

Series 5500
Bellows Pump Connectors

Catalog 474E

Series 5500 Bellows Pump Connectors

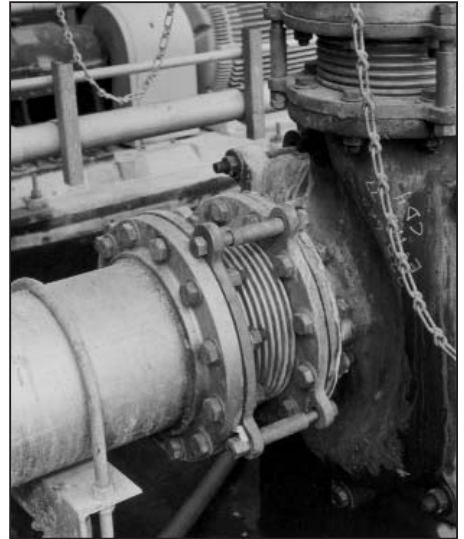
- Sizes 1-1/2" through 24"
- Design Conditions: full vacuum to 150 and 300 psig at 500°F
- Compact design with maximum flexibility and extended life
- Designed specifically to isolate and protect mechanical equipment

Series 5500 Bellows Pump Connectors are designed for installation adjacent to mechanical equipment to isolate vibration, absorb small pipe movements and to provide flexibility during installation. The bellows element is laminated (3 ply minimum) for maximum flexibility and fatigue resistance. Standard configurations include integral full thrust limit rods to react the full pressure thrust or compression for vacuum conditions.

This rugged product is designed for the most demanding industrial applications, or the maximum reliability for HVAC installations.

Standard configurations are available from inventory. Consult the factory for non-standard designs involving special materials or design conditions.

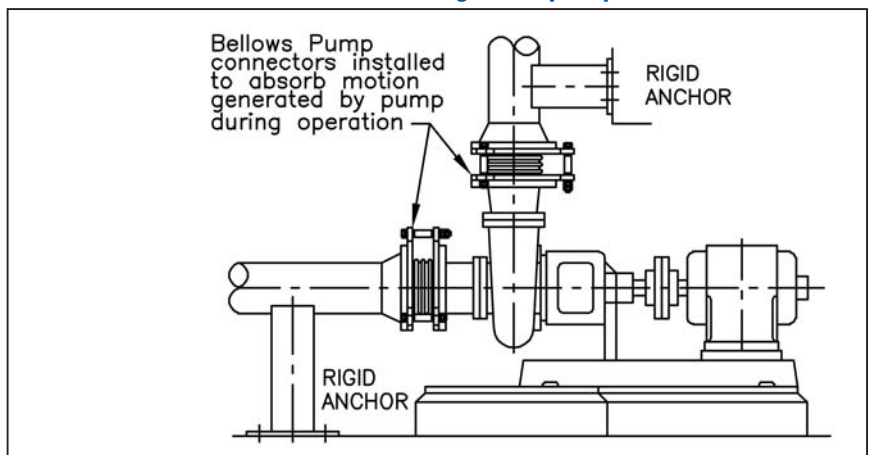
Type 5501R Bellows Pump Connectors installed on nitric acid pump.



Applications

Bellows pump connectors are designed to connect rigid piping to mechanical equipment that has thermal growth or mechanical movement. Although limit rods are an integral part of the design to prevent over extension or compression, these rods should be installed loose for full benefit. The rigid anchor shown in the illustration must be capable of reacting the pressure thrust and the spring force of the bellows.

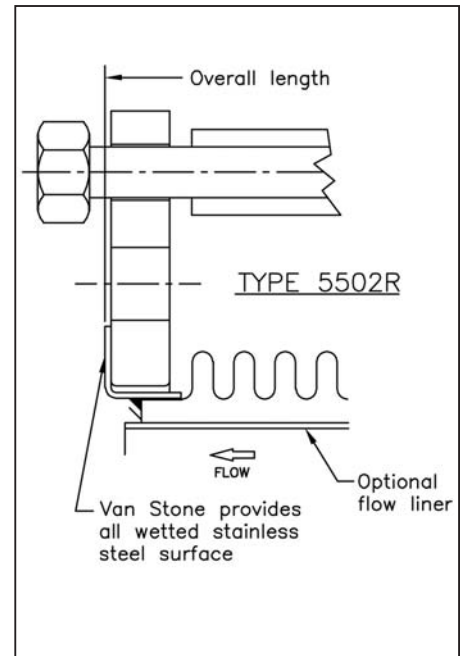
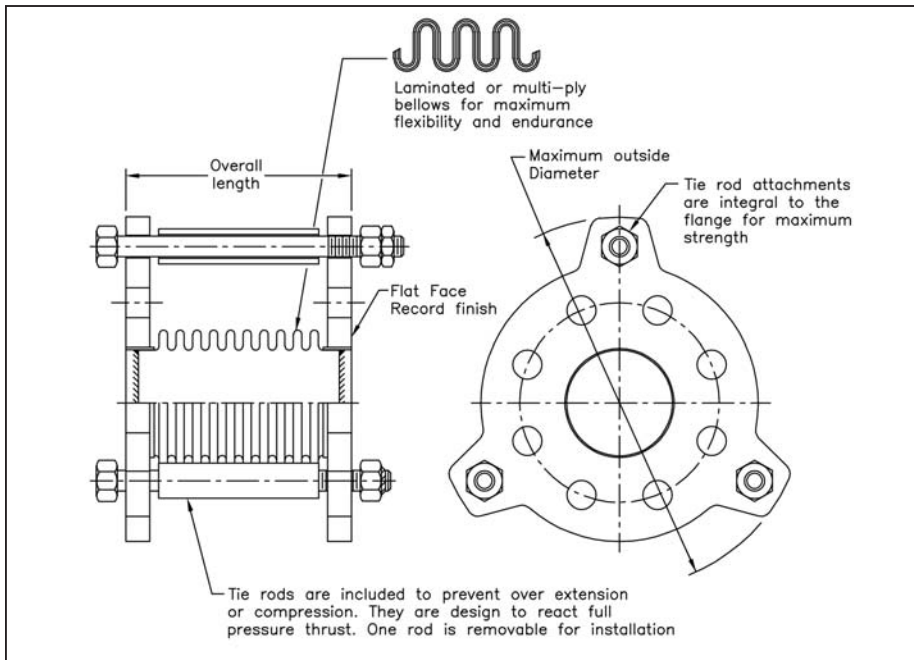
Series 5500 Bellows Pump Connectors installed on the suction and discharge of a pump.



$$\text{Rigid Anchor Force (lbs)} = \left\{ \begin{array}{l} \text{Pressure Thrust*} \\ \text{Force (lbs.) Table 2} \end{array} \right\} + \left\{ \begin{array}{l} \text{Spring Rate (lbs./in.)} \\ \text{Column 4 Table 2 or 3} \end{array} \right\} \times \left\{ \begin{array}{l} \text{Axial Travel} \\ \text{(inches)} \end{array} \right\}$$

**Use maximum pressure – including test pressure.*

Design Features



Flow Liners

Flow liners or internal sleeves are optional features on standard Series 5500 Bellows Pump Connectors. Their purpose is to: minimize pressure loss, prevent bellows resonance in turbulent flow, prevent erosion of the bellows if the media contain abrasive material or to prevent direct impingement of high temperature flow on the bellows.

The guidelines published by the Standards of the Expansion Joint Manufacturers Association, Inc. are: flow liners are recommended for gas flow with velocities exceeding 4 ft./sec. per inch of diameter through 6" NPS, and 25 ft./sec. for sizes larger than 6" NPS. For liquid flow, liners are

recommended for velocities exceeding 2 ft./sec. per inch of diameter through 6" NPS, and over 10 ft./sec. for sizes over 6" NPS. If extremely turbulent flow conditions exist, the actual flow velocity should be multiplied by 4 to use these criteria.

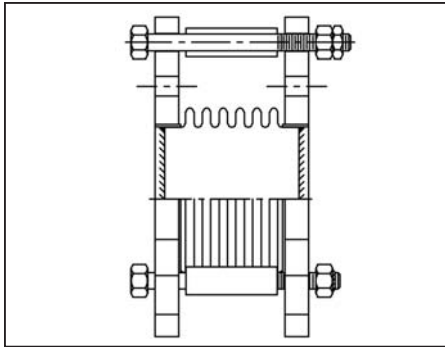
Series 5500 flow liners are designed for unidirectional flow, and flow conditions normally experienced in industrial and HVAC applications. For conditions involving bi-directional flow, high velocities, abrasive materials or extreme turbulence, consult the factory.

Table 1 Allowable Movements Bellows Pump Connectors, Types 5501R & 5502R 150 & 300 psig

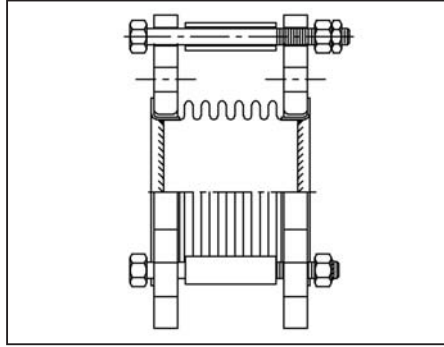
Nominal Sizes (NPS)	Allowable Movements - inches		
	1 1/2"-8"	10"-16"	18"-24"
Axial Compression	0.50	0.75	1.00
Axial Extension	0.25	0.25	0.25
Installation Offset	0.13	0.13	0.13

Offset is measured from the centerline

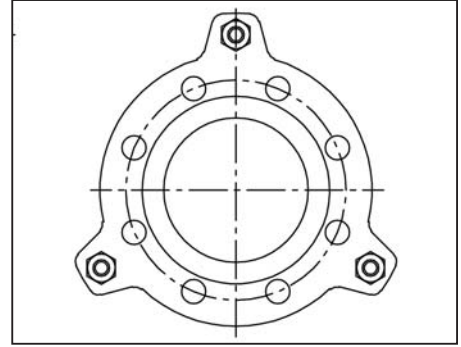
5501R Fixed Flange



5502R Van Stone Flange



Typical End View



Flanges: Flat face carbon steel made from ASME A-36 plate with integral limit rod lugs. Outside diameter and drilling per ASME/ANSI B16.5. Table 3 designs – 150 lb. drilling, Table 4 designs – 300 lb. drilling. See Column 5 of Tables 3 & 4 for maximum outside dimension including limit rod lugs.

Bellows: Laminated (multiply) ASTM A240 type 321 3" diameter and under, type 304 over 3" diameter.

Van Stone: ASTM A240 type 304, The primary purpose of van stoned ends on Series 5500 Bellows Pump Connectors is to provide an all wetted stainless steel surface in contact with the flow media. The van stone is material that is flared and flattened against the flange face. Although it is not dimensionally equivalent to a raised face, it creates a condition that is comparable. Since the flanges are not attached to the bellows or van stone, they can rotate relative to each end approximately one half hole diameter as limited by the limit rods.

Flow Liner (optional): ASTM A240 type 304, Material thickness follows the recommendations of the Standards of the [Expansion Manufacturers Association, Inc.](#) for flow velocities less than 100 ft./sec.

Limit Rods: ASTM A307 Bolts, A563 Nuts

Table 2 Pressure and Force Data Bellows Pump Connectors Types 5501R, 5502R & 5506R 150 & 300 psig

Nominal Size NPS	Effective Area (in. ²)	Effective Pressure (PSI)						
		50	75	100	150	225	300	450
1 1/2	3.6	180	270	360	540	810	1080	1620
2	5.6	280	420	560	840	1260	1680	2520
2 1/2	7.8	390	585	780	1170	1755	2340	3510
3	11.6	580	870	1160	1740	2610	3480	5220
4	19	950	1425	1900	2850	4275	5700	8550
5	28	1400	2100	2800	4200	6300	8400	12600
6	40	2000	3000	4000	6000	9000	12000	18000
8	66	3300	4950	6600	9900	14850	19800	29700
10	101	5050	7575	10100	15150	22725	30300	45450
12	147	7350	11025	14700	22050	33075	44100	66150
14	177	8850	13275	17700	26550	39825	53100	79650
16	229	11450	17175	22900	34350	51525	68700	103050
18	287	14350	21525	28700	43050	64575	86100	129150
20	355	17750	26625	35500	53250	79875	106500	159750
24	501	25050	37575	50100	75150	112725	150300	225450
1	2	3	4	5	6	7	8	9

Table 3 Type 5501R, 5502R & 5506R (3)

Design Pressure: Full Vacuum to 150 psig. Test Pressure: 225 psig. Design Temperature: 500°F

Nominal Size NPS	Part Number 5501R 5502R	Overall Length (1) (inches)	Axial Spring Rate (lb./in.)	Outside Diameter (2) (inches)	Number of Rods	Weight (lbs.)
1 1/2	-127	3.5	360	7.5	3	13
2	-131	3.5	435	8.5	3	16
2 1/2	-135	3.5	643	9.5	3	22
3	-140	4.0	860	10.0	3	24
4	-148	4.5	968	11.5	3	26
5	-155	4.5	1168	12.5	3	29
6	-160	5.0	1274	14.0	3	40
8	-167	5.0	1440	17.0	3	51
10	-174	6.0	1619	19.5	3	65
12	-180	6.0	1725	23.0	3	91
14	-181	8.0	2004	25.5	3	163
16	-182	8.0	2220	28.0	3	204
18	-183	9.0	2397	30.0	3	245
20	-184	9.0	2492	33.0	3	260
24	-186	9.0	2819	37.5	4	290
1	2	3	4	5	6	7

Table 4 Type 5501R & 5502R

Design Pressure: Full Vacuum to 300 psig. Test Pressure: 450 psig. Design Temperature: 500°F

Nominal Size NPS	Part Number 5501R 5502R	Overall Length(1) (inches)	Axial Spring Rate (lb./in.)	Outside Diameter(2) (inches)	Number of Rods	Weight (lbs.)
1 1/2	-327	3.5	360	8.63	3	16
2	-331	3.5	433	9.00	3	16
2 1/2	-335	3.5	1268	10.00	3	25
3	-340	4.0	1491	10.75	3	28
4	-348	4.5	1544	13.00	3	35
5	-355	4.5	1871	14.00	3	42
6	-360	5.0	2927	16.00	3	57
8	-367	5.0	3687	19.00	3	79
10	-374	6.0	3922	21.75	3	113
12	-380	6.0	5520	25.50	3	179
14	-381	8.0	6311	28.50	3	212
16	-382	8.0	7831	31.00	4	293
18	-383	9.0	8613	33.75	4	363
20	-384	9.0	10,126	36.50	4	433
24	-386	9.0	11,005	43.50	4	490
1	2	3	4	5	6	7

Note:

- (1) Overall length is measured from flange face to flange to flange face including the van stone for Type 5502R.
- (2) Maximum outside diameter – includes limit rod lug attachments.
- (3) Type 5506R is available rated for full vacuum to 150 psig at 500°F as a replacement for rubber expansion joints, nominal sizes 2” through 14”. Sizes 2” through 8” are 6.0” overall length and sizes 10” through 14” are 8” overall length. All other dimensions and performance data are the same as Type 5502R.

Installation Procedure

Application: Series 5500 Bellows Pump Connectors are designed for applications requiring isolation of mechanical equipment such as pumps that produce vibration or motion. The pump connector is design to connect directly to the equipment to reduce forces and moments on the equipment flanges. Refer to page 2 for a typical installation.

Operating Conditions: Series 5500 pump connectors are supplied with a tag attached stating the Part Number and Design Pressure. Standard designs are 150 psig and 300 psig, and the test pressures are 225 psig and 450 psig respectively. The design temperature for all standard joints is 500°F. Be certain that the system conditions and test conditions do not exceed the design values. All 5500 pump connectors are designed for a full vacuum.

Movement: Bellows pump connectors are designed to absorb vibration and should be installed in the neutral or manufactured position whenever possible. If necessary, they can be used for installation misalignment. Refer to Table 1 for the allowable displacements.

Flow Direction and Orientation: The flow direction can be either direction for Series 5500 expansion joints that do not include flow liners, and they can be mounted in the horizontal or vertical plane. Flow liners are offered as an option – be certain the flow is from the fixed end to the free end of the liner. The direction will be marked on the exterior.

Limit Rods: All standard Series 5500 Bellows Pump Connectors include rods which are intended to prevent over-travel of the bellows. They are designed to react the full pressure thrust but they are intended to be installed loose to take full advantage of the movement capability of the bellows. Sizes 1-1/2" through 14" have three rods – 16" and over have four. One rod is removable if required for installation. This rod should be replaced and adjusted as illustrated.

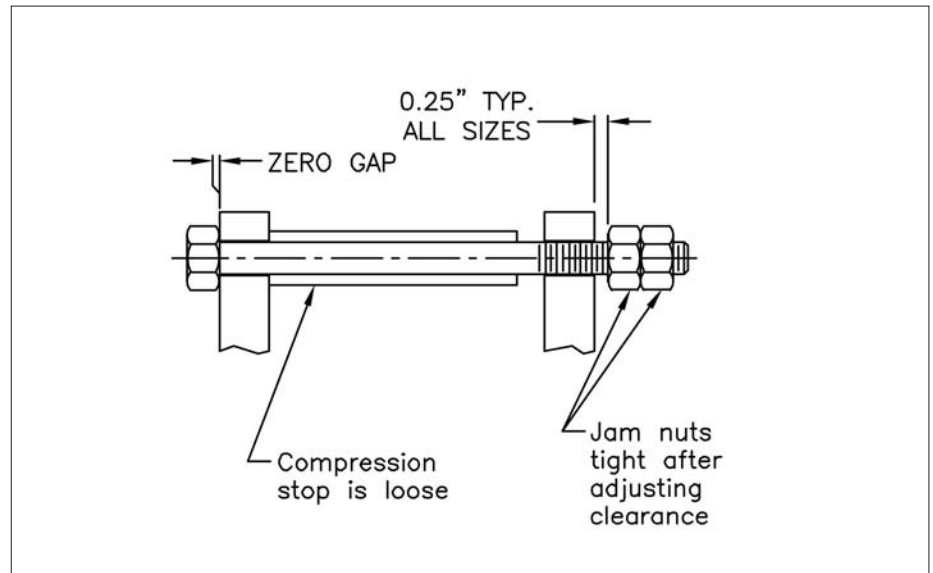
Shipping Restraints: External restraints are installed at the factory to insure installation at the correct length and alignment. For sizes 1-1/2" through 6" wood spacers are installed between the flanges. Sizes 8" and over include steel bars that are painted yellow and labeled – Shipping Bars, Remove after Installation. Leave the restraints installed until after the

installation of the pump connector is complete - but they must be removed prior to pressure testing.

CAUTION: Shipping Bars are not designed to react the pressure thrust – they must be removed prior to testing. Shipping restraints that are installed by welding should be removed by cutting and grinding welds flush.

Post Installation Inspection

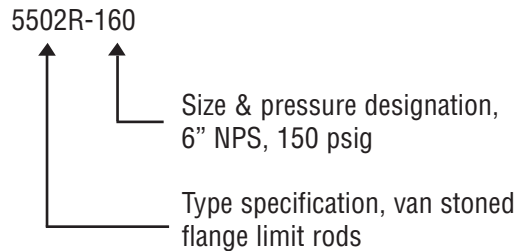
1. Inspect the pump connector for damage.
2. Is the pump connector installed at the correct location?
3. Are the Shipping Restraints removed?
4. Is the pump connector free to move and is the anchor/equipment rigidly secured?
5. If the pump connector includes a flow liner, is the flow direction correct?



Ordering Instructions

Refer to Tables 2 and 3 to select the configuration and service conditions required for your application.

Example 6" Bellows Pump
Connector at 500°F
maximum, 5502R-160
van stone 150 lb. flange
both ends, limit rods



To add an optional flow liner, add an "L" to the type specification i.e. 5501RL or 5502RL

LIMITED WARRANTY

This warranty is given by Hyspan Precision Products, Inc. (Hyspan), located at 1685 Brandywine Avenue, Chula Vista, California 91911, (619) 421-1355, for the benefit of the first purchaser of the product to which the warranty applies. This warranty applies to those parts which are manufactured and delivered by Hyspan.

The warranty is that the parts manufactured and delivered by Hyspan will be free from defects in material or workmanship under normal use and service for the time specified below.

In the event of failure of a part due to such a covered defect, Hyspan will repair or replace, at its option, the defective part at its factory located at 1685 Brandywine Avenue, Chula Vista, California 91911.

The part must be returned to the factory by and at the expense of the person claiming the benefit of the warranty.

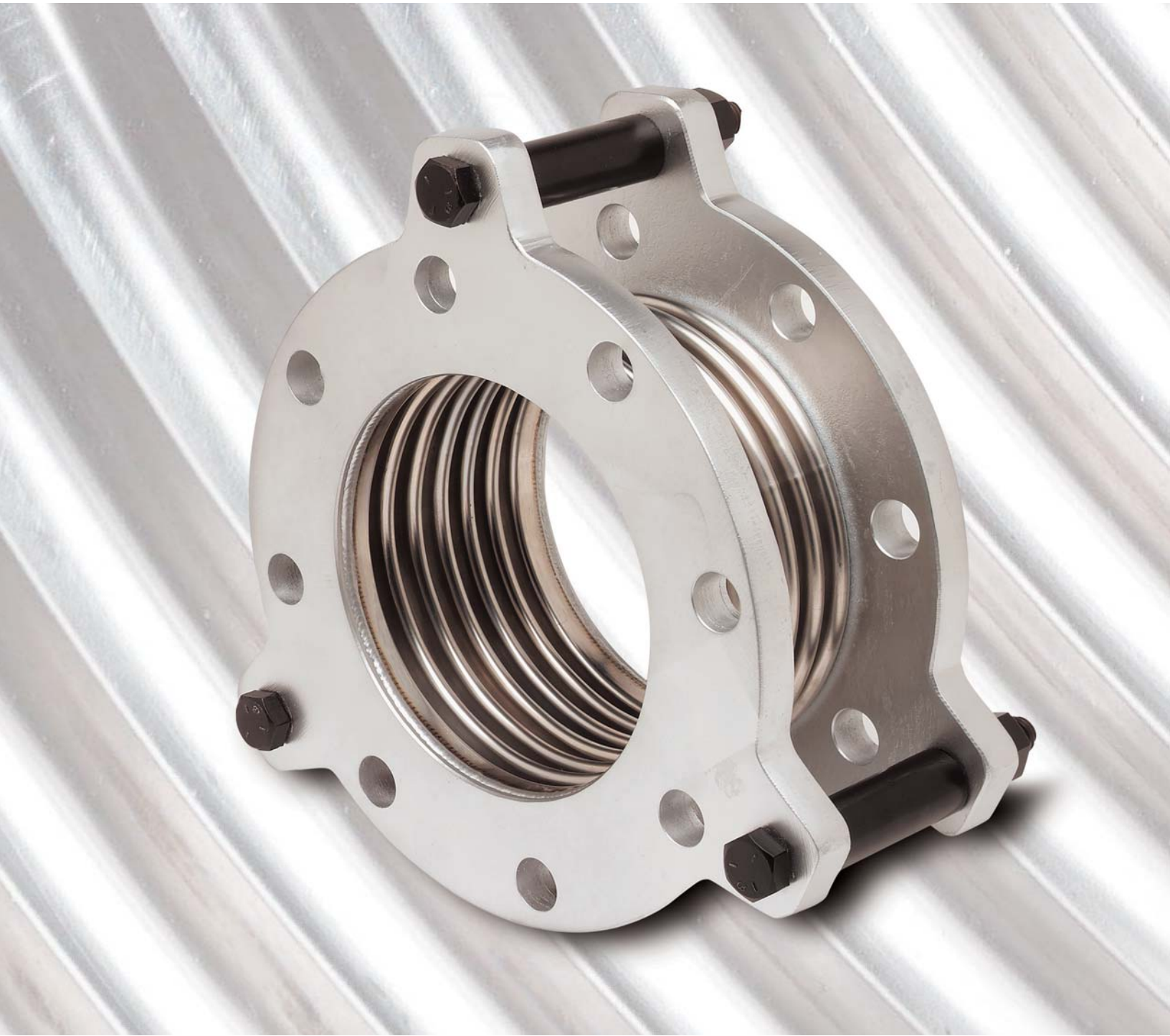
The warranty shall be for a period of twenty-four (24) months after the date of delivery of the product, twelve (12) months after commencement of use of the product, whichever period is the shortest. All products for which warranty claims are made must be returned as provided above to the factory within thirty (30) days from the date of claimed malfunction in order for this warranty to be effective. The only entity authorized to do any warranty repairs is the manufacturer.

The repairs or replacement by Hyspan will be accomplished within forty-five (45) days from receipt of the defective parts at the factory.

This warranty is expressed in lieu of all other warranties, expressed or implied, including the warranty of merchantability, the implied warranty of fitness for a particular purpose, and of all other obligations or liabilities on the part of Hyspan, and it neither assumes nor authorizes any other persons to assume for Hyspan any other liabilities in connection with the sale of the products.

This warranty does not cover parts of products made by others or products or any part thereof which have been repaired or altered, except by Hyspan, or which shall have been subjected to misuse, negligence, or accident.

Hyspan shall not be liable for damage or delay suffered by the purchaser regardless of whether such damages are general, special, or consequential in nature, whether caused by defective material or workmanship or otherwise, or whether caused by Hyspan's negligence regardless of the degree.



Hyspan[®]

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