

# series 240 single sphere expansion joints

**Table 2: Sizes • Movements • Pressures • Flange Standards • Weights**

NOMINAL PIPE	Neutral Length	Part #	240 Movement Capability: From Neutral Position <sup>2</sup>					Pressure <sup>4</sup>		Standard Flange Bolting Dimensions					Weight in lbs <sup>8</sup>		
			Axial Compression Inches	Axial Extension Inches	Lateral Deflection Inches	Angular Deflection Degrees	Thrust <sup>3</sup> Factor	Positive <sup>5</sup> PSIG	Vacuum <sup>6</sup> Inches of Hg	Flange O.D. Inches	Bolt Circle Inches	Number of Holes	Size of Holes Inches	Bolt Hole <sup>7</sup> Thread	Exp. Joint & Flanges	Control Unit Set (2 Rod)	
<b>1</b>	<b>6.00</b>	<b>240-AV</b>	0.500	0.375	0.500	37	4.43	225	26	4.25	3.13	4	0.500	1/2-13 UNC	3.8	3.3	
<b>1.25</b>	3.74	240-D	0.312	0.188	0.312	17	6.34	235	26	4.63	3.5	4	0.500	—	4.6	3.3	
	5.00	240-C	1.063	1.250	1.188	45		225	21				0.500	—			5.0
	5.00	240-E	0.500	0.375	0.500	31		225	26				0.500	—			5.0
	<b>6.00</b>	<b>240-AV</b>	0.500	0.375	0.500	31		225	26				0.500	1/2-13 UNC			5.0
<b>1.5</b>	3.74	240-D	0.375	0.188	0.312	14	6.49	225	26	5.0	3.88	4	0.500	—	5.4	4.6	
	4.00	240-M	0.375	0.188	0.312	14		225	26				0.500	—			5.5
	5.00	240-C	1.063	1.250	1.188	45		235	18				0.500	—			5.1
	5.00	240-E	0.500	0.375	0.500	27		225	26				0.500	—			6.0
	<b>6.00</b>	<b>240-AV</b>	0.500	0.375	0.500	27		225	26				0.500	1/2-13 UNC			6.1
<b>2</b>	4.00	240-M	0.375	0.188	0.312	11	7.07	225	26	6.0	4.75	4	0.625	—	8.3	6.3	
	4.13	240-D	0.375	0.188	0.312	11		225	26				0.625	—			8.5
	5.00	240-C	1.063	1.250	1.188	45		235	18				0.625	—			7.1
	5.00	240-E	0.375	0.375	0.500	20		225	26				0.625	—			8.5
	6.00	240-A	1.188	1.188	1.188	45		235	18				0.625	—			7.1
	<b>6.00</b>	<b>240-HW</b>	0.500	0.375	0.500	20		300	26				0.625	—			11.0
<b>6.00</b>	<b>240-AV</b>	0.500	0.375	0.500	20	225	26	0.625	5/8-11 UNC	12.3							
<b>2.5</b>	4.00	240-M	0.375	1.188	0.375	8	11.05	225	26	7.0	5.5	4	0.625	—	12.0	7.6	
	4.53	240-D	0.500	0.250	0.375	11		225	26				0.625	—			12.3
	5.00	240-C	1.063	1.250	1.188	45		235	18				0.625	—			10.6
	5.00	240-E	0.500	0.375	0.500	17		225	26				0.625	—			12.0
	6.00	240-A	1.188	1.188	1.188	43		235	18				0.625	—			12.0
	<b>6.00</b>	<b>240-AV</b>	0.500	0.375	0.500	17		225	26				0.625	5/8-11 UNC			12.3
<b>3</b>	5.00	240-C	1.063	1.250	1.188	40	13.36	235	15	7.5	6.0	4	0.625	—	13.3	8.3	
	5.00	240-E	0.500	0.375	0.500	14		225	26				0.625	—			14.0
	5.14	240-D	0.500	0.375	0.500	14		225	26				0.625	—			14.0
	6.00	240-A	1.188	1.188	1.188	38		235	15				0.625	—			13.8
	6.00	240-HW	0.500	0.375	0.500	14		300	26				0.625	—			17.5
	<b>6.00</b>	<b>240-AV</b>	0.500	0.375	0.500	14		225	26				0.625	5/8-11 UNC			14.0
<b>8.00</b>	<b>240-AV</b>	0.500	0.375	0.500	14	225	26	0.625	5/8-11 UNC	15.0							
<b>3.5</b>	<b>6.00</b>	<b>240-AV</b>	0.500	0.375	0.500	12	18.67	225	26	8.5	7.0	8	0.625	5/8-11 UNC	17.6	7.4	
<b>4</b>	5.00	240-C	1.063	1.250	1.188	32	22.69	235	15	9.0	7.5	8	0.625	—	16.5	7.4	
	5.00	240-E	0.750	0.500	0.500	14		225	26				0.625	—			17.0
	5.32	240-D	0.750	0.500	0.500	14		225	26				0.625	—			17.1
	6.00	240-A	1.188	1.188	1.188	30		235	15				0.625	—			17.5
	6.00	240-HW	0.750	0.500	0.500	14		300	26				0.625	—			26.0
	<b>6.00</b>	<b>240-AV</b>	0.750	0.500	0.500	14		225	26				0.625	5/8-11 UNC			18.3
<b>8.00</b>	<b>240-AV</b>	0.750	0.500	0.500	14	225	26	0.625	5/8-11 UNC	19.3							
<b>5</b>	5.00	240-C	1.063	1.250	1.188	27	30.02	235	10	10.0	8.5	8	0.750	—	20.3	8.3	
	5.00	240-E	0.750	0.500	0.500	11		225	26				0.750	—			22.0
	6.00	240-A	1.188	1.188	1.188	25		235	10				0.750	—			21.8
	<b>6.00</b>	<b>240-AV</b>	0.750	0.500	0.500	11		225	26				0.750	3/4-10 UNC			22.8
	6.69	240-D	0.750	0.500	0.500	11		225	10				0.750	—			23.6
	<b>8.00</b>	<b>240-AV</b>	0.750	0.500	0.500	11		225	26				0.750	3/4-10 UNC			25.0
<b>6</b>	5.00	240-C	1.063	1.250	1.188	23	41.28	225	8	11.0	9.5	8	0.750	—	22.6	10.4	
	5.00	240-E	0.750	0.500	0.500	9		225	26				0.750	—			26.0
	6.00	240-A	1.188	1.188	1.188	21		235	10				0.750	—			24.0
	6.00	240-HW	0.750	0.500	0.500	9		300	26				0.750	—			39.0
	<b>6.00</b>	<b>240-AV</b>	0.750	0.500	0.500	9		225	26				0.750	3/4-10 UNC			26.8
	7.09	240-D	0.750	0.500	0.500	9		225	26				0.750	—			29.0
<b>8.00</b>	<b>240-AV</b>	0.750	0.500	0.500	9	225	26	0.750	3/4-10 UNC	29.1							
<b>8</b>	5.00	240-C	1.063	1.188	1.188	17	63.62	235	8	13.5	11.75	8	0.750	—	35.5	13.4	
	5.00	240-E	0.750	0.500	0.500	7		225	26				0.750	—			40.0
	6.00	240-A	1.188	1.188	1.188	16		235	8				0.750	—			38.5
	6.00	240-HW	0.750	0.500	0.500	7		300	26				0.750	—			70.0
	<b>6.00</b>	<b>240-AV</b>	0.750	0.500	0.500	7		225	26				0.750	3/4-10 UNC			40.6
	8.07	240-D	1.000	0.563	0.875	8		225	26				0.750	—			41.3
<b>10</b>	5.00	240-C	1.063	1.188	1.188	14	103.87	235	6	16.0	14.25	12	0.875	—	49.3	21.0	
	5.00	240-E	1.000	0.625	0.750	7		225	26				0.875	—			56.0
	8.00	240-A	1.188	1.188	1.188	13		235	6				0.875	—			53.6
	<b>8.00</b>	<b>240-AV</b>	1.000	0.625	0.750	7		225	26				0.875	7/8-9 UNC			56.6
	9.00	240-HW	1.000	0.625	0.750	7		225	26				0.875	7/8-9 UNC			57.0
	8.00	240-D	1.000	0.625	0.875	7		225	26				0.875	—			56.0
9.45	240-D	1.000	0.625	0.875	7	225	26	0.875	—	58.5							
<b>10.00</b>	<b>240-AV</b>	1.000	0.625	0.750	7	225	26	0.875	7/8-9 UNC	60.5							
<b>12</b>	5.00	240-C	1.063	1.250	1.188	12	137.89	235	6	19.0	17.0	12	0.875	—	73.4	26.5	
	5.00	240-E	1.000	0.625	0.750	6		225	26				0.875	—			74.0
	8.00	240-A	1.188	1.188	1.188	11		235	6				0.875	—			80.0
	8.00	240-HW	1.000	0.625	0.750	6		275	6				0.875	—			100.0
	<b>8.00</b>	<b>240-AV</b>	1.000	0.625	0.750	6		225	26				0.875	7/8-9 UNC			83.0
	10.24	240-D	1.000	0.625	0.875	6		225	26				0.875	7/8-9 UNC			88.0
<b>14</b>	8.00	240-HW	1.000	0.625	0.750	5	182.65	200	26	21.0	18.75	12	1.000	—	162.0	28.0	
	<b>8.00</b>	<b>240-AV</b>	1.000	0.625	0.750	5		150	26				1.000	—			115.0
	9.00	240-M	1.000	0.625	0.750	5		150	26				1.000	—			117.0
	10.43	240-D	1.000	0.625	0.875	5		150	26				1.000	—			120.0
<b>16</b>	8.00	240-C	1.000	1.063	1.188	8	240.53	145	6	23.5	21.25	16	1.000	—	136.0	26.8	
	8.00	240-HW	1.000	0.625	0.750	4		175	26				1.000	—			185.0
	<b>8.00</b>	<b>240-AV</b>	1.000	0.625	0.750	4		125	26				1.000	—			165.0
	9.00	240-M	1.000	0.625	0.750	4		125	26				1.000	—			168.0
10.43	240-D	1.000	0.625	0.975	4	125	26	1.000	—	170.0							
<b>18</b>	8.00	240-HW	1.000	0.625	0.750	4	298.65	175	26	25.0	22.75	16	1.125	—	209.0	31.4	
	<b>8.00</b>	<b>240-AV</b>	1.000	0.625	0.750	4		125	26				1.125	—			168.0
	9.00	240-M	1.000	0.625	0.750	4		125	26				1.125	—			169.0
	10.43	240-D	1.000	0.625	0.875	4		125	26				1.125	—			170.0
<b>20</b>	8.00	240-C	1.000	1.063	1.188	6	363.05	145	6	27.5	25.00	20	1.125	—	154.0	32.4	
	8.00	240-HW	1.000	0.625	0.750	3		175	26				1.125	—			234.0
	<b>8.00</b>	<b>240-AV</b>	1.000	0.625	0.750	3		125	26				1.125	—			170.0
	9.00	240-M	1.000	0.625	0.750	3		125	26				1.125	—			173.0
10.43	240-D	1.000	0.625	0.875	3	125	26	1.125	—	175.0							
<b>22</b>	<b>10.00</b>	<b>240-AV</b>	1.000	0.625	0.750	3	433.74	115	26	27.5	25.0	20	1.125	—	210.0	34.5	
<b>24</b>	8.00	240-C	1.000	1.063	1.188	5											

# series 242 twin sphere expansion joints

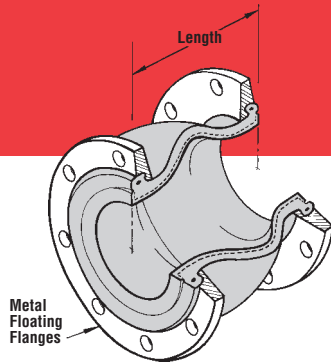
Table 3: Sizes • Movements • Pressures • Flange Standards • Weights																	
NOMINAL PIPE	Neutral Length	Part #	242 Movement Capability: From Neutral Position <sup>2</sup>					Pressure <sup>4</sup>		Standard Flange Bolting Dimensions					Weight in lbs <sup>8</sup>		
			Axial Compression Inches	Axial Extension Inches	Lateral Deflection Inches	Angular Deflection Degrees	Thrust <sup>3</sup> Factor	Positive <sup>5</sup> PSIG	Vacuum <sup>6</sup> Inches of Hg	Flange O.D. Inches	Bolt Circle Inches	Number of Holes	Size of Holes Inches	Bolt Hole <sup>7</sup> Thread	Exp. Joint & Flanges	Control Unit Set (2 Rod)	
<b>1</b>	10.00	242-C	2.000	1.188	1.750	45	4.43	225	26	4.25	3.13	4	0.500	—	5.2	3.6	
<b>1.25</b>	7.0	242-A	2.000	1.188	1.750	45	6.34	225	26	4.63	3.5	4	0.500	1/2-13 UNC	5.3	3.5	
	7.0	242-HA						300					0.500	—	6.5	3.5	
	10.00	242-C						225					0.500	—	6.2	3.6	
<b>1.5</b>	6.00	242-B	2.000	1.188	1.750	45	6.49	225	26	5.0	3.88	4	0.500	—	6.1	4.6	
	6.00	242-HB						300					0.500	—	7.6	4.6	
	7.00	242-A						225					0.500	1/2-11 UNC	6.8	4.8	
	7.00	242-HA						300					0.500	—	8.3	4.8	
10.00	242-C	225	0.500	—	7.7	5.1											
<b>2</b>	6.00	242-B	2.000	1.188	1.750	45	7.07	225	26	6.0	4.75	4	0.625	—	9.0	6.6	
	6.00	242-HB						300					0.625	—	10.5	6.6	
	7.00	242-A						225					0.625	5/8-11 UNC	9.0	7.0	
	7.00	242-HA						300					0.625	—	10.5	7.0	
10.00	242-C	235	0.625	—	10.2	7.3											
<b>2.5</b>	6.00	242-B	2.000	1.188	1.750	43	11.05	225	26	7.0	5.5	4	0.625	—	12.9	7.6	
	6.00	242-HB						300					0.625	—	15.3	7.6	
	7.00	242-A						225					0.625	5/8-11 UNC	13.3	8.0	
	7.00	242-HA						300					0.625	—	15.8	8.0	
10.00	242-C	225	0.625	—	14.5	8.4											
<b>3</b>	7.00	242-A	2.000	1.188	1.750	38	13.36	225	26	7.5	6.0	4	0.625	5/8-11 UNC	14.3	8.6	
	7.00	242-HA						300					0.625	—	18.2	8.6	
	9.00	242-B						225					0.625	—	15.2	9.0	
	10.00	242-C						225					0.625	—	15.8	9.1	
12.00	242-C	300	0.625	—	16.0	9.9											
<b>3.5</b>	10.00	242-C	2.000	1.188	1.750	34	18.67	225	26	8.5	7.0	8	0.625	—	20.6	8.1	
<b>4</b>	9.00	242-A	2.000	1.375	1.562	34	22.69	225	26	9.0	7.5	8	0.625	5/8-11 UNC	20.3	8.0	
	9.00	242-HA						300					0.750	—	26.4	8.0	
	10.00	242-C						225					0.750	—	21.3	8.2	
	12.00	242-C						225					0.750	3/4-10 UNC	22.0	8.2	
<b>5</b>	9.00	242-A	2.000	1.375	1.562	29	30.02	225	26	10.0	8.5	8	0.750	—	24.5	8.3	
	9.00	242-HA						300					0.750	—	31.4	8.3	
	10.00	242-C						225					0.750	—	25.5	9.1	
	12.00	242-C						225					0.750	—	26.0	9.1	
<b>6</b>	9.00	242-A	2.000	1.375	1.562	25	41.28	225	26	11.0	9.5	8	0.750	3/4-10 UNC	29.5	11.7	
	9.00	242-HA						300					0.750	—	38.6	11.7	
	10.00	242-C						225					0.750	—	30.5	11.9	
	12.00	242-C						225					0.750	—	31.0	12.0	
	14.00	242-C						225					0.750	—	32.0	12.0	
<b>8</b>	9.00	242-B	2.375	1.375	1.375	19	63.62	225	26	13.5	11.75	8	0.750	—	42.3	14.5	
	9.00	242-HB						300					0.750	—	55.4	14.5	
	10.00	242-C						225					0.750	—	43.4	15.0	
	12.00	242-C						225					0.750	—	44.0	15.2	
	13.00	242-A						225					0.750	3/4-10 UNC	43.8	15.4	
	14.00	242-HA						300					0.750	—	57.5	15.4	
242-C	225	0.750	—	46.0	16.0												
<b>10</b>	12.00	242-B	2.375	1.375	1.375	15	103.87	225	26	16.0	14.25	12	0.875	—	64.1	23.5	
	12.00	242-HB						275					0.875	—	86.5	23.5	
	13.00	242-A						225					0.875	7/8-9 UNC	65.5	24.5	
	13.00	242-HA						275					0.875	—	88.4	24.5	
	14.00	242-C						225					0.875	—	66.7	24.5	
<b>12</b>	12.00	242-B	2.375	1.375	1.375	13	137.89	225	26	19.0	17.00	12	0.875	—	94.0	30.0	
	12.00	242-HB						275					0.875	—	110.0	30.0	
	13.00	242-A						225					0.875	7/8-9 UNC	95.0	31.0	
	13.00	242-HA						275					0.875	—	110.0	31.0	
14.00	242-C	225	0.875	—	99.1	31.0											
<b>14</b>	12.00	242-C	1.750	1.118	1.118	9	182.65	150	26	19.0	18.75	12	1.000	—	110.0	30.5	
	13.75	242-A						150					1.000	—	112.0	32.0	
	13.75	242-HA						200					1.000	—	144.0	32.0	
<b>16</b>	12.00	242-C	1.750	1.118	1.118	8	240.53	125	26	23.5	21.25	16	1.000	—	124.0	28.8	
	12.00	242-HC						175					1.000	—	160.0	28.8	
	13.75	242-A						125					1.000	—	132.0	30.8	
	13.75	242-HA						175					1.000	—	170.2	30.8	
<b>18</b>	12.00	242-C	1.750	1.118	1.118	7	298.65	125	26	25.0	22.75	16	1.125	—	138.0	35.1	
	13.75	242-A						125					1.125	—	146.0	36.1	
	13.75	242-HA						175					1.125	—	181.2	36.1	
<b>20</b>	12.00	242-C	1.750	1.118	1.118	7	363.05	125	26	27.5	25.0	20	1.125	—	172.0	35.0	
	13.75	242-A						125					1.125	—	182.0	35.5	
	13.75	242-HA						160					1.125	—	182.0	35.5	
<b>22</b>	12.00	242-C	1.750	1.118	1.118	6	433.74	115	26	29.5	27.25	20	1.125	—	181.0	35.5	
	12.00	242-C						115					1.125	—	181.0	35.5	
<b>24</b>	12.00	242-C	1.750	1.118	1.118	5	510.70	110	26	32.5	29.5	20	1.125	—	190.0	47.0	
	13.75	242-A						110					1.125	—	220.0	48.0	
13.75	242-HA	160	1.125	—	266.2	48.0											
<b>26</b>	12.00	242-C	1.750	1.118	1.118	5	593.96	110	26	34.25	31.75	24	1.125	—	243.0	52.0	
	12.00	242-C						110					1.125	—	243.0	52.0	
<b>30</b>	12.00	242-C	1.750	1.118	1.118	4	779.31	110	26	38.75	36.0	28	1.125	—	270.0	62.0	

# control units

**Table 4: Control Units/Unanchored**

Control Units must be installed when pressures (test • design • surge • operating) exceed rating below:

Pipe Size	Series 240 P.S.I.G.	Series 242 P.S.I.G.
1" thru 4"	180	135
5" thru 10"	135	135
12" thru 14"	90	90
16" thru 24"	45	45
26" thru 30"	35	35

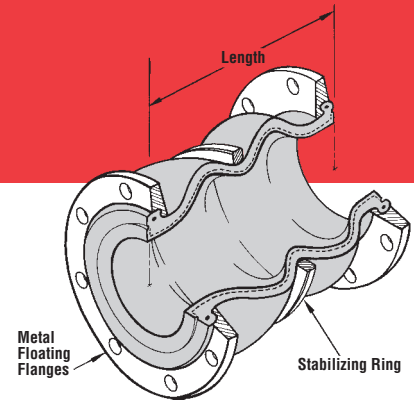


**Figure 1.**  
**Style 240**  
**Single Sphere Connector**

**Table 5: Control Units**

Control Rod Plate O.D. (in)	Control Rod Plate Thickness (in)	Rod Diameter <sup>2</sup> (in)	Nominal Pipe Size (in)	Maximum Surge or Test Pressure of System/PSIG <sup>3</sup>		
				Number of Rods Required:		
				2	3	4
8.375	0.375	0.625	1	949	—	—
8.750	0.375	0.625	1.25	830	—	—
9.125	0.375	0.625	1.5	510	—	—
10.125	0.375	0.625	2	661	—	—
11.125	0.375	1.000	2.5	529	—	—
11.625	0.375	1.000	3	441	—	—
12.625	0.375	1.000	3.5	365	547	729
13.125	0.375	1.000	4	311	467	622
14.125	0.500	1.000	5	235	353	470
15.125	0.500	1.000	6	186	278	371
19.125	0.500	1.000	8	163	244	326
21.625	0.750	1.000	10	163	244	325
24.625	0.750	1.000	12	160	240	320
26.625	0.750	1.000	14	112	167	223
30.125	0.750	1.250	16	113	170	227
31.625	0.750	1.250	18	94	141	187
34.125	0.750	1.250	20	79	118	158
36.125	1.000	1.250	22	85	128	171
38.625	1.000	1.250	24	74	110	147
40.825	1.000	1.250	26	62	93	124
44.125	1.250	1.500	28	65	98	130
46.375	1.250	1.500	30	70	105	141

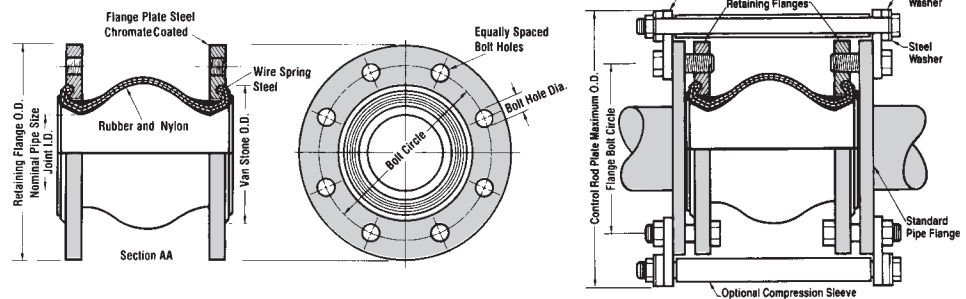
Pipe Size	Series 240 & 242 Heavyweight P.S.I.G.
1" thru 8"	300
10" thru 12"	275
14"	200
16" thru 20"	175
22" thru 30"	160



**Figure 2.**  
**Style 242**  
**Twin Sphere Connector**

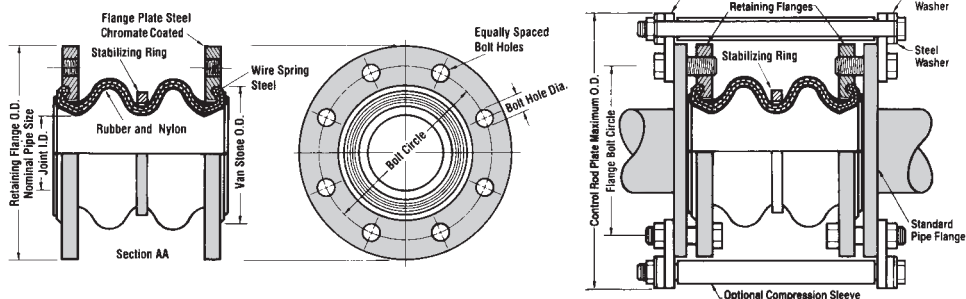
## Style 240 Single Sphere Connector

**Figure 3.**



## Style 242 Twin Sphere Connector

**Figure 4.**



**Control Rod/Unit Applications.** Control unit assemblies 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 equipment. (See Tables 4 & 5).

- 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 as shown in Tables 2 & 3.
- Unanchored Systems:** Control unit assemblies are always required in unanchored systems. Additionally, control unit assemblies must be used when maximum pressure exceeds the limits shown in Table 4 & 5, or the movement exceeds the rated movements as shown in Tables 2 & 3.

- Spring-Mounted Equipment:** Control unit assemblies are always recommended for spring-mounted equipment. Additionally, control unit assemblies must be used when maximum pressure exceeds the limits shown in Tables 4 & 5, or the movement exceeds the rated movements as shown in Tables 2 & 3.

**Special Applications.** Certain Style 240 (Single Sphere) and 242 (Twin Sphere) expansion joints are available in High-Pressure Designs. For specific pressures, see Table 6. Style designations are listed as 240-HW (sizes stocked in Table 2) and 242-HA, 242-HB & 242-HC (sizes stocked in Table 3.) The High-Pressure Design is recommended when the connector is to be installed into ANSI 250/300# piping systems.

# drilling for series 240 and series 242 expansion joints

**Table 7: Flange Drilling**

NOMINAL PIPE SIZE Inch/ mm	American 125/150# Conforms to ANSI B16.1 and B16.5				American 25/300# Conforms to ANSI B16.1 and B16.5				British Standard 10:1902 Conforms to BS 10 Table E				Metric Series Conforms to I.S.O. 2084-1974 Table NP10 Holes to I.S.O. /R-273				Metric Series Conforms to I.S.O. 2084-1974 Table NP16 Holes to I.S.O. /R-273								
	Flange Thickness	Flange O.D.	Bolt Circle	No. of Holes	Drilled Hole Size	Threaded Hole Size	Flange Thickness	Flange O.D.	Bolt Circle	No. of Holes	Hole Size	Flange Thickness	Flange O.D.	Bolt Circle	No. of Holes	Flange Thickness	Flange O.D.	Bolt Circle	No. of Holes	Flange Thickness	Flange O.D.	Bolt Circle	No. of Holes	Hole Size	
1	0.55	4.25	3.13	4	0.62	1/2 - 13 UNC	0.63	4.88	3.5	4	0.75	0.59	4.5	3.25	4	0.62	4.53	3.35	4	0.63	4.53	3.35	4	0.55	
25	1.40	108.0	79.4	4	15.9	1/2 - 13 UNC	16.0	124.0	88.9	4	19.1	15.0	114.0	82.6	4	15.9	115.0	85.0	4	16.0	115.0	85.0	4	14.0	
1.25	0.55	4.63	3.5	4	0.62	1/2 - 13 UNC	0.63	5.25	3.88	4	0.75	0.59	4.75	3.44	4	0.62	5.51	3.94	4	0.63	5.51	3.94	4	0.71	
32	1.40	118.0	88.9	4	15.9	1/2 - 13 UNC	16.0	133.0	98.4	4	19.1	15.0	121.0	87.3	4	15.9	140.0	85.0	4	16.0	140.0	100.0	4	18.0	
1.5	0.55	5.0	3.88	4	0.62	1/2 - 13 UNC	0.63	6.12	4.50	4	0.88	0.59	5.25	3.88	4	0.62	5.91	4.33	4	0.63	5.91	4.33	4	0.71	
40	1.40	127.0	98.4	4	15.9	1/2 - 13 UNC	16.0	156.0	114.3	4	22.2	15.0	133.0	98.4	4	15.9	150.0	110.0	4	16.0	150.0	110.0	4	18.0	
2	0.63	6.0	4.75	4	0.75	5/8 - 11 UNC	0.71	6.50	5.00	8	0.75	0.63	6.0	4.5	4	0.75	6.50	4.92	4	0.71	6.50	4.92	4	0.71	
50	1.60	152.0	120.7	4	19.1	5/8 - 11 UNC	18.0	165.0	127.0	8	19.1	16.0	152.0	114.3	4	19.1	165.0	125.0	4	18.0	165.0	125.0	4	18.0	
2.5	0.71	7.0	5.5	4	0.75	5/8 - 11 UNC	0.71	7.5	5.88	8	0.88	0.71	7.5	5.0	4	0.75	7.25	5.71	4	0.71	7.25	5.71	4	0.71	
65	1.80	178.0	139.7	4	19.1	5/8 - 11 UNC	18.0	191.0	149.2	8	22.2	18.0	165.0	127.0	4	19.1	185.0	145.0	4	18.0	185.0	145.0	4	18.0	
3	0.71	7.5	6.0	4	0.75	5/8 - 11 UNC	0.79	8.25	6.62	8	0.88	0.71	7.25	5.75	4	0.75	7.87	6.3	4	0.79	7.87	6.30	4	0.71	
80	1.80	191.0	152.4	4	19.1	5/8 - 11 UNC	20.0	210.0	168.2	8	22.2	18.0	184.0	146.1	4	19.1	200.0	160.0	4	18.0	200.0	160.0	4	18.0	
3.5	0.71	8.5	7.0	8	0.75	5/8 - 11 UNC	0.79	9.0	7.25	8	0.88	0.71	8.0	6.5	8	0.75	8.66	7.09	8	0.79	8.66	7.09	8	0.71	
90	1.80	216.0	177.8	8	19.1	5/8 - 11 UNC	20.0	229.0	184.2	8	22.2	18.0	203.0	165.1	8	19.1	220.0	180.0	8	18.0	220.0	180.0	8	18.0	
4	0.71	9.0	7.5	8	0.75	5/8 - 11 UNC	0.79	10.0	7.88	8	0.88	0.71	8.5	7.0	8	0.75	9.79	8.27	8	0.79	9.79	8.27	8	0.71	
100	1.80	229.0	190.5	8	19.1	5/8 - 11 UNC	20.0	254.0	200.0	8	22.2	18.0	216.0	177.8	8	19.1	250.0	210.0	8	18.0	250.0	210.0	8	18.0	
5	0.79	10.0	8.5	8	0.88	3/4 - 10 UNC	0.87	11.0	9.25	8	0.88	0.79	10.0	8.25	8	0.75	9.84	8.27	8	0.87	9.84	8.27	8	0.71	
125	2.00	254.0	215.9	8	22.2	3/4 - 10 UNC	22.0	279.0	235.0	8	22.2	20.0	254.0	209.6	8	19.1	220.0	200.0	8	18.0	220.0	200.0	8	18.0	
6	0.87	11.0	9.5	8	0.88	3/4 - 10 UNC	0.87	12.5	10.62	12	0.88	0.87	11.0	9.25	8	0.88	11.22	9.45	8	0.87	11.22	9.45	8	0.87	
150	2.20	279.0	241.3	8	22.2	3/4 - 10 UNC	22.2	318.0	269.9	12	22.2	22.2	279.0	235.0	8	22.2	285.0	240.0	8	22.0	285.0	240.0	8	22.0	
8	0.87	13.5	11.75	8	0.88	3/4 - 10 UNC	0.95	15.0	13.0	12	1.00	0.87	13.25	11.5	8	0.88	13.39	11.61	8	0.87	13.39	11.61	12	0.87	
200	2.20	343.0	299.5	8	22.2	3/4 - 10 UNC	24.0	381.0	330.2	12	25.4	22.2	337.0	292.1	8	22.2	340.0	295.0	8	22.0	340.0	295.0	12	22.0	
10	0.95	16.0	14.25	12	1.00	7/8 - 9 UNC	1.02	17.5	15.25	16	1.13	0.95	16.0	14.0	12	0.88	15.55	13.78	12	1.02	15.94	13.98	12	1.02	
250	2.40	406.0	362.0	12	25.4	7/8 - 9 UNC	26.0	445.0	387.4	16	28.6	24.0	406.0	355.6	12	22.2	26.0	395.0	350.0	12	26.0	405.0	355.0	12	26.0
12	1.02	19.0	17.0	12	1.00	7/8 - 9 UNC	1.02	20.5	17.75	16	1.25	0.95	18.0	16.0	12	1.00	17.52	15.75	12	1.02	18.11	16.14	12	1.02	
300	2.40	483.0	431.8	12	25.4	7/8 - 9 UNC	26.0	521.0	450.9	16	31.8	24.0	457.0	406.4	12	25.4	26.0	445.0	400.0	12	26.0	460.0	410.0	12	26.0
14	1.02	21.0	18.75	12	1.13	1 - 8 UNC	1.10	23.0	20.25	20	1.25	1.02	20.75	18.5	12	1.00	19.88	18.11	16	1.10	20.47	18.50	16	1.02	
350	2.60	535.0	476.3	12	28.6	1 - 8 UNC	28.0	584.0	514.4	20	31.8	26.0	527.0	469.9	12	25.4	28.0	505.0	460.0	16	28.0	520.0	470.0	16	26.0
16	1.10	23.5	21.25	16	1.13	1 - 8 UNC	1.18	25.5	22.5	20	1.38	1.10	22.75	20.5	12	1.00	22.24	20.28	16	1.18	22.83	20.67	16	1.18	
400	2.80	597.0	539.8	16	28.6	1 - 8 UNC	30.0	648.0	571.5	20	34.9	28.0	578.0	520.7	12	25.4	30.0	565.0	515.0	16	30.0	580.0	525.0	16	30.0
18	1.18	25.0	22.75	16	1.25	1 1/8 - 7 UNC	1.18	28.0	24.75	24	1.38	1.18	25.25	23.0	16	1.00	24.21	22.24	20	1.18	25.20	23.03	20	1.18	
450	3.00	635.0	577.9	16	31.8	1 1/8 - 7 UNC	30.0	711.0	628.7	24	34.9	30.0	641.0	584.2	16	25.4	30.0	615.0	565.0	20	30.0	640.0	585.0	20	30.0
20	1.18	27.5	25.0	20	1.25	1 1/8 - 7 UNC	1.18	30.5	27.0	24	1.38	1.18	27.75	25.25	16	1.00	26.38	24.41	20	1.18	28.15	25.59	20	1.30	
500	3.00	695.0	635.0	20	31.8	1 1/8 - 7 UNC	30.0	775.0	688.8	24	34.9	30.0	705.0	641.4	16	25.4	30.0	670.0	620.0	20	30.0	715.0	650.0	20	33.0
22	1.18	29.5	27.25	20	1.38	1 1/4 - 7 UNC	1.18	33.0	29.5	24	1.38	1.18	30.0	27.5	16	1.13	28.74	26.57	20	1.18	30.51	27.95	20	1.30	
550	3.00	749.0	692.2	20	34.9	1 1/4 - 7 UNC	30.0	836.0	743.0	24	34.9	30.0	762.0	698.5	16	25.4	30.0	730.0	675.0	20	30.0	775.0	710.0	20	33.0
24	1.18	32.06	29.5	20	1.38	1 1/4 - 7 UNC	1.18	36.0	32.0	24	1.62	1.18	32.5	29.75	16	1.25	30.71	28.54	20	1.18	33.07	30.31	20	1.42	
600	3.00	813.0	749.3	20	34.9	1 1/4 - 7 UNC	30.0	914.0	812.8	24	41.3	30.0	826.0	755.7	16	31.8	30.0	780.0	725.0	20	30.0	840.0	770.0	20	36.0
26	1.26	34.25	31.75	24	1.38	1 1/4 - 7 UNC	1.26	38.25	34.5	28	1.75	1.26	35.25	32.5	20	1.38	32.87	30.71	24	1.26	33.86	31.10	24	1.42	
650	3.20	870.0	806.5	24	34.9	1 1/4 - 7 UNC	32.0	972.0	876.0	28	44.5	32.0	885.0	820.0	24	30.0	32.0	835.0	780.0	24	32.0	860.0	790.0	24	36.0
30	1.26	38.75	36.0	28	1.38	1 1/4 - 7 UNC	1.26	43.0	39.25	28	2.00	1.26	39.25	36.5	20	1.38	37.99	35.43	24	1.26	38.19	35.43	24	1.42	
750	3.20	984.0	914.4	28	34.9	1 1/4 - 7 UNC	32.0	1092.0	997.0	28	50.8	32.0	997.0	927.1	20	34.9	32.0	965.0	900.0	24	32.0	970.0	900.0	24	36.0

