

## RUBBER EXPANSION JOINT INSTALLATION

### General Installation Instructions

#### Service and Conditions:

Make sure the expansion joint rating for temperature, pressure, vacuum, movements, and selection of elastomer materials match the system requirements. Contact Twin City Hose if the system requirements exceed those of the expansion joint selected.

#### Vacuum Service for Spherical Rubber Connectors:

Vacuum rating is based on neutral installed length, without external load. These products should not be installed "extended" on vacuum applications.

#### Alignment:

Expansion joints are not designed to make up for piping misalignment errors. Pipe misalignment should be no more than 1/8" in any direction. Misalignment of an expansion joint will reduce the rated movements and can induce severe stress of the material properties, thus causing reduced service life.

#### Anchoring:

Anchors are required whenever a piping system changes direction. Expansion joints should be located as close as possible to the anchor points. If an anchoring system is not used, it is recommended that control rods be installed on the expansion joint to prevent excessive movements from occurring due to pressure thrust of the line.

#### Pipe Support:

Piping must be supported so the expansion joints do not carry any pipe weight.

#### Mating Flanges:

1. Install the expansion joint against the mating pipe flanges and install bolts so that the bolt head is against the expansion joint flange. Flange to flange dimensions of the expansion joint must match the breech opening.
2. A spherical rubber connector must be compressed 1/8" to 3/16" during installation in order to obtain a correctly installed face to face dimension.
3. Make sure mating flanges are clean and are flat faced type. When attaching beaded end flange expansion joints to raised face flanges, ring gaskets are required to prevent metal flange faces from cutting the rubber bead during installation.
4. Never install expansion joints next to wafer type check valves or butterfly valves. Serious damage to the rubber flange bead can result due to the lack of flange mating surface and or bolt connection.

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#### Bolt Torque:

Below are the minimum recommended torque values for non-metallic expansion joints with beaded end type flanges to achieve an adequate seal.

#### MS1 and MS2 Torque Data:

Nominal Pipe Size	Bolt Torque				
	Step 1	Reset	Step 2	Reset	Step 3
in.	ft • lbs	Minutes	ft • lbs	Minutes	ft • lbs
1	18	30	30	60	45 - 60
1.25	18	30	30	60	45 - 60
1.5	18	30	30	60	45 - 60
2	18	30	30	60	45 - 60
2.5	18	30	35	60	50 - 60
3	25	30	45	60	60 - 75
3.5	25	30	45	60	60 - 75
4	25	30	45	60	60 - 75
5	25	30	45	60	60 - 75
6	30	30	50	60	60 - 75
8	30	30	50	60	60 - 75
10	30	30	50	60	75 - 85
12	30	30	50	60	75 - 85
14	30	30	60	60	75 - 85
16	30	30	60	60	75 - 85
18	30	30	60	60	90 - 95
20	30	30	65	60	95 - 185
24	30	30	65	60	95 - 185
30	30	30	65	60	95 - 220

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S1 Spool-Type

### S1 Torque Data:

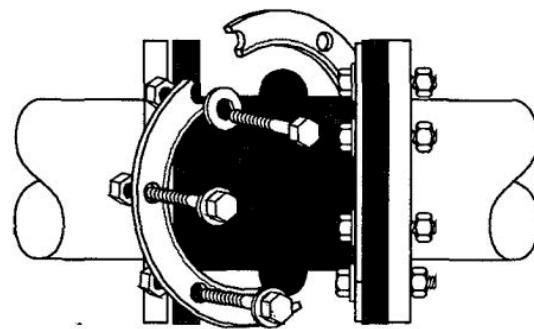
Flange Size	Standard Pressure		High Pressure	
	Pressure Rating	Torque	Pressure Rating	Torque
in.	PSI	ft-pounds	PSI	ft-pounds
1/2	165	13	200	16
3/4	165	25	200	30
1	165	20	200	25
1.25	165	25	200	30
1.5	165	25	200	30
2	165	40	200	50
2.5	165	55	200	65
3	165	60	200	75
4	165	40	200	50
5	140	45	190	60
6	140	55	190	75
8	140	75	190	100
10	140	70	190	95
12	140	105	190	142
14	85	80	130	125
16	65	55	110	90
18	65	70	110	120
20	65	70	110	115
24	65	90	100	135
30	55	65	90	110
36	55	90	90	145
42	55	109	80	150
48	55	100	80	150
54	55	125	80	185
66	55	160	80	230
72	45	145	70	225

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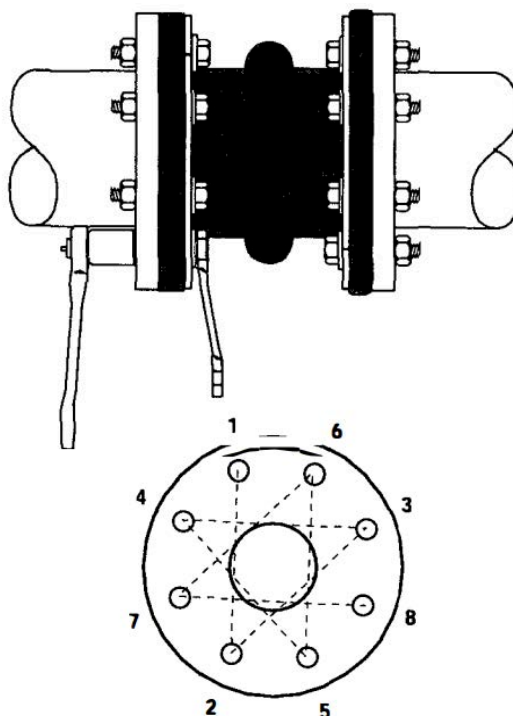
#### Install the Retaining Rings:

One set of split steel back-up retaining rings is used for each flange of the expansion joint to ensure a tight, even seal, and to prevent hardware from damaging the rubber flange. Bolts with integral washers should be inserted from the steel retaining ring side of the joint. Flat washers should be used in conjunction with hex bolts at all splits in the steel rings.



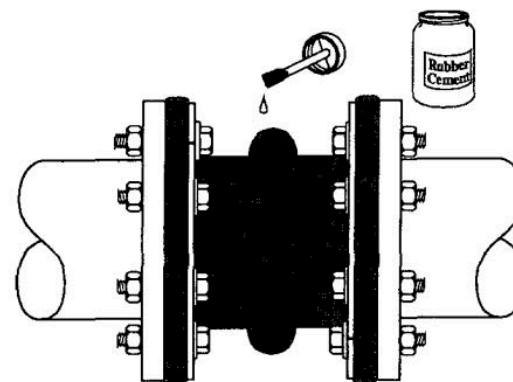
#### Tightening Bolts:

When tightening bolts, two wrenches should be used to prevent damage to the rubber flange. Always use a star pattern when bolting an expansion joint or rubber pipe. Initially, torque the bolts to the recommended values shown in the Torque Values chart. Pressurize the line. Retorque the bolts to the proper torque. If process fluid leaks, increase the torque in increments of 50% of the tabulated values. During installation, you may need to retorque the flange bolts several times for a proper seal. This will overcome any leaks due to the cold flow of the rubber expansion joint flange. Check bolt torque and retighten if necessary several days after the initial operation and then periodically thereafter.



#### Inspect Cover After Installation:

After the unit is securely bolted into position, carefully inspect the cover of the expansion joint for any cuts or gouges caused by tools or bolts. These should be sealed with rubber cement to prevent oil or water from penetrating the elastomeric cover.



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Tighten bolts in stages by alternating around the flange. Use the recommended torque values to achieve a good seal. Never tighten an expansion joint to the point that there is metal to metal contact between the expansion joint flange and the mating flange.

**Note:** Over-torquing bolts can cause deformation of the rubber expansion joint flanges, thus resulting in premature failure.

#### Storage:

1. Store expansion joints in a dry, cool place, such as a warehouse.
2. Store flange face down on a pallet or wooden platform.
3. Do not store other heavy items on top of expansion joints.
4. Ten year shelf life can be expected with ideal conditions.

#### Handling:

Do not lift with ropes or bars through bolt holes. If lifting through the bore, use padding or a saddle to distribute the weight. Do not let expansion joints sit vertically on the edges of the flanges for any period of time.

#### Additional Tips:

1. Insulation over non-metallic rubber expansion joints is not recommended. However, if the insulation is required, it should be made removable to permit easy access to the flange area in order to check the bolting.
2. 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.
3. Do not weld in the vicinity of a non-metallic expansion joint.
4. If an expansion joint is to be installed outdoors, make sure the cover material will withstand ozone and environmental elements. Materials such as EPDM and Chlorobutyl are recommended.

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5. If the expansion joint is to be installed underground, or will be submerged in water, contact Twin City Hose for specific guidelines.
6. Check the tightness of the retaining rings two or three weeks after installation and re-tighten as necessary after routine inspections.

**Warning:** Expansion joints may operate in pipelines or equipment carrying fluids 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. Rubber expansion joints should not be installed in areas where inspection is impossible.