW25FS	40	26.2	34.0	28.4
NW40F	55	41.2	42.7	37.1
NW40FS	55	41.2	48.6	43
NW50F	75	52.2	60.5	54.9
NW63F	87	70.2	76.3	70.2

25 NW long flange

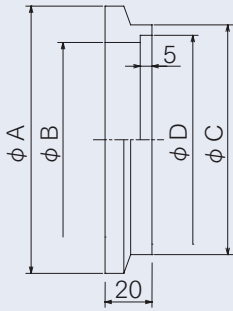


Material : SUS304,SUS316L

Standard dimensions

Model No.	A	B	C	D
NW10FL	30	12.2	13.8	10
NW16FL	30	17.2	21.7	17.5
NW25FL	40	26.2	27.2	23
NW40FL	55	41.2	42.7	37.1
NW50FL	75	52.2	60.5	54.9

26 NW short flange Large-diameter

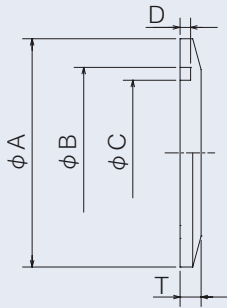


Material : SUS304,SUS316L

Standard dimensions

Model No.	A	B	C	D
NW80F	114	83.2	98	89.1
NW100F	134	102.2	118	114.3

27 NW blind flange

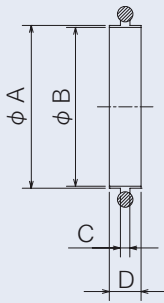


Material : SUS304,SUS316L

Standard dimensions

Model No.	A	B	C	D	T
NW10FB	30	12.2	—	2.5	5
NW16FB	30	17.2	11	2.5	5
NW25FB	40	26.2	20	2.5	5
NW40FB	55	41.2	35	2.5	5
NW50FB	75	52.2	46	2.5	5
NW63FB	87	70.2	64	2.5	5
NW80FB	114	83.2	73	6.5	11
NW100FB	134	102.2	92	6.5	11

28 NW center ring



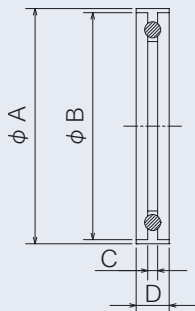
Material : SUS316L

Standard dimensions

Model No.	A	B	C	D
NW10CV	12	10	3.9	8
NW16CV	17	16	3.9	8
NW25CV	26	25	3.9	8
NW40CV	41	40	3.9	8
NW50CV	52	50	3.9	8
NW63CV	70	68	3.9	8
NW80CV	83	80	3.9	8
NW100CV	102	99	3.9	8

※O-ring material: Viton

29 NW center ring with outer ring



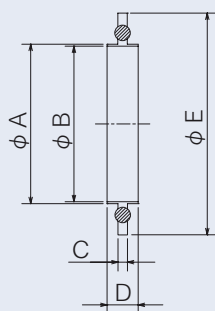
Material : Inner SUS316L, Outer SUS304

Standard dimensions

Model No.	A	B	C	D
NW10/16CVH	30	32	3.9	8
NW25CVH	40	42	3.9	8
NW40CVH	55	57	3.9	8
NW50CVH	75	77	3.9	8

※O-ring material: Viton

30 NW center ring with outer ring(ISO)



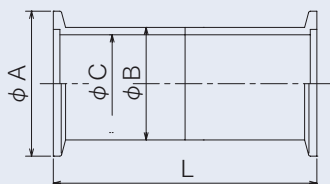
Material : Inner SUS316L, Outer SUS304

Standard dimensions

Model No.	A	B	C	D	E
NW10CVH-ISO	12	10	4	8	30
NW16CVH-ISO	17	16	4	8	30
NW25CVH-ISO	26	25	4	8	41.5
NW40CVH-ISO	41	40	4	8	57
NW50CVH-ISO	52	50	4	8	75
NW63CVH-ISO	70	68	4	8	89
NW80CVH-ISO	83	80	4	8	110
NW100CVH-ISO	102	99	4	8	130

※O-ring material: Viton

31 NW nipple

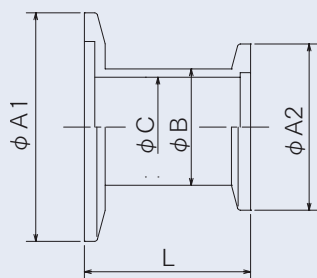


Material : SUS304,SUS316L

Standard dimensions

Model No.	A	B	C	L
NW10N	30	13.8	10	100
NW16N	30	21.7	17.5	100
NW25N	40	27.2	23	100
NW40N	55	42.7	37.1	100
NW50N	75	60.5	54.9	100

32 NW reducer

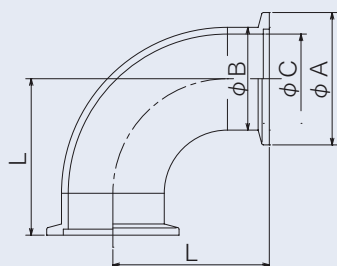


Material : SUS304,SUS316L

Standard dimensions

Model No.	A ₁	A ₂	B	C	L
NW25-10R	40	30	14	10	40
NW25-16R	40	30	20	16	40
NW40-16R	55	30	20	16	40
NW40-25R	55	40	28	24	40
NW50-25R	75	40	28	24	40
NW50-40R	75	55	44	39	40
NW80-50R	114	75	60.5	54.9	40
NW100-80R	134	114	89.1	83.1	40

33 NW elbow

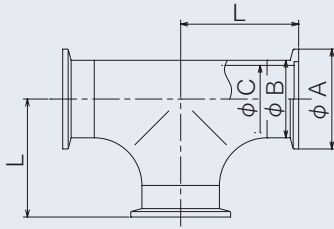


Material : SUS304,SUS316L

Standard dimensions

Model No.	A	B	C	L
NW16E	30	21.7	17.4	50
NW25E	40	27.2	23.0	50
NW40E	55	42.7	37.1	65
NW50E	75	60.5	54.9	80
NW80E	114	89.1	83.1	110
NW100E	134	114.3	108.3	120

34 NW tee

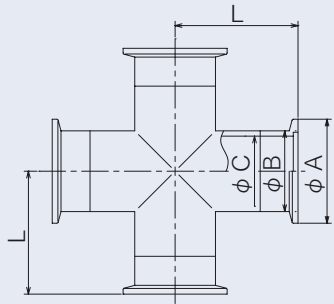


Material : SUS304,SUS316L

Standard dimensions

Model No.	A	B	C	L
NW16T	30	21.7	17.5	40
NW25T	40	27.2	23.0	50
NW40T	55	42.7	37.1	65
NW50T	75	60.5	54.9	80

35 NW cross

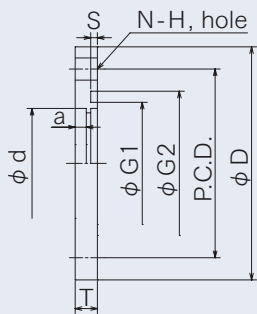


Material : SUS304,SUS316L

Standard dimensions

Model No.	A	B	C	L
NW16X	30	21.7	17.5	40
NW25X	40	27.2	23.0	50
NW40X	55	42.7	37.1	65
NW50X	75	60.5	54.9	80

36 VG flange

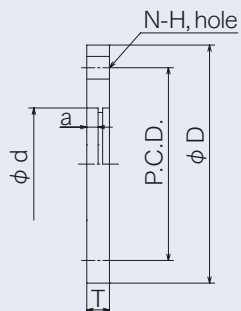


Material : SUS304,SUS316L

Standard dimensions

Model No.	D	T	P.C.D.	N-H	G ₁	G ₂	S	d	a
VG20	80	8	60	4-10	34	44	3	28	4
VG25	90	8	70	4-10	40	50	3	35	4
VG40	105	10	85	4-10	55	65	3	49.5	5
VG50	120	10	100	4-10	70	80	3	61	5
VG65	145	10	120	4-12	85	95	3	77	5
VG80	160	12	135	4-12	100	110	3	90	6
VG100	185	12	160	8-12	120	130	3	115	6

37 VF flange

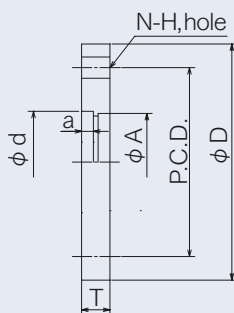


Material : SUS304,SUS316L

Standard dimensions

Model No.	D	T	P.C.D.	N-H	d	a
VF20	80	8	60	4-10	28	4
VF25	90	8	70	4-10	35	4
VF40	105	10	85	4-10	49.5	5
VF50	120	10	100	4-10	61	5
VF65	145	10	120	4-12	77	5
VF80	160	12	135	4-12	90	6
VF100	185	12	160	8-12	115	6

38 ISO-BT flange



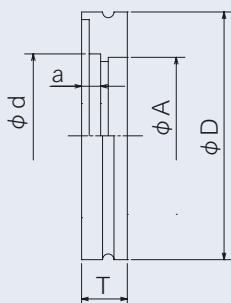
■ Material : SUS304, SUS316L

■ Standard dimensions

Model No.	D	T	A	d	a	P.C.D.	N-H
ISO-BT-63-50	130	12	70.2	61	5	110	4- 9
ISO-BT-80-80	145	12	83.2	90	5	125	8- 9
ISO-BT-100-100	165	12	102.2	115	5	145	8- 9
ISO-BT-160-153	225	16	153.2	153	9	200	8-11
ISO-BT-200-203	285	16	213.2	204	9	260	12-11

● Flanges for special pipes can be fabricated.

39 ISO-MF flange



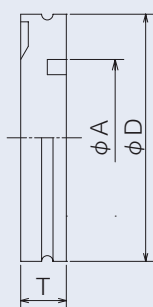
■ Material : SUS304, SUS316L

■ Standard dimensions

Model No.	D	T	A	d	a
ISO-MF63-50	95	12	70.2	61	5
ISO-MF63-65	95	12	70.2	77	5
ISO-MF80-65	110	12	83.2	77	5
ISO-MF80-80	110	12	83.2	89.5	5
ISO-MF100-90	130	12	102.2	102	5
ISO-MF100-100	130	12	102.2	115	5
ISO-MF160-125	180	12	153.2	141	5
ISO-MF200-203	240	12	213.2	204	5

● Flanges for special pipes can be fabricated.

40 ISO-MF Blank flange

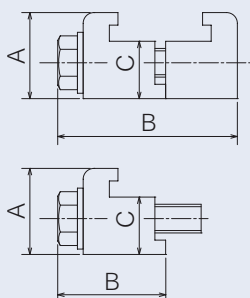


■ Material : SUS304, SUS316L

■ Standard dimensions

Model No.	D	T	A
ISO-MF63B	95	12	70.2
ISO-MF80B	110	12	83.2
ISO-MF100B	130	12	102.2
ISO-MF160B	180	12	153.2
ISO-MF200B	240	12	213.2

41 Double-claw clamp/single-claw clamp



■ Material: A ℓ +SUS

■ Standard dimensions of single-claw clamp

Model No.	BOLT SIZE	A	B	C
ISO63-SC	M8	24	30.4	16
ISO80-SC	M8	24	30.4	16
ISO100-SC	M8	24	30.4	16
ISO160-SC	M10	28	31.7	20
ISO200-SC	M10	28	31.7	20

■ Standard dimensions of double-claw clamp

Model No.	BOLT SIZE	A	B	C
ISO63-WC	M8	24	50	16
ISO80-WC	M8	24	50	16
ISO100-WC	M8	24	50	16
ISO160-WC	M10	28	52	20
ISO200-WC	M10	28	52	20

Special models

42 Bellows made of special materials

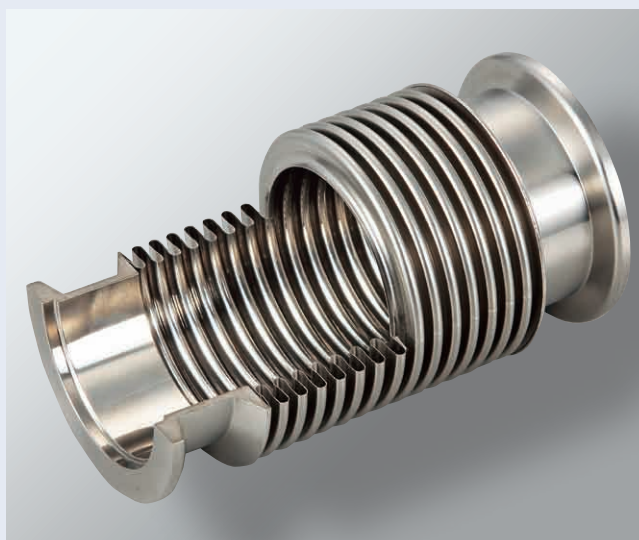
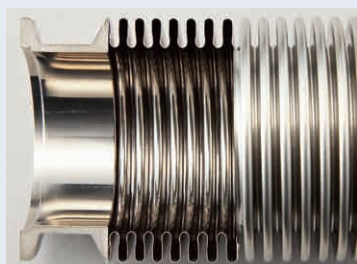
- Titanium and HASTELLOY bellows can be fabricated.
For the details, please contact us.



Titanium bellows

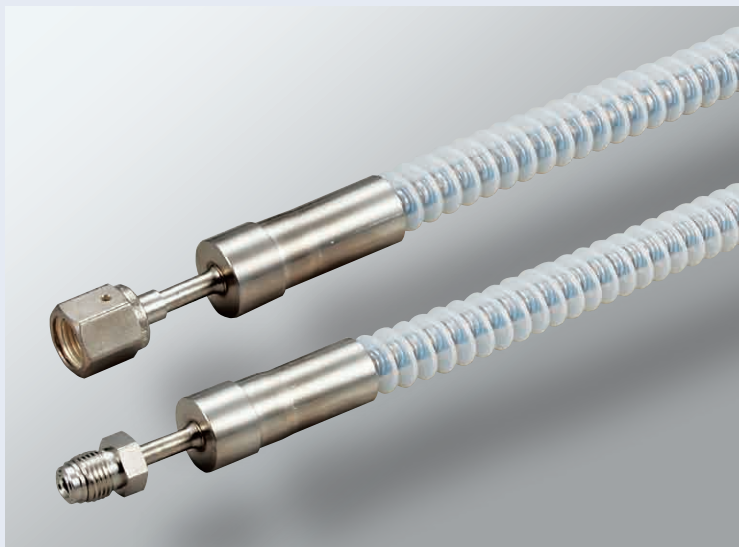
43 Bellows with inner surface polished

- Bellows whose inner surface has been polished by the same method as that for Megaflex® (see page 26). Since the surface is polished after the bellows are formed, the surface roughness is uniform.



44 Leak detectable flexible hose

- The leak detectable flexible hose is a double-layer hose consisting of an inner metallic flexible hose and an outer Teflon pliable hose. When a toxic or harmful fluid is fed into the hose, leaking areas, if any, can be shielded and detected.



45 Various kinds of vacuum piping

- The vacuum piping is a piping unit consisting of various joints, such as NW flange, VG, VF and ICF flanges, elbow and reducer.



MEMO