

INSTALLATION INSTRUCTIONS

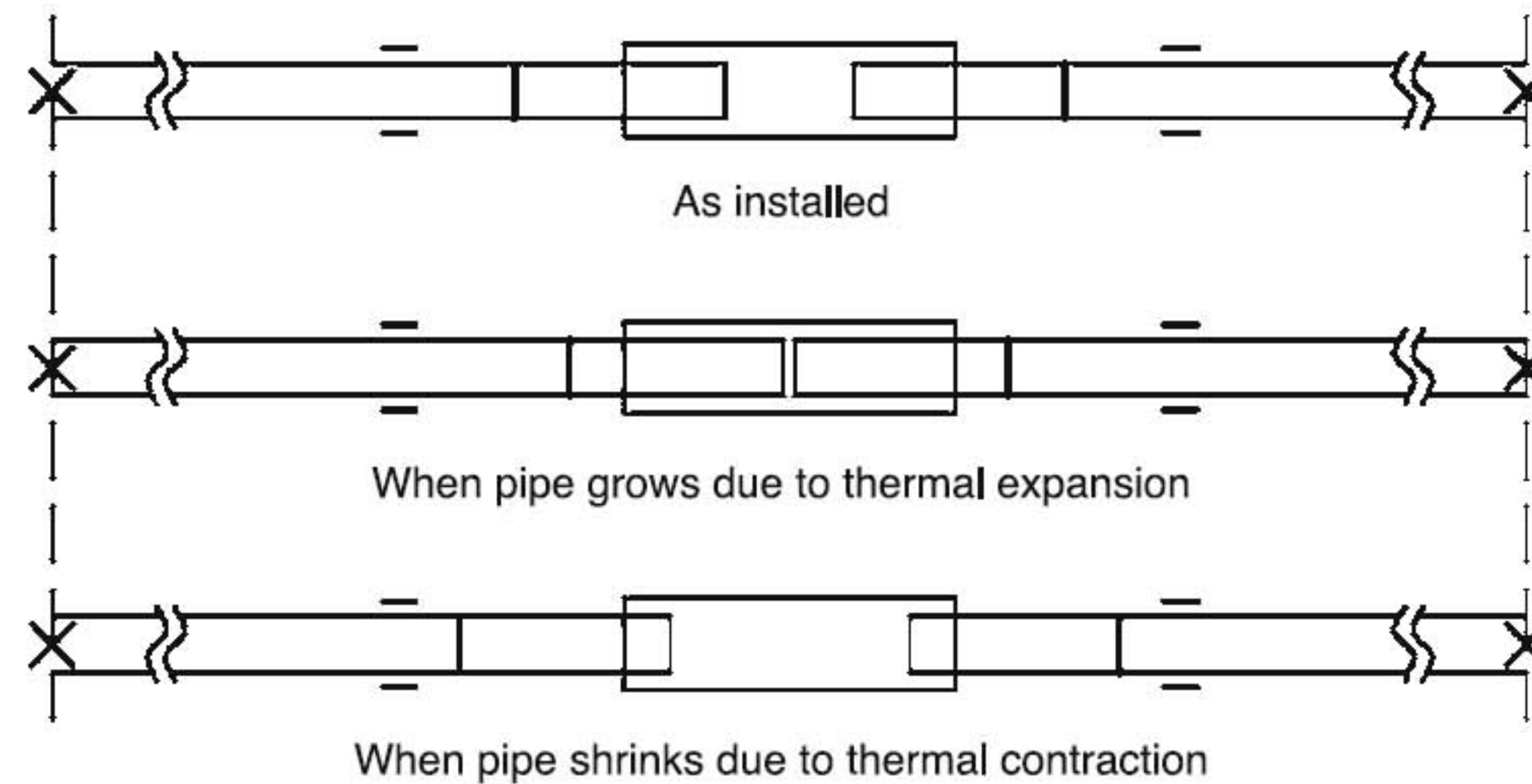
SHURJOINT Model 650N and 651 Expansion Joints

Product Description

Shurjoint Models 650N and 651 Expansion Joints are a combination of couplings and specially machined pipe nipples that are joined in a series to provide an excellent means of accommodating pipeline expansion or contraction. The standard unit is supplied with grooved-ends while plain-ends are also available as an option.

As thermal movement occurs in the path of the least resistance and pressure-generated movement thrusts the system to its maximum expanded length, the system shall always be anchored properly to direct the movement towards the expansion joint.

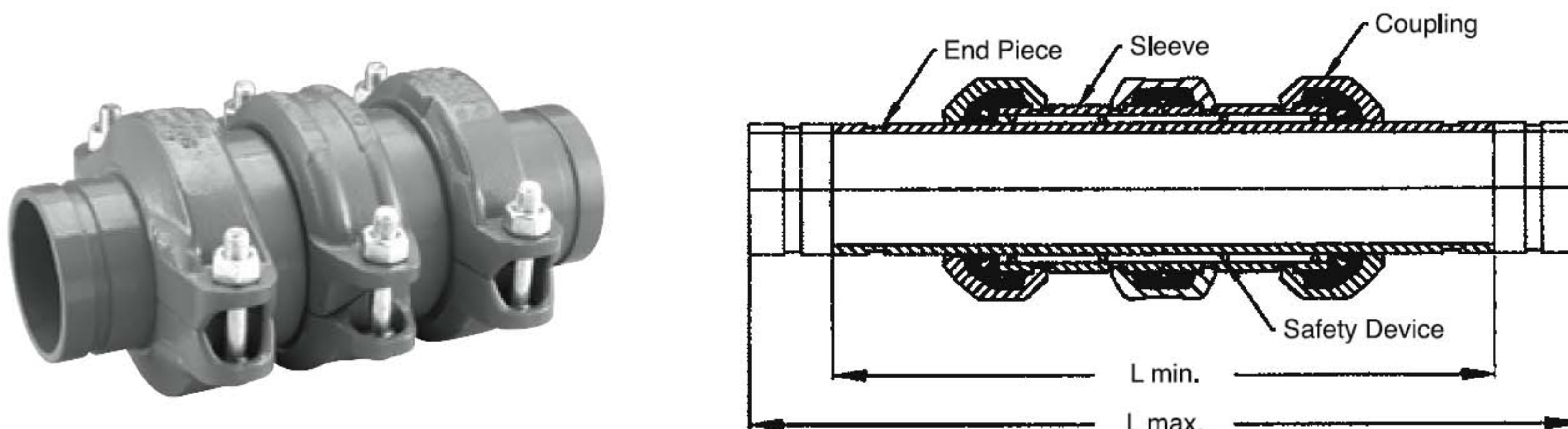
Anchors shall be placed at both ends of a straight run of pipe and, when necessary, intermediate anchors shall be added. Those anchors not only serve to direct the thermal movement towards the expansion joint but also prevent the expansion joint from opening up to its maximum expanded length when the system is pressurized.



Both Ends Anchored

Model 650N

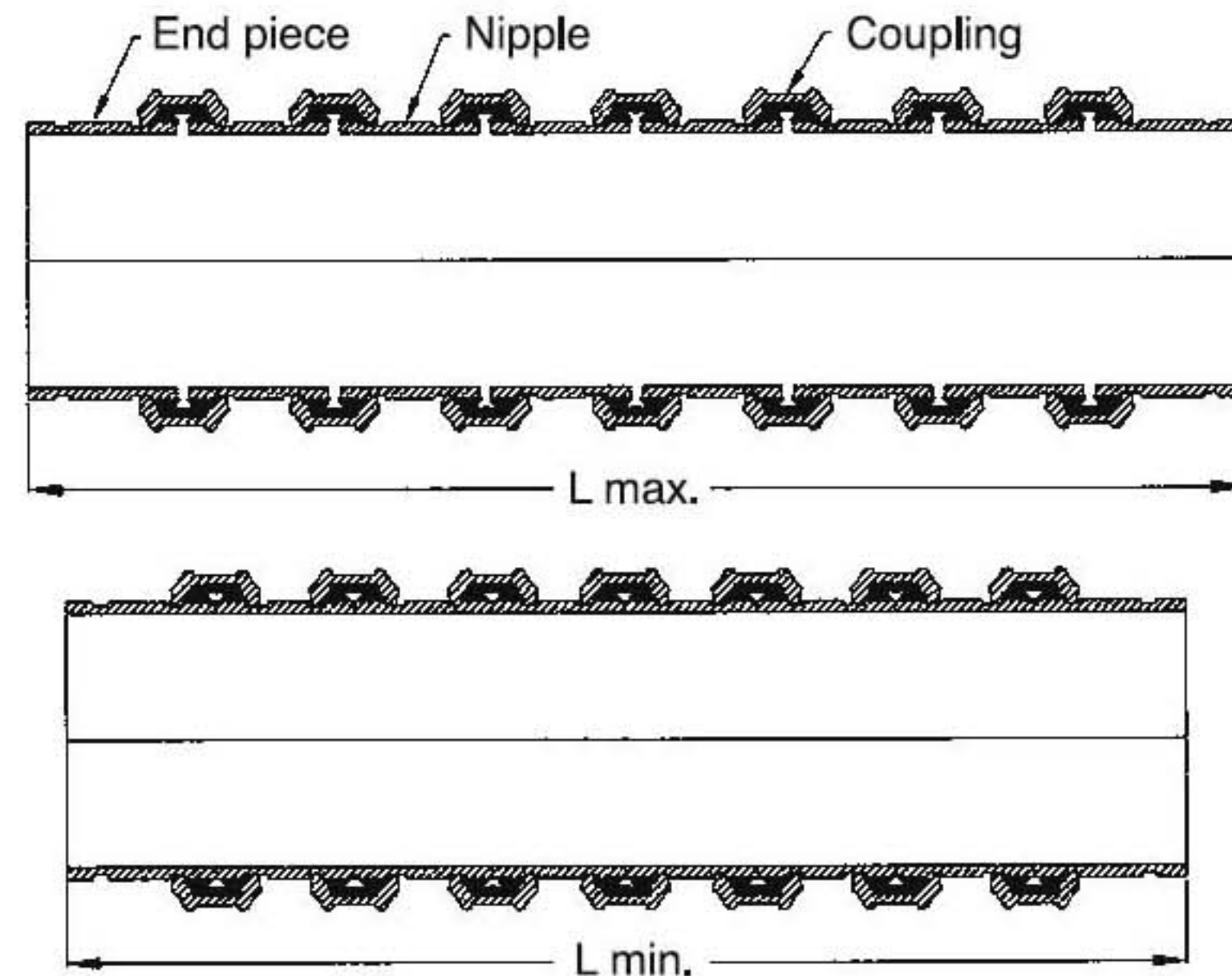
The Shurjoint Model 650N Expansion Joint is a slide-type expansion compensation joint, consisting of two sleeves and two end pieces connected with three couplings. An integral safety device prevents excess movement and or the accidental slip-out of the end pieces.



- Axial movement: 0 to 3" (0 to 76mm)
- Maximum working pressure: 350 psi (25 bar)
- Applicable to a straight run of pipe only. Not applicable to risers
- The straight run of pipe should always be anchored at both ends

Model 651

The Model 651 Expansion Joint is comprised of either Model 7705 or Model 7707 flexible couplings and a number of cut-grooved Sch. 40 pipe nipples.



- Standard axial movement: 0 to 1.75" (45mm) or 2.25" (58mm) depending on the pipe size
- Maximum working pressure: 350 psi (25 bar)
- Applicable to a straight run of pipe only. Not applicable to risers
- The straight run of pipe should always be anchored at both ends

Installation Instructions

(Refer to the examples below)

1. Determine the operational temperature range and the total length of the pipe run. Calculate the total linear movement of the pipe run. Once calculated, add an additional 25% to the linear movement, as a safety factor.
2. Determine the required number of Model 650N or 651 Expansion Joints required to accommodate the above linear movement calculations.
3. According to the temperature at the time of installation calculate and set the length of the expansion joint.
4. Connect the Model 650N or 651 Expansion Joints to the piping system with a couple of Shurjoint rigid couplings (Model Z07 or 7771). For a plain-end unit, use a couple of Shurjoint Model 79 plain-end couplings.
5. Secure the straight run of pipe with anchors at both ends and add proper troughs and or guides to support the expansion joint. (Refer to the examples of pipe supports).
6. Always depressurize and drain the piping system before attempting to remove an expansion joint.

Installation Examples

Example 1

- Operational temperature range: 0°F to 150°F (-18°C to 65°C)
- Pipeline length: 200 feet (61 meters)
- Both ends anchored
- Pipe size: 4" (100 N.B.)
- Installation temperature: 70°F (21°C)

The thermal expansion / contraction can be obtained from Table 1.

Table 1 Thermal Expansion

Temp. (°F)	Pipe Length (feet)			
	20	40	60	100
	Thermal expansion between 70°F And indicated temperature (inch)			
0 (-18°C)	-0.10	-0.20	-0.29	-0.49
25 (-4°C)	-0.06	-0.13	-0.19	-0.32
50 (10°C)	-0.03	-0.06	-0.08	-0.14
70 (21°C)	0	0	0	0
100 (38°C)	0.05	0.09	0.14	0.23
125 (52°C)	0.08	0.17	0.25	0.42
150 (65°C)	0.12	0.24	0.37	0.61
175 (79°C)	0.16	0.32	0.48	0.80
200 (93°C)	0.20	0.40	0.59	0.99
225 (107°C)	0.24	0.48	0.73	1.21

Coefficient of thermal expansion of steel pipe = 6.33 in/in, °F x 10⁻⁶

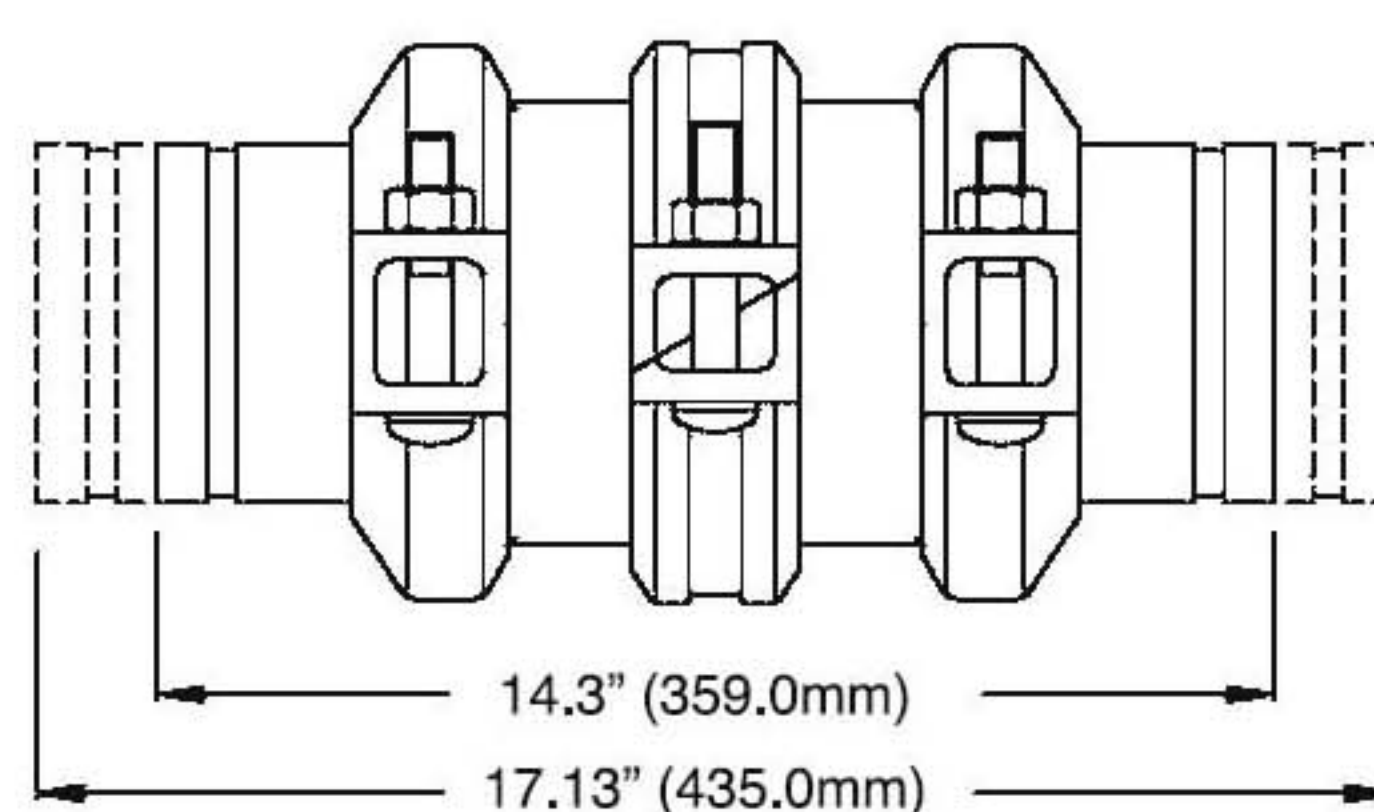
At 0°F: -0.49 x 2 = -0.98 inches (-25mm)
 At 150°F: 0.61 x 2 = 1.22 inches (31mm)
 Total linear movement = 2.2 inches (56mm)
 Add 25% as a safety factor = 2.75 inches (70mm)

The Shurjoint Model 650N Expansion Joint will accommodate linear movement in a pipeline up to 3" (76mm). Therefore one Model 650N Expansion Joint will be sufficient to compensate for the 2.75" (70mm) movement, which includes the safety factor.

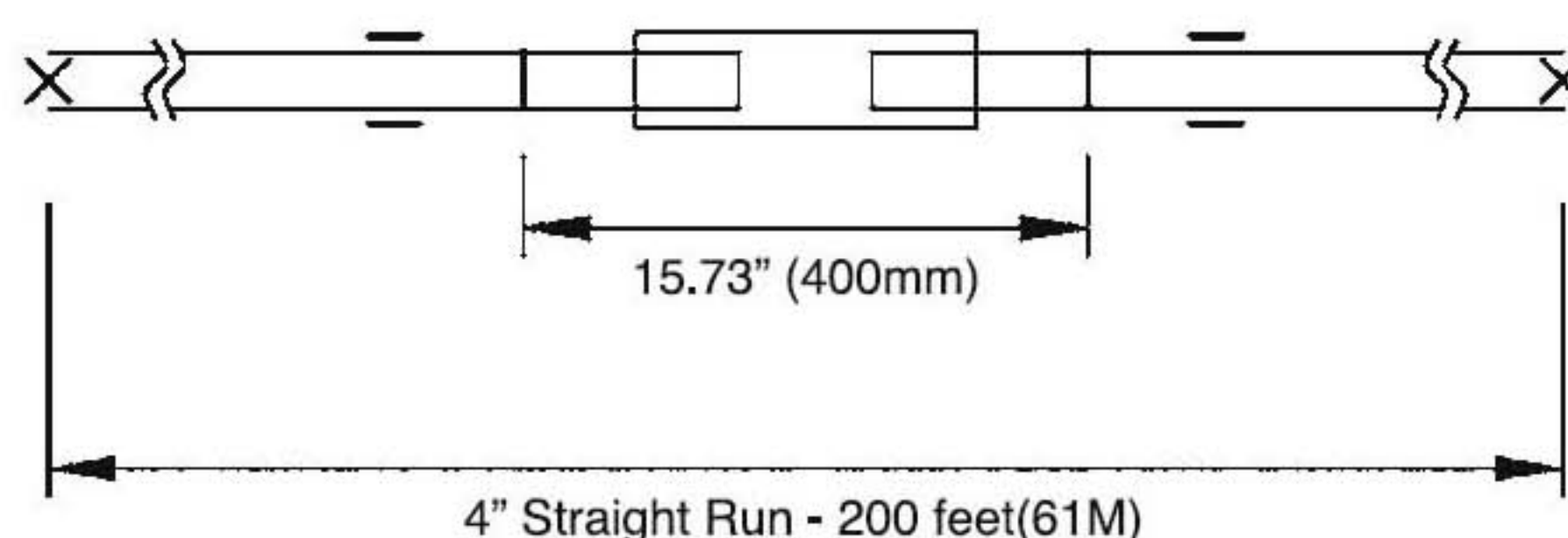
The 4" Model 650N Expansion Joint is 17.13 inches (435mm) long when it is expanded to the maximum length and 14.13 inches (359mm) when contracted to the minimum length. If the temperature of the pipeline at the time of installation is 70°F (21°C), the overall length of the expansion joint should be adjusted to 15.73 inches (400mm). Refer to the table 2 below.

Table 2

Temperature	Installation Length	Remarks
0°F (-18°C)	17.13" (435mm)	= Max. length (100%)
25°F (-4°C)	16.63" (422mm)	
50°F (10°C)	16.13" (410mm)	
70°F (21°C)	15.73" (400mm)	= 46.6% length when installed
100°F (38°C)	15.13" (384mm)	
150°F (65°C)	14.13" (359mm)	= Min. length (0%)



Conclusion: The installation length shall be 15.73" (400mm) when installed at 70°F (21°C).



Example 2

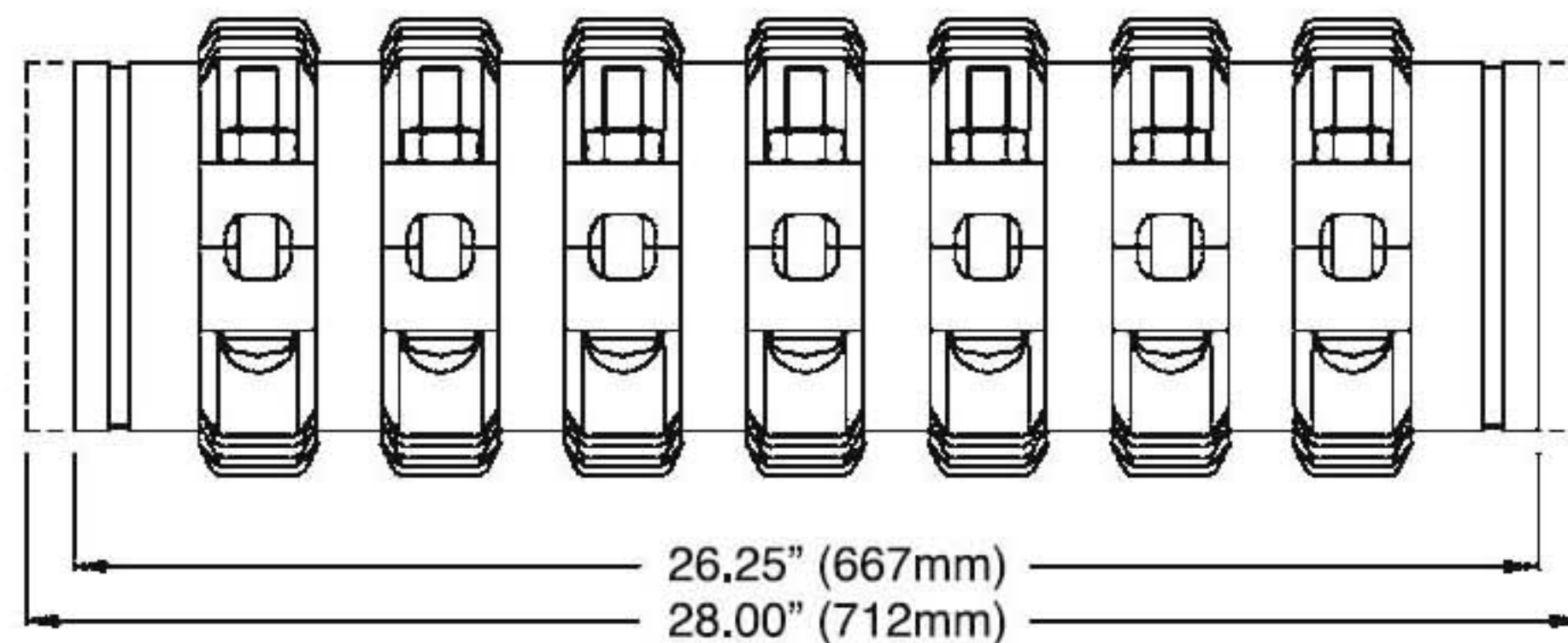
- Operational temperature range: 41°F to 150°F (5°C to 65°C)
- Pipeline length: 120 feet (36.5 meters)
- Both ends anchored
- Pipe size: 6" (150 N.B.)
- Installation temperature: 41°F (5°C)

Max. temperature change: 150°F - 41°F = 109°F

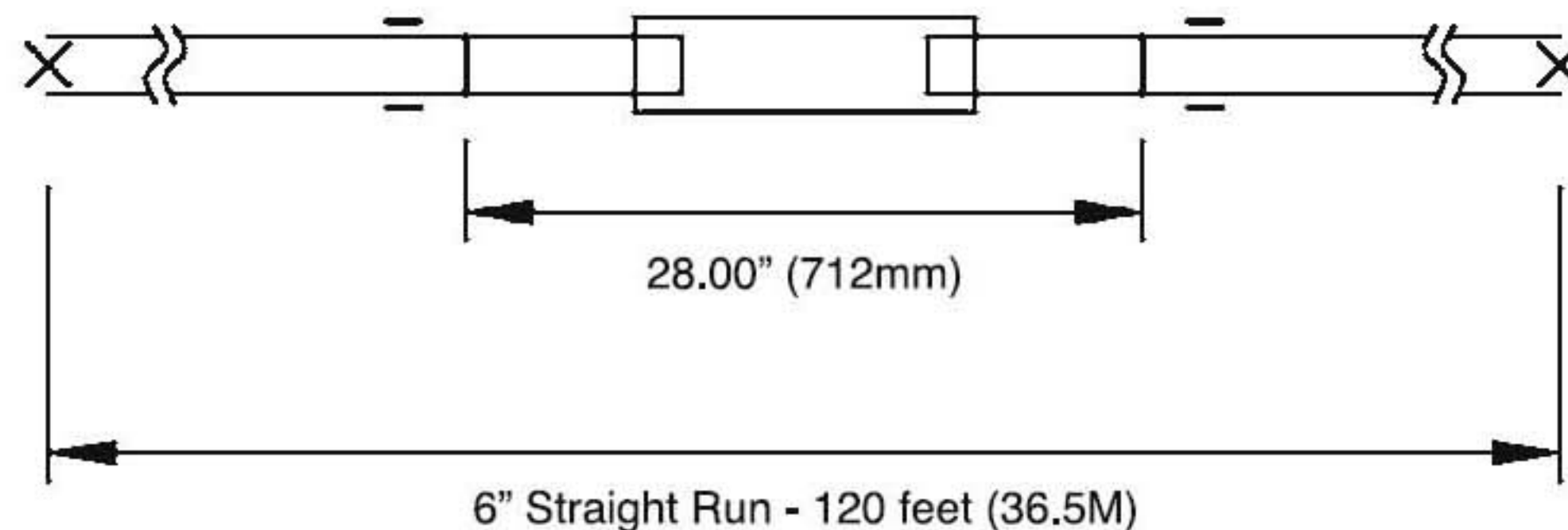
Total linear movement = $6.33 \times 12 \times 120 \times 109 \times 10^{-6}$
= 0.99" (25mm)

Add 25% as a safety factor = 1.24" (31.5mm)

Since a 6" Shurjoint Model 651 Expansion Joint is able to accommodate a linear movement up to 1.75" (45mm), one unit of Model 650N Expansion Joint will be sufficient to compensate for the 1.24" (31.5mm) movement.



Conclusion: The 6" Shurjoint Model 651 Expansion Joint shall be adjusted to its maximum length of 28.00" (712mm) when installed at 41°F (5°C).



Cautions and Warning

- The Model 650N and 651 Expansion Joints are designed only for use on straight pipe runs and should not be used on risers.
- Always install the Model 650N or 651 Expansion Joint between anchors (main or intermediate). Without anchors, pressure generated movement could expand the expansion joint to its maximum length or beyond. This may damage the device or the piping system and could result in joint failure.
- The Model 650N or 651 Expansion Joint only compensates for linear movement. Angular deflection will damage the device and could result in joint failure.
- If connecting the Model 650N or 651 Expansion Joints to the piping system by means other than rigid couplings, great care and precautions must be used to ensure no damage occurs to the epoxy surface coating or internal gaskets. Damages caused by excessive heat or rough handling could result in joint failure.
- Always depressurize and drain the piping system before disassembly and removal of any piping component including the Model 650N or 651 Expansion Joints.

Examples of pipe supports

These illustrations are examples only, and not intended for use on all installations as conditions and requirements vary from job to job. System designers should provide anchors (main and intermediate) and pipe guides with proper spacing to protect the system from unexpected large bending movement.

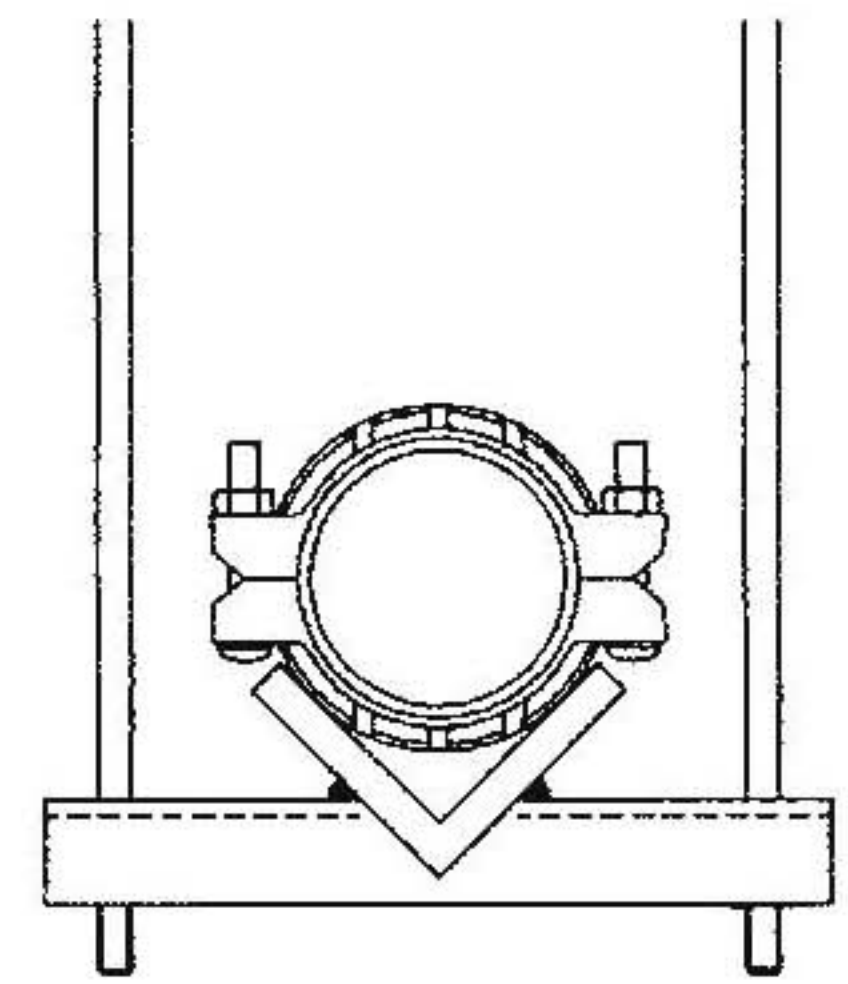
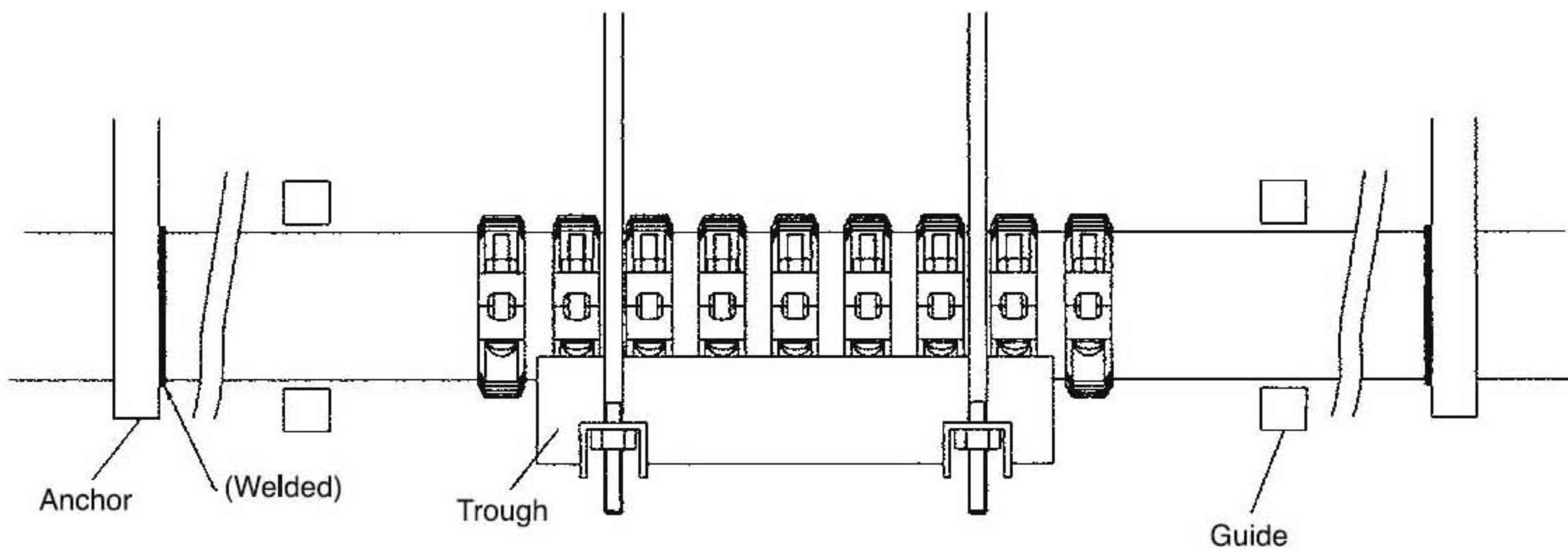
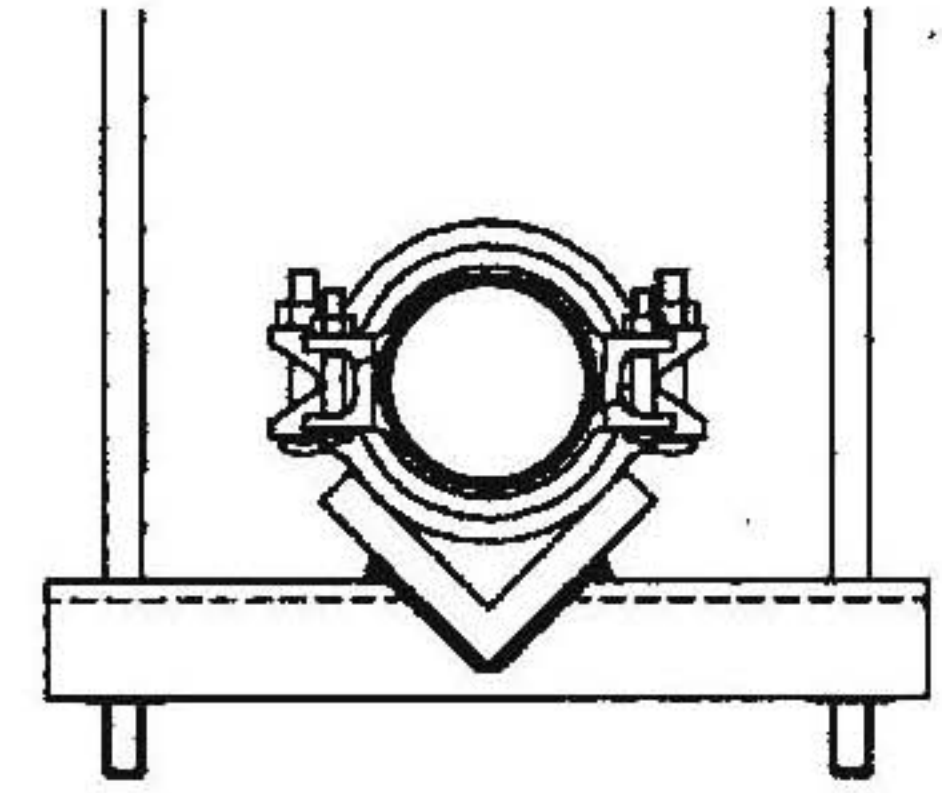
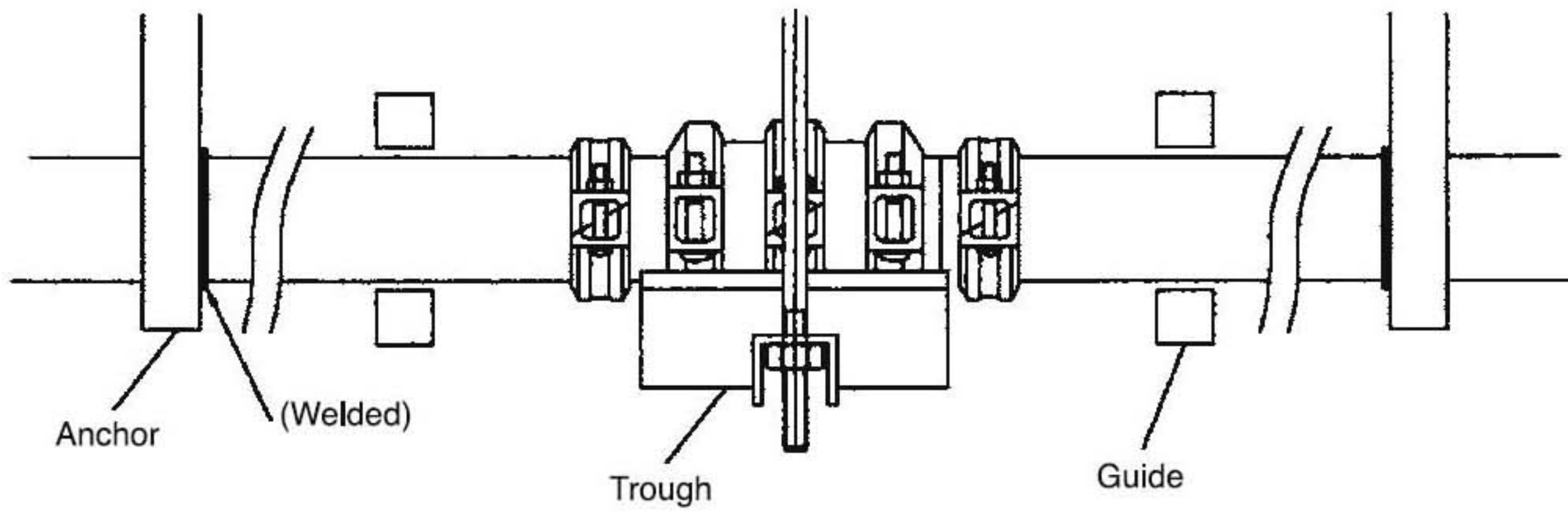
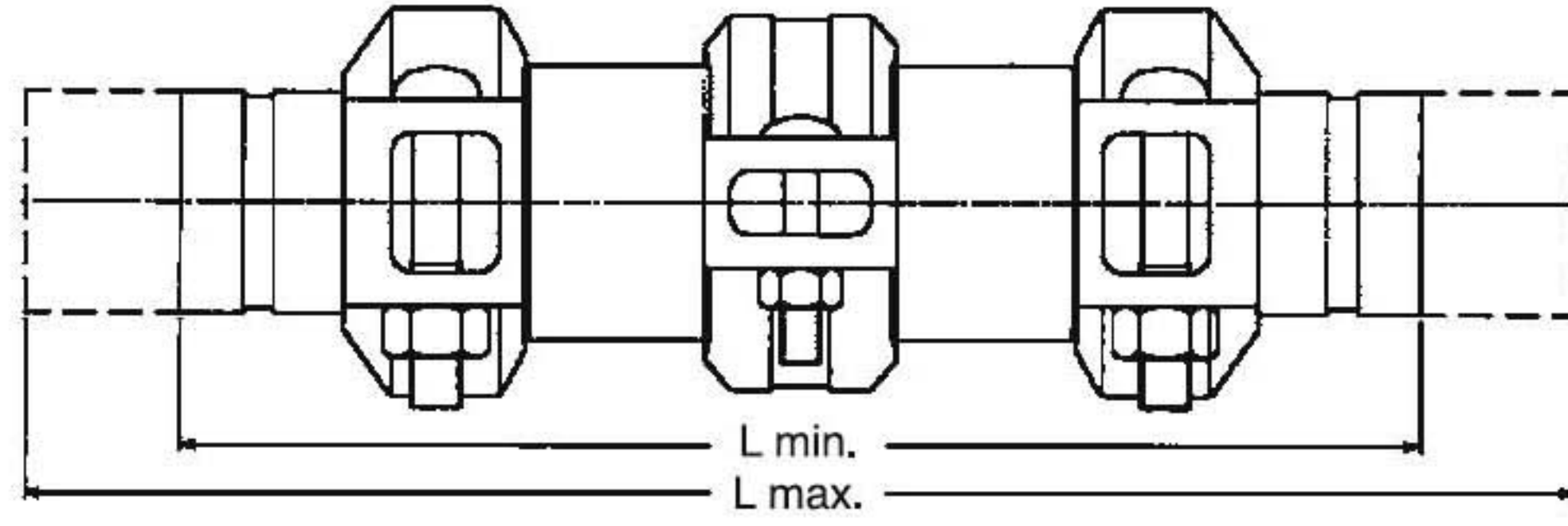
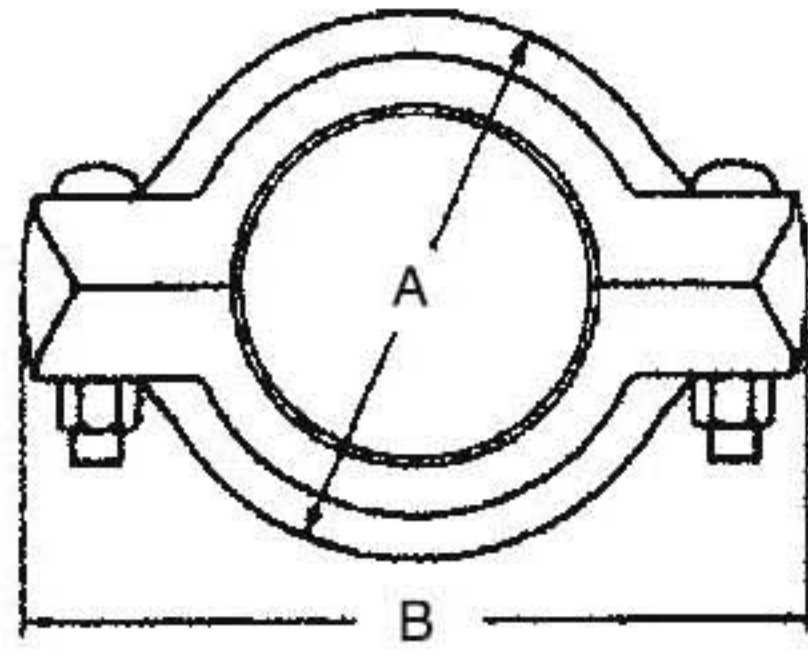
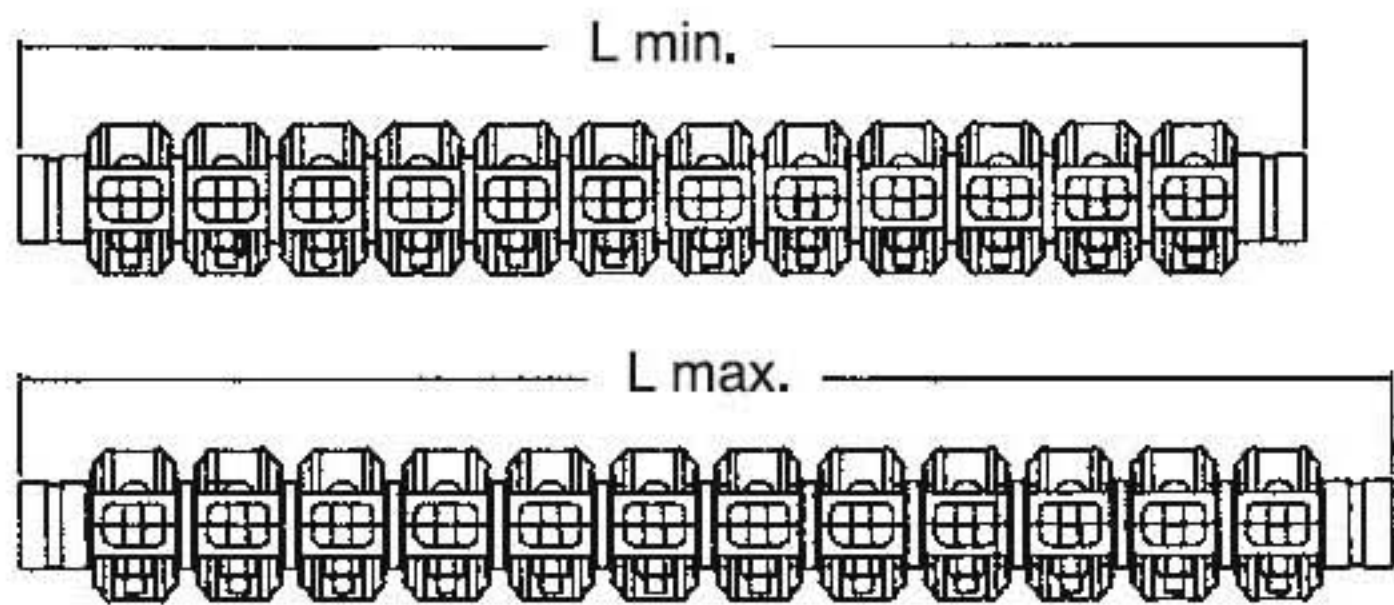


Table 3. SHURJOINT Model 650N Expansion Joint Performance Data



Nominal Size	Pipe O.D.	Max. Working Pressure	Max. Movement	Dimensions				Approx. Weight
				A	B	L min.	L max.	
mm	mm	Bar	mm	mm	mm	mm	mm	Kgs
in	in	PSI	in	in	in	in	in	Lbs
50	60.3	25	76	96	144	304	381	7.2
2	2.375	350	3	3.78	5.67	12.00	15.00	15.8
65	73.0	25	76	116	168	304	381	9.6
2-1/2	2.875	350	3	4.57	6.61	12.00	15.00	21.1
65	76.1	25	76	116	168	304	381	9.6
2-1/2	3.000	350	3	4.57	6.61	12.00	15.00	21.1
80	88.9	25	76	146	198	304	381	12.5
3	3.500	350	3	5.76	7.80	12.00	15.00	27.5
100	114.3	25	76	160	250	359	435	18.0
4	4.500	350	3	6.30	9.84	14.13	17.13	39.6
150	165.1	25	76	260	334	406	482	34.0
6	6.500	350	3	10.25	13.15	16.00	19.00	74.8
150	168.3	25	76	260	334	406	482	34.0
6	6.625	350	3	10.25	13.15	16.00	19.00	74.8

Table 4. SHURJOINT Model 651 Expansion Joint Performance Data



Nominal Size	Pipe O.D.	Max. Movement	L min.	L max.	Approx. Weight
mm	mm	mm	mm	mm	Kgs
in	in	in	in	in	Lbs
40	48.3	58	718	776	11.0
1.5	1.900	2.25	28.25	30.55	24.2
50	60.3	58	718	776	12.2
2	2.375	2.25	28.25	30.55	27.0
65	73.0	58	718	776	16.3
2.5	2.875	2.25	28.25	30.55	36.0
65	76.1	58	718	776	16.3
2.5	3.000	2.25	28.25	30.55	36.0
80	88.9	58	718	776	20.9
3	3.500	2.25	28.25	30.55	46.0
100	114.3	45	667	712	24.5
4	4.500	1.75	26.26	28.00	54.0
125	133.0	45	667	712	32.7
5	5.250	1.75	26.25	28.00	72.0
150	165.1	45	667	712	32.7
6	6.500	1.75	26.26	28.00	72.0
150	168.3	45	724	712	40.8
6	6.625	1.75	28.50	28.00	90.0
200	219.1	45	667	769	68.0
8	8.625	1.75	26.26	30.28	150.0
250	273.0	45	826	870	145.3
10	10.750	1.75	32.50	34.25	320.0
300	323.9	45	826	870	169.3
12	12.750	1.75	32.50	34.25	373.0