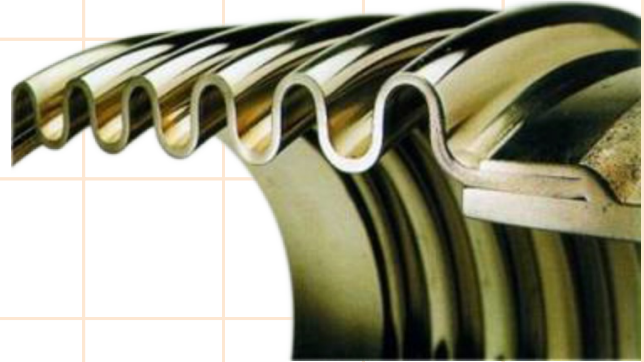


Bellows are a flexible piping element. The corrugation of the expansion joint is designed to be flexible in order to absorb pipe expansion and contraction due to changes in temperature. The number of corrugation of bellows is decided according to the displacement amount and the expansionary and contracting force that the bellows have to absorb. Bellows have to be strong to the design pressure and operating pressure of piping and installation and they also have to be flexible to absorb thermal movement. The thrust force of the flow in the piping has to be buttressed by things other than bellows. These are usually anchors, tie rods, hinges or gimbaled structures and our style ETR thrust restraints.



The value of the thrust force of bellows is usually calculated by multiplying the value of the effective cross section area by the value of the flow pressure of pipe

Kanwal's Easy Flex Bellows are fabricated from cylindrical tubes made of high ductility material. The cylindrical body is formed onto parallel corrugations which accommodates all basic movements without encountering wear and tear as associated with conventional mechanical devices. Bellows are designed and manufactures as per the latest additions of EJMA, ASME, GIS, BS, DIN, IS standards under the supervision of highly qualified team of engineers and technocrats.

To attain high flexibility and above average life expectancy, our Bellows are made from tested S. S. 316/321/304 stainless steel material. These bellows retain the flexibility when subject to internal pressure. Kanwal's Easy Flex Bellows have proven their outstanding performance in a wide variety of applications.



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- ⇒ Measurements are subject to 5% tolerance.
- ⇒ To achieve good results do not over load fitting more than designed parameters as per drawing / catalogue.

Why Expansion Joints are Required

While designing pipelines, a main artery of the modern industry, planners always face many obstacles : the expansion and contraction of pipes caused by temperature changes both external and internal, vibrations generated from machine operation and other stress imposed on the pipelines by wind or in some cases by earthquake. Therefore, protection from these hazardous elements is always of major interest to the pipeline engineers.

To absorb pressure from expansion, contraction and the vibration of pipes, flexibility is key. One of the most effective flexible elements is the metallic bellows type expansion joint, which is currently widely used due to continued developments and improvements in the performance and design technique.

Parts and Features of Expansion Joints

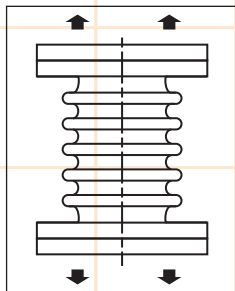
Bellows : After welded Piping forming with high-quality stainless steel sheets, bellows are produced through hydraulic forming or roll forming. And sometimes the bellows are heat treated to eliminate the remaining welding stress on the welded part or to remove the remaining stress generated during forming.

End Pipe: To facilitate connecting and fitting into the ends of bellows, the end pipe is normally made with the same material that is used for the pipeline, and also to the same size as the pipeline.

Liner/Internal Sleeve: A device which minimizes contact between the inner surface of the bellows of an expansion joint and the fluid flowing through it. It prevents vibration, and erosion of the Bellows.

Flange: Customer can choose a flange standard from among BS 10 Table D / ANSI / DIN / IS or any other standard.

Tie Rod: The rods protect a device from excessive stretching and prevent the dislocation of pipelines. They also stabilize pipelines by absorbing thrusts.

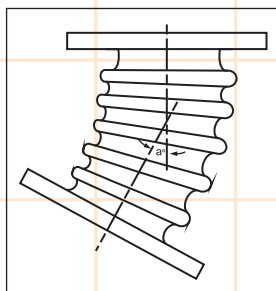
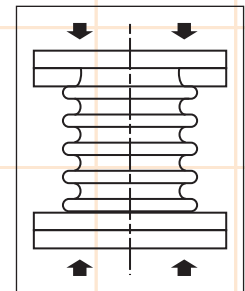


Axial Elongation

Axial Extension is the dimensional lengthening of the Expansion Joint.

Axial Compression

Axial Compression is the dimension shortening of an Expansion Joint along its longitudinal axis.

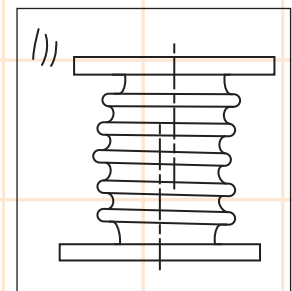


Angular Movement

Angular Rotation is the displacement of the longitudinal axis of the Expansion Joint from its initial straight line position into a circular arc.

Lateral Movement

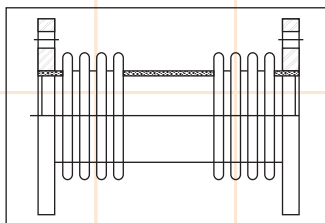
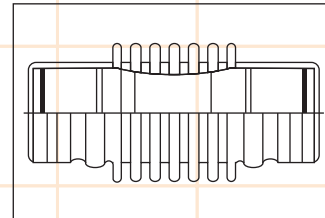
Lateral Deflection is the relative displacement of the two ends of an Expansion Joint perpendicular to its longitudinal axis.



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Single Bellows Assembly

The simplest type of expansion joint consists of a single bellows element welded to end fittings, normally flange or pipe ends. The single bellows can absorb small amounts of axial, lateral and angular movement with ease, but adequate anchors and guides must be provided.

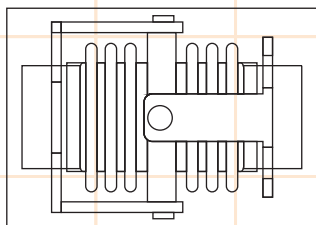
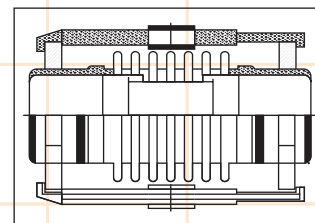


Universal Expansion Joint Assembly

This assembly consists of two bellows connected by a center spool piece with flange or pipe ends. The universal arrangement allows greater axial, lateral and angular movements than a Single Bellows Assembly. Increasing the center spool length produces increased movement capability. Like for the single Bellows adequate anchors and guides must be provided.

Hinged Bellows Assembly

When a Hinged Expansion Joint is used, movement is limited to angulations in one plane. Hinged Assemblies are normally used in sets of two or three to absorb large amounts of expansion in high pressure piping systems. Only low spring forces are transmitted to the equipment. The hinge hardware is designed to carry the pressure thrust of the system, and often is used to combat torsional movement in a piping system. Slotted hinged Expansion Joints are a variant of the standard Hinged Expansion Joints that allow axial and angular movement. Be careful; once a slotted Hinge is introduced, torsion in the piping system is still resisted but the hinge no longer carries pressure thrust.

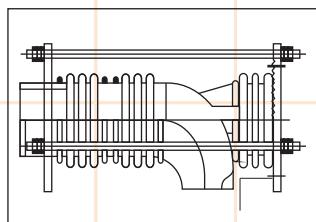
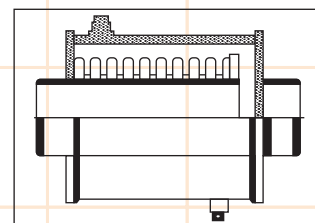


Gimbal Bellows Assembly

The gimbal restraint is designed to absorb system pressure thrust and torsional twist while allowing angulation in any plane. Gimbal Assemblies, When used in pairs or with a single hinged unit, have the advantage of absorbing movements in multi-planer piping systems. The gimbal works the same as an automobile's universal drive shaft.

Externally Pressurized Assembly

Line pressure acts externally on the bellows by means of a pressure chamber, This allows a greater number of convolutions to be used for large axial movements, without fear of bellows instability. Externally pressurized expansion joints have the added benefit of self-draining convolutions if standing media is a concern. Anchors and guides are an essential part of a good installation.



Pressure Balanced Elbow Assembly

These assemblies are used in applications where space limitations preclude the use of main anchors. Pressure thrust acting on the line bellows (bellows in the media flow) is equalized by the balancing bellows through a system of tie rods linkages. The only forces created by the axial, lateral, or angular movements. An elbow must be present in the piping network to install this style of expansion joint.

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Kanwal Industrial Corporation manufactures Corrugated Hoses and Hose Assemblies at an ultra-modern facility under the supervision of a qualified team of engineers and technocrats. They are suitable for wide range of chemicals, petroleum products, super heated steam, liquified gas and cooling lines.

Size : 1/4" (6mm) to 12" (300mm)

Temperature : -200°C to 700°C

Material : Hose S.S. 316/321/304, Braiding S.S. 304.

End Connections

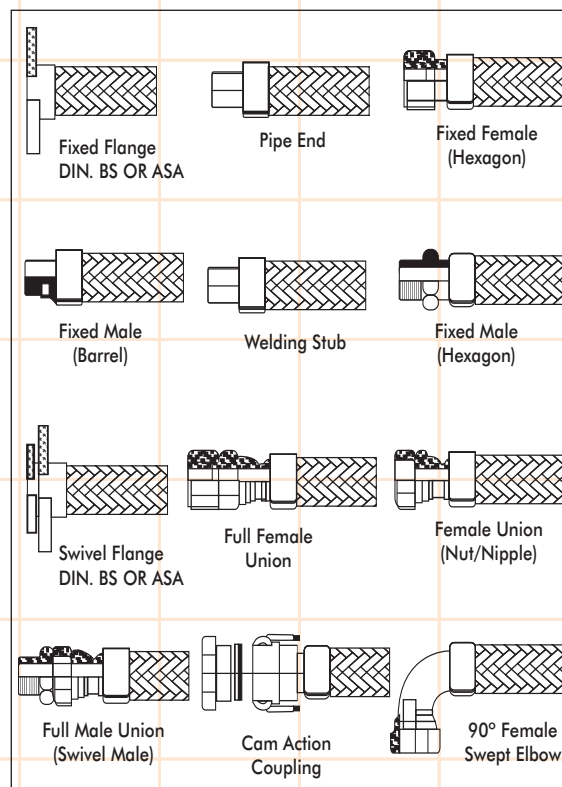
Material of End connection : M.S., Carbon Steel, brass, G.M. SS 304/304L/316L/321.

Type of End Connections ; threaded Type BSP, BSPT, NPT, NPTF, METRIC, SAE, JIC.

Flange ; As per BS, ASA, DIN, Slipon, RTJ or as per your requirement.

End Fittings

Manufactured from Mild Steel, Stainless Steel or Brass. These are fitted by Argon Welding (TIG) or brazing on S.S. Hose depending upon hose type and service conditions to form a complete hose assembly.



TECHNICAL DATA

SIZE		SINGLE BRAID				DOUBLE BRAID			
Nominal size DN	Inch mm	Max. Working Pressure Kg/cm ²	Test Pressure Kg/cm ²	Burst Bend Kg/cm ²	Static Bend Radius mm	Dynamic Bend Radius mm	Max. Working Pressure Kg/cm ²	Test Pressure Kg/cm ²	Burst Pressure Kg/cm ²
1/4	6	100	150	400	25	100	160	240	640
3/8	10	90	135	360	40	150	144	216	576
1/2	12	80	120	320	50	200	128	192	512
5/8	16	70	105	280	50	200	112	168	448
3/4	20	64	96	256	70	200	102	153	408
1	25	50	75	200	90	200	80	120	320
1 1/4	32	40	60	160	110	250	64	96	256
1 1/2	40	32	48	128	130	250	48	72	192
2	50	28	42	112	175	350	44	66	176
2 1/2	65	24	36	96	200	410	42	61	152
3	80	18	27	72	205	450	28	42	112
4	100	16	24	64	230	560	26	39	104
5	125	12	18	48	280	660	20	30	80
6	150	10	15	40	320	815	16	24	64
8	200	8	12	32	435	1015	12	18	48

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EasyflexTM

Flexible Metallic Pump Connector



Application

Kanwal's stainless steel pump connectors have been optimally designed for use in pipework systems for pumps or compressors and used to suppress noise, absorb vibration, to correct and accommodate for minor lateral misalignment or thermal movement and to adjust for any building settlement

Construction

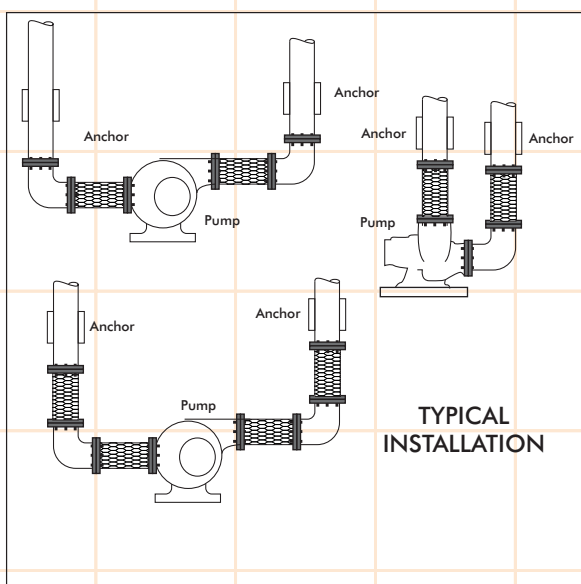
Manufactured with AISI 321 stainless steel corrugated tubing (to BS 6501 Pt.1) with AISI 304 stainless steel single overbraid & carbon or stainless steel end fittings, TIG welded AISI 304/316 stainless steel Corrugated Hose also available.

End Fittings

Screwed assemblies - Threaded BSP Taper Male Hexagon or Half Barrel Fittings Flanged assemblies, to BS10 table D/BS4504 & ANSI/ASA standards.

Installation

Braided pump connectors are not designed to absorb lateral movements and absorb vibration. For maximum efficiency the connectors should be placed in both the suction and discharge lines as close as possible & at 90° to the Vibration Source. They must be anchored at the pipework on the end away from the source.



Nominal I.D. of "Easy Flex" S. S. Braided Bellow	Overall Length Inch/mm	Max. Working Pressure At Room Temp.	Drilling Table
1/2"	6"/150	16 Bar	BS 10 Tab D
3/4"	6"/150	16 Bar	BS 10 Tab D
1"	6"/150	16 Bar	BS 10 Tab D
1 1/4"	6"/150	16 Bar	BS 10 Tab D
1 1/2"	6"/150	16 Bar	BS 10 Tab D
2"	6"/150	16 Bar	BS 10 Tab D
2 1/2"	6"/150	16 Bar	BS 10 Tab D
3"	6"/150	16 Bar	BS 10 Tab D
4"	6"/150	16 Bar	BS 10 Tab D
5"	6"/150	16 Bar	BS 10 Tab D
6"	6"/150	16 Bar	BS 10 Tab D
8"	6"/150	10 Bar	BS 10 Tab D
10"	12"/300	4.5 Bar	BS 10 Tab D
12"	12"/300	4.5 Bar	BS 10 Tab D

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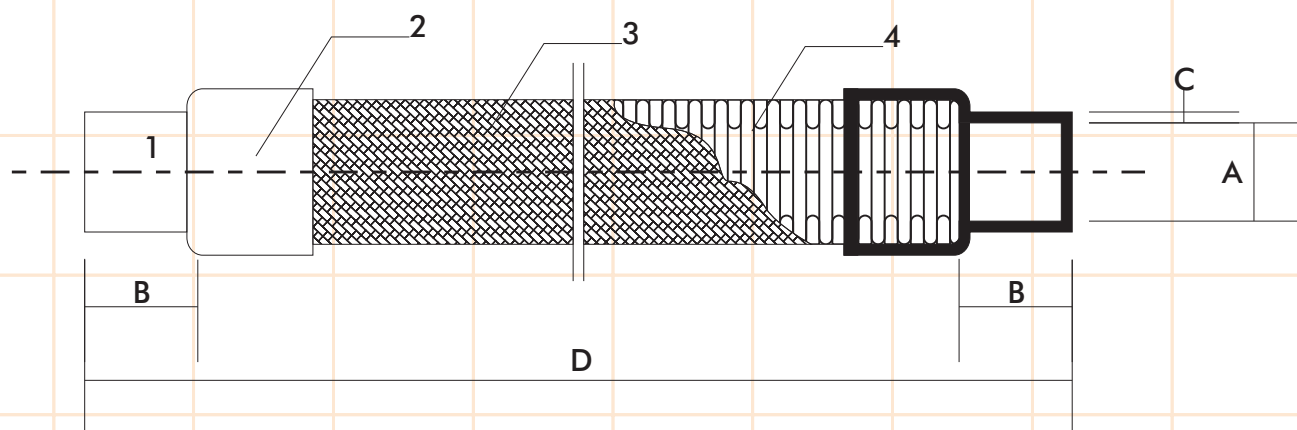
Suitable for use with Refrigerants

R12	R401A	R407A	R410A
R22	R401B	R407B	R410B
R23	R402A	R407C	R502
R125	R402B	R408A	R507
R134A	R404A	R408A	R508, R509



Stainless Steel Vibration Eliminators With Copper Ends

Part No.	Actual OD of Copper Tubing (in)	Dimension in mm				Max. Working Pressure (psi.)	Burst Pressure (psi.)
		A	B (±3)	C	D (±5)		
SLBZ10	3/8	9.6	20	1.2	300	580	3770
SLBZ12	1/2	12.8	22	1.2	300	580	3770
SLBZ15	5/8	16.0	24	1.2	300	580	3770
SLBZ20	3/4	19.2	32	1.2	300	580	3770
SLBZ22	7/8	22.2	37	1.2	300	507	2900
SLBZ25	1-1/8	28.6	46	1.5	300	507	2465
SLBZ32	1-3/8	34.9	51	1.5	300	507	2320
SLBZ40	1-5/8	41.3	57	1.5	300	493	1740
SLBZ50	2-1/8	54.0	70	2.0	300	493	1740



1 = Copper End 2 = Neck Ring 3 = SS Braid 4 = SS Corrugated Hose

EasyflexTM

Metallic Flexible Connector for Fan Coil & AHU's



Features

- ⇒ Connects To Any Pipe Material GI, MS, Copper, Brass, SS or PVC
- ⇒ Minimizes Transmission of Vibration And Noise
- ⇒ Absorbs Expansion, Contraction And Misalignment
- ⇒ Serves As Flexible Pipe Joint or Expansion Joint
- ⇒ Convenient To Align And Install, Saves Labor
- ⇒ Low Cost option.
- ⇒ Each unit is individually Hydro tested before despatch.

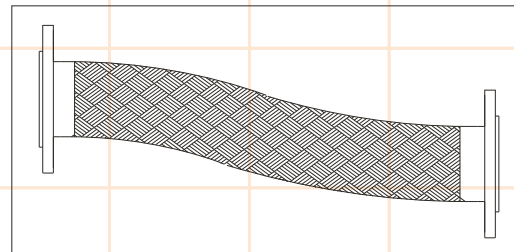
Notes :

- ⇒ Standard Connector are available with female swivel BSP threaded brass end connections.
- ⇒ Other end connection are available please contact our Engineering Department.
- ⇒ Different MOC of End connections are available please contact our Engineering Department.
- ⇒ To order please indicate model no. or pipe size connections are overall length design pressure and type of end connections required.

Model No.	Dia (mm)	Bend R. (Min) (mm)	Design Pressure	Standard Length
EFFCUC015	15	30	7 Bar	100
EFFCUC020	20	40	7 Bar	100
EFFCUC025	25	50	7 Bar	100

* Different Lengths and end fittings as per customer requirements are available.

EASYFLEX braided building expansion joints are used to suppress vibration from pumps, to absorb intermittent lateral movement in pipelines and to compensate for subsidence when pipelines cross building movement lines. They must be installed at right angles to the direction of movement when installed in pipelines and close to the suction and discharge connections when used on pumps. They are not suitable for absorbing AXIAL movement, but are an alternative to articulated or angular expansion joints for low velocity applications.



Type EFBBF

For use on steel pipelines and is suitable for steam and hot water for heating. This unit has stainless steel hose and overbraiding with flanges of carbon steel.

Type EFBBFN

For use on copper pipelines and is suitable for condensate and domestic hot water. This unit has stainless steel hose and overbraiding with ends having stainless steel to all internal surfaces. Hence, this unit is also suitable for potable water.

Nominal Size	Minimum Bend Radius	Overall Length for +/- 3mm Lateral Mvt.	Overall Length for +/- 12mm Lateral Mvt.	Overall Length for +/- 25mm Lateral Mvt.	Overall Length for +/- 50mm Lateral Mvt.
15	165	140	200	240	340
20	225	160	230	280	370
25	260	170	250	310	400
32	300	180	280	330	440
40	340	220	330	400	520
50	390	260	390	470	610
65	500	290	430	520	680
80	525	310	470	590	770
100	625	330	510	630	820
125	750	360	550	670	880
150	900	400	630	770	1030
200	1020	440	680	830	1110
250	1220	500	750	900	1220

Other lengths and sizes are available.

Working Pressure

Using carbon steel PN16 flanges and single overbraid.

Nominal Size	20°C	100°C	150°C
15-80 mm	16 bar	16 bar	14 bar
100 mm	14 bar	13 bar	12 bar
125 mm	10 bar	9.5 bar	8.5 bar
150 mm	8 bar	7.5 bar	7 bar
200 mm	7 bar	7.5 bar	7 bar
250 mm	6 bar	4.5 bar	4 bar

N.B. A higher working pressure can be achieved using double overbraid.

Test Pressure: 1.5 x Working Pressure.

Design Consideration

The overall lengths in the table are for flexing applications. When using these units on static applications, for example subsidence, they will absorb 1.5 times the lateral movements shown.

Material Specifications

Convoluted hose and overbraid are stainless steel.

For steel service the flanges are carbon steel.

For copper service all wetted surfaces are stainless steel.

Notice

Braided building expansion joints should be used to absorb lateral movements.

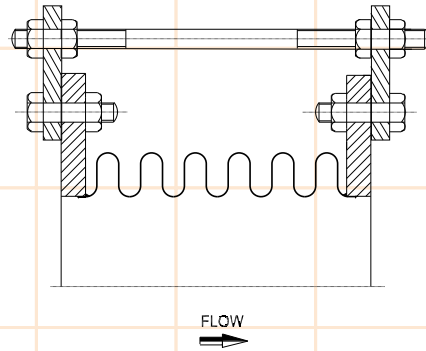
Do not exceed the minimum bend radius.

Do not stretch or twist the unit.

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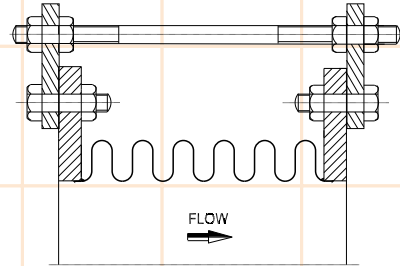
EasyflexTM

Stainless Steel Metallic Exhaust Bellow



Model No. Nominal Bore x Overall Length	Design Temperature upto	Maximum Working Pressure	Lateral Movement (mm)	Axial Movement (mm)	Cycle Life (Cycles)	End Flanges Details
SSEB 6" x 200	600°C	2Kg/cm ²	2	±10	12000	BS10 Table D
SSEB 6" x 250	600°C	2Kg/cm ²	4	±15	12000	BS10 Table D
SSEB 6" x 300	600°C	2Kg/cm ²	6	±20	12000	BS10 Table D
SSEB 8" x 200	600°C	2Kg/cm ²	2	±10	12000	BS10 Table D
SSEB 8" x 250	600°C	2Kg/cm ²	4	±15	12000	BS10 Table D
SSEB 8" x 300	600°C	2Kg/cm ²	6	±20	12000	BS10 Table D
SSEB 10" x 200	600°C	2Kg/cm ²	2	±10	12000	BS10 Table D
SSEB 10" x 250	600°C	2Kg/cm ²	4	±15	12000	BS10 Table D
SSEB 10" x 300	600°C	2Kg/cm ²	6	±20	12000	BS10 Table D
SSEB 12" x 200	600°C	2Kg/cm ²	2	±10	12000	BS10 Table D
SSEB 12" x 250	600°C	2Kg/cm ²	4	±15	12000	BS10 Table D
SSEB 12" x 300	600°C	2Kg/cm ²	6	±20	12000	BS10 Table D
SSEB 14" x 200	600°C	2Kg/cm ²	2	±10	12000	BS10 Table D
SSEB 14" x 250	600°C	2Kg/cm ²	4	±15	12000	BS10 Table D
SSEB 14" x 300	600°C	2Kg/cm ²	6	±20	12000	BS10 Table D
SSEB 16" x 200	600°C	2Kg/cm ²	2	±10	12000	BS10 Table D
SSEB 16" x 250	600°C	2Kg/cm ²	4	±15	12000	BS10 Table D
SSEB 16" x 300	600°C	2Kg/cm ²	6	±20	12000	BS10 Table D
SSEB 18" x 200	600°C	2Kg/cm ²	2	±10	12000	BS10 Table D
SSEB 18" x 250	600°C	2Kg/cm ²	4	±15	12000	BS10 Table D
SSEB 18" x 300	600°C	2Kg/cm ²	6	±20	12000	BS10 Table D
SSEB 20" x 200	600°C	2Kg/cm ²	2	±10	12000	BS10 Table D
SSEB 20" x 250	600°C	2Kg/cm ²	4	±15	12000	BS10 Table D
SSEB 20" x 300	600°C	2Kg/cm ²	6	±20	12000	BS10 Table D
SSEB 22" x 200	600°C	2Kg/cm ²	2	±10	12000	BS10 Table D
SSEB 22" x 250	600°C	2Kg/cm ²	4	±15	12000	BS10 Table D
SSEB 22" x 300	600°C	2Kg/cm ²	6	±20	12000	BS10 Table D
SSEB 24" x 200	600°C	2Kg/cm ²	2	±10	12000	BS10 Table D
SSEB 24" x 250	600°C	2Kg/cm ²	4	±15	12000	BS10 Table D
SSEB 24" x 300	600°C	2Kg/cm ²	6	±20	12000	BS10 Table D

- ⇒ Material of Standard Exhaust Bellow SA 240 TP 321, SA 240 TP 304 also available.
- ⇒ Material of End Flanges IS 2062 Grade 2 (Carbon Steel)
- ⇒ Custom Made Bellows as per customer specification available for additional movements.
- ⇒ End Flanges as per customers specification available.
- ⇒ Accessories like nut bolts / gaskets / tie rod assembly / mating flanges available at extra cost.
- ⇒ Compliance - Metallic Bellows designed as EJMA USA 9th Edition.



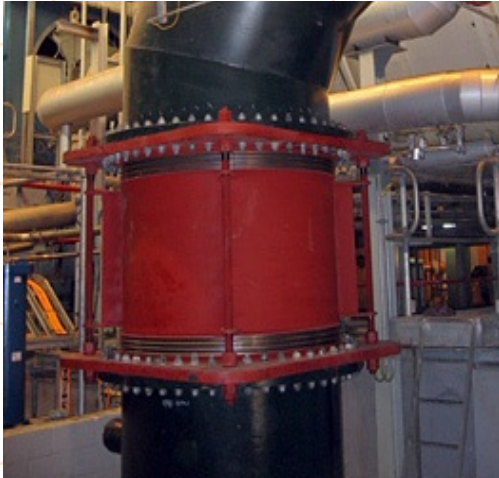
PN - 10

Model No. Nominal Bore x Overall Length	Design Temperature upto	Maximum Working Pressure	Lateral Movement (mm)	Axial Movement (mm)	Cycle Life (Cycles)	End Flanges Details
SSMB 2" x 150	250°C	10Kg/cm ²	2	±10	12000	BS10 Table D
SSMB 2½" x 150	250°C	10Kg/cm ²	2	±10	12000	BS10 Table D
SSMB 3" x 150	250°C	10Kg/cm ²	2	±10	12000	BS10 Table D
SSMB 4" x 150	250°C	10Kg/cm ²	2	±10	12000	BS10 Table D
SSMB 5" x 150	250°C	10Kg/cm ²	2	±10	12000	BS10 Table D
SSMB 6" x 150	250°C	10Kg/cm ²	2	±10	12000	BS10 Table D
SSMB 8" x 150	250°C	10Kg/cm ²	2	±10	12000	BS10 Table D
SSMB 10" x 200	250°C	10Kg/cm ²	2	±10	12000	BS10 Table D
SSMB 12" x 200	250°C	10Kg/cm ²	2	±10	12000	BS10 Table D
SSMB 14" x 200	250°C	10Kg/cm ²	2	±10	12000	BS10 Table D
SSMB 16" x 200	250°C	10Kg/cm ²	2	±10	12000	BS10 Table D
SSMB 18" x 200	250°C	10Kg/cm ²	2	±10	12000	BS10 Table D
SSMB 20" x 200	250°C	10Kg/cm ²	2	±10	12000	BS10 Table D
SSMB 22" x 200	250°C	10Kg/cm ²	2	±10	12000	BS10 Table D
SSMB 24" x 200	250°C	10Kg/cm ²	2	±10	12000	BS10 Table D

PN - 16

Model No. Nominal Bore x Overall Length	Design Temperature upto	Maximum Working Pressure	Lateral Movement (mm)	Axial Movement (mm)	Cycle Life (Cycles)	End Flanges Details
SSMB 2" x 150	250°C	16Kg/cm ²	2	±10	12000	ANSI B 16.5 #150
SSMB 2½" x 150	250°C	16Kg/cm ²	2	±10	12000	ANSI B 16.5 #150
SSMB 3" x 150	250°C	16Kg/cm ²	2	±10	12000	ANSI B 16.5 #150
SSMB 4" x 150	250°C	16Kg/cm ²	2	±10	12000	ANSI B 16.5 #150
SSMB 5" x 150	250°C	16Kg/cm ²	2	±10	12000	ANSI B 16.5 #150
SSMB 6" x 150	250°C	16Kg/cm ²	2	±10	12000	ANSI B 16.5 #150
SSMB 8" x 150	250°C	16Kg/cm ²	2	±10	12000	ANSI B 16.5 #150
SSMB 10" x 200	250°C	16Kg/cm ²	2	±10	12000	ANSI B 16.5 #150
SSMB 12" x 200	250°C	16Kg/cm ²	2	±10	12000	ANSI B 16.5 #150
SSMB 14" x 200	250°C	16Kg/cm ²	2	±10	12000	ANSI B 16.5 #150
SSMB 16" x 200	250°C	16Kg/cm ²	2	±10	12000	ANSI B 16.5 #150
SSMB 18" x 200	250°C	16Kg/cm ²	2	±10	12000	ANSI B 16.5 #150
SSMB 20" x 200	250°C	16Kg/cm ²	2	±10	12000	ANSI B 16.5 #150
SSMB 22" x 200	250°C	16Kg/cm ²	2	±10	12000	ANSI B 16.5 #150
SSMB 24" x 200	250°C	16Kg/cm ²	2	±10	12000	ANSI B 16.5 #150

- ⇒ Material of Standard Metallic Bellow SA 240 TP 304, SA 240 TP 316 also available.
- ⇒ Material of End Flanges IS 2062 Grade 2 (Carbon Steel)
- ⇒ Custom Made Bellows as per customer specification available for additional movements.
- ⇒ End Flanges as per customers specification available.
- ⇒ Accessories like nut bolts / gaskets / tie rod assembly / mating flanges available at extra cost.
- ⇒ Compliance - Metallic Bellows designed as EJMA USA 9th Edition.)



Recommended Installation Instructions

Do's

- ⇒ Inspect for damage during shipment, i.e. dents, broken hardware, water marks on carton, etc.
- ⇒ Store in clean dry area where it will not be exposed to damaging environment.
- ⇒ Make the piping system by fitting the expansion joint first. By stretching, compressing, or offsetting the joint to fit the piping, it may be over stressed when the system in service.
- ⇒ It is good practice to leave one flange loose until the expansion joint has been fitted into position. Make necessary adjustment of loose flange before welding.
- ⇒ Install joint with arrow pointing in the direction of flow.
- ⇒ Remove all shipping devices after the installation is complete and before any pressure test of the installed system
- ⇒ Remove any foreign material that may have been lodged between the convolutions.
- ⇒ Refer to EJMA Standards for proper guide spacing and anchor recommendations.

Dont's

- ⇒ Do not drop or strike carton.
- ⇒ Do not remove shipping bars until installation is complete.
- ⇒ Do not use chains or any lifting device directly on the bellows or bellows cover.
- ⇒ Do not allow weld splatter to hit unprotected bellows. Protect with wet chloride free asbestos.
- ⇒ Do not use cleaning agents that contain chlorides.
- ⇒ Do not use steel wool or wire brushes on bellows.
- ⇒ Do not force-rotate one end of an expansion joint alignment of bolt holes. Ordinary bellows are not capable of absorbing torque.
- ⇒ Do not hydrostatic pressure test or evacuate the system before proper installation of all guides and anchors.
- ⇒ Pipe hangers are not adequate guides.
- ⇒ Do not exceed a pressure or 1½ times the rated working pressure of the expansion joint.
- ⇒ Do not use shipping bars to retain the pressure thrust if tested prior to installation.

The manufacturer's warranty may be void if improper installation procedures have been used.

- ⇒ Due to policy of continual improvement, the specifications are subject to change without prior notice.
- ⇒ Measurements are subject to 5% tolerance.
- ⇒ To achieve good results do not over load fitting more than designed parameters as per drawing / catalogue.