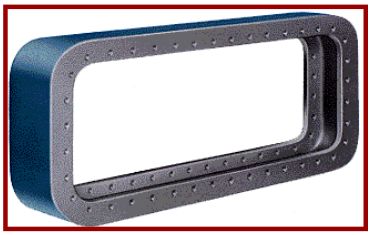
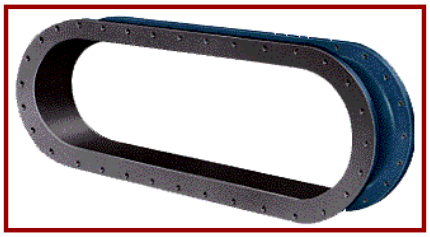
RUBBER EXPANSION JOINTS





Rubber expansion joints are available from **Flex-Weld, Inc. /Keflex Engineered Products** as standard or custom offerings. We have a wider array of material and configuration types than any other manufacturer.

Our products are designed and engineered to carry a variety of media in pressure or vacuum applications. They absorb harmful system vibration and contract or expand in response to pipe motion induced from thermal expansion and contraction, respectively.

We offer any type of rubber expansion joints from single sphere to triple, floating flange to cable-tied, standard sizes and diameters to custom lengths and reducers. Material ranges from standard Neoprene and EPDM to *Hypalon or Teflon. We have in-house molding, custom ducting assembly lines, or off-shore proprietary sourcing. We will design, engineer, and fabricate an expansion joint to meet the requirements of the application. We can cross-reference to any existing product or redesign to fit a new system requirement.

Additional Literature:

Expansion Joint Selector Guide (308/311)
Single Externally Pressurized Expansion Joints
Dual Externally Pressurized Expansion Joints
Fabric Expansion Joints
Metal Expansion Joints–Condensed Capabilities

*Hypalon and Teflon, as used throughout this brochure, are registered trademarks of DuPont Dow Elastomers and the DuPont Company, respectively.

ADVANTAGES:

- Higher Pressures
- Wide Array of Styles & Materials
- U.S. Coast Guard Approved
- Large Inventory
- Lowest Cost
- Engineers On-Staff

MODELS:

SNN / SEE
TNN / TEE
CNN / CEE
Marine Flex

KEFLEX

FLEX-WELD, INC./KEFLEX ™ 1425 Lake Avenue Woodstock, IL 60098 (800) 323-6893 Fax: (815) 334-3689 www.flex-weld.com

RUBBER EXPANSION JOINTS

RUBBER EXPANSION JOINTS

Rubber Expansion Joints are inexpensive products that provide critical protection of piping and mechanical equipment in a multitude of engineered applications. If designed, manufactured, applied, and installed properly, rubber expansion joints can serve to:

Absorb pump and mechanical equipment vibration

Absorb and deaden noise generated by the system

Absorb axial motion- in compression and extension

Accommodate lateral offset induced from transient system movements

Allow for misalignment in problematic pipe runs

Reduce stress on mechanical equipment, piping and solid joints and unions.

Eliminate electrolysis in dissimilar metals employed in the same pipe system Protect piping systems against pressure surges

ADVANTAGES OVER METAL EXPANSION JOINTS

Noise Reduction
Low Cost
Space saving design

FEATURES / SERVICES

Higher Pressures
Lower Force to Actuate
Large Stocking Inventory with same day shipping on standards

Engineering Analysis
Metallurgical Analysis
On-Site Consultation
Chemical Media Analysis

Retrofitting
Cross Reference
Engineering Staff Available for Consultation 24/7

OPTIONS—STANDARD & CUSTOM

Materials:
Neoprene
EPDM
Teflon
Butyl
Hypalon
Nitrile
All Domestic

Styles:
Sphere Type – Single & Dual
Wide Arch
Reducing
Cable-Tied
Female Union
Custom Styles & Lengths

Flange Type:
Floating
Integrated
Custom

Drill Pattern:
Standard
Navy

Shape:
Round
Rectangular
Oval
Custom

1-800-323-6893

RUBBER EXPANSION JOINTS

SELECTION APPLICATION GUIDELINES

Single Sphere— Used in tight spaces

Twin Sphere—Use when additional movement is necessary

Wide Arch— Non-clogging

Neoprene— Cold water

EPDM— Hot water applications

Floating Flanges— Problematic bolt hole alignment

Control Rods— Concerns over pipe anchoring and guiding

SINGLE RUBBER EXPANSION JOINTS—SERIES S

Sizes • Movements • Pressure • Weights

Nominal Pipe Size I.D. of E.J.	KEFLEX™ Model Number	F/F Installed Neutral Length	Allowable Movements from Neutral				Pressures @ 170° F		Weights	
			Axial Compression	Axial Extension	± Lateral Deflection	± Angular Deflection	Positive P.S.I.G.	Negative In. of Hg.	Joint & Flanges	Control Rod Set
1 ½	F014SNN060	6.0	.5	.375	.5	27°	225	26	6.1	4.6
2	F020SNN060	6.0	.5	.375	.5	20°	225	26	12.3	7.6
2 ½	F024SNN060	6.0	.5	.375	.5	17°	225	26	12.3	7.6
3	F030SNN060	6.0	.5	.375	.5	14°	225	26	14.0	8.3
4	F040SNN060	6.0	.75	.5	.5	14°	225	26	18.3	7.4
5	F050SNN060	6.0	.75	.5	.5	11°	225	26	22.8	8.3
6	F060SNN060	6.0	.75	.5	.5	9°	225	26	26.8	10.4
8	F080SNN060	6.0	.75	.5	.5	7°	225	26	40.6	13.4
10	F100SNN080	8.0	1.0	.625	.75	7°	225	26	56.6	21.3
12	F120SNN080	8.0	1.0	.625	.75	6°	225	26	83.0	27.0
14	F140SNN080	8.0	1.0	.625	.75	5°	150	26	115.0	28.0
16	F160SNN080	8.0	1.0	.625	.75	4°	125	26	165.0	26.8
18	F180SNN080	8.0	1.0	.625	.75	4°	125	26	168.0	31.4
20	F200SNN080	8.0	1.0	.625	.75	3°	125	26	170.0	32.4
24	F240SNN100	10.0	1.0	.625	.75	3°	110	26	225.0	45.0

Note: Replaces WA225NFF Series

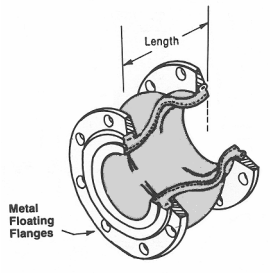
RUBBER EXPANSION JOINTS

TWINSPHERE RUBBER EXPANSION JOINTS—SERIES T

Sizes • Movements • Pressure • Weights

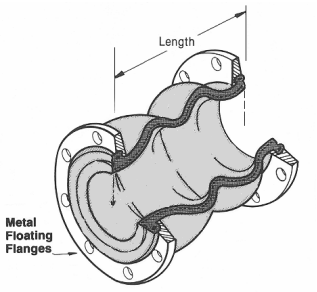
Nominal Pipe Size I.D. of E.J.	KEFLEX™ Model Number	F/F Installed Neutral Length	Allowable Movements from Neutral				Pressures @ 170° F		Weights	
			Axial Compression	Axial Extension	± Lateral Deflection	± Angular Deflection	Positive P.S.I.G.	Negative In. of Hg.	Joint & Flanges	Control Rod Set
2	F020TNN070	7.0	2.0	1.18	1.75	45°	225	26	9.0	7.0
2 ½	F024TNN070	7.0	2.0	1.18	1.75	43°	225	26	13.3	8.0
3	F030TNN070	7.0	2.0	1.18	1.75	38°	225	26	14.3	8.6
4	F040TNN090	9.0	2.0	1.375	1.562	34°	225	26	20.3	8.0
5	F050TNN090	9.0	2.0	1.375	1.562	29°	225	26	24.5	8.3
6	F060TNN090	9.0	2.0	1.375	1.562	25°	225	26	29.5	11.7
8	F080TNN130	13.0	2.375	1.375	1.375	19°	225	26	43.8	15.4
10	F100TNN130	13.0	2.375	1.375	1.375	15°	225	26	65.5	24.5
12	F120TNN130	13.0	2.375	1.375	1.375	13°	225	26	95.0	31.0

Note: Replaces KTWNNFF Series



Series S
Single Sphere Connector

Series T
Twin Sphere Connector



NOTES:

1. Dimensions in inches unless otherwise specified. Weights are approximate in pounds.
2. Pressure rating is based on 170° F operating temperature. At higher temperatures the pressure rating is reduced slightly. Refer to temperature/pressure relationship table.
3. Pressures shown are recommended "operating." Test pressure is 1.5 times "operating." Burst pressure is approximate 4 times "operating."
4. Vacuum rating is based on neutral installed length, without external load. Products should not be installed "extended" on vacuum applications.
5. All expansion joints are furnished complete with retaining flanges. Control units are recommended.
6. Cover and tube elastomer is neoprene unless otherwise stated.
7. Contact factory for other available sizes.

Control Rod/Unit Applications. Control unit assemblies are factory pre-set at the maximum allowable expansion and/or contraction of the connector. They are designed to absorb static pressure thrust developed at the expansion joint. When used in this manner, control unit assemblies are an additional safety factor, minimizing possible failure of the expansion joint or damage to the equipment.

1. **Anchored Systems:** Control unit assemblies are not required in piping systems that are anchored on both sides of the expansion joint, provided piping movements are within the rated movements. A pump is not considered an anchor.
2. **Unanchored Systems:** Control unit assemblies are always recommended in unanchored systems. Additionally, control unit assemblies must be used when the maximum pressure exceeds the value shown, or the movement exceeds the rated movement.
3. **Spring Mounted Equipment:** Control unit assemblies are always recommended for spring mounted equipment. Control units must be used when the maximum pressure exceeds the control unit value shown, or the movement exceeds the rated movement. Additionally, when control units are not used, the expansion joint must be installed "extended" in accordance with the Installation Instructions.

RUBBER EXPANSION JOINTS

SINGLE & TWINSPHERE RUBBER EXPANSION JOINTS—SERIES S & T

Drilling

Standard Flange Bolting Dimensions

Pipe Size	Flange O.D.	Bolt Circle	# Holes	Bolt Hole Thread
1-1/2"	5.0	3.88	4	1/2 - 13 UNC
2"	6.0	4.75	4	5/8 - 11 UNC
2-1/2"	7.0	5.5	4	5/8 - 11 UNC
3"	7.5	6.0	4	5/8 - 11 UNC
4"	9.0	7.5	8	5/8 - 11 UNC
5"	10.0	8.5	8	3/4 - 10 UNC
6"	11.0	9.5	8	3/4 - 10 UNC
8"	13.5	11.75	8	3/4 - 10 UNC
10"	16.0	14.25	12	7/8 - 9 UNC
12"	19.0	17.0	12	7/8 - 9 UNC
14"	21.0	18.75	12	1 - 8 UNC
16"	23.5	21.25	16	1 - 8 UNC
18"	25.0	22.75	16	1-1/8 - 7 UNC
20"	27.5	25.0	20	1-1/8 - 7 UNC
22"	29.5	27.25	20	1-1/4 - 7 UNC
24"	32.1	29.5	20	1-1/4 - 7 UNC

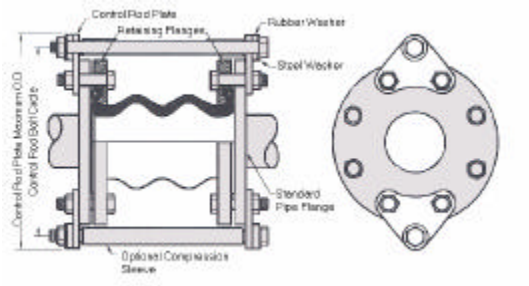
Drilling meets 125/150 lb. Standards of: ANSI B16.1, B16.24, B16.5;AWWA C-207–Class D & F; MSS-SP 44 & 51

Temperature / Pressure Relationship

Temperature Degrees Fahrenheit	Pressure Derating Factors
	Series S / Series T
170	1.00
180	.93
190	.86
200	.80
210	.73
220	.67
225 (max.)	.63

CONTROL RODS

Floating Flange and Control Unit



Technical Note: Flex-Weld strongly encourages the use of Control Rods in most, if not all, Rubber EJ applications. Most applications that utilize rubber expansion joints are not anchored properly. A simple pump connector does not protect against extreme stresses and strains produced by water hammer or air induced surge pressure, common to most applications, which greatly exceed normal system operating pressure.

Control Units

Add On Type

Pipe I.D.	Plate Width	# Rods	Rod Dia.	Pressure Rating
1-1/2"	.375	2	.5	510
2"	.375	2	.63	661
2-1/2"	.375	2	.63	529
3"	.375	2	.63	441
4"	.375	2	.63	311
5"	.375	2	.63	235
6"	.5	2	.63	186
8"	.5	2	.75	163
10"	.75	2	.88	163
12"	.75	2	1.0	160
14"	.75	2	1.0	112
16"	.75	2	1.13	113
18"	.75	2	1.13	94
20"	.75	2	1.13	79
22"	1.0	2	1.25	85
24"	1.0	2	1.25	74

KEFLEX RUBBER EXPANSION JOINTS

THREADED METAL / RUBBER EXPANSION JOINT—C SERIES*

*Replaces K500N Series

Styles • Sizes • Movements • Dimensions • Weights

Nominal Pipe Size / Connector I.D. C Series	"F" Installed Length				Total Travel		Allowable Movement from Neutral				Dimensions		Pressure @ 170°		Weights
	"F" Overall Neutral Length	Minimum Installed	Maximum Installed	Recommended Pipe Opening	Total Compressed	Total Extended	Axial Comp.	Axial Ext.	± Lateral Deflection	± Angular Deflection	"A" Length of Fitting	"B" Length of Rubber	Positive P.S.I.G.	Negative In. of Hg.	
3/4"	8.0	7.34 – 8.11		6.25	7.13 – 8.23		.87	.23	.87	32.2°	1.06	5.88	150	26	1.6
1"	8.0	7.34 – 8.11		6.25	7.13 – 8.23		.87	.23	.87	25.3°	1.14	5.72	150	26	2.6
1-1/4"	8.0	7.34 – 8.11		6.25	7.13 – 8.23		.87	.23	.87	20.7°	1.26	5.48	150	26	3.3
1-1/2"	8.0	7.34 – 8.11		6.25	7.13 – 8.23		.87	.23	.87	17.5°	1.30	5.40	150	26	4.0
2"	8.0	7.34 – 8.11		6.25	7.13 – 8.23		.87	.23	.87	13.3°	1.42	5.16	150	26	5.5

NOTES:

1. Dimensions in inches unless otherwise specified. Weights are approximate in pounds.
2. The amount of Angular Movement is based on the maximum allowable Extension Movement from Neutral. Angular Movement can be increased, if it is in conjunction with Compression Movement. KEFLEXTM is aware that some manufacturers of similar products list ratings of 45-50°. It is noted these companies do not give any parameters to justify their rating. KEFLEXTM questions that different I>D> sizes, each with the same Compression/Extension Movement can have the same Angular Movement.
3. The maximum operating pressure is 170 PSIG, the maximum operating negative pressure is 26 inches of mercury, the minimum test pressure is 225 PSIG and the minimum burst pressure is 600 PSIG. At high temperatures, the pressure rating is reduced slightly.
4. Cover and tube elastomer is butyl, unless otherwise specified.

Temperature / Pressure Relationship

Temperature Degrees Fahrenheit	Pressure Derating Factors
	Series C
170	1.00
180	.97
190	.94
200	.91
210	.88
220	.85
225 (max.)	.83

MARINE FLEX—WIDE ARCH RUBBER EXPANSION JOINT

Neoprene / Neoprene Cover & Tube

Greater Expansion & Compression Than Sphere Type

Custom Sizes Available!

U.S. COAST GUARD *APPROVED!*

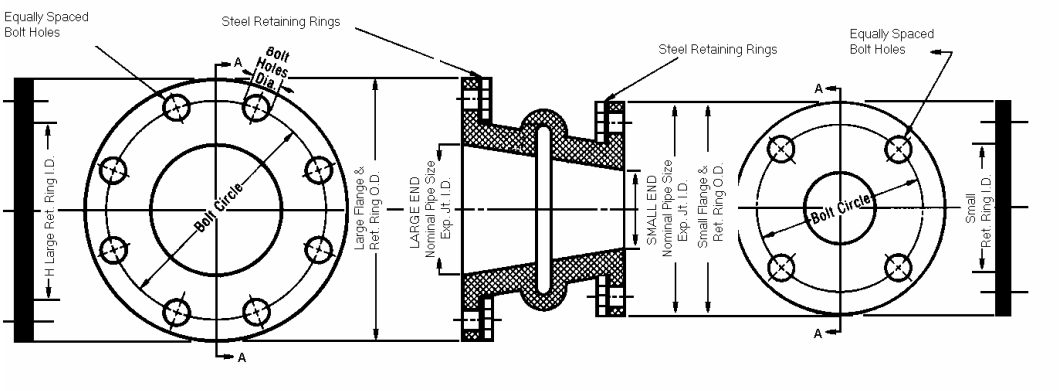
Sizes • Movements • Weights • Pressures

Nominal Pipe Size I.D.	Neutral Length	Movement Capability from Neutral Position				Weights	
		Axial Compression	Axial Extension	±Lateral Deflection	±Angular Deflection	Joint/ Rings	Control Rod Assembly
1"	6.0	1.2	0.6	0.6	50.4°	4.0	3.0
1-1/2"	6.0	1.2	0.6	0.6	38.1°	5.5	3.0
2"	6.0	1.4	0.7	0.6	34.2°	8.0	3.0
2-1/2"	6.0	1.4	0.7	0.6	27.6°	9.0	3.0
3"	6.0	1.4	0.7	0.6	23.0°	11.0	3.0
4"	6.0	1.4	0.7	0.6	18.8°	16.0	3.0
5"	6.0	1.4	0.7	0.6	15.2°	17.5	4.0
6"	6.0	1.4	0.7	0.6	12.8°	20.5	4.0
8"	6.0	1.4	0.7	0.6	9.7°	29.5	8.0
10"	8.0	1.6	0.8	0.8	9.1°	40.0	10.0
12"	8.0	1.6	0.8	0.5	7.6°	51.0	10.0
14"	8.0	1.6	0.8	0.8	6.5°	67.0	12.0
16"	8.0	1.6	0.8	0.8	5.7°	81.0	15.0
18"	8.0	1.6	0.8	0.8	5.1°	90.0	16.0
20"	8.0	1.6	0.8	0.8	5.7°	105.0	16.0

1-800-323-6893

RUBBER EXPANSION JOINTS

CONCENTRIC REDUCER RUBBER EXPANSION JOINT–R SERIES



Sizes • Movements • Weights • Pressures										
Reducer Joint Size: I.D. x I. D. x Length	Movement Capability from Neutral Position						Pressure		Weights	
	Axial Compression	Axial Extension	±Lateral Deflection	±Angular Deflection	Degrees of Torsional	Thrust Factor	Positive P.S.I.G.	Negative In. of Hg.	Joint/ Rings	Control Rod Assembly
3 x 2 x 6	.5	.25	.5	11.3°	3°	19.79	200	26	8.3	7.0
4 x 2 x 6	.5	.25	.5	9.5°	3°	23.92	200	26	10.8	7.1
4 x 3 x 6	.5	.25	.5	8.1°	3°	28.46	200	26	12.0	8.0
5 x 3 x 6	.5	.25	.5	7.1°	3°	33.38	190	26	13.4	10.0
5 x 4 x 6	.5	.25	.5	6.3°	3°	38.70	190	26	14.4	10.0
6 x 4 x 6	.5	.25	.5	5.7°	3°	44.41	190	26	15.9	11.0
6 x 5 x 6	.5	.25	.5	5.2°	3°	50.51	190	26	17.1	11.0
8 x 4 x 6	.75	.375	.5	7.1°	3°	63.51	190	26	22.9	19.0
8 x 5 x 6	.75	.375	.5	6.6°	3°	70.77	190	26	21.4	18.0
8 x 6 x 6	.75	.375	.5	6.1°	3°	78.42	190	26	23.0	18.0
10 x 6 x 8	.75	.375	.5	5.4°	3°	94.90	190	26	29.0	26.0
10 x 8 x 6	.75	.375	.5	4.8°	3°	112.95	190	26	29.9	25.0
12 x 8 x 6	.75	.375	.5	4.3°	3°	132.57	190	26	37.6	28.0
12 x 10 x 8	.75	.375	.5	3.9°	3°	153.76	190	26	47.8	24.0

NOTES:

1. Dimensions in inches unless otherwise specified. Weights are approximate in pounds.
2. The amount of Angular Movement is based on the maximum allowable Extension Movement from Neutral. Angular Movement can be increased, if it is in conjunction with Compression Movement.
3. Torsional Movement is expressed when the expansion joint is at Neutral.
4. To determine End Thrust: multiply Thrust Factor by operating pressure of system. This is End Thrust in P.S.I.G.
5. Pressure rating is based on 170° F. Operating Temperature. At higher temperatures, the pressure is slightly reduced. Minimum Burst Pressure is 4:1.
6. Cover and tube elastomer is butyl, unless otherwise specified.
7. Contact factory for other available size combinations or material types.

Temperature / Pressure Relationship	
Temperature Degrees Fahrenheit	**Pressure Derating Factors**
	Series R
170	1.00
180	.93
190	386
200	.80
210	.73
220	.67
225 (max.)	.67

KEFLEX SELECTION GUIDE

RUBBER EXPANSION JOINTS

NOTES:

The part numbering system for Rubber Expansion Joints of all types is a very simple system consisting of 6 base product specification indictors (A,B,C,D,E and F), which are explained in detail below.

ALL Rubber EJ lengths shown are standard lengths. For non-standard lengths, please consult yours manufacturer's representative or Flex-Weld, Inc. / Keflex™.

(A)	(B)	(C)	(D)	(E)
Manufacturer	**Diameter (nominal)**	**Body Type**	**Material (cover/tube)**	**Length (nominal)**

Example: For a Flex-Weld, 1-1/4" diameter, single sphere, neoprene/neoprene EJ, 6" in length, the part number would be:

(A)	(B)	(C)	(D)	(E)
F	**012**	**S**	**NN**	**060**

(A) **Manufacturer:** All Flex-Weld part numbers will begin with the letter "F" for "Flex-Weld".

(B) **Diameter (nominal):** All diameter sizes are denominated in 1/8" increments. The "012" example given indicates a nominal diameter of 1-1/4". With the exception of Reducing EJs (both concentric and eccentric), all diameters will be indicated with a 3 digit number. Concentric and Eccentric Reducing EJs are shown with a 5 digit number. The two diameter sizes are joined together into one single 5 digit number, simply eliminating the last digit of the second number. Examples are given below:

1) 3" x 2" x 6" Concentric Reducer EJ
** Diameter size is indicated with the 5 digit number "03002"
** The resulting part number would be F03002RNN060
2) 12" x 10" x 8" Concentric Reducer EJ
** Diameter size is indicated with the 5 digit number "12010"
** The resulting part number would be F12010RNN080

(C) **Body Type:** "S" example given indicates a single sphere body type. Available options shown below:

S	Single
T	Twin
R	Reducer (Concentric)
E	Reducer (Eccentric)
C	Connector (Threaded Metal)
F	Floating Flange Connector
W	Wide Arch (Marine Flex)

(D) **Material:** "NN" example given indicates Neoprene/Neoprene for both cover and tube material. Options available shown below:

BB	Butyl / Butyl	
EE	EPDM / EPDM	**For hot water & steam applications
ET	EPDM / Teflon	**Special—Consult manufacturer (Food oriented applications)
HH	Hypalon / Hypalon	
NH	Neoprene / Hypalon	
NJ	Neoprene / Nitrile(FDA)	**Special—Consult manufacturer (FDA controlled applications)
NN	Neoprene / Neoprene	
NP	Neoprene / Nitrile	
NT	Neoprene / Teflon	

(E) **Length (nominal):** All length measurements are denominated in 1/8" increments, in the same manner as are diameters. Examples are given below:

002	1/4"
014	1-1/2"
030	3"
120	12"