DME

METAL EXPANSION JOINTS

CONTENTS

Serving Customers since 1974
With Quality Products at
Competitive Prices

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This catalog presents the basic styles and construction of D.M.E. Expansion Joints for Piping and Ducting Systems. Materials are carefully selected for their specific application. Manufacturing is performed in a modern facility using techniques that produce the greatest economy and maximum performance.

Rigid quality control and testing assure customers that D.M.E. Expansion Joints will meet their most stringent application requirements. These factors, plus a wide range of expansion joint configurations, both catalog and special, provide customers with products outstanding in value, performance and reliability; reflecting the technical skills, craftsmanship and dedicated purpose that guarantee consistently high quality products.

D.M.E. has the experience, engineering knowledge and production capability to design and fabricate expansion joints to meet specific requirements. Our engineering staff will help solve any special or critical expansion joint application problem.

The manufacturing techniques at D.M.E. have been designed to promote the utmost in service. Each and every order is processed and expedited individually to provide rapid response to the customers' needs.

Each employee is committed to providing incomparable service and quality products

EXPANSION JOINT SELECTION GUIDE

The proper selection and application of an expansion joint is the determining factor in its operation and life. Improper selection and application will lead to problems in the field causing down time and system problems.

When selecting an expansion joint, these important factors should be considered:

- Pipe or line size.
- Maximum working pressure.
- Maximum temperature
- Type of movement (axial, lateral, angular, or a combination of movements).
- Amount of movement.
- Rate of media flow or velocity through the expansion joint.
- Type of media flowing through the expansion joint (steam, water, corrosives, etc.).
- Type of end fittings (flanges, weld ends, or special fittings.
- Extreme service conditions (vibration, large amounts of motion in more than one plane, etc.).

Experience has shown that if these basic factors are considered in the selection and specification stage, expansion joints perform as designed with minimal system problems.

EXPANSION JOINT TERMINOLOGY

There will be applications that may require the use of an expansion joint that is not shown in this catalog. A quick phone call or fax to D.M.E. and engineering or technical help will be available to resolve the expansion joint selection. To help in the selection process we've included some expansion joint terminology.

ANGULAR – The displacement of the longitudinal axis of the expansion joint from its straight line position into a circular arc.

AXIAL COMPRESSION OR EXTENSION – The dimensional shortening or lengthening of an expansion joint. Axial compression or extension has been referred as axial movement, traverse, compression, etc.

BELLOWS – The flexible element of an expansion joint, consisting of one or more corrugations (convolutions) may be single or multi-ply constructions.

COMBINED MOVEMENTS – Axial, lateral or angular movements that occur at the same time.

CONTROL RODS - Rods or bars that limit the travel of individual bellows in a universal tied expansion joint or in a dual bellows unit where each bellows takes a special motion. Control rods like limit rods can be designed to take full pressure thrust loads as well as loads imposed by the weight of the expansion joint. Control rods can be used to support loads external to the expansion joint but must be carefully specified. Not designed to absorb pressure thrust.

CYCLE - One complete movement of an expansion joint from initial to extreme position and return.

CYCLE LIFE - Total number of cycles an expansion joint will absorb at rated movement.

DEFLECTION FORCE - Amount of force required to cause movement in an expansion joint.

INTERNAL SLEEVE (LINER) - A device which minimizes contact between the inner surface of the bellows of an expansion joint and the fluid flowing through it.

LATERAL DEFLECTION - The relative displacement of the two ends of an expansion joint perpendicular to its longitudinal axis. Sometimes referred to as lateral offset, or shear.

LIMIT RODS - Rods or bars that limit the travel of the expansion joint. These are different from tie rods in that they are not usually designed to contain full press thrust forces generated by the expansion joint. In case of anchor failure they are designed to absorb pressure thrust loading.

MAXIMUM WORKING PRESSURE - Greatest pressure allowed on the expansion joint during operation**.**

MAXIMUM TEST PRESSURE - Highest permissible pressure which an expansion joint can be subjected without causing objectionable deformation of the bellows element.

MOVEMENT - The dimensional changes which an expansion joint is required to absorb, such as those resulting from thermal expansion or contraction.

PIPE ALIGNMENT GUIDE - Device used to guide, not support, the pipe as it moves due to thermal expansion or cotraction.

PIPE ANCHOR - Device used to firmly fix the location of a point in the piping system. No movement should occur at anchor point.

RATED MOVEMENT - Maximum amount of movement (axial compression, lateral deflection, angular rotation, or any combination thereof) which an expansion joint is capable of absorbing.

SHIPPING RODS (BARS) - Temporary supporting members attached to an expansion joint to prevent movement of the joint and retain dimensional stability during shipping, handling and installation.

SPRING RATE - Force required to compress, extended, laterally deflected, or angularly deflected an expansion joint one inch.

THRUST AREA - Area over which the effects of pressure in an expansion joint will produce a longitudinal force in the piping system.

TIE RODS - Rods or bars for the purpose of restraining the expansion joint from the thrust forces due to internal pressure on the expansion joint.

TORSION - The rotation of one end of the expansion joint relative to the opposite end of the expansion joint. Commonly referred to as torquing the expansion joint. This is not a recommended expansion joint application.

EXPANSION JOINT OPTIONAL ACCESSORIES

Liners or Internal Sleeves

A straight tube liner or internal sleeve should be provided in an expansion joint when high velocities are encountered and where it is desirable to reduce the temperature the bellows element is subjected to.

For steam, air, and gas line application, liners are recommended where the flow velocity exceeds 240 F.P.M. per inch of diameter up to 6" size and where the flow velocity exceeds 1500 F.P.M. in larger than 6" line sizes.

In water and liquid lines, liners are recommended where flow velocity exceeds 120 F.P.M. per inch of diameter up to 6" I.P.S. and where velocity exceeds 600 F.P.M. in larger than 6" I.P.S.

Liners should not be used for high viscosity fluids such as tars which can " pack-up" or "cake", and prevent drainage between the bellows element and liner causing premature failure of the bellows element of the expansion joint. When the fluid is such that purging would prevent "packing-up", purge ports may be used between bellows and liners.

Where lateral deflection or angular rotation is present, a liner with a smaller diameter must be provided to allow clearance between bellows I.D. and liner O.D.

Limit Rods

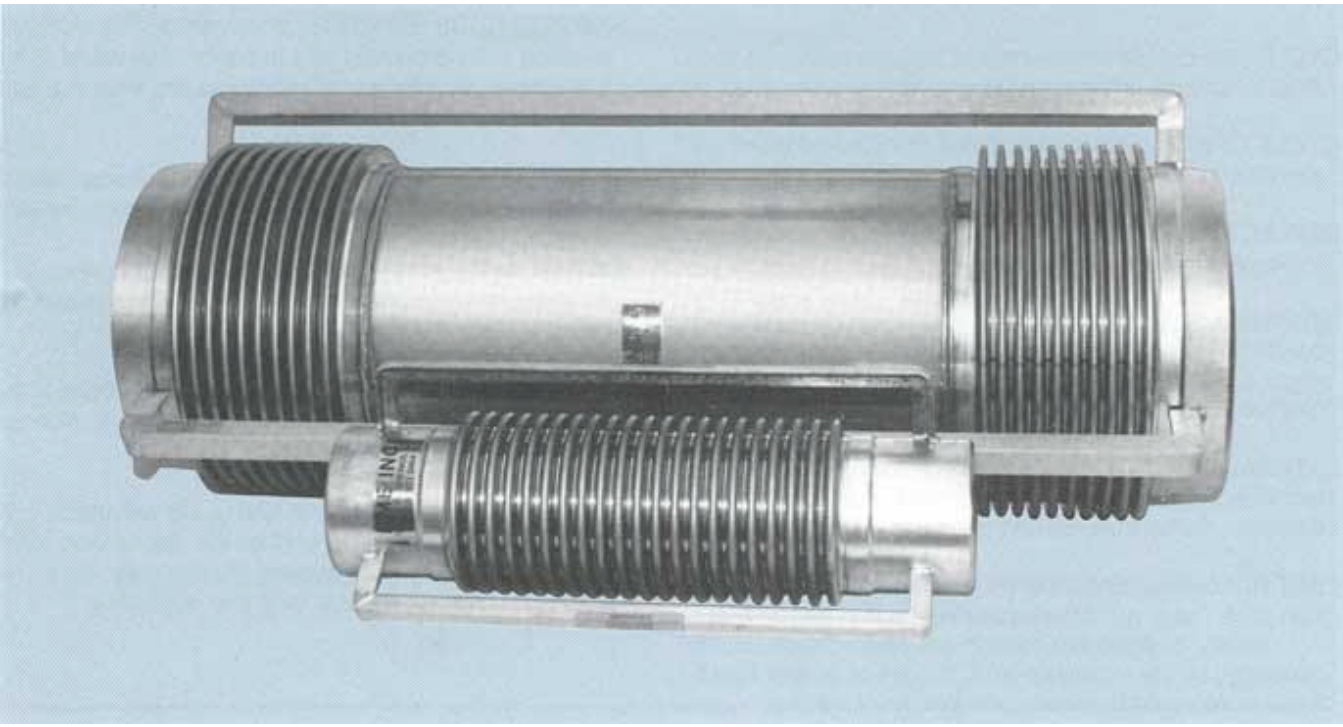
Limit rods are external devices that have stops to limit the amount of movement that an expansion joint is required to absorb, or to distribute the movement between several parts of the expansion joint. Limit rods may also be designed to support the weight of adjacent piping. Limit rods are designed to absorb full pressure thrust loading of the expansion joint and in case of anchor failure the dynamic forces generated.

Tie Rods

Tie rods are devices that are secured to the extreme ends of an expansion joint and are designed to constrain the full pressure thrust loads of an expansion joints.

Shrouds

Shrouds are external covers of sheet metal furnished to protect the exterior surfaces off the bellows element in an expansion joint from mechanical damage. Shrouds are also required where external insulation is to be placed over the expansion joint.



SERIES 250 LOW PRESSURE EXPANSION JOINTS

The Series 250 Low Pressure Expansion Joint was designed for applications where the weight off the expansion joint in the system is a consideration. Although light in weight, the Series 250 is strong in dependability.

Especially suited for application in low pressure, high temperature thin wall ducting systems. Typical applications are diesel exhaust piping, gas turbine exhaust, steam exhaust and forced air ducting.

The lightweight design of Series 250 Expansion Joints is achieved by using lightweight carbon steel plate flanges. Weld end configurations use standard weight wall thickness pipe through 12" size and .250" thick wall 14" through 48".

The bellows element is manufactured from stainless steel, engineered to contain the pressure, temperature and motion requirements.

Series 250 Low Pressure Expansion Joints are available in vanstone configuration to isolate the media from the carbon steel flanges. Vanstone flanges also allow flanges to be rotated for bolt hole alignment in field installations where this might be a problem. Stainless steel flow liners can be provided as an option when flows are turbulent.

Standard units have 321 stainless steel bellows elements and bellows extensions to flange. Weld ends are carbon steel. Flange drilling conforms to ANSI B16.5 Class 150.

Small amounts of lateral deflection are provided for in the design of Series 250 Expansion Joints but high cyclic lateral deflection is not recommended. (Dual Bellows Expansion Joints are recommended for high cyclic lateral deflection.)

The catalog lists sizes 4" I.P.S. through 48" I.P.S. as standard items. 1-1/2" through 96" sizes are available. Consult factory concerning Series 250 Expansion Joints over 48" I.P.S. diameter.

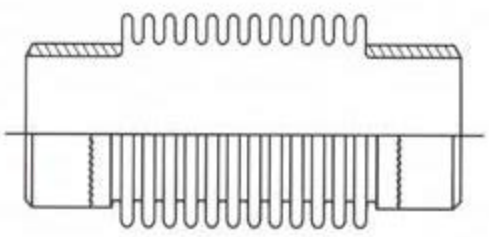
ORDERING AND SPECIFYING INSTRUCTIONS

Example: 14" I.P.S., Fixed Flange, 3.0" Axial Compression

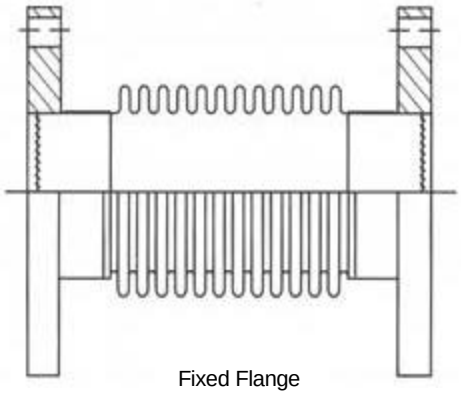
Part Number 25 - 5 - 14 - 30

- Series
- Fixed Flange
- 14" I.P.S. Size
- 3.0" Axial Compression

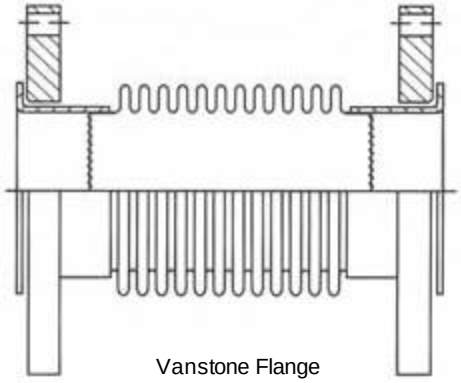
Note: Optional materials are available for severe corrosion applications. Series 250 can be supplied with angle iron and marmon type flanges as an option



Weld End
No. 254



Fixed Flange
No. 255



Vanstone Flange
No. 256

SERIES 250 SINGLE PLY LOW PRESSURE EXPANSION JOINTS

50 P.S.I. WORKING PRESSURE 75 P.S.I. TEST PRESSURE

Nominal Size (ips)	Size Designation	Axial Compression (inches)	Axial Extension (inches)	Lateral Offset from C/L (inches)	Axial Spring Rate (lbs/inch)	Overall Length (inches) (254) (255) (256)	Weight Approx. (lbs) (255) (256)	(254)
4	4	1.0 2.0 2.5 3.0	0.5 1.0 1.3 1.5	0.25 0.40 0.50 0.75	258 294 519 617	7.0 11.0 14.0 16.0	19 21 22 23	4 6 8 9
5	5	1.0 2.0 2.5 3.0	0.5 1.0 1.3 1.5	0.25 0.40 0.50 0.75	193 391 560 509	7.0 11.0 14.0 16.0	22 24 25 27	6 8 10 12
6	6	1.0 2.0 2.5 3.0	0.5 1.0 1.3 1.5	0.25 0.40 0.50 0.75	351 459 362 578	7.0 11.0 14.0 16.0	25 27 28 30	7 10 13 15
8	8	1.0 2.0 2.5 3.0	0.5 1.0 1.3 1.5	0.20 0.35 0.45 0.70	286 410 469 685	7.0 11.0 14.0 16.0	36 38 40 42	11 13 18 20
10	10	1.0 2.0 2.5 3.0	0.5 1.0 1.3 1.5	0.10 0.20 0.40 0.60	246 384 346 511	7.0 11.0 14.0 16.0	45 48 50 53	15 18 31 34
12	12	1.0 2.0 2.5 3.0	0.5 1.0 1.3 1.5	0.10 0.20 0.30 0.50	814 333 406 557	7.0 11.0 14.0 16.0	66 68 70 74	18 27 33 38
14	14	2.0 2.5 3.0	1.0 1.3 1.5	0.10 0.25 0.45	724 633 507	11.0 14.0 16.0	85 87 89	22 30 35
16	16	2.0 2.5 3.0	1.0 1.3 1.5	0.10 0.20 0.40	822 720 576	11.0 14.0 16.0	102 104 106	25 34 40
18	18	2.0 2.5 3.0	1.0 1.3 1.5	0.08 0.15 0.35	923 718 646	11.0 14.0 16.0	103 106 108	28 37 42
20	20	2.0 2.5 3.0 3.5	1.0 1.3 1.5 1.8	0.07 0.15 0.20 0.35	1013 788 645 545	11.0 14.0 16.0 17.0	120 124 127 129	32 41 45 48
22	22	2.0 2.5 3.0 3.5	1.0 1.3 1.5 1.8	0.05 0.08 0.15 0.30	1117 869 782 601	11.0 14.0 16.0 17.0	129 134 136 138	35 45 52 53
24	24	2.0 2.5 3.0 3.5	1.0 1.3 1.5 1.8	0.05 0.10 0.15 0.25	1208 940 846 604	11.0 14.0 16.0 17.0	151 155 158 161	38 49 60 65

SERIES 250 SINGLE PLY LOW PRESSURE EXPANSION JOINTS

Nominal Size (ips)	Size Designation	Axial Compression (inches)	Axial Extension (inches)	Lateral Offset from C/L (inches)	Axial Spring Rate (lbs/inch)	Overall Length (inches) (254) (255) (256)	Weight Approx. (lbs) (255) (256)	(254)
26	26	2.0 2.5 3.0 3.5	1.0 1.3 1.5 1.8	0.05 0.10 0.15 0.23	936 702 648 601	11.0 14.0 16.0 17.5	171 177 179 182	51 63 73 83
28	28	2.0 2.5 3.0 3.5	1.0 1.3 1.5 1.8	0.05 0.17 0.10 0.20	1001 751 693 643	11.0 14.0 16.0 17.5	184 190 193 196	60 68 78 89
30	30	2.0 3.0 3.5	1.0 1.5 1.8	0.05 0.08 0.20	1137 910 827	12.0 16.0 18.0	211 218 223	67 92 105
32	32	2.0 3.0 3.5	1.0 1.5 1.8	0.05 0.08 0.20	1218 974 886	12.0 16.0 18.0	252 260 265	70 98 111
34	34	2.0 3.0 3.5	1.0 1.5 1.8	0.05 0.10 0.10	1287 1029 936	12.0 16.0 18.0	256 264 270	76 105 119
36	36	2.0 3.0 3.5	1.0 1.5 1.8	0.05 0.10 0.19	1369 1095 996	12.0 16.0 18.0	279 287 294	81 111 122
38	38	2.0 3.0 3.5	1.0 1.5 1.8	0.05 0.10 0.18	1438 1151 1046	12.0 16.0 18.0	319 327 334	85 116 132
40	40	2.0 3.0 3.5	1.0 1.5 1.8	0.03 0.10 0.16	1508 1206 1096	12.0 16.0 18.0	331 340 348	90 123 140
42	42	2.0 3.0 3.5	1.0 1.5 1.8	0.03 0.09 0.15	1577 1256 1147	12.0 16.0 18.0	356 366 373	94 130 147
44	44	2.0 3.0 3.5	1.0 1.5 1.8	0.02 0.08 0.14	1662 1330 1209	12.0 16.0 18.0	379 388 396	99 136 154
46	46	2.0 3.0 3.5	1.0 1.5 1.8	0.02 0.07 0.14	1732 1386 1255	12.0 16.0 18.0	395 496 414	103 142 161
48	48	2.0 3.0 3.5	1.0 1.5 1.8	0.02 0.06 0.12	1802 1441 1310	12.0 16.0 18.0	419 429 438	108 148 168

Notes:

Bellows and Bellows Extension to Flanges are 321 Stainless Steel.
Flanges are Carbon Steel Plate

Flange Drilling, Sizes 4" through 24", to ANSI B16.5
Flange Drilling, Sizes 26" through 48" to CLASS 125LW.

Weld Ends, Sizes 4" through 24", Standard Wall Carbon Steel Pipe
With 37-1/2 Degree Bevel for Welding

Movements are non-concurrent

Weld Ends, Sizes 26" through 48", 0.375" Thick Wall Carbon Steel with 37-1/2 Degree Bevel for Welding.

Angle Flanges Available for All Sizes. Consult Factory for Angle Size and Drilling.

Optional Flow Liner Available.

1-1/2" Through 96" Sizes are Available.

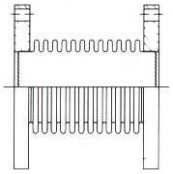
Design Temperature: 800 Degree Fahrenheit.

SERIES 150 SINGLE PLY EXPANSION JOINTS

D.M.E. Series 150 Single Ply Expansion Joints are designed for general purpose applications. Careful consideration in design, manufacturing and quality control insure the Series 150 Expansion Joint will perform in service. The bellows element of the Series 150 Expansion Joint is computer designed using E.J.M.A. standards as guidelines. Modern bellows forming equipment in D.M.E.'s manufacturing facility along with the computer desing produce a quality bellows element for the D.M.E. Series 150 Expansion Joint.

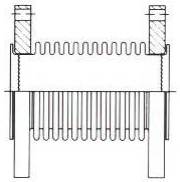
The catalog list the most popular size range, 3" through 24", but D.M.E. is not restricted to these sizes. 1-1/2" through 96" sizes can and are produced at D.M.E.'s facility.
Standard construction is 321 stainless steel bellows, carbon steel plate flanges, and carbon steel weld ends. All flanges on standard products are drilled to match 150# drilling. Optional materials are available for bellows, flanges and weld ends. Optional internal liners, tie rods and shrouds are also available for the Series 150.

Series (151)



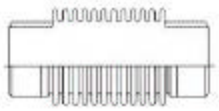
Fixed Flange

Series (152)



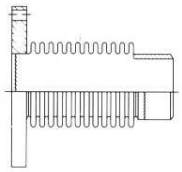
Vanstone Flange

Series (153)



Weld End

Series (154)



Flange x Weld End

150 P.S.I. WORKING PRESSURE 225 P.S.I. TEST PRESSURE

Nominal Size (i.p.s.)	Size Designation	Axial Deflection (inches)	Overall Length Inches (151) (152)	Overall Length Inches (153))	Overall Length Inches (154)	Weight Lbs. (151-152)	Weight Lbs. (153)	(Weight Lbs. (154)
3	1.0 1.5	1.0 1.5	6.0 8.0	7.0 9.0	6.75 8.75	15 16	3 4	9 10
3 ½	3.5	1.0 1.5	6.0 8.0	7.0 9.0	6.75 8.75	19 20	4 5	11 12
4	4.0	1.0 1.5	6.0 8.0	7.0 9.0	6.75 8.75	21 22	5 6	12 13
5	5.0	1.25 1.75	7.0 9.0	8.0 10.0	7.5 9.5	23 24	6 7	14 16
6	6.0	1.25 1.75	7.0 9.0	8.0 10.0	7.5 9.5	22 23	7 9	15 16
8	8.0	1.25 1.75 2.50	7.0 9.0 11.0	8.0 10.0 12.0	7.5 9.5 11.5	37 39 40	10 12 14	24 26 27
10	10.0	1.25 1.75 2.50	7.0 9.0 11.0	8.0 10.0 12.0	7.5 9.5 11.5	47 49 51	24 23 23	32 36 40
12	12.0	1.25 1.75 2.50	7.0 9.0 11.0	8.0 10.0 12.0	7.5 9.5 11.5	67 70 72	21 23 28	44 49 54
14	14.0	2.0 2.5 3.0	9.0 11.0 12.0	12.0 13.0 15.0	10.5 11.5 13.0	88 91 92	35 36 42	62 63 67
16	16.0	2.0 2.5 3.0	9.0 11.0 12.0	12.0 13.0 15.0	10.5 12.0 13.0	136 139 140	40 41 48	88 90 94
18	18.0	2.0 2.5 3.0	9.0 11.0 12.0	12.0 13.0 15.0	10.5 12.0 13.0	137 141 142	45 46 54	91 93 98
20	20.0	2.0 2.5 3.0	9.0 11.0 12.0	12.0 13.0 15.0	10.5 12.0 13.0	160 164 166	50 51 60	105 108 113
24	24.0	2.0 2.5 3.0	11.0 13.0 15.0	13.0 16.0 17.0	12.0 14.50 15.75	211 219 225	66 79 80	139 149 152

SERIES 550 BELLOWS TYPE PUMP CONNECTORS

D.M.E. Series 550 Multi-Ply Bellows Type Pump Connectors are the solution to vibration and motion isolation when space is at a premium.
Series 550 Bellows Pump Connectors short overall length to motion ratio makes them ideal solutions for pump and machinery isolation in piping systems.
The 550 Series was designed with mechanical equipment protection in mind. Compact and very flexible, the Series 550 Bellows Type Pump Connector reduces noise and vibration transmission while reducing stresses set up between the mechanical equipment and adjacent piping systems.

The convoluted bellows element of the 550 Series is constructed of multiple laminations of type 321 stainless steel, permitting use in high pressure, high temperature application.
Flanges are carbon steel with drilling conforming to ANSI 150#. Tie rods are designed to prevent overtravel and react to full thrust loads resulting from internal pressure.
Type 321 Stainless Steel Flow Liner is available as an option for applications involving severe flow turbulence.
Isolation of the carbon steel flanges from the flow media can be achieved by the use of Vanstone Flanges incorporated in Series 552-R Design.

150 P.S.I. WORKING PRESSURE 225 P.S.I. TEST PRESSURE

Nominal Size (i.p.s.)	Size Designation	Overall Length (Inches)		Weight (approx.-Lbs)	
		(551R-552R	(553R)	(551R-552R)	(553R)
3	3	4.0	8.0	28	32
3 ½	3.5	4.0	8.0	33	37
4	4	4.5	8.0	36	42
5	5	4.5	9.0	43	50
6	5	5.0	9.0	48	60
8	8	5.0	9.0	70	85
10	10	6.0	10.0	94	114
12	12	6.0	10.0	123	148

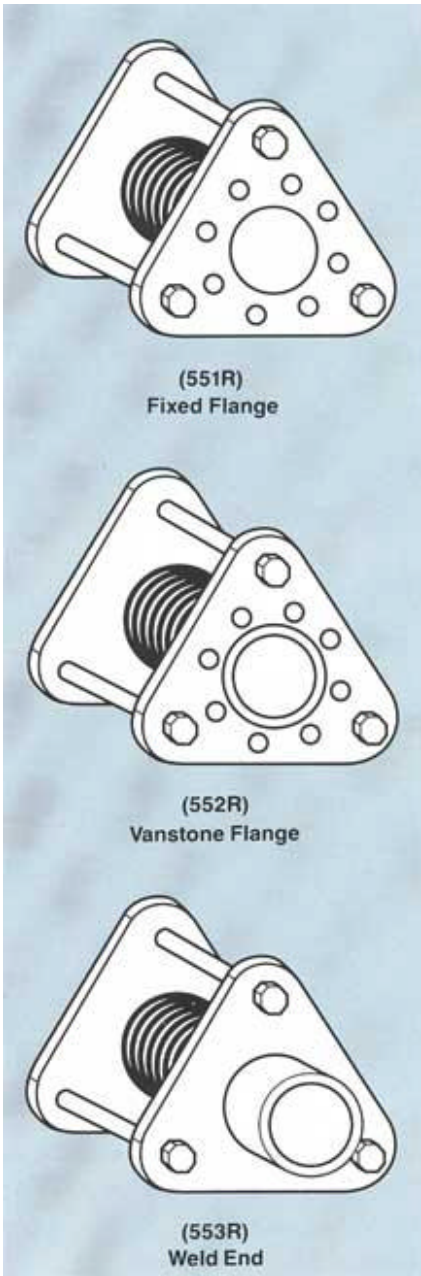
Allowable Movements (inches)

Sizes	3" – 8"	10" – 12"
Axial Compression	0.50	0.75
Axial Extension	0.25	0.25
Lateral Offset	0.13	0.13

Pressure Thrust

Pipe Size (i.p.s.)	Effective Area (sq. inches)	50 P.S.I.	75 P.S.I.	100 P.S.I.	125 P.S.I.	150 P.S.I.
3	12.06	603	905	1206	1508	1809
3 ½	15.34	767	1151	1534	1918	2301
4	19.71	986	1478	1971	2464	2957
5	29.78	1498	2978	3723	4467	
6	40.94	2047	3071	4094	5118	6141
8	66.76	3338	5007	6676	8345	10014
10	106.04	5302	7953	10604	13255	15906
12	145.69	7285	14569	18211	21845	

Notes:
Flanges are Carbon Steel Plate with Drilling Conforming to ANSI B16.5 Class 150.
Weld Ends are Standard Wall Carbon Steel Pipe 37 ½Degree Bevel.
Bellows are 321 Stainless Steel Multi-Ply Construction.
Working Pressure of 150 P.S.I. is at 800 Degree Fahrenheit.
Optional Flow Liner is available.

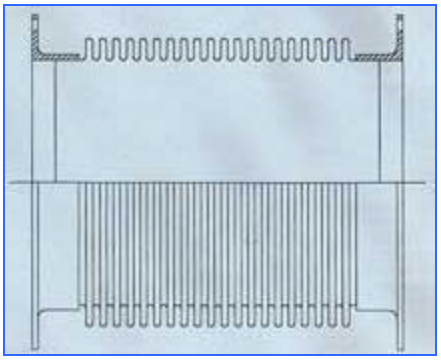


SERIES 400 DUCT EXPANSION JOINTS

5 P.S.I. WORKING PRESSURE 950 DEGREE F.

NOMINAL SIZE	AXIAL MOVEMENT	ANGLE FLANGE SIZE	TUBE END LENGTH AND THICKNESS	OVERALL LENGTH (IN) SERIES 451 & 453
16” 18” 20” 22” 24”	1.75 3.50 5.25	1-3/4” X 1-3/4” X 3/16”	1-3/4” X 3/16”	8.75 14.00 19.25
26” 28” 30” 32” 34”	1.75 3.63 5.50	2” X 2” 3/16”	2” X 3/16”	9.00 14.00 19.00
36” 38” 40” 42” 44” 46” 48”	2.50 3.75 5.00	2” X 2” X 3/16”	2” X 3/16”	11.50 15.25 19.00
50” 52” 54” 60” 66”	2.50 3.75 5.00	3” X 3” X 1/4"	3” X 1/4"	13.50 17.25 21.00
72” 78” 84” 90” 90” 96”	2.50 3.75 5.00	3” X 3” X 3/8”	3” X 3/8”	13.50 17.25 21.00

MODEL 451 ANGLE FLANGES ***

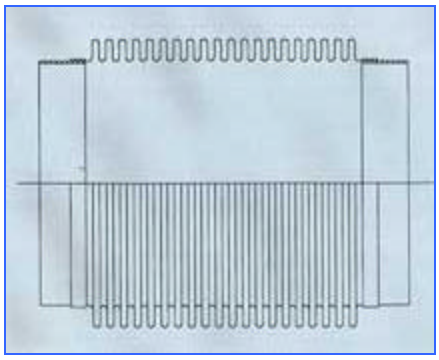


- Bellows material is A 240 type 321 stainless steel
- Flanges and weld ends are A 36 carbon steel.

*** Bolt patterns per customer’s requirements.

- Bellows and end fittings can be manufactured from all available materials.

MODEL 453 TUBE ENDS



- Bellows with heavy wall thickness also available.
- Options include flow liners, external shrouds, and plate flanges.
- Tube ends can be ordered to fit over customer’s tube.
- Most in-between sizes and metric sizes available.

SERIES T050 & T150 TIED UNIVERSAL EXPANSION JOINTS

D.M.E. Tied Universal Bellows Expansion Joints are designed to absorb large amounts of lateral deflection along with a small amout of axial motion in the standard catalog configurations. (increased lateral deflection and axial motion can be achieved by adding to overall length.)

The ability of Tied Universal Expansion Joints to absorb motion in multiple planes makes it the ideal expansion joint for floating systems where main anchors are not practical.

SERIES T050 SINGLE PLY BELLOWS

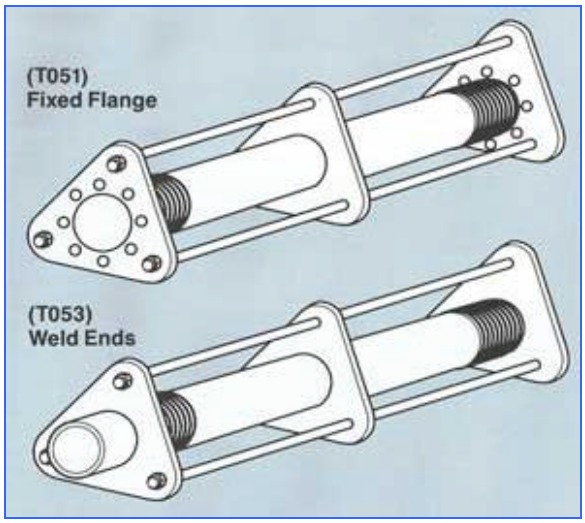
50 P.S.I. WORKING PRESSURE
75 P.S.I. TEST PRESSURE

Nominal Size (i.p.s.)	Size Designation	Overall Length (Inches)		Weight (approx.-Lbs)	
		(T051)	(T053)	(T051)	(T053)
3	3.0	26	32	56	62
3 ½	3.5	26	32	64	71
4	4.0	26	32	72	80
5	5.0	26	32	95	105
6	6.0	26	32	99	112
8	8.0	30	36	153	173
10	10.0	30	36	198	225
12	12.0	30	36	251	285
14	14.0	30	36	270	301
16	16.0	30	36	310	346
18	18.0	32	38	340	380
20	20.0	32	38	389	431
22	22.0	32	38	425	470
24	24.0	32	38	495	547

SERIES T150 SINGLE PLY BELLOWS

150 P.S.I. WORKING PRESSURE
225 P.S.I. TEST PRESSURE

Nominal Size (i.p.s.)	Size Designation	Overall Length (Inches)		Weight (approx.-Lbs)	
		(T051)	(T053)	(T051)	(T053)
3	3.0	26	32	57	63
3 ½	3.5	26	32	65	72
4	4.0	26	32	73	81
5	5.0	26	32	96	106
6	6.0	26	32	100	113
8	8.0	30	36	155	175
10	10.0	30	36	200	227
12	12.0	30	36	253	287



Series T050 Universal Tied Expansion Joints are Rated for 2.0" Lateral Offset from Center Line and 0.5" Axial Compression, Concurrent Motions.

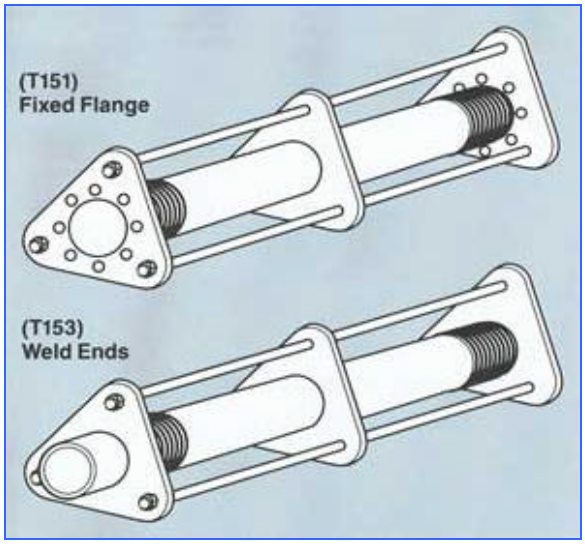
Additional Lateral: For Each Additional 1.0" of lateral Offset Required Add 11.5" to Overall Length.

Bellows Material is 321 Stainless Steel.

Flange Material is Carbon Steel with Drilling Conforming to ANSI B16.5 Class 150 Drilling.

Weld End Material is Standard Wall Thickness Carbon Steel Pipe. 37 ½ Degree Bevel for Welding

Design Temperature: 800 Deg. F.



Series T150 Universal Tied Expansion Joints are Rated for 2.0" Lateral Offset from Center Line and 0.5" Axial Compression, Concurrent Motions.

Additions Lateral: For Each Additional 1.0" of Lateral Offset Required Add 11.5" to Overall Length.

Bellows Material is 321 Stainless Steel.

Flange Material is Carbon Steel with Drilling Conforming to ANSI B16.5 Class 150 Drilling.

Weld End material is Standard Wall Thickness Carbon Steel Pipe. 37 ½ Degree Bevel for Welding.

Design Temperature: 800 Deg. F.

SERIES 650 MULTI-PLY EXHAUST EXPANSION JOINTS

D.M.E. series 650 Multi-Ply Exhaust Expansion Joints, the answer to those demanding exhaust expansion joint application. Engineered to overcome exhaust system piping motion and vibration.

Designed with prime power and marine systems in mind, the Series 650 has proven itself in the field.

The multi-ply bellows is capable of absorbing vibration as well as the listed motions. This capability along with low spring rates reduces the loads on the system imposed by the Series 650 Expansion Joint.

Today's modern engine package systems require the sophistication designed into the Series 650 Expansion Joint. Its ability to operate at a higher temperature over long periods of time insures minimum downtime and greater system reliability.

The marine industry recognized the importance of reliable exhaust expansion joints and has come to D.M.E. for the Series 650 Exhaust Expansion Joints.

The Series 650 bellows element (unlike flexible metal hose) is specifically engineered to exhaust applications. The bellows attachment welds are made at the bellows neck which is a low stress point, not at the I.D. or O.D. of a corrugation as on flex hose. The corrugation height is greater, improving flexibility and reducing the spring rates. Multi-Ply construction provides a dampening effect on vibration instead of transmitting it to the system. Non-standard overall expansion joint lengths can be provided because of the flexibility of D.M.E.'s manufacturing processes.

When it comes to exhaust expansion joint installations and exhaust expansion joint problems. D.M.E. and the Series 650 are ready to serve you. Series 650 bellows element is constructed of multi-plys of 321 stainless steel. Flanges are carbon steel with drilling conforming to A.N.S.I. 150#. Special flange drilling is available to match specific applications. Weld ends are standard wall carbon steel pipe. Flow liners can be provided as an option.

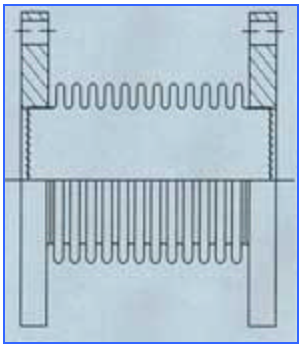
The Series 650 with vanstone flanges is available when flange hole alignment may be a problem.

SERIES 650 MULTI-PLY EXHAUST EXPANSION JOINTS

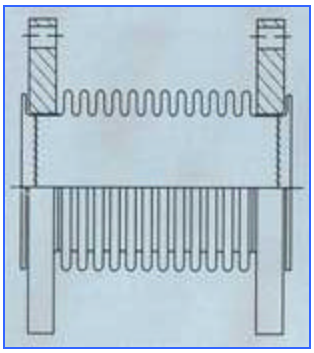
Nominal Size (i.p.s.)	Size Designation	Axial Compression (inches)	Lateral Offset from C/L (inches)	Axial Spring Rate (lbs/inch)	Lateral Spring Rate (lbs/inch)	Overall Length (inches) (655) (656)	(653)	Weight Approx. (lbs) (656)	(653)
3	3.0-7 3.0-12	3.5 3.5	.63 1.0	183 107	87 17	8.0 13.0	11.0 16.0	9 10	5 6
4	4.0-7 4.0-12	2.0 3.5	.63 1.0	136 79	106 21	8.0 13.0	11.0 16.0	12 14	7 9
5	5.0-7 5.0-12	2.0 3.5	.63 1.0	144 86	159 34	8.0 13.0	11.0 16.0	14 16	8 10
6	6.0-7 6.0-12	2.5 4.0	.63 1.0	165 99	249 53	8.0 13.0	11.0 16.0	16 19	11 13
8	8.0-7 8.0-12	2.5 4.0	.63 1.0	206 123	505 109	8.0 13.0	11.0 16.0	28 31	15 19
10	10.0-7 10.0-12	3.0 4.5	.50 .88	115 70	454 103	8.0 13.0	11.0 16.0	35 40	21 25
12	12.0-7 12.0-12	3.0 4.5	.50 .88	132 80	717 163	8.0 13.0	12.0 17.0	50 55	25 31
14	14.0-7 14.0-12	3.0 4.5	.50 .88	108 64	751 162	8.0 13.0	12.0 17.0	59 66	25 33
16	16.0-7 16.0-12	3.0 4.5	.50 .88	121 72	1078 232	9.0 14.0	12.0 17.0	101 108	28 35
18	18.0-7 18.0-12	3.0 4.5	.50 .88	131 78	1355 314	9.0 14.0	12.0 17.0	102 110	32 40
20	20.0-7 20.0-12	3.0 4.5	.38 .50	141 84	1916 414	9.0 14.0	12.0 17.0	114 122	35 44
22	22.0-7 22.0-12	3.0 4.5	.38 .50	157 94	2548 550	9.0 14.0	12.0 17.0	129 138	39 48
24	24.0-7 24.0-12	3.0 4.5	.38 .50	168 101	3225 696	9.0 14.0	12.0 17.0	150 161	42 53

Notes:
Series (655, 656) have D.M.E. standard Plate Flanges. ½Thick A -36 Carbon Steel
Series (653) Sizes 3" through 12" have standard Wall Thick Weld Ends.
Series (653) Sizes 14" through 24" have .375 Thick Weld Ends.

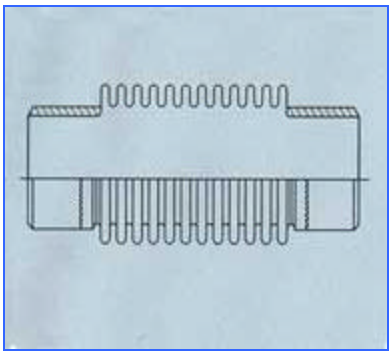
1 ½Through 96" Diameter Sizes are Available.
Design Temperature 950 Deg. F. Higher Temperature Ratings Available.



(655)
Fixed Flange



(656)
Vanstone Flange

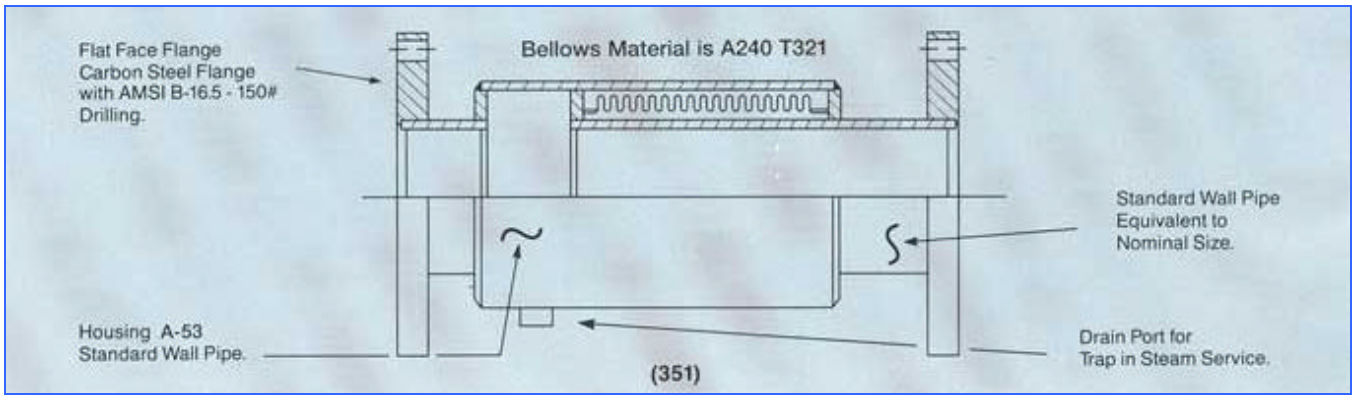


(653)
Weld End

SERIES 350 EXTERNALLY PRESSURIZED EXPANSION JOINTS

150 P.S.I. WORKING PRESSURE 225 P.S.I. TEST PRESSURE 750 DEG. F.

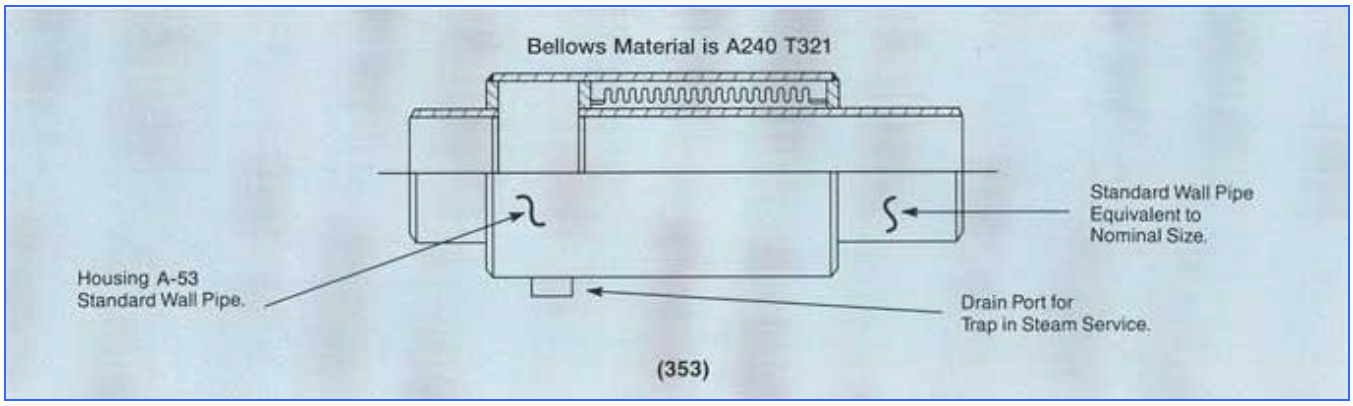
Nominal Size (inches)	Part Number	Axial Compression (inches)	Axial Extension (inches)	Housing Outside Diameter	Axial Spring Rate (lbs/inch)	Overall Length (inches)	Weight Approx. (lbs)
2	351-2-4.0 351-2-6.0 351-2-8.0	4.0 6.0 8.0	1.0 2.0 2.0	4.5	219 146 121	24.75 33.75 40.25	35 44 50
2 ½	351-2.5-4.0 351-2.5-6.0 351-2.5-8.0	4.0 6.0 8.0	1.0 2.0 2.0	5.56	233 153 116	24.75 33.75 40.25	49 63 71
3	351-3-4.0 351-3-6.0 351-3-8.0	4.0 6.0 8.0	1.0 2.0 2.0	6.63	264 174 132	24.75 33.75 40.25	62 79 90
3 ½	351-3.5-4.0 351-3.5-6.0 351-3.5-8.0	4.0 6.0 8.0	1.0 2.0 2.0	6.63	362 241 197	24.75 33.75 40.25	67 85 97
4	351-4-4.0 351-4-6.0 351-4-8.0	4.0 6.0 8.0	1.0 2.0 2.0	8.63	397 235 198	24.75 33.75 40.25	92 117 133
5	351-5-4.0 351-5-6.0 351-5-8.0	4.0 6.0 8.0	1.0 2.0 2.0	10.75	424 265 223	24.75 33.75 40.25	97 125 143
6	351-6-4.0 351-6-6.0 351-6-8.0	4.0 6.0 8.0	1.0 2.0 2.0	10.75	536 371 268	26.50 35.25 41.25	139 177 202
8	351-8-4.0 351-8-6.0 351-8-8.0	4.0 6.0 8.0	1.0 2.0 2.0	12.75	812 575 460	26.50 35.25 41.25	187 250 274
10	351-10-4.0 351-10-6.0 351-10-8.0	4.0 6.0 8.0	1.0 2.0 2.0	16	1524 996 864	26.50 35.25 41.25	259 327 370
12	351-12-4.0 351-12-6.0 351-12-8.0	4.0 6.0 8.0	1.0 2.0 2.0	18	1152 768 658	28.75 37.25 44.50	340 417 475
14	351-14-4.0 351-14-6.0 351-14-8.0	4.0 6.0 8.0	1.0 2.0 2.0	20	1314 876 750	28.75 37.25 44.50	392 480 545



SERIES 350 EXTERNALLY PRESSURIZED EXPANSION JOINTS

150 P.S.I. WORKING PRESSURE 225 P.S.I. TEST PRESSURE 750 DEG. F.

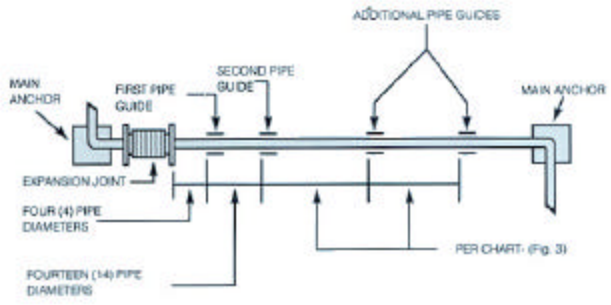
Nominal Size (inches)	Part Number	Axial Compression (inches)	Axial Extension (inches)	Housing Outside Diameter	Axial Spring Rate (lbs/inch)	Overall Length (inches)	Weight Approx. (lbs)
2	353-2-4.0 353-2-6.0 353-2-8.0	4.0 6.0 8.0	1.0 2.0 2.0	4.5	219 146 121	24.25 33.25 39.75	26 35 41
2 ½	353-2.5-4.0 353-2.5-6.0 353-2.5-8.0	4.0 6.0 8.0	1.0 2.0 2.0	5.56	233 153 116	24.25 33.25 39.75	37 50 59
3	353-3-4.0 353-3-6.0 353-3-8.0	4.0 6.0 8.0	1.0 2.0 2.0	6.63	264 174 132	24.25 33.25 39.75	48 65 76
3 ½	353-3.5-4.0 353-3.5-6.0 353-3.5-8.0	4.0 6.0 8.0	1.0 2.0 2.0	6.63	362 241 197	24.25 33.25 39.75	50 68 80
4	353-4-4.0 353-4-6.0 353-4-8.0	4.0 6.0 8.0	1.0 2.0 2.0	8.63	397 235 198	24.25 33.25 39.75	74 98 114
5	353-5-4.0 353-5-6.0 353-5-8.0	4.0 6.0 8.0	1.0 2.0 2.0	10.75	424 265 223	24.25 33.25 39.75	77 105 123
6	353-6-4.0 353-6-6.0 353-6-8.0	4.0 6.0 8.0	1.0 2.0 2.0	10.75	536 371 268	26.00 34.75 40.75	116 154 178
8	353-8-4.0 353-8-6.0 353-8-8.0	4.0 6.0 8.0	1.0 2.0 2.0	12.75	812 575 460	26.00 34.75 40.75	153 206 240
10	353-10-4.0 353-10-6.0 353-10-8.0	4.0 6.0 8.0	1.0 2.0 2.0	16	1524 996 864	26.00 34.75 40.75	216 285 328
12	353-12-4.0 353-12-6.0 353-12-8.0	4.0 6.0 8.0	1.0 2.0 2.0	18	1152 768 658	28.25 36.75 44.00	279 355 413
14	353-14-4.0 353-14-6.0 353-14-8.0	4.0 6.0 8.0	1.0 2.0 2.0	20	1314 876 750	28.25 36.75 44.00	314 403 468



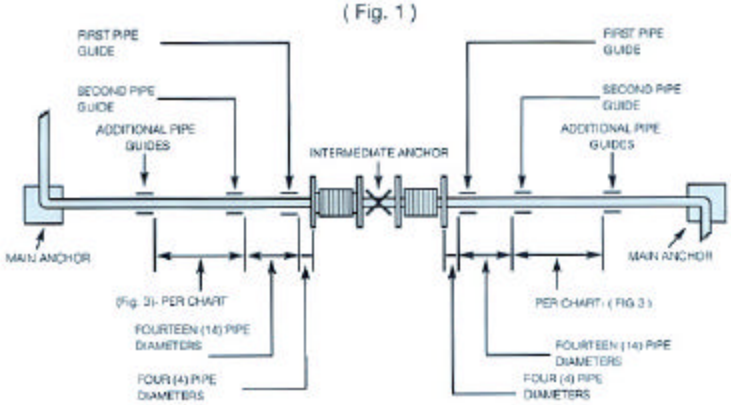
ANCHORING AND GUIDING

In a piping system containing expansion joints that absorb axial motion, it is important to properly anchor and guide the pipes to insure the expansion joint absorbs the motion for which it was designed. Inadequate anchoring and improper guiding can cause stresses that reduce the expansion joint's life, cause pipe buckling and system failure. When an expansion joint is pressurized, internal thrust forces are created which react on the system and anchors. This force is due to internal pressure acting on the effective area of the bellows element in the expansion joint.

This force created by pressure must be absorbed in the piping system by anchors to prevent the bellows element from extending. Anchors in a piping system are generally of two kinds, main anchors to absorb full pressure thrust forces generated by the expansion joint, and intermediate anchors to absorb forces generated by the expansion joint bellows spring forces.



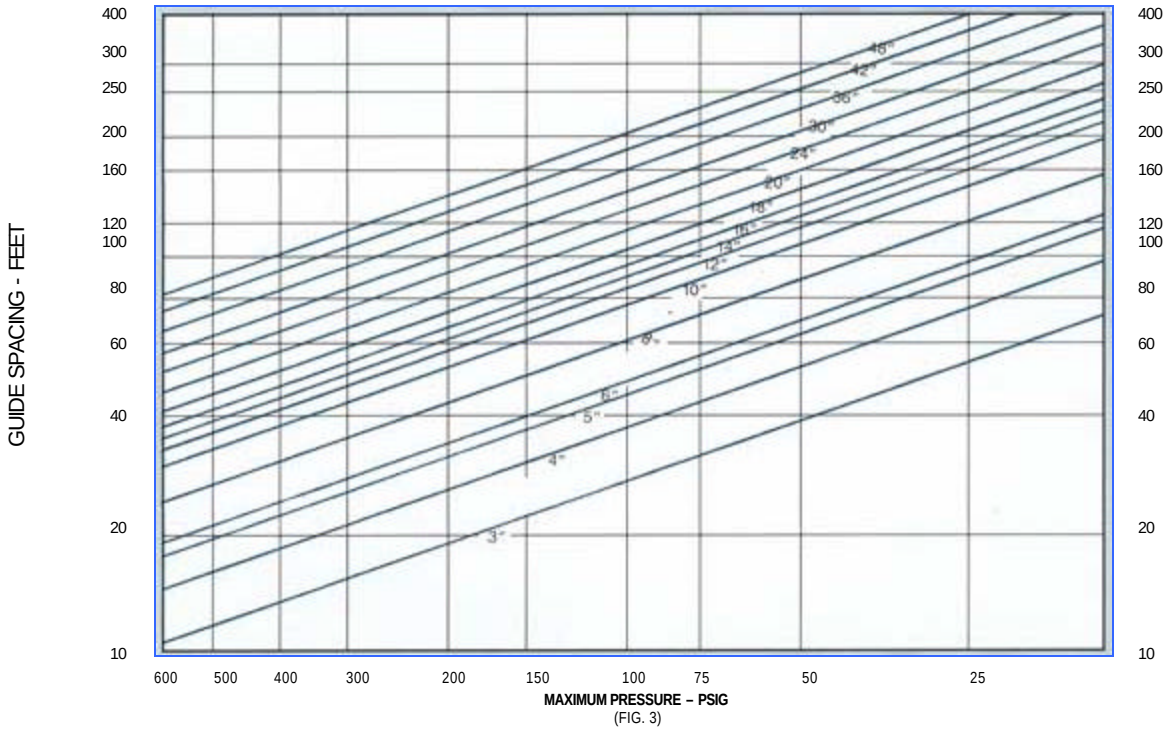
(Fig. 1)



(Fig. 2)

Spacing for Pipe Guides in Expansion Joint Applications.
These recommendations are shown in the diagram (fig. 1 – fig. 2) and the accompanying guide spacing chart (fig. 3). Examples of main anchors and intermediate anchors are also shown in the diagram. It should be noted that pipe guides are intended to guide the pipes in a system and not support the weight of pipes and media conveyed through them.

MAXIMUM RECOMMENDED SPACING FOR PIPE GUIDES
(AXIAL DEFLECTION ONLY – STANDARD WEIGHT CARBON STEEL PIPE)



(FIG. 3)

THERMAL EXPANSION OF PIPE TABLE

Thermal Expansion of Pipe in Inches Per 100 Feet

Saturated Steam Vacuum in HG below 212°F, Pressure, PSIG Above 212°F.	Temp Deg. Fahr.	Cast Iron	Carbon and Carbon Molybdenum	Wrought Iron	4-6% Cr. Alloy Steel	18 Cr. 8 Ni Stainless Steel	Copper
	-200	-1.058	-1.282	-1.289	-1.250	-2.030	-1.955
	-180	-0.982	-1.176	-1.183	-1.150	-1.850	-1.782
	-160	-0.891	-1.066	-1.073	-1.030	-1.670	-1.612
	-140	-0.797	-0.948	-0.955	-0.970	-1.480	-1.428
	-120	-0.697	-0.826	-0.833	-0.800	-1.300	-1.235
	-100	-0.593	-0.698	-0.705	-0.700	-0.900	-1.040
	-80	-0.481	-0.563	-0.570	-0.550	-0.880	-0.835
	-60	-0.368	-0.428	-0.435	-0.430	-0.670	-0.630
	-40	-0.248	-0.288	-0.295	-0.290	-0.450	-0.421
	-20	-0.127	-0.145	-0.152	-0.145	-0.225	-0.210
	0	0	0	0	0	0	0
	20	0.12	0.148	0.180	0.140	0.223	0.238
	32	0.209	0.230	0.280	0.234	0.356	0.366
	40	0.270	0.300	0.350	0.280	0.446	0.451
29.39	60	0.410	0.448	0.540	0.430	0.669	0.684
28.89	80	0.550	0.580	0.710	0.500	0.892	0.896
27.99	100	0.680	0.753	0.887	0.650	1.115	1.134
26.48	120	0.830	0.910	1.058	0.800	1.338	1.366
24.04	140	0.970	1.064	1.240	0.950	1.545	1.590
20.27	160	1.110	1.200	1.420	1.100	1.784	1.804
14.63	180	1.240	1.360	1.580	1.250	2.000	2.051
6.45	200	1.390	1.520	1.750	1.400	2.230	2.296
0	212	1.480	1.610	1.870	1.500	2.361	2.428
2.5	220	1.530	1.680	1.940	1.550	2.460	2.516
10.3	240	1.670	1.840	2.120	1.720	2.680	2.756
20.7	260	1.820	2.020	2.300	1.880	2.920	2.985
34.5	280	1.970	2.180	2.470	2.050	3.150	3.218
52.3	300	2.130	2.350	2.670	2.200	3.390	3.461
74.9	320	2.268	2.530	2.850	2.370	3.615	3.696
103.3	340	2.430	2.700	3.040	2.530	3.840	3.941
138.3	360	2.590	2.880	3.230	2.700	4.100	4.176
180.9	380	2.750	3.060	3.425	2.860	4.346	4.424
232.4	400	2.910	3.230	3.620	3.010	4.580	4.666
293.7	420	3.090	3.421	3.820	3.180	4.800	4.914
366.1	440	3.250	3.595	4.020	3.350	5.050	5.154
451.3	460	3.410	3.784	4.200	3.530	5.300	5.408
550.3	480	3.570	3.955	4.400	3.700	5.540	5.651
664.3	500	3.730	4.151	4.600	3.860	5.800	5.906
795.3	520	3.900	4.342	4.810	4.040	6.050	6.148
945.3	540	4.080	4.525	5.020	4.200	6.280	6.410
1115	560	4.250	4.730	5.220	4.400	6.520	6.646
1308	580	4.430	4.930	5.430	4.560	6.780	6.919
1525	600	4.600	5.130	5.620	4.750	7.020	7.184
1768	620	4.790	5.330	5.840	4.920	7.270	7.432
2041	640	7.970	5.530	6.050	5.100	7.520	7.689
2346	660	5.150	5.750	6.250	5.300	7.770	7.949
2705	680	5.330	5.950	6.470	5.480	8.020	8.196
3080	700	5.520	6.160	6.670	5.650	8.280	8.472
	720	5.710	6.360	6.880	5.850	8.520	8.708
	740	5.900	6.570	7.100	6.030	8.780	8.999
	760	6.090	6.790	7.320	6.220	9.050	9.256
	780	6.280	7.000	7.530	6.410	9.300	9.532
	800	6.470	7.230	7.730	6.610	9.580	9.788
	820	6.660	7.450	7.960	6.800	9.820	10.068
	840	6.850	7.660	8.180	7.000	10.100	10.308
	860	7.049	7.970	8.400	7.190	10.370	10.610
	880	7.248	8.100	8.630	7.380	10.630	10.971
	900	7.460	8.340	8.870	7.580	10.900	11.156
	920	7.668	8.540	9.070	7.770	11.180	11.421
	940	7.862	8.770	9.300	7.970	11.460	11.707
	960	8.073	8.990	9.520	8.170	11.730	11.976
	980	8.300	9.220	9.740	8.360	12.000	12.269
	1000	8.510	9.420	9.970	8.550	12.260	12.543
	1020		9.65		8.75	12.55	
	1040		9.87		8.95	12.82	
	1060		10.08		9.15	13.10	
	1080		10.32		9.35	13.37	
	1100		10.57		9.54	13.62	
	1120		10.75		9.75	13.91	
	1140		10.98		9.95	14.17	
	1160		11.21		10.15	14.45	
	1180		11.43		10.36	14.72	
	1200		11.63		10.49	14.98	
	1220		11.87		10.75	15.26	
	1240		12.10		10.95	15.53	
	1260		12.33		11.15	15.81	
	1280		12.55		11.35	16.08	
	1300		12.75		11.55	16.34	
	1320		12.98		11.75	16.62	
	1340		13.21		11.95	16.90	
	1360		13.42		12.15	17.17	
	1380		13.65		12.35	17.43	
	1400		13.87		12.54	17.70	
	1420					17.98	
	1440		From the Piping Handbook			18.25	
	1460		By Sabin Crocker,			18.52	
	1480		Mcgraw-Hill Publishing Co.			18.80	
	1500		& Acme Paper No. 53-A-52, 1954.			19.07	

The first step in the selection of an expansion joint is to compute the exact change in the linear dimensions of the piping system; the next is to consider a safety factor. The actual expansion of a 100-foot length of pipe has been computed at different temperatures for various materials commonly used in piping.

Given:

150-foot-long, 6” diameter steel steam line
Maximum steam temperature in service……380º F.
Minimum winter temperature to be encountered……..15º F.

Calculated Traverse:

From Table 10, the expansion of carbon steel pipe at:
380º F……..3.060 in. per 100 ft. of pipe
15º F…… .111 in. per 100 ft. of pipe
Difference……2.949 in. per 100 ft. of pipe

For 150 feet of pipe the expansion is proportionately larger.

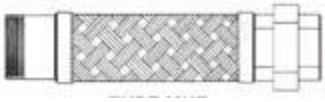
Thus, Calculated Traverse = 150/100 x 2.949” = 4.42”

STAINLESS STEEL FLEXIBLE CONNECTORS

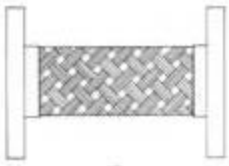
DME stainless steel braided flexible connectors are designed for use in gas and oil connections to absorb engine vibration, to correct minor piping misalignment, compensate for thermal growth and reduce piping stress. All DME flexible connectors are 100% pressure tested before shipment to insure a leak-proof system.

DME also manufactures braided flexible connectors to any length dimension, with any type of end fitting combination, in various metals to suit your special applications.

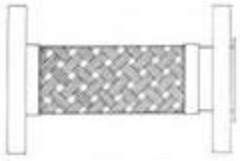
TYPE MM
¼ – 4" Size
Male Pipe
Thread Ends



TYPE MUF
¼ – 4" Size
Male Pipe x
Female Pipe Union



TYPE FF
½ – 12" Size
150# ASA Fixed
Flange Ends



TYPE F/FL
2" – 12" Size
150# ASA Fixed x
Floating Flanges

Fuel, Oil, Water, and Gas Connectors

	LENGTH/TYPE (INCHES)				Working Pressure @70° F	Maximum Temperature	Bend Radius Inches	Maximum Offset ± Centerline Inches
Size Inches	MM	MUF	FF	F/FL				
1/4	10	10	--	--	2375	850° F	6	3/4
3/8	10	10	--	--	1650	850° F	7	3/4
1/2	10	10	10	--	1100	850° F	8	3/4
3/4	11	11	10	--	800	850° F	10	3/4
1	12	12	10	--	750	850° F	11	3/4
1-1/4	13	13	10	--	725	850° F	12-1/2	3/4
1-1/2	14	14	10	--	565	850° F	14	3/4
2	15	15	10	10	500	850° F	17	3/4
2-1/2	18	18	12	12	400	850° F	20	3/4
3	18	18	12	12	288	850° F	22	3/4
3-1/2	20	20	12	12	250	850° F	25	3/4
4	20	20	16	16	250	850° F	27	3/4
5	--	--	16	16	200	850° F	31	3/4
6	--	--	18	18	175	850° F	36	3/4
8	--	--	18	18	212	850° F	62	3/4
10	--	--	20	20	175	850° F	65	3/4
12	--	--	20	20	160	850° F	66	3/4