

Excellence in Manufacturing  
**UNAFLEX**<sup>®</sup> LLC.

SECURE-FLEX  
STYLE 7000



Product Guide  
ISO 9001:2008 CERTIFIED



### DuPont Kevlar<sup>®</sup> Reinforced Non-Metallic Expansion Joint

The Secure-Flex Van Stone interlocking flanges are compatible to mate with Lap-Joint Stub ends, Raised Face or Flat Full Face type flanges. For other mating flange surfaces (wafer type check or butterfly valves), a full face hard spacer may be required. Consult UNAFLEX<sup>®</sup> Engineering. The standard floating flanges are 150# drilled powder-coated carbon steel. Galvanized, stainless steel and other alloy type materials are also available. DIN-PN-JIS and other non-standard drill patterns customizable to your needs.

Kevlar<sup>®</sup> wrapped around a solid steel ring in the base of the rubber flange portion eliminates the tire cord from pulling out of the flange and provides superior sealing force when compressed against the mating flange during installation. The ring also prevents the distortion of the sealing surface if the installation tolerance is exceeded providing an "extra" margin of safety. Polyester tire cord may be substituted, with customer approval, for sizes 14" and above if design temperature does not exceed 250 degrees F.

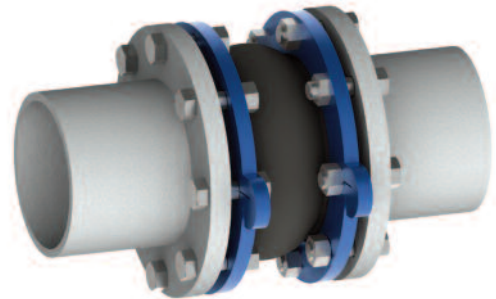
Our Flexible Tooling process allows us to manufacture the Expansion Joints to Non-Standard face-to-face dimensions. For smaller dimensions than Standard, design movements may be reduced.

Double and Triple arch expansion joints are also available for greater movement and reduced spring rates. We can also manufacture Concentric and Eccentric Tapers and Offset styles. Sizes up to 144" can be constructed.

**NOTE:** Decrease of working pressure for constructions made of Kevlar<sup>®</sup> above 350°F.  
Contact UNAFLEX<sup>®</sup> Engineering for further details.

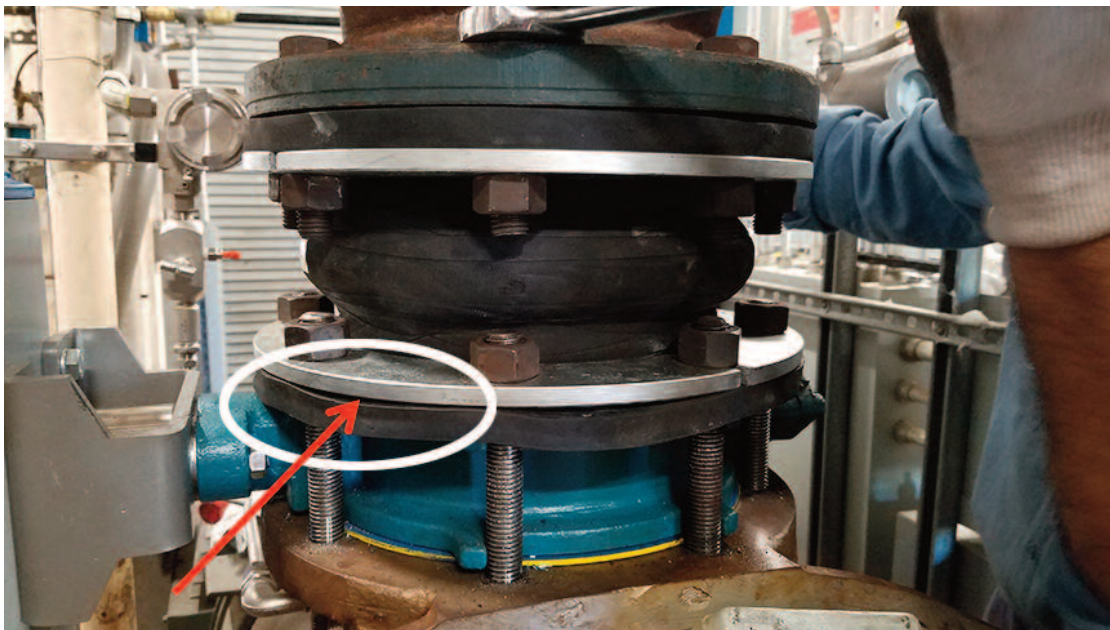
## Features and Benefits

- Precision Laser-Cut Carbon Steel Flanges
- Powder-Coated Flanges for maximum durability
- Floating Flange Design for ease of installation
- Kevlar® wrapped around a solid steel ring in the base of the rubber flange
  - Prevents the Tire-Cord from pulling out of the flange
  - Provides Superior Sealing
- Available in non-standard face-to-face dimensions
- PTFE lining available
- Compensates for offset bolt holes and piping misalignment



**NOTE:** Decrease of working pressure for constructions made of Kevlar® above 350°F. Contact UNAFLEX® Engineering for further details.

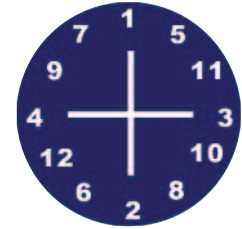
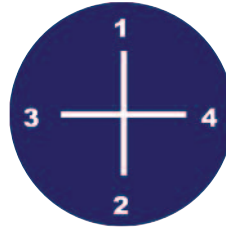
## Standard Spool Type Joint In Service



The above photo displays what happens when a standard spool type expansion joint is installed to a non-full face flange. **SecureFlex will perform optimally in this type of installation!**

## Bolt Torque Sequence

Finger-tighten all nuts and bolts. With a calibrated torque wrench, tighten each flange connection in a crisscross pattern (refer to figure). Using this pattern, tighten in 20% increments up to 80% of the final bolt torque. To achieve the final torque value, tighten



bolts in a sequential clockwise pattern once around the flange. Maximum recommended torque is suggested for systems that will be operating at or near the maximum pressure and temperature limits of the liner or conveying small molecular gasses.

## Retorquing

After the initial installation, we recommend checking the torque of each bolt after 24 hours have elapsed or a temperature cycle or pressure cycle (hydrostatic test) has occurred. Any bolts falling below the recommended value should be retorqued. Values should only be exceeded by 10% increments when necessary to reseal. All torquing on the process system should be done when the system is ambient and cool.



Retorquing should be performed annually, especially if the system experiences elevated temperatures or extreme temperature swings.

## Secure-Flex 7000 Available Materials and Temperature Ratings

In order to accommodate a wide array of temperatures, the Secure-Flex Style 7000 is available in an assortment of elastomer and reinforcement combinations. Temperature allowances may range from 180°F to 400°F.

### Primary Elastomers

- Natural Rubber - 180°F
- Gum Rubber - 180°F
- Neoprene - 225°F
- Nitrile - 225°F
- EPDM - 250°F
- Hypalon - 250°F
- Chlorobutyl - 250°F
- Viton® - 400°F
- PTFE/FEP/TFE - 400°F

### Other Elastomers Available

- White FDA
- NSF
- Peroxide Cured

300°F rating available for EPDM and Chlorobutyl for Air Service at **50 PSI MAX**

# Secure-Flex Single Arch DuPont Kevlar® Reinforced Non-Metallic Expansion Joint

Dimensions and Allowable Movements  
\*Custom face-to-face dimensions available

## Secure-Flex 7001 Series (Short Style)

Nominal I.D.	Standard Face-to-Face	Outside Diameter	Bolt Circle Diameter	Bolt Hole Diameter	Number of Bolt Holes	Design Pressure-PSI	Vacuum In. Hg	Axial Compression	Axial Elongation	Lateral Deflection	SPRING RATES-Lbs./In.			Bolt Torque-Ft./Lbs.	Weight-Lbs.
											Comopression	Lateral	Elongation		
DRILLING DATA-Inches					MOVEMENTS-Inches	SPRING RATES-Lbs./In.			Bolt Torque-Ft./Lbs.	Weight-Lbs.					
1.5	4	5.00	3.875	0.625		4	250	20			0.625	0.5	0.375	170	135
2	4	6.00	4.75	0.750	4	250	20	0.625	0.5	0.375	225	170	280	30-50	11
2.5	4	7.00	5.5	0.750	4	250	20	0.625	0.5	0.375	280	210	347	30-60	12
3	4	7.50	6.00	0.750	4	250	20	0.625	0.5	0.375	335	250	414	40-70	13
4	4	9.00	7.50	0.750	8	250	20	0.625	0.5	0.375	450	365	552	40-70	17
5	4	10.00	8.50	0.875	8	250	20	0.625	0.5	0.375	560	450	688	40-70	20
6	6	11.00	9.50	0.875	8	250	20	1	0.625	0.625	700	530	826	40-70	23
8	6	13.50	11.75	0.875	8	250	20	1	0.625	0.625	755	590	919	50-75	31
10	6	16.00	14.25	1.000	12	250	20	1	0.625	0.625	950	730	1148	50-75	40
12	6	19.00	17.00	1.000	12	250	20	1	0.625	0.625	1150	870	1378	50-75	45
14	9	21.00	18.75	1.125	12	250	20	1.125	0.875	0.875	1150	870	1378	50-90	75
16	9	23.50	21.25	1.125	16	250	20	1.125	0.875	0.875	1150	870	1378	50-90	85
18	9	25.00	22.75	1.250	16	180	20	1.125	0.875	0.875	1285	980	1551	50-90	98
20	9	27.50	25.00	1.250	20	180	20	1.125	0.875	0.875	1430	1090	1720	50-100	115
24	10	32.00	29.50	1.375	20	180	20	1.125	1	1	1710	1315	2065	50-100	125

### NOTES:

1. Full vacuum construction is available,consult UNAFLEX® Engineering
2. For higher pressures than shown, consult UNAFLEX® Engineering
3. Control units (sold separately) must be used when piping is not properly anchored
4. Safety Shields/Splash Guards recommended.



## Secure-Flex 7001 Series (Long Style)

Nominal I.D.	Standard Face-to-Face	Outside Diameter	Bolt Circle Diameter	Bolt Hole Diameter	Number of Bolt Holes	Design Pressure-PSI	Vacuum In. Hg	Axial Compression	Axial Elongation	Lateral Deflection	Comopression	Lateral	Elongation	Bolt Torque-Ft./Lbs.	Weight-Lbs.
1.5	6	5.00	3.875	0.625	4	250	26	1.25	0.75	0.75	170	135	225	30-50	10
2	6	6.00	4.75	0.750	4	250	26	1.25	0.75	0.75	225	170	280	30-50	11
2.5	6	7.00	5.50	0.750	4	250	26	1.25	0.75	0.75	280	210	347	30-60	12
3	6	7.50	6.00	0.750	4	250	26	1.25	0.75	0.75	335	250	414	40-70	13
4	6	9.00	7.50	0.750	8	250	26	1.25	0.75	0.75	450	365	552	40-70	17
5	6	10.00	8.50	0.875	8	250	26	1.25	0.75	0.75	560	450	688	40-70	20
6	6	11.00	9.50	0.875	8	250	26	1.25	0.75	1.00	700	530	826	40-70	23
8	8	13.50	11.75	0.875	8	250	26	1.25	0.75	1.00	755	590	919	50-75	31
10	8	16.00	14.25	1.000	12	250	26	1.75	0.75	1.00	950	730	1148	50-75	40
12	8	19.00	17.00	1.000	12	250	26	1.75	0.75	1.00	1150	870	1378	50-75	45
14	9	21.00	18.75	1.125	12	250	20	1.75	0.75	1.00	1150	870	1378	50-90	75
16	9	23.50	21.25	1.125	16	250	18	1.75	0.75	1.00	1150	870	1378	50-90	85
18	9	25.00	22.75	1.250	16	180	18	1.75	0.75	1.00	1285	980	1551	50-90	98
20	9	27.50	25.00	1.250	20	180	16	1.75	0.75	1.00	1430	1090	1720	50-100	115
24	10	32.00	29.50	1.375	20	180	16	1.75	1.00	1.00	1710	1315	2065	50-100	125

### NOTES:

- When mating to FRP-Fiberglass Flat Full Face Flanges, an elastomeric spacer gasket is required. This gasket will distribute the load evenly to the mating flange.
- Ranges in the chart are recommended Torque Values. The amount of torque required is different for all applications. They can change depending on media, temperature, pressure, mating flange type and surface, material and environmental conditions.

# Secure-Flex Double Arch DuPont Kevlar® Reinforced Non-Metallic Expansion Joint

Dimensions and Allowable Movements  
\*Custom face-to-face dimensions available

## Secure-Flex 7002 Series (Short Style)

Nominal I.D.	Standard Face-to-Face	Outside Diameter	Bolt Circle Diameter	Bolt Hole Diameter	Number of Bolt Holes	Design Pressure-PSI	Vacuum In. Hg	Axial Compression	Axial Elongation	Lateral Deflection	Compression	Lateral	Elongation	Bolt Torque-Ft./Lbs.	Weight-Lbs.
1.5	7	5.00	3.875	0.625	4	250	16	1.25	0.75	0.75	85	67.5	113	30-50	11
2	7	6.00	4.75	0.750	4	250	16	1.25	0.75	0.75	112.5	85	140	30-50	13
2.5	7	7.00	5.5	0.750	4	250	16	1.25	0.75	0.75	140	105	177.5	30-60	14
3	7	7.50	6.00	0.750	4	250	16	1.25	0.75	0.75	167.5	125	207	40-70	15
4	7	9.00	7.50	0.750	8	250	16	1.25	0.75	0.75	225	182.5	276	40-70	20
5	7	10.00	8.50	0.875	8	250	16	1.25	0.75	0.75	280	225	344	40-70	23
6	7	11.00	9.50	0.875	8	250	16	1.25	0.75	0.75	350	265	413	40-70	27
8	8	13.50	11.75	0.875	8	250	16	1.5	0.875	0.875	377.5	295	459.5	50-75	36
10	8	16.00	14.25	1.00	12	250	16	1.5	0.875	0.875	475	365	574	50-75	47
12	8	19.00	17.00	1.00	12	250	16	1.5	0.875	0.875	575	435	689	50-75	53
14	10	21.00	18.75	1.125	12	250	16	1.625	1	1	575	435	689	50-90	88
16	11	23.50	21.25	1.125	16	250	16	1.75	1	1	575	435	689	50-90	100
18	11	25.00	22.75	1.250	16	180	16	1.75	1	1	642.5	490	775.5	50-90	115
20	12	27.50	25.00	1.250	20	180	16	1.875	1.125	1.125	715	545	860	50-100	135
24	12	32.00	29.50	1.375	20	180	16	1.875	1.125	1.125	855	657.5	1032.5	50-100	147

**NOTES:**

1. Full vacuum construction is available, consult UNAFLEX® Engineering
2. For higher pressures than shown, consult UNAFLEX® Engineering
3. Control units (sold separately) must be used when piping is not properly anchored
4. Safety Shields/Splash Guards recommended.



## Secure-Flex 7002 Series (Long Style)

Nominal I.D.	Standard Face-to-Face	Outside Diameter	Bolt Circle Diameter	Bolt Hole Diameter	Number of Bolt Holes	Design Pressure-PSI	Vacuum In. Hg	Axial Compression	Axial Elongation	Lateral Deflection	Comopression	Lateral	Elongation	Bolt Torque-Ft./Lbs.	Weight-Lbs.
1.5	10	5.00	3.875	0.625	4	250	26	2.5	1.5	1.5	85	67.5	112.5	30-50	11
2	10	6.00	4.75	0.750	4	250	26	2.5	1.5	1.5	112.5	85	240	30-50	13
2.5	10	7.00	5.50	0.750	4	250	26	2.5	1.5	1.5	140	105	223.5	30-60	14
3	10	7.50	6.00	0.750	4	250	26	2.5	1.5	1.5	167.5	125	207	40-70	15
4	10	9.00	7.50	0.750	8	250	26	2.5	1.5	1.5	225	182.5	276	40-70	20
5	10	10.00	8.50	0.875	8	250	26	2.5	1.5	1.5	280	225	344	40-70	23
6	10	11.00	9.50	0.875	8	250	26	2.5	1.5	2.00	350	265	413	40-70	27
8	10	13.50	11.75	0.875	8	250	26	2.5	1.5	2.00	377.5	295	459.5	50-75	36
10	12	16.00	14.25	1.00	12	250	26	3.5	1.5	2.00	475	365	574	50-75	47
12	12	19.00	17.00	1.00	12	250	26	3.5	1.5	2.00	575	435	689	50-75	53
14	12	21.00	18.75	1.125	12	250	20	3.5	1.5	2.00	575	435	689	50-90	88
16	12	23.50	21.25	1.125	16	250	18	3.5	1.5	2.00	575	435	687	50-90	100
18	12	25.00	22.75	1.250	16	180	18	3.5	1.5	2.00	642.5	490	775.5	50-90	115
20	12	27.50	25.00	1.250	20	180	16	3.5	1.5	2.00	715	545	860	50-100	135
24	14	32.00	29.50	1.375	20	180	16	3.5	2.0	2.00	855	657.5	1032.5	50-100	147

### NOTES:

- When mating to FRP-Fiberglass Flat Full Face Flanges, an elastomeric spacer gasket is required. This gasket will distribute the load evenly to the mating flange.
- Ranges in the chart are recommended Torque Values. The amount of torque required is different for all applications. They can change depending on media, temperature, pressure, mating flange type and surface, material and environmental conditions.

# Installation Instructions for Non-Metallic Expansion Joints

**Service Conditions.** Make sure the expansion joint rating for temperature, pressure, vacuum and movements match the system requirements. Contact UNAFLEX® for advice if the system requirements exceed those of the expansion joint selected. Check to make sure the elastomer selected is chemically compatible with the process fluid or gas.

**Alignment.** Expansion joints are normally not designed to compensate for piping misalignment errors. Piping should be lined up within 1/4". Misalignment reduces the rated movements of the expansion joint and can induce severe stress and reduce service life. Pipe guides should be installed to keep the pipe aligned and to prevent undue displacement.

**Anchoring.** Solid anchoring is required wherever the pipeline changes direction, and expansion joints should be located as close as possible to anchor points. If anchors are not used, the pressure thrust may cause excessive movements and damage the expansion joint.

**Pipe Support.** Piping must be supported so expansion joints do not carry any pipe weight.

**Mating Flanges.** Install the expansion joint against the mating pipe flanges and install bolts so that the bolt head and washer are against the expansion joint flanges. Flange-to-flange dimensions of the expansion joint must match the breech type opening.

**Tightening Bolts.** Tighten bolts in stages by alternating around the flange. Torque bolts sufficiently to assure leak-free operation at hydrostatic test pressure. (See Bolt Torque Sequence)

**Storage.** Ideal storage is a warehouse with a relatively dry, cool location. Store flange face down on a pallet or wooden platform. Do not store other heavy items on top of an expansion joint. Ten-year shelf-life can be expected with ideal conditions. If storage must be outdoors, joints should be placed on wooden platforms and should not be in contact with the ground. Cover with a tarpaulin.

## Additional Tips.

Do not insulate over a non-metallic expansion joint; however, if insulation is required, it should be made removable to permit easy access to the flanges. This facilitates periodic inspection of the tightness of the joint bolting.

It is acceptable (but not necessary) to lubricate the expansion joint flanges with a thin film of graphite dispersed in glycerin or water to ease disassembly at a later time.

Do not weld in the near vicinity of a non-metallic joint.

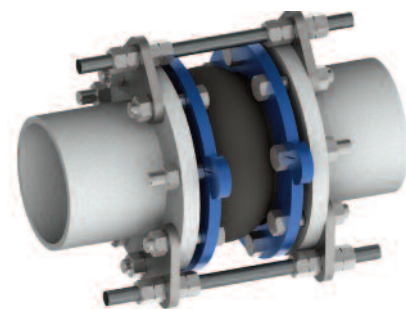
If expansion joints are to be installed underground, or will be submerged in water, contact UNAFLEX® for specific recommendations.

If the expansion joint will be installed outdoors, make sure the cover material will withstand ozone, sunlight, etc. Materials such as Neoprene and Chlorobutyl are recommended. Materials painted with weather resistant paint will give additional ozone and sunlight protection.

Check the tightness of leak-free flanges two or three weeks after installation and re-tighten if necessary.

## Control Rod Installation.

**A.** Assemble expansion joint between pipe flanges to the manufactured face-to-face length of the expansion joint.



**WARNING:** Expansion joints may operate in pipelines or equipment carrying fluids and/or gases at elevated temperatures and pressures and may transport hazardous materials. Precautions should be taken to protect personnel in the event of leakage or splash. Non-metallic joints should not be installed in inaccessible areas where inspection is impossible. Make sure proper drainage is available in the event of leakage when operating personnel are not available.

**B.** Assemble control rod plates behind pipe flanges. Flange bolts through the control rod plate must be longer to accommodate the plate. Control rod plates should be equally spaced around the flange. Depending upon the size and pressure rating of the system, 2, 3 or more control rods may be required.

**C.** Insert control rods through top plate holes. Steel washers are to be positioned at the outer plate surface. An optional rubber washer is positioned between the steel washer and the outer plate surface.

**D.** If a single nut per unit is furnished, position this not so that there is a gap between the nut and the steel washer. This gap is equal to the joint's maximum extension (commencing with the nominal face-to-face length). To lock this nut in position, either "stake" the thread in two places or tack weld the nut to the rod. If two jam nuts are furnished for each unit, tighten the two nuts together, so as to achieve a "jamming" effect to prevent loosening. NOTE: Consult UNAFLEX® if there is any question as to the rated compression and elongation. These two dimensions are critical in setting the nuts and sizing the compression pipe sleeves.

**E.** If there is a requirement for compression pipe sleeves, ordinary pipe may be used and sized in length to allow the joint to be compressed to its normal limit.

**F.** For reducer installations, it is recommended that all control rod installations be parallel to the piping.

**Location.** The expansion joint should always be installed in an accessible location to allow for future inspection or replacement.