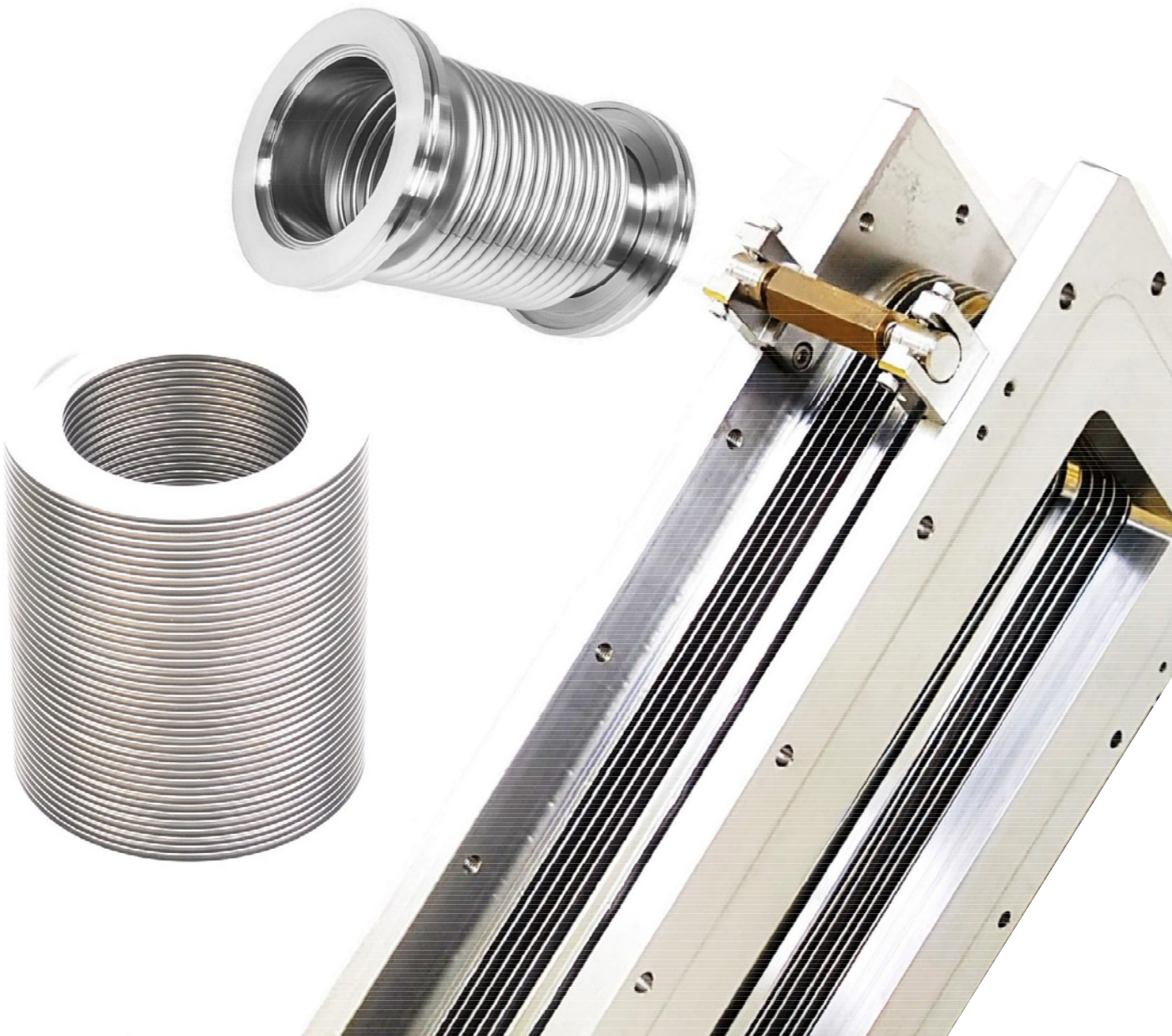
PRECESS VACUUM®
普瑞赛思 · Company

焊接金属波纹管

Welded Metal Bellows



Company Introduction

Founded in 2019 Years – Located Beijing city, the capital of China. Global footprint China, Korea and America, PRECESS is a developer of high-performance vacuum valve, weld bellow and vacuum components. With the innovation and engineering excellence is the driving force of PRECESS' technology solutions and services. Customization on PRECESS product signifies our strong focus to provide customers solutions without compromise.

普瑞赛思 ® brand provides full portfolio of vacuum products in China.

Semiconductor BU – Control valve, transfer valve, ATM door, gate valve, pendulum valve, angle valve.

Solar & Display BU – Control valve, large transfer valve, ATM Door, pendulum valve, gate valve.

GVA and R&D BU – UHV gate valve and angle valve.

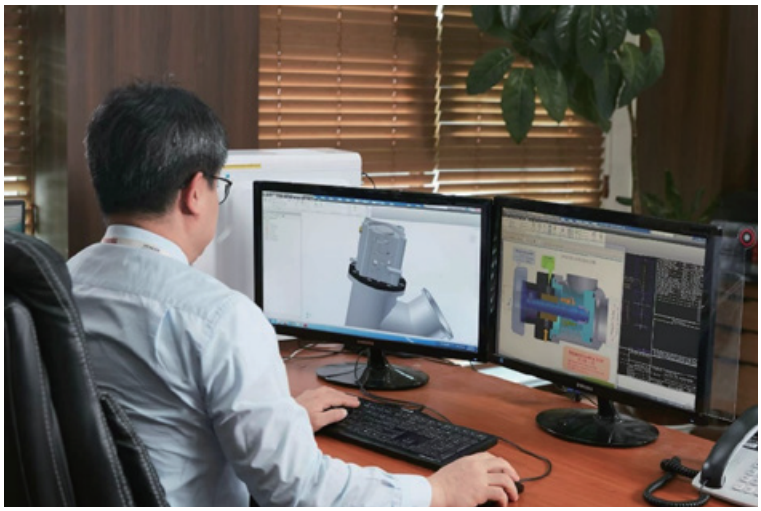
Our strength is the wide range of our product portfolio which comprises approximately 100 vales series with more than 1,500 customized and 1,000 standard products, high steady quality, short lead time, high experienced team. We have solutions for all vacuum levels from sub-atmospheric to extremely high vacuum (XHV).

Aim to be the world best, full portfolio of vacuum valve solution – Control valve, transfer valve, ATM door, gate valve, protection gate valve, pendulum valve, angle valve.

We focus on vacuum technology as our key competence. From the beginning, our approach was to work very closely with our customers. We have a deep knowledge of their industries, needs and expectations and develop new products accordingly. This is our passion for technology innovation.

Applications of our valve are semiconductor process, solar & display, industrial and R&D. Custom options include heating, water cooling, specialty coatings and seals.

After-sales service. Our service team is highly experienced and utilized well-established, proven process.



Product Portfolio – Valve Manufacturing

Manufacturing of vacuum valve

Manufacturing Environment

Form-die & Zig

We pride in our metal mold design, but also various types and sizes of metal molds. Among metal molds and ZIGs, welded metal bellows ' sheet pressing metal molds require precise design, manufacture an d management.

We are able to predict quality decline by recording and managing th e number and time period of production according to the metal mold' s serial number.

By taking proactive measures against these predictions, we are furth er able to preventquality problems. Because this is directly linked to t he product's quality, price and competitiveness, only our experts are delegated the task of design and management.

Purity of Cleaning

Quality management regarding cleaning is treated equally with leakage as a critical quality point (CQP).

The aftertreatment processing of electrolytic polishing perfects, the purification of points not visible or touchable.

We have installed 2 systems (total 6 tanks) and D.I watering facilities as ultrasonic cleaners.

Purity of D.I. Water

We use hot D.I. water and ultrasonic cleaning system to block possibility of contamination-related defects.

Cleaning processing is applied to all the products we manufacture. For ultrasonic cleaning, products are separated by level of contamination into 6 different cleaning tanks.

We offer solution to various outgassing problems. Electrolytic polishing solution that has remained in gaps over time leaks or corrodes the interior, causing contamination and defects.

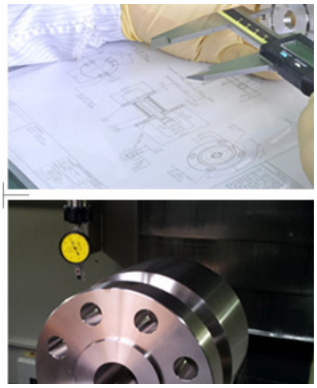
Type	Basis	Toc	UF	Absolute
0.22um	Standard	Standard	Standard	Standard
254/185nm UV Lamp	—	Standard	—	Standard
MW 5000 UF filter	—	—	Standard	Standard
Water Quality	—	—	—	—
Resistivity (at 25C)	18.2	18.2	18.2	18.2
TOC	5-10ppb	1-5ppb	5-10ppb	1-5ppb
Edotoxin(Progens)	—	—	—	—
Bacteria	<1cfu/mm	<1cfu/mm	<1cfu/mm	<1cfu/mm
Particles(0.2um)	<1/mm	<1/mm	<1/mm	<1/mm

Product Portfolio – Valve Manufacturing

Manufacturing of vacuum valve

Accuracy of Machining

Vacuum valve is our core product. We create, we machine process them with accuracy and precision as our principle. Our product parts meet the promised standard of excellence with our clients.



Management of Material

We have the quality of raw material, ratio of constituents and purity inspection. Especially, for the most important material of the welded bellows AM350, hastelloy-C, inconel and other special alloys, in case of durability and corrosion resistance, components ratios, purity we manufactured. It has a decisive influence on the quality of the finished product. We are responsible for quality control through periodic material. By doing this, to guarantee the quality of products, corrosion resistance, service life and reliability.

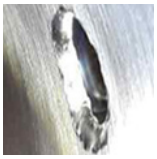
Accuracy of Welding

To minimize deformation from welding, we use optimal ZIG. Products requiring high precision are processed a secondary machining to correct for any deviation from the target measurement. In UHV and HV environment, we use the back bead welding process to manufacture vacuum pipes.

To prevent oxidation and minimize outgassing, we weld only after nitrogen charging.

Condition of Inside Welding

We check the interior welding status, which is the most important part of vacuum pipe quality control. We focus not only on the exterior condition of our products but also the interior, which directly affect product performance.



Back bead

Autogenous

Fillet

Welded Metal Bellows

Material

■ AM350

USA		Others	Japan
UNS	AMS		JIS
S35000	5548	AM350	SUS633

AM350 corresponds to JIS SUS633 and is chrome-nickel-molybdenum-stainless steel. Compared to other stainless steel,our product has superior welding,integrity and oxidation resistance.

■ SUS316L

<0.03% C, 16-18.5% Cr, 10-14% Ni, 2-3% Mo, <2% Mn,<1% Si, <0.045% P, <0.03% S

SUS316L is the most basic material. Durable and corrosion-resistant, it is reasonably priced.

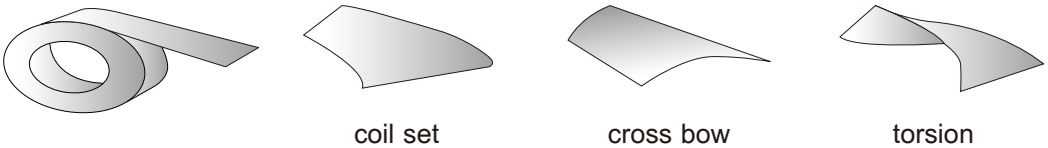
■ Nickel-based Alloys(Hastelloy®, Inconel®,ETC)

Alloy type	UNS	Standard	Density g/cm^3
INCONEL ® 625	N06625	AMS-5599 AMS-5666	8.44

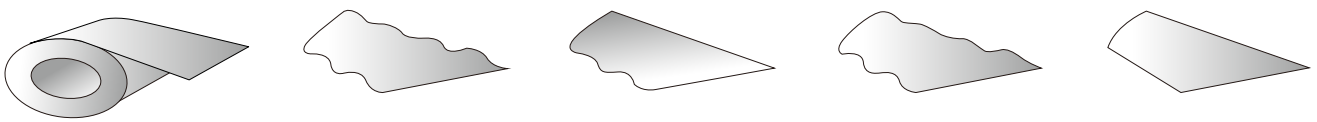
Our products offer excellent craftsmanship, superior strength, oxidation resistance and welding upon heat treatment.

⚠ Sheet coil strips require careful treatment. Upon visual inspection, they are discarded or corrected to be used in manufacturing depending on the condition.

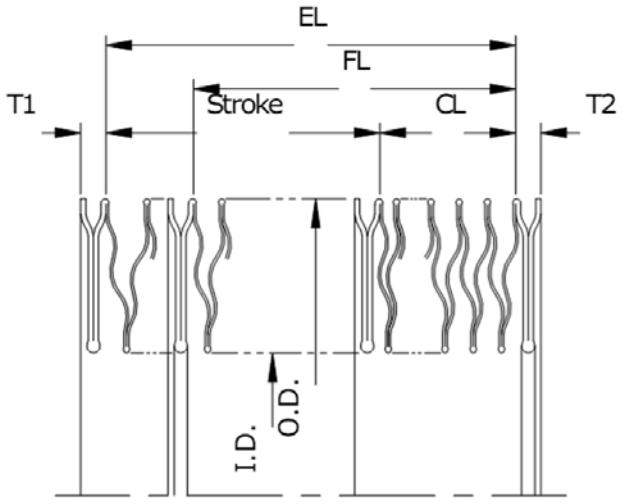
Narrow srtip



Broad strip



CAPSULE



DESIGN CONSIDERATIONS

1.OUTSIDE DIAMETER(O.D)
2.INSIDE DIAMETER(I.D)
3.COMPRESSED LENGTH(C.L)
4.EXTENDED LENGTH(E.L)
5.FREE LENGTH(F.L)

We are happy to manufacture even a single custom-ordered welded bellows

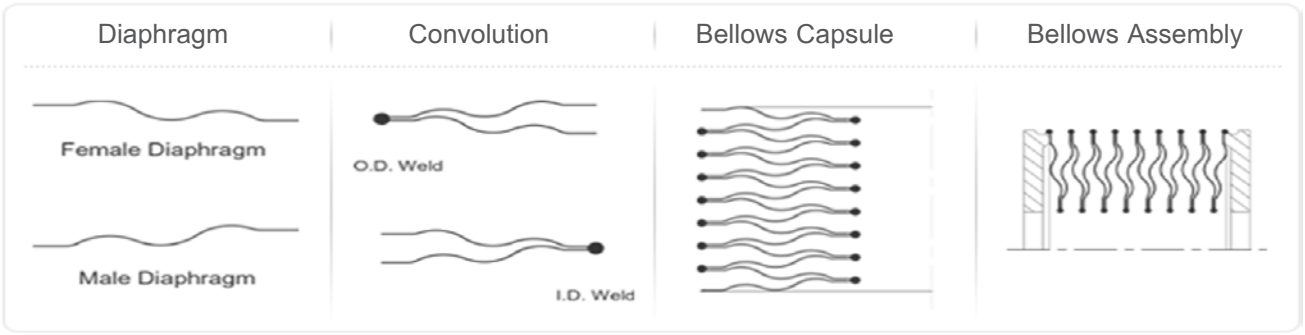
There is no limit of stroke or length!

BELLOWS SPECIFICATION

O.D: 3.000”(76.200mm)
I.D: 2.000”(50.800mm)
Thickness: 0.004”(0.016mm)
Material of capsule:SUS316L
Qt'y of Conv: 1,840 Cv
Extension Length: 3,850.0mm
Compression Length : 850.0mm
Stroke: 3000.0mm
Shaft Dia: 40
Pressure: -Outside ATM -Inside Vacuum
Leak rate: Less than 1x10-8 STD cc/sec He

Welded Metal Bellows

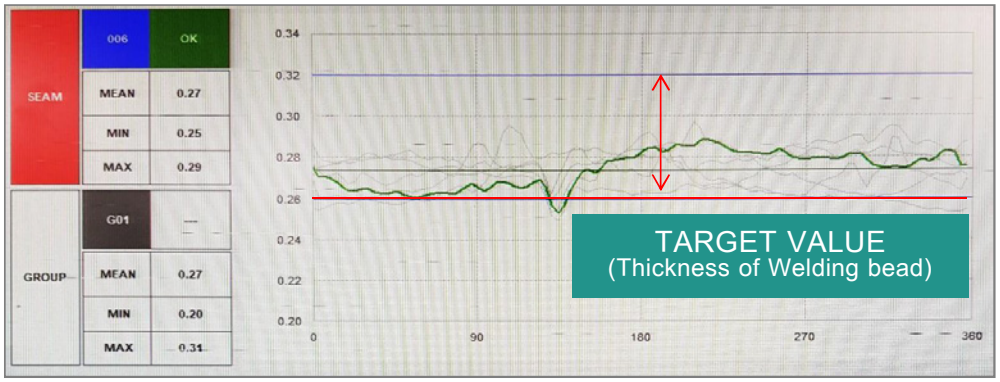
Manufacturing & Technology

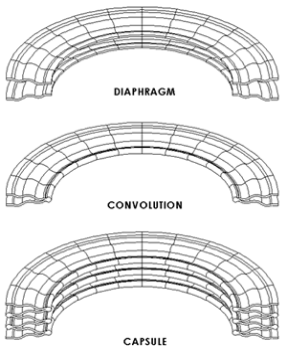


Quality may decrease or defects may arise from human error in cases where micro-welding is done by hand.

Our selected method for manufacturing welded bellows both produces and 100% automatically inspects errors of approximately 1/100mm in perimeter of the welded bead.

This method makes possible the highest quality control. i-San, Inc.'s welded bellows guarantee the best quality, price and durability.



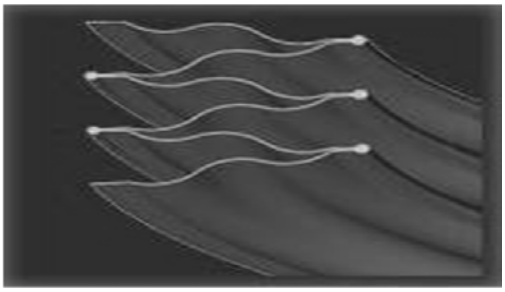


Nested Ripple Flat I.D

Consisted of Nesting design male& female diaphragm

Extremely Normal shape of welded metal bellows

Maximum stroke in small space



Welded Metal Bellows

Form-Die List

NO	FORM DIE NUMBER	BELLOWS SIZE			
		INCH		METRIC	
		O.D.	I.D.	O.D.	I.D.
1	DV1201			12.60	5.00
2	DV1202	0.750	0.250	19.0500	6.3500
3	DV1101	0.750	0.312	19.0500	7.9248
4	DV1203			23.00	12.50
5	DV1204	0.937	0.402	23.7998	10.2108
6	DV1205			26.00	14.00
7	DV2101	1.025	0.482	26.0350	12.2428
8	DV2102	1.030	0.540	26.1620	13.7160
9	DV1206			26.50	17.50
10	DV2103	1.170	0.750	29.7180	19.0500
11	DV2104	1.250	0.625	31.7500	15.8750
12	DV2105	1.250	0.750	31.7500	19.0500
13	DX1220	1.312	0.812	33.3248	20.6248
14	DV4503			34.00	14.00
15	DV3101	1.355	0.540	34.4170	13.7160
16	DX1422	1.437	0.937	36.4998	23.7998
17	DV4504			37.00	19.00
18	DV2501	1.500	0.750	38.1000	19.0500
19	DV2106	1.500	1.000	38.1000	25.4000
20	DYM025	1.548	1.048	39.3192	26.6192
21	DV2107	1.560	0.960	39.6240	24.3840
22	DX1625	1.562	1.062	39.6748	26.9748
23	DV3102	1.625	0.750	41.2750	19.0500
24	DYM028	1.661	1.161	42.1894	29.4894
25	DX1828	1.687	1.187	42.8498	30.1498
26	DN2032	1.687	1.297	42.8498	32.9438
27	DV2108	1.740	1.220	44.1960	30.9880
28	DV4104	1.750	0.750	44.4500	19.0500
29	DV2502	1.750	1.000	44.4500	25.4000
30	DV4501			45.00	25.80
31	DV4502			46.00	26.00
32	DV2109	1.812	1.312	46.0248	33.3284
33	DX2032	1.812	1.312	46.0248	33.3284
34	DYM033	1.860	1.360	47.2440	34.5440
35	DV3103	1.875	0.975	47.6250	24.7650
36	DV2110	1.890	1.390	48.0060	35.3060
37	DV4505			49.00	21.00
38	DX2235	1.937	1.437	49.1998	36.4998
39	DN2438	1.937	1.547	49.1998	39.2938
40	DV3201	2.000	1.250	50.8000	31.7500
41	DX2438	2.062	1.562	52.3748	39.6748
42	DX2640	2.187	1.687	55.5498	42.8498
43	DV4201	2.200	1.040	55.8800	26.4160
44	DV3202	2.250	1.500	57.1500	38.1000
45	DV4506			58.00	42.00
46	DX2845	2.312	1.812	58.7248	46.0248
47	DV4507			60.00	40.00
48	DX3048	2.437	1.937	61.8998	49.1998
49	DV3203	2.500	1.750	63.5000	44.4500
50	DX3250	2.562	2.062	65.0748	52.3748

We accept custom orders for measurenments/sizes not listed

Welded Metal Bellows

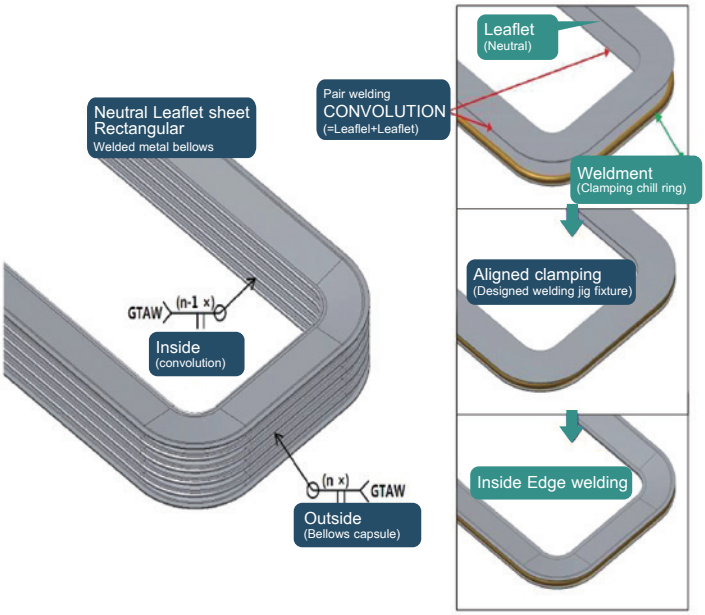
Form-Die List

NO	FORM DIE NUMBER	BELLOWS SIZE			
		INCH		METRIC	
		O.D.	I.D.	O.D.	I.D.
51	DX3453	2.687	2.187	68.2498	55.5498
52	DV4508			70.00	50.00
53	DX3655	2.812	2.312	71.4248	58.7248
54	DX3860	2.937	2.437	74.5998	61.8998
55	DV4301	3.000	2.000	76.2000	50.8000
56	DX4063	3.187	2.562	80.9498	65.0748
57	DV4302	3.250	2.250	82.500	57.1500
58	DX4265	3.312	2.687	84.1248	68.2498
59	DV5101	3.312	2.812	84.1248	71.4248
60	DV4509			85.00	60.00
61	DX4470	3.437	2.812	87.2998	71.4248
62	DV5102	3.500	2.000	88.9000	50.8000
63	DV5103	3.500	2.500	88.9000	63.5000
64	DV4510			90.00	65.00
65	DV6101	3.625	3.000	92.0750	76.2000
66	DV6102	3.637	2.625	92.3798	66.6750
67	DX4875	3.750	3.125	95.2500	79.3750
68	DV3301	3.875	3.250	98.4250	82.5500
69	DX5000	3.875	3.250	98.4250	82.5500
70	DX5280	4.000	3.375	101.600	85.7250
71	DX5485	4.125	3.500	104.775	88.9000
72	DV4401	4.250	3.200	107.950	81.2800
73	DX5600	4.250	3.625	107.950	92.0750
74	DX5890	4.375	3.750	111.125	95.2500
75	DX6095	4.500	3.875	114.300	98.4250
76	DV6103	3.625	3.000	92.0750	76.2000
77	DX6200	4.625	4.000	117.475	101.600
78	DV4402	4.750	3.750	120.650	95.2500
79	DX6400	4.750	4.125	120.650	104.775
80	DX6605	4.875	4.250	123.825	107.950
81	DV3401	4.970	4.000	126.238	101.600
82	DX9035	5.250	4.500	133.350	114.300
83	DX9036	5.375	4.625	136.525	117.475
84	DX9038	5.625	4.875	142.875	123.825
85	DX9040	5.875	5.125	149.225	130.175
86	DX9041	6.000	5.250	152.400	133.350
87	DX9044	6.375	5.625	161.925	142.875
88	DX9048	6.875	6.125	174.625	155.575
89	DV7101	7.500	6.000	190.500	152.400
90	DX9054	7.625	6.875	193.675	174.625
91	DV4511			195.00	175.00
92	DV4512			200.00	167.00
93	DX9059	8.250	7.500	209.550	190.500
94	DV7102	8.625	7.125	219.075	180.975
95	DV7103	8.800	7.800	223.520	198.120
96	DX9066	9.125	8.375	231.775	212.725
97	DV7501			250.000	219.000
98	DV7502			270.0000	211.000
99					
100					

We accept custom orders for measurenments/sizes not listed

Rectangular Bellows

Consist of Bellow Capsule

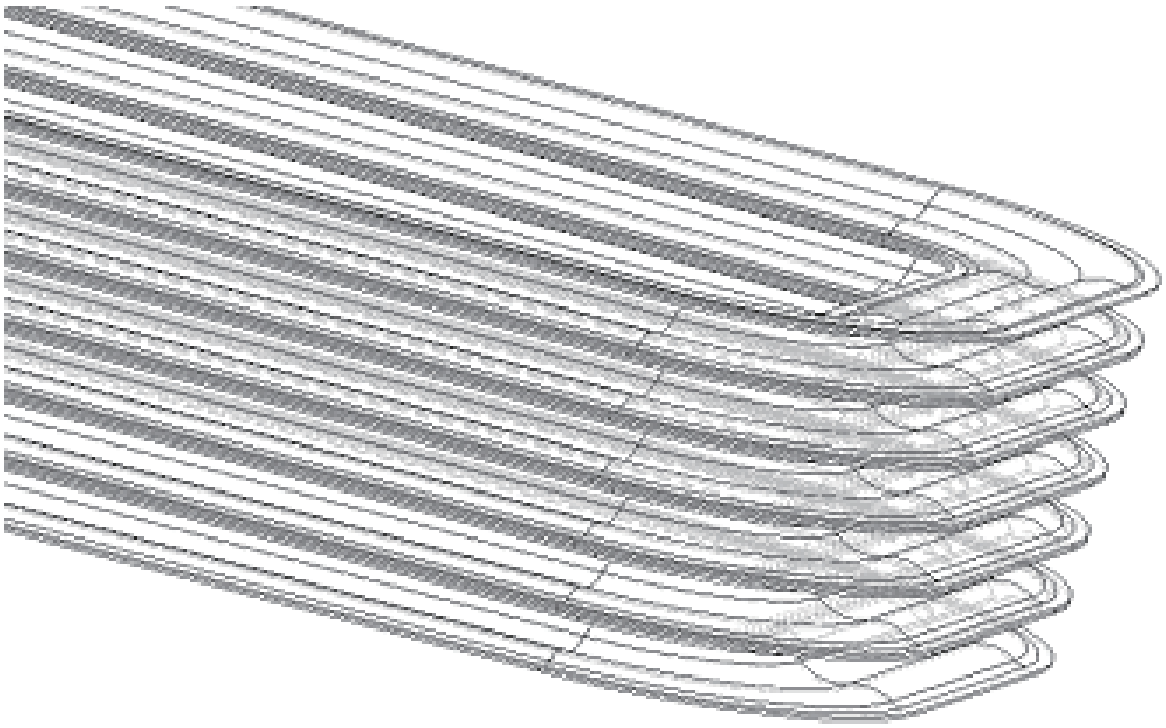


Compared to circle bellows, square bellows are disadvantageous in all aspects including manufacture cost, pricing and productivity.

Our manufacture and design technology of square bellows favorably serve the small quantity batch production. In addition, we offer our clients competitive prices and fast payment when it comes to reasonable pricing and efficient production.

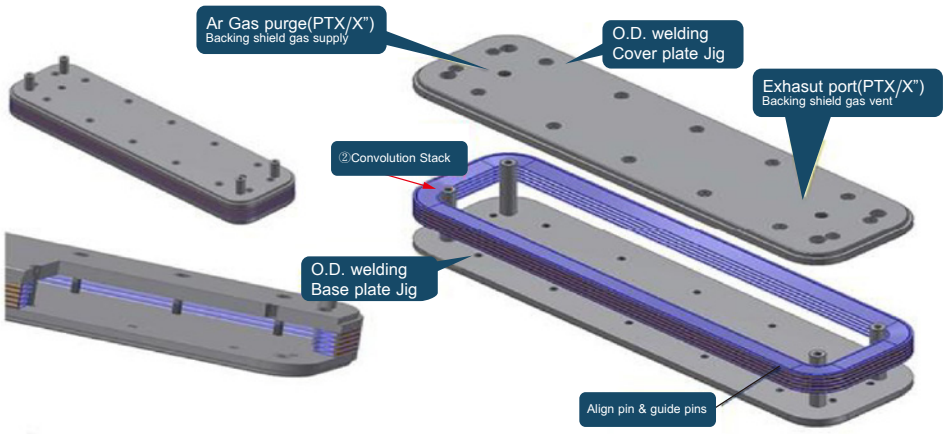
“ANY SIZE CAN BE MADE”

■ EXPANSION & PENETRATED PICTURE

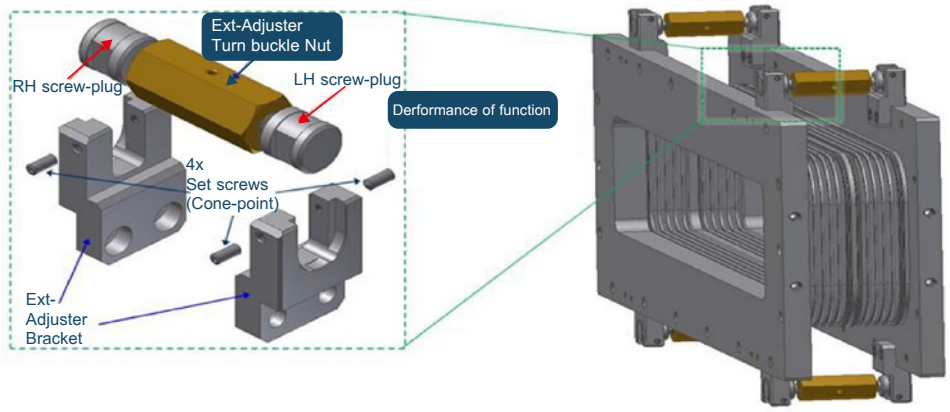


Rectangular Bellows

Manufacturing & Technology



With new manufacture processing, we are able to create products by changing the welded shape.
By using neutral leaflet sheets, we are able to minimize product deformation due to welding heat transformation. In this way, there is no more press forming process to manufacture die forming leaflets, reducing costs including molding costs. Bellows used in environments without frequent stroke movements do not need die pitch forming and the minute changes are correctible.
The key is to manufacture them such that the seal is maintained without exposure under high-vacuum conditions.

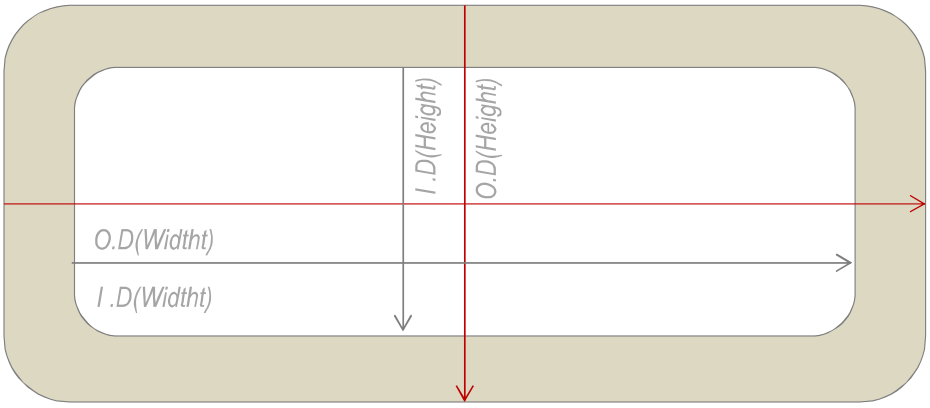


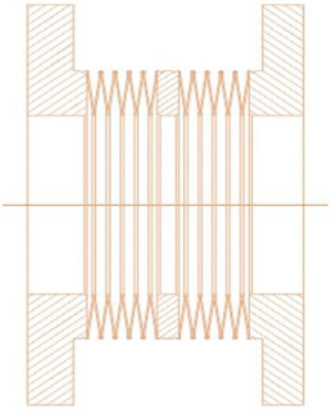
Shaping rectangular bellows made from flat (neutral) sheets
Upon completing the exterior welding of rectangular bellow capsules and final welding of end flanges (end fitting), the features of the “extension adjusted are as follows:
Final product treatment, fixed movement feature: flexible machine elements restrain product damage from pressurized deformation due to gravity and during shipping
Gap control feature from installing final product: contrains and expands during final product installation, removed from product afterwards
*Extension adjuster is designed to be attachable and detachable upon final product installation

Rectangular Bellows

Size List

OD		ID	
Height	Width	Height	Width
240	1020	320	1100
250	100	220	70
250	1400	350	1500
560	150	515	105
560	380	500	320
600	150	560	110
730	200	650	120
750	150	710	110
750	350	670	270
800	100	760	60
900	250	800	150
1100	200	1060	160
1150	450	1070	370
1360	240	1300	180





With our manufacture method for rectangular bellows which is much more efficient than the standard method, we offer cost-effectiveness. We accept custom orders for measurements/sizes not listed.

We accept custom orders for measurenments/sizes not listed

Formed Bellows

Material

Division	Constituent
STAINLESS STEEL	S/S340, 316, 321,310
	S/S304H
	S/S316MO, 316Ti, 316L, 316H
	S/S321H
	S/S410
DUPLEX	C-207
HI-ALLOY	INCO.600, 600H, 625, 625LCF, 800, 800H, 825
	MONEL400
CARBON STEEL	A516-60, A516-70
	SPA-H, CORTEN-A, S-TEN, ANCOR-A

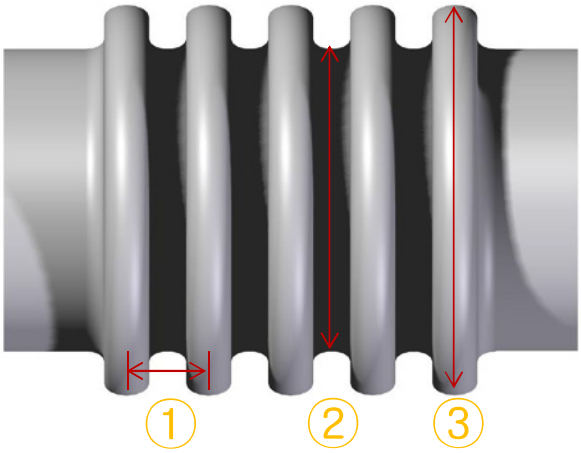
Our formed bellows can select and apply various materials.
We offer optimized solutions for strength, heat resistance and corrosion resistance.

Tolerance

BELLOWS PITCH (mm)	MFG TOL. (+/- mm)
0~12.7	1.6
12.7~25.4	3.2
25.4~38.1	4.7
38.1~50.8	6.4
50.8~	7.9

BELLOWS O.D (mm)	MFG TOL. (+/- mm)
0~12.7	0.8
12.7~25.4	1.6
25.4~38.1	2.4
38.1~50.8	3.2
50.8~63.5	4.0
63.5~76.2	4.7
76.2~88.9	5.6
88.9~101.6	6.4
101.6~	7.1

BELLOWS I.D (mm)	MFG TOL. (+/- mm)
0~219	1.6
219~610	3.2
610~1219	4.7
1219~1524	6.4
1524~	7.9



① BELLOWS PITCH

② OUTSIDE DIMENSION

③ INSIDE DIMENSION

Formed Bellows

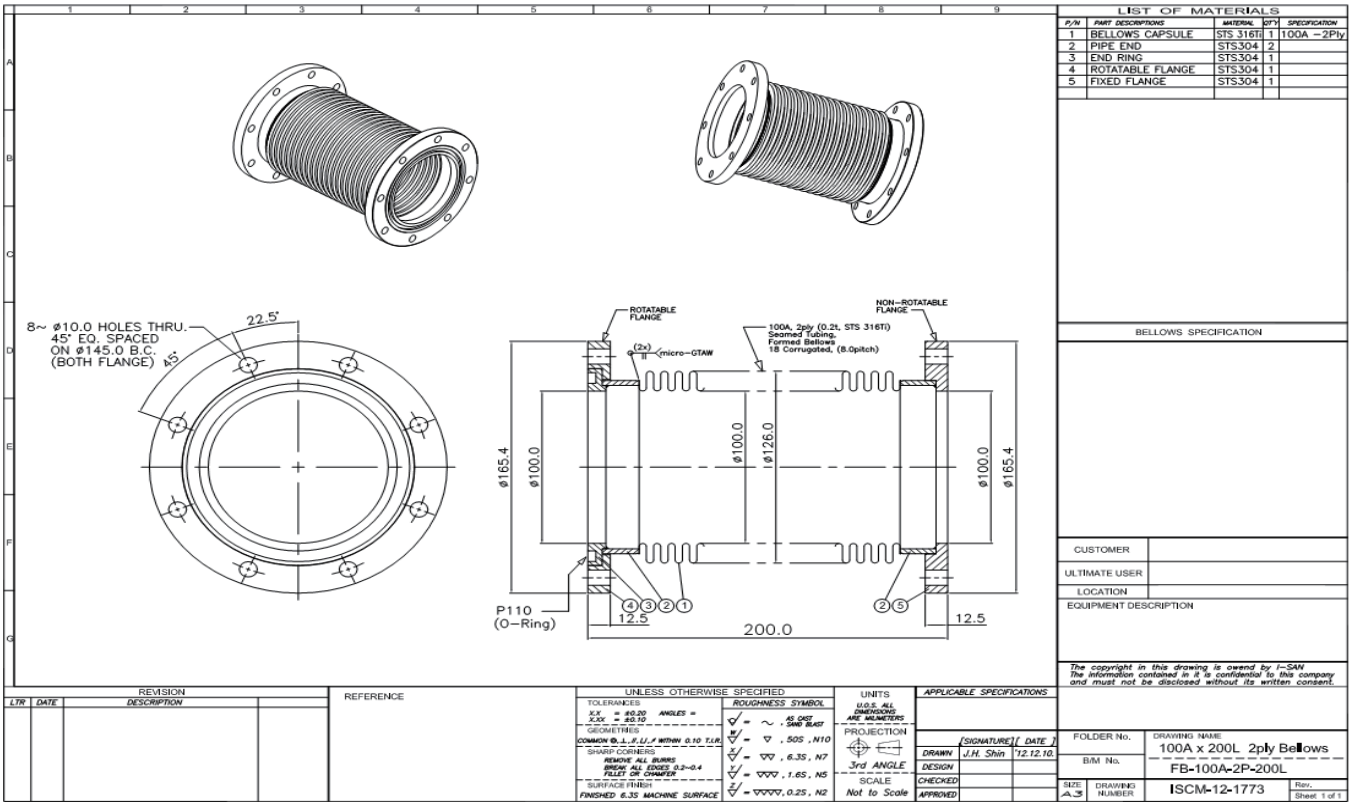
Technology of Multi-ply Bellows

Multi-layer (Formed) bellows' use purpose Features of bellows change depending on the pressure, life cycle and spring rate (excluding resistance to corrosion and basic strength).

Generally, the thicker the bellow the stronger to pressure but the spring rate increases, decreasing the life cycle. On the other hand, the thinner the bellow the weaker to pressure but the spring rate decreases, increasing the life cycle. Based on this feature, multi-layer (Formed) bellows are used for the following purposes/case:

Application Of Multi-ply Bellows

1) To decrease the spring rate of high-pressure products
2) To increase the life cycle of high-pressure products
3) When corrosion identifier is necessary
4) When safety device is necessary to prevent exposure due to purge feature
5) When an economic design is necessary for strong corrosiveness purposes (highly corrosive material inside)
6) When design for high motors, such as engines and pumps, is necessary



Formed Bellows

Size List

NO	SIZE	Thickness	Inside Diameter	Outer Diameter	Bellows pitch
1	20A	0.20	20.00	29.5	3.2
2	25A	0.20	25.00	37.0	3.7
3	32A	0.20	31.50	46.0	4.8
4	40A	0.20	38.00	54.0	5.2
5	50A	0.20	50.00	68.0	5.3
6	65A	0.20	65.50	87.0	6.6
7	80A	0.20	81.00	104.0	9.0
8	100A	0.20	101.50	126.0	7.6
9	125A	0.25	127.00	154.0	9.4
10	150 A	0.25	149.50	175.5	9.4
11	200A	0.30	200.00	233.0	10.0
12	250A	0.40	251.50	291.0	12.0
13	300A	0.40	301.00	345.0	14.0

We accept custom orders for measurenments/sizes not listed

Formed Bellows

Form-die List

NO	TYPE	SIZE	BLW I.D	BLW O.D	Thickness
1	TUBE END	1/4"	6.1	9.8	0.15
2		3/8"	10	14.5	0.15
3		1/2"	12	17.7	0.2
4		3/4"	20.2	26.5	0.2
5		1"	25.5	32.5	0.2
6	VCR NUT	1/4"	6.1	9.8	0.15
7		3/8"	10	14.5	0.15
8		1/2"	12	17 7	0.2
9		3/4"	20.2	26.5	0.2
10		1"	25.5	32.5	0.2
11	TUBE END (BRAID/MESH)	1/4"	6.1	9.8	0.15
12		3/8"	10	14.5	0.15
13		1/2"	12	17.7	0.2
14		3/4"	20.2	26.5	0.2
15		1"	25.5	32.5	0.2
16	KF/ISO FLANGE	NW16	20	30	0.2
17		NW25	25	36.5	0.2
18		NW40	38	54	0.2
19		NW50	50.5	67.5	0.2
20		KF/ISO-K63	65.5	88	0.2
21		KF/ISO-K80	79	104	0.2
22		KF/ISO-K100	102	125.5	0.2
23		KF/ISO-K125	127.5	152.5	0.25
24		KF/ISO-K160	149.8	175.5	0.25
25		KF/ISO-K200	200	240	0.3
26		KF/ISO-K250	254	294	0.4
27	ISO BOLTED FLANGE	65A	65.5	88	0.2
28		80A	79	104	0.2
29		100A	102	125.5	0.2
30		125A	127.5	152.5	0.25
31		150A	149.8	175.5	0.25
32		200A	200	240	0.3
33		250A	254	294	0.4
34		320A	302	350	0.4
35		400A	354	400	0.5
36	VG/VF BOLTED FLANGE	20A	20	30	0.2
37		25A	25	36.5	0.2
38		40A	38	54	0.2
39		50A	50.5	67.5	0.2
40		65A	65.5	88	0.2
41		80A	79	104	0.2
42		100A	102	125.5	0.2
43		125A	127.5	152.5	0.25
44		150A	149.8	175.5	0.25
45		200A	200	240	0.3
46		250A	254	294	0.4
47		320A	302	350	0.4
48		400A	354	400	0.5

"LENGTH
(MIN. 50mmL - MAX. 3000mmL)

We accept custom orders for measurenments/sizes not listed

Manual and precaution

① Safety

①-① Be sure to read this manual.

①-② The precautions shown here are intended to prevent harm and damage to you and others by using the product safely and correctly. These items are divided into three categories: [Danger], [Warning], and [Caution] to specify the size and extent of damage or damage. All of them are important for safety, so please observe the international standard [ISO / IEC] and other safety regulations. This chapter should be read and understood by those who use this product at all stages of use of this product. Failure to read this manual may result in property damage. Be sure to read the manual.

	Danger	**Serious danger** Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.
	Warning	**Moderate risk** Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	Caution	**Low intensity hazard** Indicates that incorrect handling may result in minor or moderate injury.
	Notice	**Notice** Indicates if unavoidable, causing property loss

Warning

① The system designer will determine the suitability of our products.

Since this product has a variety of conditions used, the determination of suitability should be made by the system designer after technical analysis and, if necessary, testing. The performance and safety assurance of the system is the responsibility of the person who determines the suitability of the system.

② Please treat our products with a sufficient knowledge and experience.

- This product can not be guaranteed the safety when handling incorrectly.
- Those who have sufficient knowledge and experience in assembly and operation maintenance of machinery and equipment.

③ Please do not disassemble the machine-handling equipment or the machine until safety is confirmed.

- Inspection and maintenance of machinery and equipment should be carried out only after confirming measures to prevent falls or prevent runaway of driven objects.
- When disconnecting the product, check the above safety precautions and shut off the energy source and the power supply to the equipment.
- When restarting the machine, be sure to check the safety.

④ Do not use under the following conditions and environments. If unavoidable, please contact us after taking appropriate action to ensure safety.

- Used in conditions or circumstances other than those specified, outdoors or in areas where direct sunlight affects.
- Use is expected to have a significant impact on people or property, especially in applications where safety is required. property, especially in applications where safety is required.

② Personal Eligibility

Warnings for non-qualified personnel

- Improper handling may result in injury or property damage.
- Only persons with certain training qualifications may perform the tasks described in this manual.

③ Safety label indication

Label	Marking position on valve
	Protective film covering valve openings
	Valve body or actuation part

④ Common safety considerations

④-① Usage Precautions

④-①-① Common precautions

4-1-1-1 Valve body material is SUS304, bellows is SUS316L, seal material is FKM. For other materials, you can select optional items. Please check the materials used and use a gas-free gas.

4-1-1-2 The operating pressure, piping material, and fitting heat resistance temperature should be suitable for the operating temperature.

4-1-1-3 Keep the temperature of the auto switch at 60 ° C or less.

4-1-1-4 When using with heater attached, measures should be taken to prevent overheating.

4-1-1-5 When attaching a solenoid valve, keep the temperature of the solenoid valve at 50℃ or less.

④-①-② Precautions on valve selection

4-1-2-1 For large diameter valves, O-ring seal is recommended for improved durability for high vacuum valves used in the main exhaust line.

4-1-2-2 Consider the size, length and flow characteristics of the solenoid valves for operation when managing the responsiveness of the valves.

4-1-2-3 Observe the specified operating pressure.

4-1-2-4 The operating piston seal and bellows seal are in direct contact with the atmosphere. Please consult with us about the circumstances in which the particles are a problem because they may be introduced.

④-①-③ Installation notes

4-1-3-1 Please install this so that excessive vibration or impact is not applied. If the vibration continues, the durability may be reduced.

4-1-3-2 When attaching the heater, be careful not to damage the insulation of the leads and connections.

4-1-3-3 Be sure to secure the leadwire with sufficient curvature so that excessive force is not applied.

4-1-3-4 If the valve is heated, keep the body parts other than the bonnet.

4-1-3-5 When attaching the heater, do not touch the valve with bare hands during heater heating as the valve is hot. Causes burns.

4-1-3-6 If the environment is highly humid, keep the packaging until just before installation.

4-1-3-7 Do not install excessive force on the flange.

④-①-④ Installation Precautions

4-1-4-1 Please install after Flange Seal surface and O-ring should be cleaned with ethanol.

4-1-4-2 Please do not scratch the flange seal.

4-1-4-3 Exhaust direction : In some cases, the exhaust direction is free during operation, but the durability of exhaust flow is reduced. Install to vent to the bellows. This means that the bellows face towards the pump. Conversely, installation may cause sudden impact on the bellows, resulting in bellows damage and rapid degradation of life (except warranty).

④-①-⑤ Maintenance and inspection

4-1-5-1 When removing foreign matter inside, be careful not to damage each part.

4-1-5-2 Replace the bonnet unit when it is close to its service life.

4-1-5-3 If damage is expected even before the service life, please maintenance and inspection promptly.

4-1-5-4 Please use our standard parts for maintenance parts. Refer to the structural drawing, replacement parts, and maintenance parts list.

4-1-5-5 When attached valve, Install the O-ring so that it does not twist.

Warranty and Disclaimer

① The warranty period for our products is within one year from the commencement of use or within 1.5 years after delivery, whichever comes first.

② This product has an operation count, operating distance, and replacement parts so please contact us if needs.

③ In case of failure or damage due to the responsibility of our company during the warranty period, we will provide only replacement parts or necessary parts, and we will not bear any additional loss.

④ Other damages caused by the failure of our products are not covered by the warranty.

⑤ The warranty period of the vacuum pads can not be applied within one year from the use start date.

⑥ Since the vacuum pad is a consumable item, the warranty period is one year after delivery.

However, if it is caused by wear or rubber material deterioration caused by using a vacuum pad even during the warranty period, it will not be covered by the product warranty.

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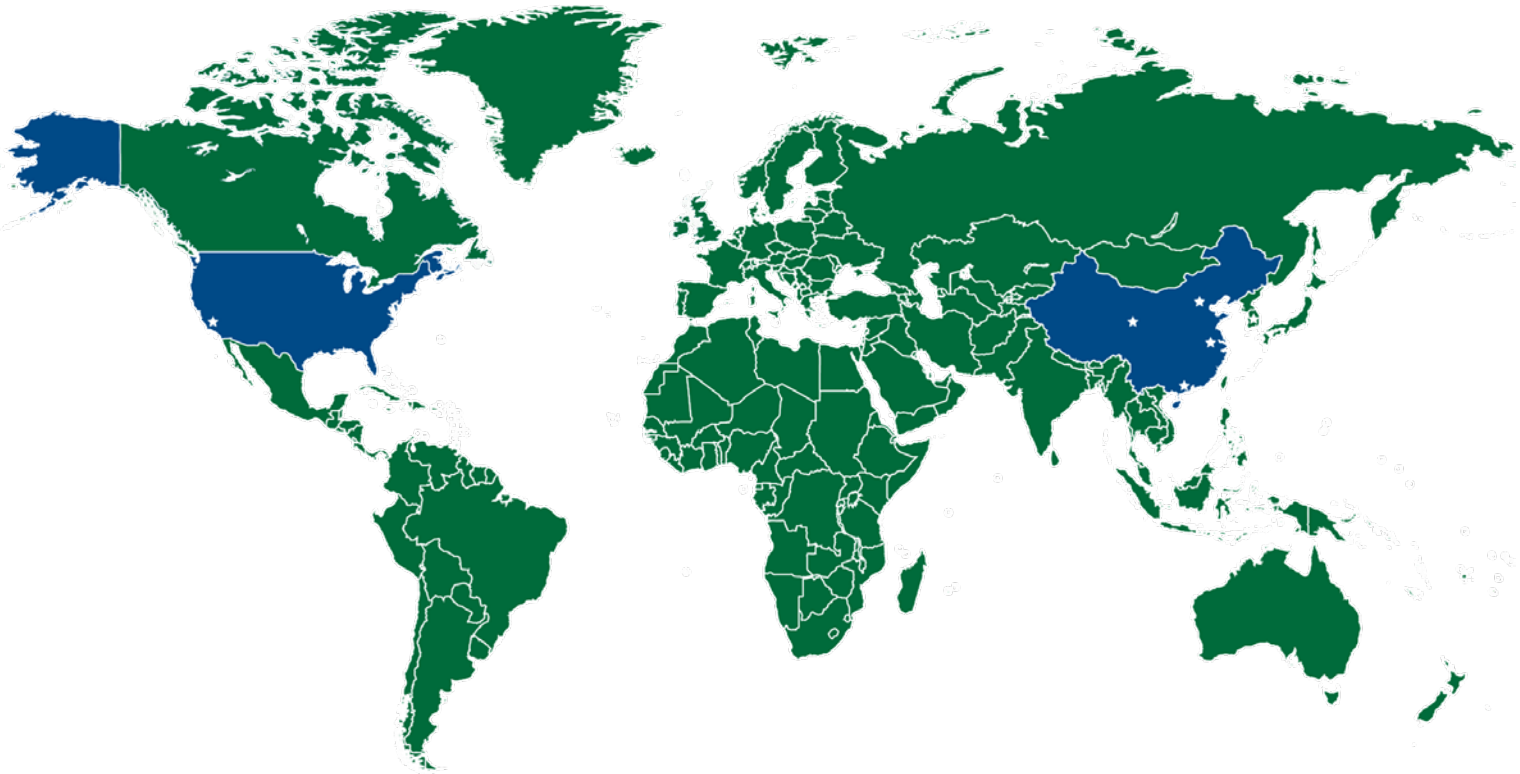

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