



# EXPANSION JOINTS AND CONNECTORS



SilverFox Enterprises P/L Australia • Email: silverfox.ent@bigpond.com • Phone: 0448 889 914

### WHY USE RUBBER EXPANSION **OR VIBRATION JOINTS?**

THREE BASIC REASONS FOR THEIR USE:



Rubber Expansion Joints provide relief from stresses caused by thermal expansion and contraction in pipelines. Movement is always experienced in piping systems due to varying ambient temperatures, differences in temperature of materials handled, and differences in composition. Expansion joints absorb this movement and eliminate the danger of buckling or pulling apart with the high replacement costs that would result.

Pumps, compressors and other pulsating equipment generate noise and vibration. The transmission of noise and vibration tends to reduce the efficiency of adjacent equipment and impairs working conditions in offices and plants. Expansion joints serve as reliable insulation against such vibration and noise.

#### DEFINITION OF MOVEMENT Axial

Elongation

Axial Compression



measured along

the axis

Reduction of faceto-face dimension

Increase of face-to-face dimension measured along the axis.

The movement of the ioint perpendicular to the axis

Transverse or

Lateral Movement





The movement of the joint due to vibrations which are effectively intercepted and insulated against transmission to remainder of system

The displacement of the longitudinal axis of the joint from its initial straight line position (a combination of axial elongation and axial compression).

Angular

Movement

### ADVANTAGES OVER METAL **EXPANSION JOINTS**

- · Vibration and sound insulation
- Greater recovery from movement
- Freedom from embrittlement
- Resistance to corrosion
- No gaskets between flanges
- No electrolvsis



- · Axial and lateral deflection Small space requirements
- Lightweight
- · Ease of installation
- · Higher working pressures

TO PREVENT STRESSES DUE TO EXPANSION and Contraction

TO INSULATE AGAINST THE TRANSFER OF NOISE AND VIBRATION

### TO COMPENSATE FOR MISALIGNMENT

Settlement, load stresses and normal wear of components will frequently cause piping and mechanical equipment to become misaligned. Expansion joints can resolve these problems within their design limits. Special designed expansion joints are available for specific conditions and misalignment.

### Control Units



Excessive elongation, caused by shifting of pipelines may seriously damage rubber expansion joints. This damage can occur when necessary support is not provided for the weight of the pipeline or low temperatures in the line are encountered, or when the system on the pressure side of air compressors are not anchored properly.

Such destructive elongation can be controlled with control units. These units are recommended for use where such conditions occur, such as on air-conditioning units that are subjected to reduced temperatures.

#### Percent of Reduction of Vibration Input With Frequency and Pressure as Compared to Steel Pipe

110 1 10330										
Center Freq.	8" I.D. x 6" F-F Expansion Joint									
Hz	10 psig	50 psig	80 psig							
40	37%	55%	72%							
68	60%	68%	78%							
125	44%	50%	60%							
250	44%	50%	50%							
500	65%	89%	90%							
1000	90%	96%	98%							
2000	94%	95%	96%							
4000	90%	93%	97%							
8000	89%	89%	94%							

S Z

### **"SUPREME" SPOOL-TYPE EXPANSION JOINTS**

### VARIATIONS



#### **Tapered Joints**

Used to connect pipelines of unequal diameter. May be manufactured as concentric or eccentric, depending upon pipe alignment.

#### **Offset Joints**

Used to correct initial pipe misalignment greater than 1/8-inch. Drawings must accompany orders or inquiries.



#### **Sleeve-Type Joints**

Constructed as a standard spool-type joint minus the integral flanges. I.D. of the sleeve end is the same as the O.D. of the pipe.

#### **Filled Arches**

Built as an integral part of the carcass. They reduce turbulence and prevent the collection of sediment in the arch. Movement of the joint is reduced approximately 50%.





#### **Multiple Arches**

Additional arches increase movement of the joint. Movement can be calculated by multiplying the movement of a single arch joint by the number of additional arches.

### **CONSTRUCTION** DETAILS

#### Flanges

Full-faced and made as an integral part of the joint to insure a tight reliable seal. No gaskets are necessary. Drilled to conform to the bolt pattern of the mating pipe flange.

#### Tube

A single piece of leakproof lining extending flange-to-flange. Can be furnished in natural rubber, neoprene, chorobutyl, hypalon, Viton®, nitrile, or other compounds and can also be lined with TEFLON® All rubber is specially formulated to provide maximum sound and heat insulation as well as abrasion resistance

#### Carcass

Strong, bias-ply construction, highstrength woven polyester reinforcing fabric between the tube and cover. Will not rot or mildew and is thoroughly impregnated with a special friction compound to give maximum adhesion under pressure, vacuum and stress.

#### Steel Reinforcements

Chemically treated, solid-round, endless steel rings or wire embedded in the carcass (with the proprietary method to prevent ring migration) giving maximum strength to the joint. Round rings are used so there will be no sharp edges to cut into the carcass while flexing of the joint occurs, eliminating premature wear.



#### Steel Retaining Rings

Made of flat-rolled steel, split, beveled and galvanized, painted, fluoropolymer coated or electroplated. Rings are required for installation of the joint.

#### Cover

The exterior surface of the joint, compounded of fire-retardant neoprene to withstand aging, cracking and corrosion. Other compounds may also be used.

#### Arch

Arches are built-in as an integral part of the carcass. They function to provide flexibility to the joint in use.

#### Hand Wrapped Finish

Hand wrapping the finish (although more time consuming in manufacture) insures individual attention so that maximum pressure for curing has been established.

"SUPREME" Spool-Type Expansion Joints are available in three basic styles:

- Style 150 for pressure and vacuum · Style 1000 for pressure, vacuum and greater movement
- Style 200 for high-pressure service. Joints that handle up to 500°F are available
- Style 200XL for extra high pressure service (consult factory)

These basic types can be manufactured to meet the requirements of ASTM F1123-87 (Note: The U.S. Navy previously used MIL-E-15330D, Class A-Type I as its standard specification, but has adopted the ASTM Specification).

Expansion Joints can be made with filled arch, multiple arches, TEFLON®; PTFE and (FEP)-lined, sleeve ends, without arch, tapered (eccentric or concentric), with enlarged arch and with special tube compounds for air, gas, oil, petroleum products, acids and chemicals of many types.

### "SUPREME" **TAPERED EXPANSION JOINTS**

"SUPREME" Tapered Spool-Type Expansion Joints are available in four types; Style 150, 1000, 200 and 200XL. Tapered joints are used to connect flanges with different diameters, whether parallel or offset, with initial misalignment less than 1/8-inch.

Tapered joints can be made with the following variations: with filled arch, sleeve ends, without arch; with special tube materials: with larger arch: with straight section on smaller end of joint to assure clearance of bolts on eccentric type joints and on joints with considerable taper.

Both concentric and eccentric shapes are available in a wide variety of sizes. As with the regular expansion joints, when piping is not anchored, control units must be used to prevent over-elongation of the joints.

For determining operating characteristics, use the largest I.D. dimension of the tapered expansion joint for specifying.

Note: Flexible Rubber Pipe can also be supplied in the tapered construction.



**Engineering Data for Tapered Expansion Joints** The degree of taper should not exceed 25°. Where a taper is more than 15° a filled arch is recommended. Where a filled arch is utilized, the available movement will be decreased 50% from that of an open arch. Where a proposed taper is greater than 25°, we recommend a steel reducer be utilized and a spool-type expansion joint be used in the adjacent piping.

The above guides are generally applicable to concentric tapers. Where an eccentric taper exceeds 25°, consult





### DIMENSIONS FOR "SUPER FLEX WIDE ARCH & SUPREME " SPOOL-TYPE (SINGLE ARCH) EXPANSION JOINTS

(Meas	surement i	in inches)	Bolt Ho	les	Bolt Hole	Ret. Ring	Flange Thk.	NOTE: All joints suitable for vacuum service and can be manuf. for full vac.		Axial Extension		Traverse De⊑ection		Estimated Weights					
					Dia.	I.D.		Maxi	Maximum Working Axial Pressure Compression		ial ession								
Joint Size N.D.	Face-to- Face	Flange O.D.	Bolt Circle Dia.	No. of Bolts				Style 150	Style 200	Style 1000	Allow. Mvt. 150/200	Allow. Mvt. 1000	Allow. Mvt. 150/200	Allow. Mvt. 1000	Allow. Mvt. 150/200	Allow. Mvt. 1000	Exp. Joint	Ret. Rings	Cntrl. Units
1/2	6	3-1/2	2-3/8	4	9/16	1-5/8	1/2	165	200	165	7/16	1.75	1/4	.75	1/2	.75	1	1.5	6
3/4	6	3-7/8	2-3/4	4	9/16	1-7/8	1/2	165	200	165	7/16	1.75	1/4	.75	1/2	.75	1.5	2	6
1	6	4-1/4	3-1/8	4	5/8	2-3/8	9/16	165	200	165	7/16	1.75	1/4	.75	1/2	.75	2	2	6
1-1/4	6	4-5/8	3-1/2	4	5/8	2-5/8	9/16	165	200	165	7/16	1.75	1/4	.75	1/2	.75	2.5	2.5	6
1-1/2	6	5	3-7/8	4	5/8	2-7/8	9/16	165	200	165	7/16	1.75	1/4	.75	1/2	.75	3	3	6
2	6	6	4-3/4	4	3/4	3-5/8	9/16	165	200	225	7/16	1.75	1/4	.75	1/2	.75	4	4	6
2-1/2	6	7	5-1/2	4	3/4	4-1/8	9/16	165	200	225	7/16	1.75	1/4	.75	1/2	.75	4.5	5.5	7
3	6	7-1/2	6	4	3/4	4-5/8	9/16	165	200	225	7/16	1.75	1/4	.75	1/2	.75	5.5	6	8
4	6	9	7-1/2	8	3/4	5-7/8	9/16	165	200	225	7/16	1.75	1/4	.75	1/2	.75	8	7.5	7
5	6	10	8-1/2	8	7/8	6-7/8	9/16	165	200	225	7/16	1.75	1/4	.75	1/2	.75	9	8	7
6	6	11	9-1/2	8	7/8	7-7/8	5/8	140	200	225	7/16	1.75	1/4	.75	1/2	1.00	11	9	9
8	6	13-1/2	11-3/4	8	7/8	9-7/8	3/4	140	200	225	7/16	1.75	1/4	.75	1/2	1.00	15	12	12
10	8	16	14-1/4	12	1	12-1/8	3/4	140	190	225	7/16	1.75	1/4	.75	1/2	1.00	23	16	16
12	8	19	17	12	1	14-1/2	3/4	140	190	225	11/16	1.75	3/8	.75	1/2	1.00	34	22	16
14	8	21	13-3/4	12	1-1/8	16-1/2	7/8	140	190	225	11/16	1.75	3/8	.75	1/2	1.00	40	25	20
16	8	23-1/2	21-1/4	16	1-1/8	18-1/2	7/8	85	130	160	11/16	1.75	3/8	.75	1/2	1.00	47	27	20
18	8	25	22-3/4	16	1-1/4	20-1/2	7/8	65	110	160	11/16	1.75	3/8	.75	1/2	1.00	56	29	21
20	8	27-1/2	25	20	1-1/4	22-5/8	1	65	110	130	11/16	1.75	3/8	./5	1/2	1.00	67 70	35	21
22	10	29-1/2	27-1/4	20	1-3/8	24-5/8	1	65	110	130	13/16	1.75	7/16	.75	1/2	1.00	70	44	32
24	10	29-1/2	29-1/2	20	1-3/0	20-5/6	1	65	100	110	15/16	1.75	1/2	1.00	1/2	1.00	100	40 50	32
20	10	34-1/4	34	24	1-3/8	30-7/8	1	55	90	110	15/16	1.75	1/2	1.00	1/2	1.00	102	55	32
30	10	36-1/2	36	28	1-3/8	32-7/8	1	55	90	95	15/16	2.25	1/2	1.00	1/2	1.00	117	58	32
34	10	38-3/4	40-1/2	32	1-5/8	37	1	55	90	95	15/16	2.25	1/2	1.25	1/2	1.00	122	91	43
36	10	43-3/4	42-3/4	32	1-5/8	39	1	55	90	95	15/16	2.25	1/2	1.25	1/2	1.00	143	99	43
40	10	46	47-1/4	36	1-3/4	43	1	55	90	90	15/16	2.25	1/2	1.25	1/2	1.00	173	108	43
42	12	50-3/4	49-1/2	36	1-5/8	45-1/4	1-3/16	55	90	90	15/16	2.25	1/2	1.25	1/2	1.00	193	110	44
44	12	53	51-3/4	40	1-3/4	47-1/4	1-3/16	55	80	90	15/16	2.25	1/2	1.25	1/2	1.00	198	136	44
48	12	55-1/4	56	44	1-5/8	51-1/4	1-3/16	55	80	90	15/16	2.25	1/2	1.25	1/2	1.00	211	154	87
50	12	59-1/2	58-1/4	44	1-7/8	53-1/4	1-3/16	55	80	85	15/16	2.25	1/2	1.25	1/2	1.00	240	163	87
54	12	61-3/4	62-3/4	44	2	57-1/4	1-3/16	55	80	85	15/16	2.25	1/2	1.25	1/2	1.00	265	185	87
56	12	66-1/4	65	48	2	59-1/4	1-3/16	55	80	85	15/16	2.25	1/2	1.25	1/2	1.00	288	203	87
60	12	68-3/4	69-1/4	52	2	63-1/4	1-3/16	55	80	85	15/16	2.25	1/2	1.25	1/2	1.00	309	215	87
62	12	73	71-3/4	52	2	65-1/4	1-3/16	55	80	85	15/16	2.25	1/2	1.25	1/2	1.00	325	230	87
66	12	75-3/4	76	52	2	69-1/4	1-3/16	55	80	85	15/16	2.25	1/2	1.25	1/2	1.00	350	255	87
72	12	80	82-1/2	60	2	75-1/4	1-3/16	45	70	85	15/16	2.25	1/2	1.25	1/2	1.00	385	300	87
78	12	86-1/2	88-3/4	64	2-1/8	81-1/4	1-3/16	45	70	80	15/16	2.25	1/2	1.25	1/2	1.00	410	325	103
84	12	99-3/4	95-1/2	64	2-1/4	87-1/2	1-3/16	45	70	80	1	2.25	9/16	1.25	1/2	1.00	435	350	113
96	12	113-1/4	108-1/2	68	2-1/2	99-3/8	1-3/16	45	70	80	1	2.25	9/16	1.25	1/2	1.00	460	375	125

Technical statements and engineering data in this catalog is the most accurate information available at the time of printing and are subject to change without notice.

 All charts are applicable to DURA-PERM TEFLON® Expansion Joints with respect to Temperature and Pressure data.

· For a filled arch, reduce available movements by 50%.

• For multiple arch expansion joints, take the movement shown above and multiply by the number of arches.







SilverFox Enterprises P/L Australia • Email: silverfox.ent@bigpond.com • Phone: 0448 889 914

Note:

### ORDERING INFORMATION FOR STYLES 150, 200 & 1000

	Temperature Limits for Continuous Service									
Style	Temp	Style	Temp							
150	180°	150 HTS	300°							
200	180°	200 HTS	300°							
1000	180°	1000 HTS	300°							
1100	180°	150 V	400°							
150 HT	250°	200 V	400°							
200 HT	250°	1000 V	400°							
1000 HT	250°	189 SG	400°							
1100 HT	250°									

#### To receive a quotation or when placing an order, please specify the following:

- Style (140, 150, etc.)
- · Quantity
- Inner Diameter
- Flange Drilling
- Materials Conveyed in Line
- Pressure and/or Vacuum Ranges
- Temperature Range
- · Movements-Axial Compression, Extension and Lateral De ection

#### "SUPREME" LIGHTWEIGHT AND U-TYPE EXPANSION JOINTS

Arch	Joint Size I.D. (in.)	Min. Face- to-Face (in.)	Comp. (in.)	Ext. (in.)	Lateral (in.)	000000
Single	2 to 5	8	7/16	5/16	5/8	ő
	6 to 13	8	11/16	9/16	5/8	0
	14 to 24	8	13/16	11/16	5/8	0
	25 to 30	8	15/16	13/16	5/8	0
Double	2 to 5	12	7/8	5/8	1-1/4	
	6 to 13	12	1-3/8	1-1/8	1-1/4	00000
	14 to 24	13	1-5/8	1-3/8	1-1/4	
	25 to 30	13	1-7/8	1-5/8	1-1/4	
Triple	2 to 5	16	1-5/16	15/16	2-1/2	
	6 to 13	16	2-1/16	1-11/16	2-1/2	arcsi istra
	14 to 24	18	2-7/16	2-1/16	2-1/2	
	25 to 30	18	2-13/16	2-7/16	2-1/2	

Maximum operating pressures for all sizes is 25 psig internal pressure and 15 inches of mercury vacuum

### STYLE 145, 155, 156, 157 AND 185

"SUPREME" U-Style Rubber Expansion Joints form a flexible connection between equipment outlet and inlet flanges. They are normally constructed of a natural rubber tube, several heavy plies of rubber or neoprene-impregnated fabric and a neoprene cover to protect the carcass. Consult engineering department for maximum operating temperature. They are available in the following configurations.

#### OVAL (STYLE 155 & 157)

With external flange. Available in Style 155 for vacuum only and Style 157 for pressure and vacuum. Used in installations where external bolting is desired. Style 155 withstands 30 inches of vacuum with standard flat steel retaining rings. Style 157 is designed for both 30 inches of vacuum and 25psi gauge internal pressure and are designed with special steel fabricated support rings.

With internal flange (no arch) for vacuum and pressure. They allow ample axial and lateral movement capable of withstanding 30-inches of vacuum, or 25psi gauge internal pressure. Retaining flanges are provided for support.

. . . . . . . . . . . . 000000000000

#### ROUND (STYLE 156 & 185)

Lightweight rubber expansion joints available in Style 156, "U"-Type, no arch, for vacuum only; Style 185, round "U"-Type, no arch, steel reinforced for vacuum and pressure. Style 156 body is of duck and rubber without metal reinforcing. Style



185 is constructed with steel reinforcement. These units can also be supplied with offset features.



### SilverFox Enterprises P/L Australia • Email: silverfox.ent@bigpond.com • Phone: 0448 889 914

ORT RINGS

### STVLE 190 DIMENSIONIS & SPECIFICATIONS

"SUPREME" Rubber Expansion Joints as follows:

- Style 150 for pressure and vacuum service
- Style 200 for high

pressure service

•	Style 1000 for pressure
	and vacuum with greater
	movement

Minimum Face-to-Face Dimensions For Styles 150, 200 & 1000								
Joint Size I.D. (in.)	Single Arch Min. f-f (in.)	Double Arch Min. f-f (in.)	Triple Arch Min. f-f (in.)					
1/2 to 6	6	10/12*	12/16*					
8	6	10/12*	14/18*					
10	10 8		14/20*					
12	8	12/16*	14/20*					
14 to 20	8	12/16*	16/20*					
22 to 24	10	14/16*	18/22*					
26 to 34	10	14/16*	18/22*					
36 to 40	10	14/18*	18/22*					
42 to 96	12	14/18*	18/22*					
	*Wide Ar	ch Style 1000						

Note: These face-to-face dimensions are only a guide. Consult factory for special requirements

They feature a lighter wall and flange thickness to provide flexibility. Their duck plies are reinforced with steel rings. Style 189 Joints are also available

#### "SUPREME" Style

189 Lightweight Rubber Expansion Joints are available in either round or rectangular (with arch) configurations. They are recommended for pressure and limited vacuum applications such as: air, gas and water service where pressures are low and medium-not too severe. They may also be used on equipment where temperatures do not exceed 180°F.



**RECTANGULAR (STYLE 145)** 

for temperatures up to 500°F and can be made with sleeve ends.



### "DURA-PERM" STYLES 140, 150 AND 200

"DURA-PERM" \*FEP-lined Expansion Joints combine the features of FEP/PTFE for chemical resistance, anti-stick properties, thermal stability, and resistance to age cracking–with the best features of elastomeric expansion joints–good noise an vibration dampening, flexibility and high-pressure ratings. Temperature ratings to 400° F available. Sizes of 1" to 48" I.D. in standard face-to-face dimensions, or special lengths. For dimensions and working conditions, refer to charts on page 4-5.



1/2"-12" are PTFE lined.

14" and above are FEP lined (Fluorinated Ethelene Propylene Copolymer).

### Dimensions for DURA-PERM PTFE/FEP-Lined Style 1000 Expansion Joints

									a Thial				Моу	veme	nts	V	Veight	ts
Joint Size N.D.	Face-to-Face	Flange O.D.	Bolt Circle Dia.	No. of Bolts	Bolt Hole Dia.	Retaining Ring I.D.	A	B-Body C-Interr D-Arch E-Arch	Thickn Thickn al Arch Width Thickne C	ness ess i Height ess D	E	Style 1000 Max. PSI	Axial Compression	Axial Extension	Lateral De⊡ection	Joint Weight/Ibs.	Retaining Rings/lbs.	Control Units Lbs.
1/2	6	3-1/2	2-3/8	4	9/16	1-1/4	1/2	7/8	1	1-3/4	3/8	225	1-3/4	3/4	3/4	1	1.5	6
3/4	6	3-7/8	2-3/4	4	9/16	1-5/8	1/2	7/8	1	1-3/4	3/8	225	1-3/4	3/4	3/4	1.5	2	6
1	6	4-1/4	3-1/8	4	5/8	1-7/8	9/16	7/8	1	1-3/4	3/8	225	1-3/4	3/4	3/4	2	2.25	6
1-1/4	6	4-5/8	3-1/2	4	5/8	2-1/8	9/16	7/8	1-1/8	1-3/4	7/16	225	1-3/4	3/4	3/4	2.5	2.5	6
1-1/2	6	5	3-7/8	4	5/8	2-3/8	9/16	7/8	1-1/8	1-3/4	7/16	225	1-3/4	3/4	3/4	3	3	6
2	6	6	4-3/4	4	3/4	3-1/8	9/16	29/32	1-1/4	1-3/4	1/2	225	1-3/4	3/4	3/4	4	4	7
2-1/2	6	7	5-1/2	4	3/4	4-1/8	9/16	29/32	1-1/4	1-3/4	1/2	225	1-3/4	3/4	3/4	4.5	5.5	7
3	6	7-1/2	6	4	3/4	4-5/8	9/16	29/32	1-1/4	1-3/4	1/2	225	1-3/4	3/4	3/4	5.5	6	7
4	6	9	7-1/2	8	3/4	5-7/8	9/16	7/8	1-1/4	1-3/4	1/2	225	1-3/4	3/4	3/4	8	7.5	8
5	6	10	8-1/2	8	7/8	6-7/8	9/16	7/8	1-1/4	1-3/4	1/2	225	1-3/4	3/4	3/4	9	8	8
6	6	11	9-1/2	8	7/8	7-7/8	5/8	1	1-1/4	1-3/4	1/2	225	1-3/4	3/4	1	11	9	9
8	6	13-1/2	11-3/4	8	7/8	9-7/8	3/4	1	1-1/2	1-3/4	5/8	225	1-3/4	3/4	1	15	12	12
10	8	16	14-1/4	12	1	12-1/8	3/4	1-5/32	1-1/2	1-3/4	11/16	225	1-3/4	3/4	1	23	16	16
12	8	19	17	12	1	14-1/2	3/4	1-5/32	1-1/2	1-3/4	11/16	225	1-3/4	3/4	1	34	22	16
14	8	21	18-3/4	12	1-1/8	16-1/2	7/8	1-5/32	2	1-3/4	3/4	225	1-3/4	3/4	1	40	25	20
16	8	23-1/2	21-1/4	16	1-1/8	18-1/2	7/8	1-5/32	2	1-3/4	3/4	160	1-3/4	3/4	1	47	27	20
18	8	25	22-3/4	16	1-1/4	20-1/2	7/8	1-5/32	2	1-3/4	3/4	160	1-3/4	3/4	1	56	29	21
20	8	27-1/2	25	20	1-1/4	22-5/8	1	1-5/32	2	1-3/4	25/32	130	1-3/4	3/4	1	67	35	21
22	10	29-1/2	27-1/4	20	1-3/8	24-5/8	1	1-5/32	2	1-3/4	25/32	130	1-3/4	3/4	1	70	44	32
24	10	32	29-1/2	20	1-3/8	26-5/8	1	1-5/32	2	1-3/4	25/32	130	1-3/4	1	1	79	46	32
26	10	34-1/4	31-3/4	24	1-3/8	28-7/8	1	1-3/16	2-1/4	1-3/4	13/16	110	1-3/4	1	1	100	50	32
28	10	36-1/2	34	28	1-3/8	30-7/8	1	1-3/16	2-1/4	1-3/4	13/16	110	1-3/4	1	1	102	55	32
30	10	38-3/4	36	28	1-3/8	32-7/8	1	1-3/16	2-1/4	1-3/4	13/16	95	1-3/4	1	1	117	58	32
34	10	43-3/4	40-1/2	32	1-5/8	37	1	1-3/16	2-1/4	1-3/4	13/16	95	1-3/4	1	1	122	91	43
36	10	46	42-3/4	32	1-5/8	39	1	1-3/16	2-1/4	2-1/4	13/16	90	2-1/4	1	1	143	99	43
40	10	50-3/4	47-1/4	36	1-5/8	43	1	1-3/16	2-1/4	2-1/4	13/16	90	2-1/4	1	1	173	108	43
42	12	53	49-1/2	36	1-5/8	45-1/4	1-3/16	1-1/4	2-1/2	2-1/4	29/32	90	2-1/4	1	1	193	110	44
44	12	55-1/4	51-3/4	40	1-3/4	47-1/4	1-3/16	1-1/4	2-1/2	2-1/4	29/32	90	2-1/4	1	1	198	136	44
48	12	59-1/2	56	44	1-5/8	51-1/4	1-3/16	1-1/4	2-1/2	2-1/4	29/32	90	2-1/4	1	1	211	154	87





### "MIGHTY-SPAN" RUBBER FLUE DUCT EXPANSION JOINTS

"MIGHTY-SPAN" Style 600 Rubber Flue Duct Expansion Joints are designed to handle hot air or gasses in industrial duct work, as well as those generated by power plant and pollution control equipment. They are custom constructed of rubber and fabric to absorb thermal movements and vibration in duct work and to aid in the elimination of noises caused by scrubber equipment and mechanical dust collectors.

MIGHTY-SPAN is capable of handling any combination of large movements which might occur in a ducting system due to thermal expansion. MIGHTY-SPAN creates almost no load on damper and fan interfacing flanges, thus providing much needed protection in these critical areas.



#### **CONFIGURATIONS**

- Square, rectangular or round in any size. Standard construction "U" shape, 9" face-to-face, 3" flange.
- Arch shapes also available. One-piece body 5/16" thick. Steel retaining rings are provided (send drawing or call Una ex<sup>®</sup> for quotation.)

	P				
Sleeve Type	U-Туре	Single Arch	Multi Arch		
P	B	all a	R		
Sleeve Type	U-Type	Single Arch	Multi Arch		

#### CHOICE OF MATERIAL

#### Fabric Reinforcement

Style 600 Joints may be constructed of \*Nomex (to 400°F), fiberglass or polyester cloth impregnated with one of the following:

#### **Tube and Cover**

**Neoprene**–Resistant to heat, adverse weather, ozone and fuel gasses. Impervious to fats, oils, greases and other petroleum products. For use up to 250°F.

**Chlorobutyl**–An elastomer with all of the above advantages of neoprene, with the exception of its inability to withstand oil. For use up to 300°F.

\***Viton**<sup>®</sup>/\*\***Fluorel**<sup>®</sup>–In addition to providing all of the properties of neoprene, Fluorel is resistant to mineral acids and usable in 400°F applications.

**Silicone**–A high-quality elastomer recommended for all environments except those with sulfur gas (SO<sub>2</sub> or SO<sub>3</sub>). For use in -70° to 500°F applications.

\*DuPont trademark \*\*3M trademark.

U-Type compression and elongation formulas

Lateral Elongation= 2 lbs. per foot of perimeter per 1/16" of movement. For example: 2' x 2' I.D.= 8' perimeter de⊡ection= 1" = 16/16. 2 lbs. x 8" x 16"=256 lbs.

Axial Compression = 2.2 lbs. per foot of perimeter per 1/16" of movement. For example: 2' x 2' l.D. = 8' perimeter de⊡ection = 1" = 16/16. 2.2 lbs. x 8" x 16" = 282 lbs.

Environmental Conditions								
		Recommended for Use In						
Elastomer	Usable to°F	Oils, Grease	Ozone & Flue Gases					
Neoprene	250	good	good					
Chlorobutyl	300		good					
*Viton® 400		good	good					
Silicone 500		good						

Recommended Service							
Pressure	to 3.0 psig, max						
Vacuum	6.12" Hg, 83" Hg						
Compression*	2"						
Extension*	1/2"						
Transverse	1-1/2"						







### THE INDUSTRY'S MOST COMPLETE LINE OF EXPANSION JOINTS

### "RADI-FLEX" ELBOW EXPANSION JOINTS

"RADI-FLEX" Joints are designed to reduce noise and vibration in angled installments. Spiraled steel wires are embedded in the walls from flange-to-flange for extra strength. Standard construction is of rubber tube with polyester reinforcement with a synthetic cover. Temperature ranges up to 180°F can be handled. High temperature construction using a butyl tube with polyester reinforcement and a butyl cover allow use from 180°F to 250°F. Also available in Neoprene, Buna N, Hypalon and EPDM (Nordel). Maximum pressures for standard units are: 2" and 3"-90 psi; 4" to 6"-80 psi; 8" to 10"-70 psi; and 12" to 14"-60 psi.



	"RADI-FLEX" Elbow Joints Dimensions									
Size	B Flange C C C		C to F	Move	Movement Limitations					
N.D.	A	O.D.	90° STD.	90° L.R.	45°	Comp.	De⊡ect.	Ext.		
2"	1"	6"	4-1/2"	6-1/2"	2-1/2"	1/2"	1/2"	1/2"		
2-1/2"	1"	7"	5"	7"	3"	1/2"	1/2"	1/2"		
3"	1-1/8"	7-1/2"	5-1/2"	7-3/4	3"	1/2"	1/2"	1/2"		
4"	1-1/8"	9"	6-1/2"	9"	4"	1/2"	1/2"	1/2"		
5"	1-1/8"	10"	7-1/2"	10-1/4"	4-1/2"	3/4"	3/4"	3/4"		
6"	1-1/8"	11"	8"	11-1/2"	5"	3/4"	3/4"	3/4"		
8"	1-1/8"	13-1/2"	9"	14"	5-1/2"	3/4"	3/4"	3/4"		
10"	1-1/4"	16"	11"	16-1/2"	6-1/2"	3/4"	3/4"	3/4"		
12"	1-1/4"	19"	12"	19"	7-1/2"	3/4"	3/4"	3/4"		
14"	1-1/4"	21"	14"	22-1/2"	7-1/2"	3/4"	3/4"	3/4"		



1. Flange size dimensions conforms to ANSI-Class 150# drilling

2. Split rings are 3/8" Galvanized Steel Plate

3. Center-to-face dimensions are subject to  $\pm 1/4$ " tolerance

### **CROSSES, TEES AND SPECIAL PRODUCTS**



"RADI-FLEX" Crosses and Tees are custom manufactured to your specifications with all features of our Elbow Expansion Joints. *Call for further information regarding available constructions and delivery schedules.* 



#### **Special Products include:**

- Pipe Clamp Sleeves
- Wellpoint Sleeves
- · Endless belts for use on equipment
- Rubber Tubing
- Vacuum Sleeve Connectors
- Exhaust Connectors
- Suction Box Hose for Papermills
- Dredge Sleeves
- Slurry Connectors
- Food Handling Connectors
- Acid Hose Connectors
- Pre-Formed Hose
- · Pinch Valve Bodies

CONNECTORS

AND

EXPANSION JOINTS

SilverFox Enterprises P/L Australia • Email: silverfox.ent@bigpond.com • Phone: 0448 889 914

## "SUPER-QUIET" RUBBER VIBRATION AND SOUND ABSORBERS

### **Styles 2150 and 2250**

"Super-Quiet" Styles 2150 (150 psi WP) and 2250 (250 psi WP) vibration and sound absorbers are specially designed lengths of rubber pipe with factory attached ferrules for pipe and other connections involving standard IPT. They eliminate vibration between pump and pipe lines either for suction or discharge.



For Working Pressures to 150 PSI									
	For Water Service to 180°F	For Water Service from 180 to 250°F Max.							
Ferruled Coupling	2150	2150 H.T.							
Flanged End	3150	3150 H.T.							
F	or Working Pressures to 250	PSI							
	For Water Service to 180°F	For Water Service from 180 to 250°F Max.							
Ferruled Coupling	2250	2250 H.T.							
Elanged End	3250	3250 H T							

### "Super-Quiet" Styles 3150 and 3250

"Super-Quiet" Styles 3150 (150 psi WP) and 3250 (250 psi WP) sound absorbers are built with molded rubber flanged ends with bolt holes that accommodate standard steel flanges. Available with or without helical wire reinforcement. Special tubes can be made to meet unique requirements for either suction or discharge.



Specify Una⊡ex® Flexible Connectors											
Style 3150	150# W.P.	180°F									
Style 3250	250# W.P.	180°F									
Style 3150 HT	150# W.P.	250°F									
Style 3250 HT	250# W.P.	250°F									

	*Style 2150 and	2250 Dimens	ions
Pipe Size N.D. (in.)	Standard Overall Length (in.)	Pipe Size N.D. (in.)	Standard Overall Length (in.)
3/4	12	2	24
1	18	2-1/2	24
1-1/4	18	3	36
1-1/2	18	4	36

IMPORTANT: Vibration and Sound Absorbers are not designed to accommodate the movement in a piping system caused by temperature change or other conditions. See Spool-Type Expansion Joints for such applications.

Percentage of Reduction of Vibration Input with Frequency and Pressure as Compared to Steel Pipe												
Center Freq.	8" I.D. x 24" F-F Vibration Joint											
Hz	10 psig	50 psig	80 psig									
440	87%	91%	93%									
68	95%	96%	99%									
125	98%	99%	99%									
250	96%	97%	99%									
500	91%	93%	94%									
1000	82%	91%	96%									
2000	99%	99%	99%									
4000	99%	99%	99%									
8000	97%	97%	98%									

EXAMPLE: If a steel piping system had a major vibration frequency of 1,000 Hz at 50 PSIG and 8" rubber expansion joint was installed in the pipeline, the percentage of reduction of vibration would be 96%. Above data taken from the Fluid Sealing Association Handbook.

Joint	Face-t	Face-to-Face		tyle 3150 (	Conforms	to ANSI 1	50# Drillin	ıg)	Style 3250 (Conforms to ANSI 300# Drilling)						
Size N.D.(in.)	Min (in.)	Max (in.)	Ring I.D. (in.)	Flange Diam. (in.) Thick. (in.)		Bolt Cir. Diam. (in.)	Bolt No.	Holes Diam. (in.)	Ring I.D. (in.)	Fla Diam. (in.)	nge Thick. (in.)	Bolt Cir. Bol ) Diam. (in.) No.		Holes Diam. (in.)	
1-1/2	12	24	2-7/8	5	11/16	3-7/8	4	5/8	2-7/8	6-1/8	23/32	4-1/2	4	7/8	
2	12	24	3-5/8	6	11/16	4-3/4	4	3/4	3-5/8	6-1/2	23/32	5	8	3/4	
3	12	36	4-5/8	7-1/2	27/32	6	4	3/4	4-5/8	8-1/4	27/32	6-5/8	8	7/8	
4	12	36	5-7/8	9	27/32	7-1/2	8	3/4	5-7/8	10	7/8	7-7/8	8	7/8	
5	12	36	6-7/8	10	15/16	8-1/2	8	7/8	6-7/8	11	15/16	9-1/4	8	7/8	
6	18	36	7-7/8	11	31/32	9-1/2	8	7/8	7-7/8	12-1/2	15/16	10-5/8	12	7/8	
8	24	48	9-7/8	13-1/2	31/32	11-3/4	8	7/8	9-7/8	15	1-1/16	13	12	1	
10	24	48	12-1/8	16	1-3/16	14-1/4	12	1	12-1/8	17-1/2	1-11/32	15-1/4	16	1-1/8	
12	24	48	14-1/2	19	1-7/32	17	12	1	14-1/2	20-1/2	1-11/32	17-3/4	16	1-1/4	



Ш

### "UNASPHERE" STYLE 800 EXPANSION JOINTS

Precision molded of neoprene and nylon, these units require less force to move than conventional joints, allowing maximum deflection, elongation and compression. Their design is stronger than other configurations because of the spherical shape. The smooth flow arch reduces turbulence and allows quiet flow without sediment build-up. *All three styles also available in EPDM and nitrile with neoprene cover.* 



#### **Design Data:**

Pressure–16" HG Vacuum, 225 PSIG Temperature–20°F to 180°F.

А	L	т	н		Allowable Movement							
Size (in.)	Face-to- Face (in.)	Flange Thick (in.)	No. of Holes	Thread Size	Lateral De⊡ect (in.)	Elongation (in.)	Compression (in.)	Angular Movement				
2	6	5/8	4	5/8-11NC	±1/2	3/8	1/2	15				
2-1/2	6	11/16	4	5/8-11NC	±1/2	3/8	1/2	15				
3	6	11/16	4	5/8-11NC	±1/2	3/8	1/2	15				
4	6	11/16	8	5/8-11NC	±1/2	3/8	5/8	15				
5	6	13/16	8	3/4-10NC	±1/2	3/8	5/8	15				
6	6	7/8	8	3/4-10NC	±1/2	3/8	5/8	15				
8	6	7/8	8	3/4-10NC	±1/2	3/8	5/8	15				
10	8	15/16	12	7/8-9 NC	±3/4	1/2	3/4	15				
12	8	15/16	12	7/8-9 NC	±3/4	1/2	3/4	15				

### Size, Movement, Pressure, Weight and Drilling Data



### "TWIN-SPHERE" STYLE 802

The Twinsphere is precision molded of neoprene and nylon tire cord. The double arch design allows for greater movement four different ways and provides for a non-turbulent flow. Angular movement up to 30° is obtainable with its highly flexible design. Rated for 225 PSI WP at 170°F. Pressure is reduced at higher temperatures. Vacuum Rating to 26" HG.

Size ND	L	Comp.	Elong.	Lateral Movement	Angular Movement
2"	7"	.9	.28	.79	30
2-1/2"	7"	.9	.28	.79	30
3"	7"	.9	.28	.79	30
4"	9"	1.32	.45	.98	30
5"	9"	1.32	.45	.98	30
6"	9"	1.32	.45	.98	30
8"	13"	1.78	.58	1.18	30
10"	13"	1.78	.58	1.18	30
12"	13"	1.78	.58	1.18	30

### "TWIN-SPHERE" STYLE 803

This highly capable, low-cost expansion joint is available for smaller diameter piping systems found in power plants, chemical plants, waterworks, sewage treatment plants and private residences, etc. The Twin-Sphere provides excellent vibration absorption and stress relief in a light, compact construction.



Operating Pressure: 150 PSI. Vacuum Rating: 15" HG. Diameters are available in 3/4", 1", 1-1/4", 1-1/2"



## "MULTI-PURPOSE" PTFE (TEFLON") EXPANSION JOINTS

Styles 112A, 113A and 115A Solid TEFLON Molded® Expansion Joints were developed to withstand higher pressures and temperatures. Their design allows a shorter face-to-face dimension, making them ideal for use where space is limited. They are lightweight and corrosion resistant. Available in sizes 1" to 12" Nominal Diameter and for temperature ratings from -300°F to +400°F.



112E

### **EXPANSION JOINT DATA**

St	tyle 112A	(2 Con	volutior	ıs)	Style	113A (3 C	onvoluti	ons)	Style 115A (5 Convolutions)				
Nom. Dia.	Neutral Length	Movement Weig (In.) Lbs		Weight Lbs.	Neutral Length	Move (In	ment .)	Weight Lbs.	Neutral Length	Move (In	ment .)	Weight Lbs.	
I.D.	Ŭ	Axial	Lateral			Axial	Lateral			Axial	Lateral		
1.0	1.375	0.250	.125	2	1.750	.500	.250	2	3.000	0.500	.500	2	
1.25	1.375	0.250	.125	5	1.810	.500	.250	5	2.670	0.394	.470	5	
1.50	1.375	0.250	.125	3	2.000	.500	.250	4	3.500	0.750	.500	3	
2.00	1.563	0.250	.125	7	2.750	.750	.375	8	4.000	1.000	.500	7	
2.50	2.250	0.313	.125	10	3.188	.750	.375	11	4.600	0.980	.510	10	
3.00	2.250	0.375	.188	10	3.625	1.000	.500	13	5.000	1.000	.500	10	
4.00	2.625	0.500	.250	18	3.625	1.000	.500	19	5.250	1.250	.625	18	
5.00	3.250	0.500	.250	24	4.000	1.000	.500	25	6.000	1.250	.625	24	
6.00	2.750	0.500	.250	29	4.000	1.125	.563	30	6.000	1.250	.625	29	
8.00	4.00	0.500	.250	47	6.000	1.125	.563	48	8.000	1.250	.625	47	
10.00	5.250	0.500	.250	64	7.000	1.188	.500	60	8.750	1.250	.625	64	
12.00	6.000	0.500	.250	115	7.875	1.188	.625	77	9.000	1.375	.688	115	

\*\*Safety Shields Are Recommended

#### Unalon® Performance curve of working pressures vs. operating temperatures (all sizes)



Vacuum Service Maximum temperature for full vacuum (29.9 HG.)											
Two Convolutions											
1" to 6" 8" to 10"	400°F 250°F										
12"	150°F										
Three Convolutions											
1" to 4" 5" to 6" 8" to 12"	400°F 300°F 125°F										

Note: For greater pressure or safety requirements than shown, special Viton®/Kevlar® overlays are available. Optional flow liners are available in TEFLON®, Elastomeric, Stainless Steel and Nickel Alloys. Consult our engineering department for further details

Vacuum: Vacuum support rings can be added in the top (crest) of the convolution for full vacuum at 400°F for sizes 6" and larger. Support rings can be manufactured from various types of Stainless Steel, Tantalum and Nickel Alloys.

#### Teflon® is a registered Trademark of DuPont. Only DuPont makes Teflon®



### **STYLE 9500 METALLIC EXPANSION JOINTS**

9500 series is an expansion joint that combines the properties of metal and PTFE into the most advance, versatile expansion joint on the market today.

Unlike ordinary solid PTFE of Elastomeric type expansion joints, should up-set conditions exceeding 500°F occur, Unalon® series 9500 will maintain it's pressure carrying capacity up to 1200°F, adequate time for system shut-down and replacement.

#### Safety

The Unalon® 9500 series PTFE or FEP tubes are formed into a Stainless Steel, Inconel®, Monel®, or Hastelloy® corrugated tube.

#### Additional Types of Expansion Joints: Lined, Hinged, Dual and Universal Tied

Note: For environmentally corrosive applications; laminated, (multi-ply) bellows as well as the optional features listed below are available.

- Highly corrosive chemical-petrochemical systems
- - · Abrasive industrial process piping systems
  - · Power generating and waste water treatment plants
  - · Pulp/paper systems and marine services
  - · Pollution control systems

#### **Optional Testing Procedures**

- · Radiography of longitudinal bellows seam weld
- (PMI) Positive Material Identification of Bellows

#### **Optional Coatings**

- · Four-part epoxy coating for flanges
- · Fluropolymer coated flanges, threaded rod and nuts

#### 9500 Series will:

- Absorb pipe movement and stress
- Isolate mechanical vibration
- Reduce system noise
- Protect against surge forces

#### Working temperature from -300°F to +400°F

#### **Standard Testing Procedures**

- · Dye penetrant test of all pressure boundary welds
- · Spark test at 30,000 volts, exceeds industry standard of 10,000 volts
- Hydro test at 1.5 times the design pressure for 10 minutes

#### **Optional Features**

- Special flange construction, configuration and materials
- Internal vacuum rings for full vacuum service constructed of Stainless Steel, Nickel Alloys and Tantalum
- · Protective covers available in Stainless Steel and Nickel Allovs
- Internal flow liners available in Stainless Steel, Nickel Alloys and TEFLON®

	9500 Movements/Number of Convolutions																	
Size N.D. In.	ize I.D. 4 n. Conv.		5 Conv.		6 Conv.		7 Conv.		Co	8 Conv.		9 Conv.		0 nv.	11 Conv.		12 Conv.	
	EXT	СОМ	EXT	COM	EXT	СОМ	EXT	СОМ	EXT	СОМ	EXT	COM	EXT	COM	EXT	COM	EXT	COM
1-1/2"	0.10	0.40	0.13	0.54	0.17	0.67	0.20	0.81	0.24	0.94	0.27	1.08	0.30	1.21	0.34	1.34	0.37	1.48
2"	0.10	0.39	0.13	0.52	0.16	0.66	0.20	0.79	0.23	0.92	0.26	1.05	0.30	1.18	0.33	1.31	0.36	1.44
3"	0.10	0.39	0.13	0.53	0.16	0.66	0.20	0.79	0.23	0.92	0.26	1.05	0.30	1.18	0.33	1.32	0.36	1.45
4"	0.11	0.42	0.14	0.56	0.18	0.70	0.21	0.84	0.25	0.98	0.28	1.12	0.32	1.26	0.35	1.40	0.39	1.54
6"	0.14	0.55	0.18	0.73	0.23	0.91	0.27	1.09	0.32	1.28	0.36	1.46	0.41	1.64	0.46	1.82	0.50	2.01
8"	0.14	0.55	0.18	0.73	0.23	0.91	0.27	1.10	0.32	1.28	0.37	1.46	0.41	1.65	0.46	1.83	0.50	2.01
10"	0.14	0.55	0.18	0.73	0.23	0.92	0.27	1.10	0.32	1.28	0.37	1.47	0.41	1.65	0.46	1.83	0.50	2.02
12"	0.17	0.67	0.22	0.90	0.28	1.12	0.34	1.34	0.39	1.57	0.45	1.79	0.50	2.02	0.56	2.24	0.62	2.46
14"	0.24	0.94	0.31	1.26	0.39	1.57	0.47	1.89	0.55	2.20	0.63	2.52	0.71	2.83	0.79	3.15	0.87	3.46
16"	0.21	0.85	0.28	1.14	0.36	1.42	0.43	1.71	0.50	1.99	0.57	2.28	0.64	2.56	0.71	2.85	0.78	3.13
18"	0.21	0.85	0.28	1.14	0.36	1.42	0.43	1.71	0.50	1.99	0.57	2.28	0.64	2.56	0.71	2.85	0.78	3.13
20"	0.23	0.91	0.30	1.22	0.38	1.52	0.46	1.83	0.53	2.13	0.61	2.44	0.69	2.74	0.76	3.05	0.84	3.35
24"	0.27	1.06	0.35	1.42	0.44	1.77	0.53	2.13	0.62	2.48	0.71	2.84	0.80	3.19	0.89	3.55	0.98	3.90

Working Pressure: 50, 150 and 300 PSIG (please specify). For pressure above 300 PSIG, consult factory.



ONNECTORS  $\cup$ Ζ  $\triangleleft$ EXPANSION JOINTS

### "MATCHLESS" BELLOWS-TYPE EXPANSION JOINTS



"MATCHLESS" bellows are manufactured from solution annealed A/SA240 321SS sheet rolled into a tube and seam welded. Multi-ply bellows can be designed and manufactured based on the application and design requirements. A wide variety of materials available to design and manufacture bellows.

The most commonly used bellows materials and thicknesses in stock to serve our customers faster. "MATCHLESS" bellows conform to the latest EJMA standards.

Overall lengths of standard assemblies are based on 150# drilling for both plate flange and Raised Face Slip On flange thicknesses. Overall length may change if other types of flanges are requested. Overall lengths of the SHP and LHP series are based on 300# Raised Face Slip On flanges.

#### Fixed Plate Flanges–Type 44

Type 44 expansion joints are provided with 150# drilling carbon steel flanges (AWWA Class D C207) fixed on each end of the expansion joint. Bellows necks are welded directly to the flanges.

#### Floating Plate Flanges-Type 66

Type 66 expansion joints are provided with 150# drilling carbon steel flanges (AWWA Class D C207) floating on each end of the expansion joint. Bellows necks are flared (Vanstone) to retain the flanges. The floating flange arrangement allows use of carbon steel flanges when all wetted materials are required to be either Stainless Steel or an alloy material. Floating flanges also permit bolt hole alignment in the field.

#### Weld Ends-Type 22

Type 22 expansion joints are provided with carbon steel weld ends on each end. Weld ends are beveled per ANSI standards. Schedule 40 (sch std.) pipe is used through 24" ND and 1/4" wall thickness for sizes over 24" unless otherwise specified.

#### Raised Face Slip On Flanges Type-55

Type 55 expansion joints are provided with 150# drilling and 300# drilling carbon steel Raised Face Slip On flanges.

#### PRESSURE BALANCED & DUAL EXPANSION JOINTS

Custom design and manufacture various types of expansion joints based on your needs and requirements of the system. Some commonly used non-standard expansion joint types are:

#### **Dual Expansion Joints**

Dual expansion joints are used where axial movement is larger than can be absorbed by a single expansion joint. The dual assembly consists of two single bellows connected by an interconnecting weld end. In some cases, this interconnecting weld end has an integral anchor base. The anchor base is designed to withstand the forces required to move either bellows but not for pressure forces. When no anchor base is used, interconnecting weld end must be anchored with standard pipe anchors.

Dual expansion joints can also be used where large amount of movement in any combination (i.e. axial, lateral and angular rotation) is required which cannot be absorbed by a single expansion joint. In this type of application, the interconnecting weld end is not anchored but the remaining system must be properly anchored and guided.

#### **Elbow Pressure Balanced Unit**

"MATCHLESS" Elbow Pressure Balanced expansion joints are designed to absorb axial and/or lateral deflection while continuously restraining pressure force. Balance (out of line) bellows creates an equal and opposite force to the working (in line) bellows.

The typical arrangement (as shown) is to have a balance side and a working side separated by an elbowed mid-section. Tie-rods are used to balance and restrain pressure forces.

#### Additional Types of Expansion Joints Available

- Gimbal Expansion Joint
- Hinge Expansion Joint
- In-line Pressure Balanced Expansion Joint
- Externally Pressurized

- Expansion Joints with Pantograph Linkage
- Expansion Joints with Two-Ply Testable Bellows
- Jacketed Expansion Joints







Ш

### "MATCHLESS" BELLOWS-TYPE EXPANSION JOINTS Short style Type 22, 55, 44 & 66

SLP-Short Style Low Pressure SMP-Short Style Medium Pressure SHP-Short Style High Pressure Standard Sizes 2" through 144" diameter



Nom. Size (in.)	Series	Pressure (psig)	Raised F on Flang	Face Slip- e Type 55	Welding Typ	g Nipples be 22	Fixed Flanges	I Plate Type 44	Floating Plate Flanges Type 66		No Mo	n-Concurre vements (ii	nt 1.)	Spring Rates (Ibs./in.)		
			Overall Length (in.)	Approx. Wt. (Lbs.)	Overall Length (in.)	Approx. Wt. (Lbs.)	Overall Length (in.)	Approx. Wt. (Lbs.)	Overall Length (in.)	Approx. Wt. (Lbs.)	Comp.	Extension	Lateral	Axial	Lateral	
2	SLP SMP SHP	50 150 300	6 6 6	11 11 15	6	2 4 4	6	10 10 10	6	10 10 10	0.64	0.16	0.1	681 681 681	945 945 945	
2.5	SLP SMP SHP	50 150 300	6 6 6.5	15 15 21	7	3 3 3	6	13 13 13	6	13 13 13	0.64	0.16	0.1	664 664 1,253	1,304 1,304 2,469	
3	SLP SMP SHP	50 150 300	6 6 7	17 17 27	9	4 4 4	6	13 13 13	6	13 13 13	0.64	0.16	0.1	703 703 1,343	1,962 1,962 3,760	
3.5	SLP SMP SHP	50 150 300	6 6 7	23 23 35	9	4 4 4	6	20 20 20	6	20 20 20	0.64	0.16	0.1	728 728 1,342	2,132 2,132 3,938	
4	SLP SMP SHP	50 150 300	7 7 7.5	27 27 45	9	5 5 5	7	18 18 18	7	18 18 18	0.64	0.16	0.1	756 756 1,410	2,740 2,740 5,118	
5	SLP SMP SHP	50 150 300	8 8 8	31 31 58	10	7 7 8	8	21 21 22	8	21 21 22	1.04	0.26	0.1	564 581 2,150	3,088 2,328 10,931	
6	SLP SMP SHP	50 150 300	8 8 9	40 40 81	10	9 9 10	8	26 26 27	8	26 26 27	1.04	0.26	0.2 0.1 0.1	337 744 2,846	1,973 3,975 14,368	
8	SLP SMP SHP	50 150 300	9 9.5 11	63 64 123	10	9 10 12	8	46 37 40	8	46 37 40	1.28	0.32	0.2 0.1 0.1	250 901 2,833	1,307 4,720 14,893	
10	SLP SMP SHP	50 150 300	9.5 9.5 11	89 91 169	10	12 14 15	8	46 48 50	8	46 48 50	1.28	0.32	0.2 0.1 0.1	397 1,346 4,119	3,273 11,120 34,129	
12	SLP SMP SHP	50 150 300	10 10 12	132 134 242	10	15 17 22	9	76 78 84	9	76 78 84	1.28	0.32	0.1	309 1,534 7,148	3,075 14,342 62,597	
14	SLP SMP SHP	50 150 300	10.5 10.5 12.5	184 189 348	12	18 23 31	9	107 112 121	9	107 112 121	1.28	0.32	0.1	356 1,899 3,797	4,181 20,721 41,651	
16	SLP SMP SHP	50 150 300	11 11 13	202 206 400	12	22 26 34	9	138 142 152	9	138 142 152	1.28	0.32	0.1	651 2,452 4,887	9,449 35,626 59,981	
18	SLP SMP SHP	50 150 300	12 12 14	267 272 524	12	25 30 40	10	149 154 166	10	149 154 166	1.44	0.36	0.1	559 2,380 4,721	10,229 43,365 72,641	
20	SLP SMP SHP	50 150 300	12 12 14	342 347 665	14	41 46 61	10	191 196 214	10	191 196 214	1.44	0.36	0.1	753 2,960 5,818	17,181 67,035 132,337	
22	SLP SMP SHP	50 150 300	12 12.5 14.5	379 389 779	14	41 51 68	10	219 229 249	10	219 229 249	1.44	0.36	0.1	599 3,248 6,380	16,035 83,910 139,960	
24	SLP SMP SHP	50 150 300	13 13 15	455 461 992	14	50 55 74	11	265 271 292	11	265 271 292	1.44	0.36	0.1	898 3,544 6,958	28,938 108,343 180,225	

Catalog pressure rating and movements are based upon a design temperature range of -20°F to 500°F Lateral movement is total lateral movement. Example: 1" lateral movement = +/-0.5" lateral movement



### "MATCHLESS" BELLOWS-TYPE EXPANSION JOINTS LONG STYLE TYPE 22, 55, 44 & 66 "Matchless F

Standard Sizes 2" through 144" diameter

LLP-Long Style Low Pressure LMP-Long Style Medium Pressure LHP-Long Style High Pressure







"Matchless Expansion Joint Bellows are produced from fully annealed stainless steel sheet rolled into a tube and seam welded. Units are capable of handling vacuum and pressure to 300 PSIG. **Standard bellows**: 321 stainless steel. Various alloys are available to withstand your toughest applications. **Standard fittings**: Weld ends, fixed and floating plate flanges as well as Raised Face Slip On Flanges.

Nom. Size	Series	Pressure (psig)	Raised Face Slip- on Flange Type 55		Welding Nipples Type 22		Fixed 14 Flanges	50# Plate 5 Type 44	Vanstone 150# Plate Flanges Style 66		No M	on-Concur ovement (	Spring Rates (Ibs./in.)		
(In.)			Overall Length (in.)	Approx. Wt. (Lbs.)	Overall Length (in.)	Approx. Wt. (Lbs.)	Overall Length (in.)	Approx. Wt. (Lbs.)	Overall Length (in.)	Approx. Wt. (Lbs.)	Comp.	Extension	Lateral	Axial	Lateral
2	LLP LMP LHP	50 150 300	8 8 8	11 11 15	10	2 6 6	8	10 10 10	8	10 10 10	1.60 0.96	0.40 0.24	0.5 0.3 0.3	389 483 1,052	180 219 471
2.5	LLP LMP LHP	50 150 300	10 10 10.5	15 15 22	10	2 2 3	8	13 13 14	8	13 13 14	1.60 1.20	0.40 0.30	0.5 0.3 0.2	279 688 1,403	105 253 896
3	LLP LMP LHP	50 150 300	9.5 9.5 11	17 18 28	10	3 4 3	8	13 14 14	8	13 14 14	1.60 1.20	0.40 0.30	0.6 0.4 0.3	312 721 1,474	166 379 778
3.5	LLP LMP LHP	50 150 300	10 8.5 9.5	23 24 36	10	3 5 5	8	20 21 21	8	20 21 21	1.60 1.28	0.40	0.6 0.4 0.3	336 589 1,209	228 686 1,284
4	LLP LMP LHP	50 150 300	10 10 11	28 28 47	10	4 4 5	8	19 19 20	8	19 19 20	1.60 1.28	0.40 0.32	0.7 0.4 0.3	378 743 1,564	342 671 1,412
5	LLP LMP LHP	50 150 300	11 11.5 13	33 34 61	14	9 9 10	11	23 24 25	11	23 24 25	2.40 1.60	0.60	0.5 0.5 0.4	242 922 1,760	249 862 1,601
6	LLP LMP LHP	50 150 300	12 12 13	41 43 87	14	11 12 14	12	27 29 33	12	27 29 33	2.40 1.76	0.60 0.44	1.0 0.6 0.5	260 762 1,924	369 1,003 2,292
8	LLP LMP LHP	50 150 300	13 13 15	67 69 126	17	21 23 23	12	50 42 43	12	50 42 43	3.20 2.08	0.80 0.52	1.2 0.7 0.5	541 1,014 1,846	951 1,788 3,240
10	LLP LMP LHP	50 150 300	12.5 12.5 14	91 97 173	17	29 34 33	12	48 54 54	12	48 54 54	3.20 2.08	0.80	1.2 0.7 0.5	263 984 2,318	856 3,344 6,826
12	LLP LMP LHP	50 150 300	14.5 15 16.5	136 141 251	17	30 34 40	12	80 85 93	12	80 85 93	3.20 2.08	0.80	1.2 0.7 0.5	335 1,144 11,532	1,015 3,311 3,971
14	LLP LMP LHP	50 150 300	15 15 16	189 195 358	17	25 31 45	12	112 118 131	12	112 118 131	2.88	0.72	1.0 0.6 0.4	359 1,055 2,373	1,291 3,850 8,924
16	LLP LMP LHP	50 150 300	15.5 15.5 16.5	206 213 411	17	29 35 50	12	142 149 163	12	142 149 163	2.88	0.72	1.0 0.6 0.4	362 1,362 3,054	1,676 6,318 14,233
18	LLP LMP LHP	50 150 300	15.5 16 17	272 279 537	17	33 39 61	12	154 161 179	12	154 161 179	2.88	0.72	0.7 0.5 0.4	419 1,588 3,257	2,415 9,163 19,258
20	LLP LMP LHP	50 150 300	15 15 17	342 349 673	17	40 46 70	12	191 198 222	12	191 198 222	2.88	0.72	0.7 0.5 0.4	428 1,721 3,134	3,761 14,290 26,708
22	LLP LMP LHP	50 150 300	16.5 17 18.5	387 399 793	18	47 57 83	13	227 239 263	13	227 239 263	2.88	0.72	0.6 0.4 0.3	346 2,730 6,012	3,068 24,241 49,988
24	LLP LMP LHP	50 150 300	15 15 17.5	460 468 1,007	18	65 71 97	13	270 278 307	13	270 278 307	2.88	0.72	0.2 0.2 0.2	641 2,531 4,970	10,432 38,408 75,699

Catalog pressure rating and movements are based upon a design temperature range of -20°F to 500°F

Lateral movement is total lateral movement. Example: 1" lateral movement = +/-0.5" lateral movement



### "MASTER" FLEXIBLE METAL PUMP CONNECTORS

"MASTER" Flexible Metal Pump Connectors are designed with a flexible core of corrugated-type 321 or 316 stainless hose under the 304 stainless steel braid. Flatface flanges are standard, however, other types (150# R.F.S.O, 300# R.F.S.O flanges, stainless, metric flanges, male nipples) are available. A wire braid is used over the flexible core on most designs to provide strength for the rated operating pressure.

Note: TEFLON<sup>®</sup> lining is available.

Flanged Part Number

SFPC 025 SFPC 03 SFPC 04 SFPC 05 SFPC 06 SFPC 08 SFPC 10 SFPC 12 SFPC 14



	Temperature Compensation				
Temperature ∘F	Temp. Comp. Factor	Temp.°F	Temp. Comp. Factor		
Room Temp.	1.00	600	.74		
200	.94	700	.70		
300	.88	800	.66		
400	.93	850	.64		
500	.78				

Temperature: Elevated temperatures reduce both rated movement and pressure capabilities. To compensate, multiply both rated movement and maximum pressure by the temperature compensating the chart.



Metal Pump Connector Speci⊡cations				Threaded Male NPT Pump Connector Speci⊡cations					
Flange IPS and Nominal Hose I.D. (in.)	Overall Length (in.)	Max. Working Pressure at Room Temp. (psi)	Approx. Wt. (Ibs) Per Unit	Part Number	Nominal Hose I.D. (in.)	Overall Length (in.)	Max. Working Pressure at Room Temp. (psi)	Approx. Wt. (Ibs) Per Unit	
2-1/2	9"	300	16	SMPC 0.5	1/2	6-1/2	950	1/2	
3	9"	250	19	SMPC 0.75	3/4	7"	700	1	
4	9"	200	23	SMPC 01	1	8"	550	1	
5	11"	200	32	SMPC 01 25	1 1/4	9 1/2"	420	1 1/2	
6	11"	200	40	51011 C 01.25	1-1/4	0-1/2	420	1-1/2	
8	12"	200	62	SMPC 01.5	1-1/2	9"	380	2	
10	13"	150	101	SMPC 02	2	10-1/2"	300	2-1/2	
12	14"	125	153	SMPC 02.5	2-1/2	12"	300	2-1/2	
12	14	123	133	SMPC 03	3	14"	250	4	
14	14"	100	200	SMPC 04	4	16"	200	4-1/2	

### **TUBE-FLEX ENGINE EXHAUST EXPANSION JOINTS**

"Tube-Flex" Series 7000 Stainless Steel Engine exhaust Expansion Joints are manufactured from a thin-gauge stainless steel tube. This tubular body is formed into corrugations forming a bellows providing a highly flexible and durable connector for the extremes of exhausting engine gases.

"Tube-Flex" Style U-100 Expansion Joints can absorb longitudinal and lateral movement in one cycle. Opposite ends of the joint can move laterally in opposite directions to complete an expansion cycle. U-100 joints can be lagged with fire-proofing insulation for fire protection without affecting flexibility.







## H XPANSION | OINTS $\geq$ Ζ $\bigcirc$ 0 Ζ Ζ П $\cap$ TO P

### FLEXIBLE CORRUGATED METAL HOSE AND ASSEMBLIES



"Flexible" Metal Hoses are designed as general all-purpose hose for conveying liquids and gases. They are pressure-tight and are used for applications involving vibration or flexure. They are available as Series SS-stainless steel types 304, 321 and 316/ 316L or Series B-Bronze.

Series SS (standard gauge) hoses are constructed of close pitch, annular corrugation in (1) hose only; (2) hose with single braid; or (3) hose with double braid con gurations.

Series B hoses are constructed with annular corrugations from seamless tin bronze tubing usually covered with a bronze wire braid.

#### Fittings

Constant

Flexing

Inches

Static

Bend

Inches

Approx.

Weight

Lbs. Per

Foot

15.0

Offers the industry's widest range of standard fittings for use in metal hose assemblies. Practically any fitting can be attached to corrugated metal hose. Welding or brazing must be compatible with the metals used. Available in a wide selection of materials.

- A. Male Nipple: Available in all sizes and materials (MN).
- B. Hex Male Nipple: Available in 1/4" to 1-1/2" in brass, steel and stainless steel (HMN).
- C. Female Adaptor Unions: Available in brass only, 1/4" to 3". Male adaptor unions available in certain sizes (FAU).
- D. Female Pipe Unions: Available in 1/4" to 4" in all metals and standard pressure ratings (FPU).
- E. Fixed Flange: Available in ASA, MSS or plate. Materials include forged steel, stainless steel, monel, aluminum and brass (FPF).
- F. Floating Flange: Normally forged steel, supplied with stub end suitable for material handled. All canges available in standard or special drillings as required (FSF).
- G. Female Pipe Couplings: Available in standard sizes and most materials (FPC).

Also available in	sizes	14"-30"
-------------------	-------	---------

Temperature Compensation					
Temp. ∘F	Temp. Comp. Factor	Temp. ∘F	Temp. Comp. Factor		
Room Temp. 200 300 400 500	1.00 .94 .88 .93 .78	600 700 800 850	.74 .70 .66 .64		

Temperature: Elevated temperatures reduce both rated movement and pressure capabilities. To compensate, multiply both rated movement and maximum pressure by the temperature compensating the chart.



L									
	1/4	SS-0 SS-1 SS-2	.48 .54 .60	200 1500 2250	300 2250 3375	- 6000 9000	5	1	.12 .21 .30
	3/8	SS-0 SS-1 SS-2	.66 .72 .78	125 1250 1875	185 1875 2800	- 5000 7500	6	1-1/4	.20 .33 .46
	1/2	SS-0 SS-1 SS-2	.82 .88 .94	90 1050 1575	135 1570 2355	- 4200 6250	7	1-1/2	.22 .35 .48
	3/4	SS-0 SS-1 SS-2	1.22 1.28 1.35	75 880 1300	110 1320 1950	- 3520 5400	8	2	.45 .65 .85
	1	SS-0 SS-1 SS-2	1.47 1.52 1.60	55 615 900	45 925 1350	- 2460 3600	9	3	.60 .80 1.0
	1-1/4	SS-0 SS-1 SS-2	1.83 1.89 1.95	30 570 850	45 850 1275	- 2275 3400	10	4	.70 1.0 1.3
	1-1/2	SS-0 SS-1 SS-2	2.08 2.14 2.20	25 425 637	35 637 955	- 1700 2550	11	5	1.0 1.4 1.8
	2	SS-0 SS-1 SS-2	2.61 2.69 2.77	15 470 695	22 710 1045	- 1880 2780	13	6	1.2 1.8 2.4
	2-1/2	SS-0 SS-1 SS-2	3.34 3.42 3.50	12 450 675	18 675 1012	- 1800 2700	15	7	1.3 2.1 2.9
	3	SS-0 SS-1 SS-2	3.88 3.99 4.11	10 285 400	15 428 600	- 1140 1600	18	9	1.7 2.4 3.1
	4	SS-0 SS-1 SS-2	4.80 4.90 5.00	8 250 325	12 375 487	- 1000 1300	22	11	1.9 3.5 4.1
	5	SS-0 SS-1 SS-2	5.80 6.02 6.24	8 225 335	12 338 480	- 900 1330	28	14	3.9 5.4 6.9
	6	SS-0 SS-1 SS-2	7.00 7.14 7.27	5 200 300	7 300 450	- 800 1200	34	16	4.2 6.1 8.0
ľ	8	SS-0 SS-1	9.00 9.26	3 200	5 300	- 800	42	20	5.4 9.4
	10	SS-0 SS-1	11.30 11.55	3 150	4.5 225	600	50	24	6.9 13.3
ĺ	10	SS-0	13.25	2	3	-	59	20	8.6

Series SS-Corrugated Metal Hose Speci cations

Maximum

Test

Pressure

(PSIG)

70'

Rated

Burst

Pressure

(PSIG)

70\*

Maximum

Working

Pressure

(PSIG) 70

Nominal

N.D. (in.)

12

SS-0 Hose Only

SS-1 Hose with single braid

SS-2 Hose with double braid

SS-1

13 50

Hose

Type

Nominal

Hose

O.D.

Inches

the above data are based upon the wire braid manufactured by National Standards.

The pressure rating and outside diameter in

150

225

600

SilverFox Enterprises P/L Australia • Email: silverfox.ent@bigpond.com • Phone: 0448 889 914

\* Heavy duty hose is available for size 1"-2"

28

### **"THERMA-FLEX" FLUE DUCT EXPANSION JOINTS**

"Therma-Flex" Expansion Joints are non-metallic flue duct expansion joints or flexible connectors which, when properly designed, provide stress relief for piping and ducting systems by absorbing thermal growth and shock, isolating mechanical vibration and allowing for misalignments.

Flue duct expansion joints are custom engineered products designed to handle low pressure (±3 psig) applications with temperatures from -40°F to more than 2000°F. The expansion joints are manufactured using innovative non-metallic materials and designs.

#### Service Features of Fabric Expansion Joints

- Absorb axial, transverse and torsional movements
- More movement in shorter face-to-face
- Less force to flex than metal expansion joints
- Excellent corrosion and chemical resistance
- Temperature capability range (-40°F to more than 2000°F)
- · Lower shipping and installation costs
- Variety of flexible belt materials available: -Single-layer and composite belts
  - -Elastomers have excellent abrasion resistance -Custom designed for each specific application
- \*Alternative replacement for rectangular or square metal joints in some cases

### **Product Applications**

#### **Design Considerations**

- Media: Internal and External Environment
- Temperature: Constant operating and maximum excursion
- Pressure: Normal positive or negative
- · Movements: Axial and lateral, simultaneously or independently
- Installation: Existing equipment and duct flanges
- Assembly: Factory-assembled or field-spliced

Industrial applications can be separated into general categories based on the media composition (Air or Gas) and temperature. This section is designed to aid in the selection of the appropriate expansion joint for the specific application range. All plants are unique, therefore the service locations and temperatures may vary.

#### Ambient Air Services (-40°F to 400°F)

Ambient air temperature clean air without particulate or chemicals to damage the flexible element. Expansion joint is used frequently for vibration and sound attenuation from fan equipment.

Locations for use:

- FD Fan Intake/Outlet
- · Primary Air Fan to Air Heater
- Service Air Intakes
- · Primary Air to Recovery Boiler

Integrally flanged elastomeric joint is suggested, using either the THERMA-FLEX or MIGHTY SPAN styles. Neoprene, EPDM or Viton<sup>®</sup> single layer belts are frequently used.









#### Hot Air Services (500°F to 800°F)

Clean air coming into contact with hot flue gases at the Air Pre-Heater where temperatures are elevated with minimal particulate and or gas carryover. Expansion joint will see thermal movements and vibration. Elevated temperatures require a composite flexible element and a flow liner. Locations for use:

- - Air Heater/Air Outlet
  - Over Fire Air Fans
  - Secondary Air fan
  - Mill Air

A THERMA-FLEX flat composite belt with a bolt in or weld in frame design and a flow liner is suggested. The weld in outboard angle frame design with field welded flow liner (TWCP600VIFL) is shown.

#### Low to moderate temperature Flue Gas services (150°F to 600°F)

Flue gas which has passed through an air pre-heater and dust collector to reduce the temperature and particulate level. Flue gas may cycle near the dew point where condensation can occur and chemicals are present. Expansion joint may see thermal movements, vibration and chemical attack.

Locations for use:

- Precip. Outlet
- I.D. Fan Inlet/Outlet
- Scrubber Inlet/Outlet
- HRSG Inlet/Outlet
- Re-heater Inlet/Outlet

Single-layer belt with chemical barrier is suggested in either integrally flanged or flat belt type. Such a as the THERMA-FLEX weld in outboard angle frame design and PTFE coated single layer belt with gas film layer (TWFPR500TA) shown.

#### Hot Flue Gas Services (600°F to 1200°F)

Flue gas directly after combustion stage at elevated temperatures with possible particulate present. Expansion joint is used for possible large thermal movements at elevated temperatures.

Locations for use:

- Economizer Outlet
- Cyclone Inlet/Outlet
- · Precip. Inlet
- Recovery Boiler Outlet
- Air Heater Gas Inlet/Outlet
- Gas Recirculation System

THERMA-FLEX high temperature composite flat belt style setback frames, cavity pillow and flow liners are suggested. The standard "Z" frame design with telescoping flow liners (ZZWCP1000FPRP shown) or "J" frame with shop liner are two designs used in these applications.

#### Standard Non-Metallic Expansion Joint Profiles











25 Lissanthe Street, Mount Annan NSW 2567 Australia Mobile: **0448 889 914** | Fax: (02) 8783 5094 Email: silverfox.ent@bigpond.com | Web: www.landia.dk