

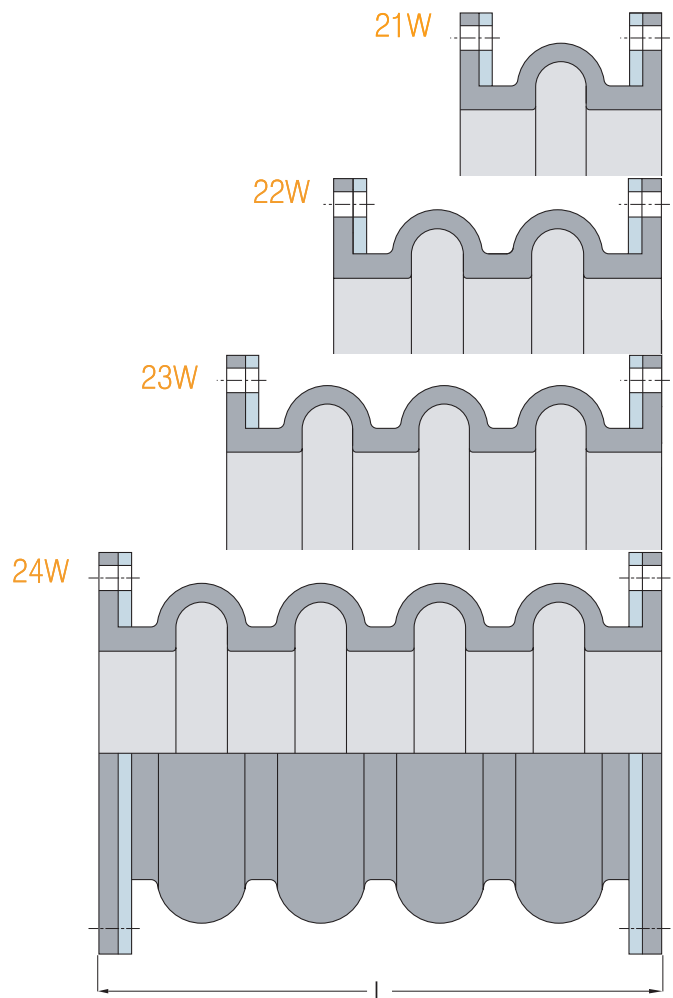
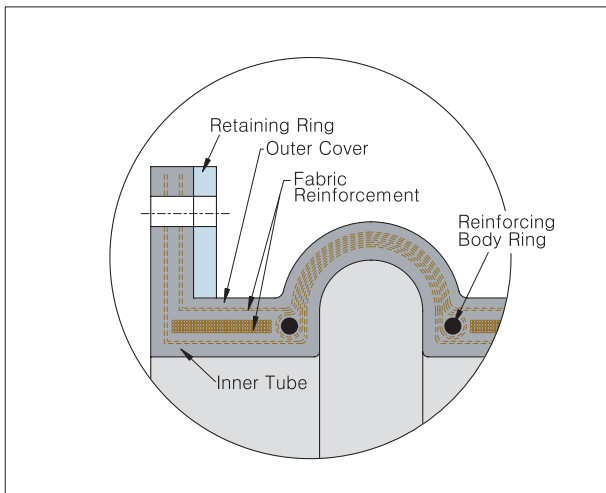
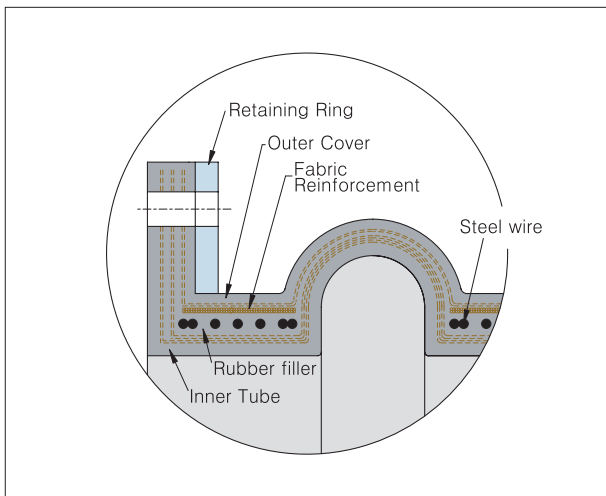
Series 20W Wide Arch Type Expansion Joint

Kurbo Series 20W, wide arch type expansion joints are reengineered design to improve movement and spring rate capabilities of Kurbo Series 10 conventional spool arch type expansion joints.

Utilizing modern engineering principles and materials developed in tire industry, we create the Series 20W, new and improved design that provides great movement capability, lower spring rate with no sacrifice of strength. As seen in the tables on page 10 and 19, the movement capability of Type 21W, single wide arch expansion joint is greater than or equal to that of Type 12 double spool arch joint, while offering shorter face to face length. The Type 22W, double wide arch expansion joints provide about 40% higher axial movement capability and 30% greater lateral movement capability than the Type 13, triple spool arch products, maintaining shorter or the same face to face length. Thus, they eliminate the needs for double or multiple arch spool type joints resulting in less cost.

Now, Kurbo Series 10 conventional designs are available only in short face to face length and for replacement purpose. See the engineering table on page 19 for the Series 10's dimension, movement, spring rate and pressure ratings.

Typical Construction of 20W

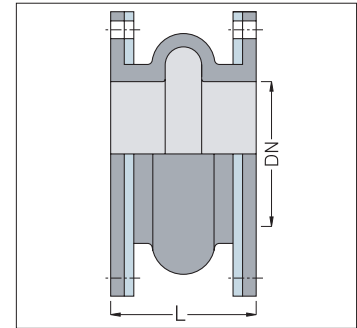


Features

- **Greater movement** : More than 2 times greater movement capability than conventional product, while offering the same face to face length.
- **Greater flexibility** : Wide arch profile and fabric angle adjustment provides great flexibility and increased all directional movement capability.
- **Lower spring rates** : Wide and large arch profile coupled with radial tire cord construction allows the 20W to provide lower flange forces—less stress in piping system. Kurbo has completed flex test for sizes up to DN1200 and currently testing larger sizes.
- **Greater strength and higher pressure rating** : Unique arrangement of spring steel wire and combined construction of bias/radial tire cord increases pressure/vacuum capability : All 21W up to DN1800 are designed to withstand full vacuum rating.
- **Greater than 4 to 1 safety factor** : Series 20W are fully tested in factory and also proven through the industry.
- **Higher temperature rating** : Standard materials of the 20W are EPDM tube/cover and polyester tire cord, so recommended to 120°C . 200°C continuous service available.
- **Superior reliability and durability—Extended service life** : With quality materials and optimum selection of construction and professional workmanship allow Kurbo 20W to guarantee longer service life.
- **Wide variety of elastomers** : As a standard elastomers, choice of natural, neoprene, nitrile, SBR, butyl, EPDM, Hypalon elastomers are available. As a special, food grade white rubber, flame resistance rubber, Viton, Teflon and more available. Please refer to Kurbo "Chemical Resistance Guide" for recommendations on elastomer best suited for the chemical/process fluid in your system.
- **Wide spectrum of fabric and metal reinforcements** : Standard fabric is high tensile polyester tire cord. Other materials like nylon, Kevlar, Nomex available. Various corrosion resistant steel wire and annular ring are used in carcass for pressure/vacuum bearing reinforcement layers.
- **Cover coating** : For extra U.V. protection, the 20W are hypalon(CSM) coated .
- **Less cost** : No need for traditional product with double arch— Less project cost
- **Lighter weight** : Less transportation and installation cost
- **Flanged design** : No gasket required due to seamless rubber flange face.
- **No ring spacer required** : Available with recessed rubber flange face for raised face flange connections.

Kurbo Series 20W Available Material and Operating Temperature				
Material Code	Elastomer		Maximum Operating Temperature	
	Outer Cover	Inner Tube		
BB	Butyl	Butyl	120°C	250°F
NN	Neoprene	Neoprene	100°C	210°F
EE	EPDM	EPDM	120°C	250°F
HH	Hypalon-CSM	Hypalon-CSM	110°C	230°F
NH	Neoprene	Hypalon-CSM	110°C	230°F
NP	Neoprene	Nitrile	90°C	200°F
NR	Neoprene	Natural	80°C	180°F
NV	Neoprene	Viton	200°C	400°F
NT	Neoprene	Teflon	200°C	400°F
NF	Neoprene	Food grade Neoprene	100°C	210°F
EF	EPDM	Food grade EPDM	120°C	250°F

Type 21W One Open Wide Arch



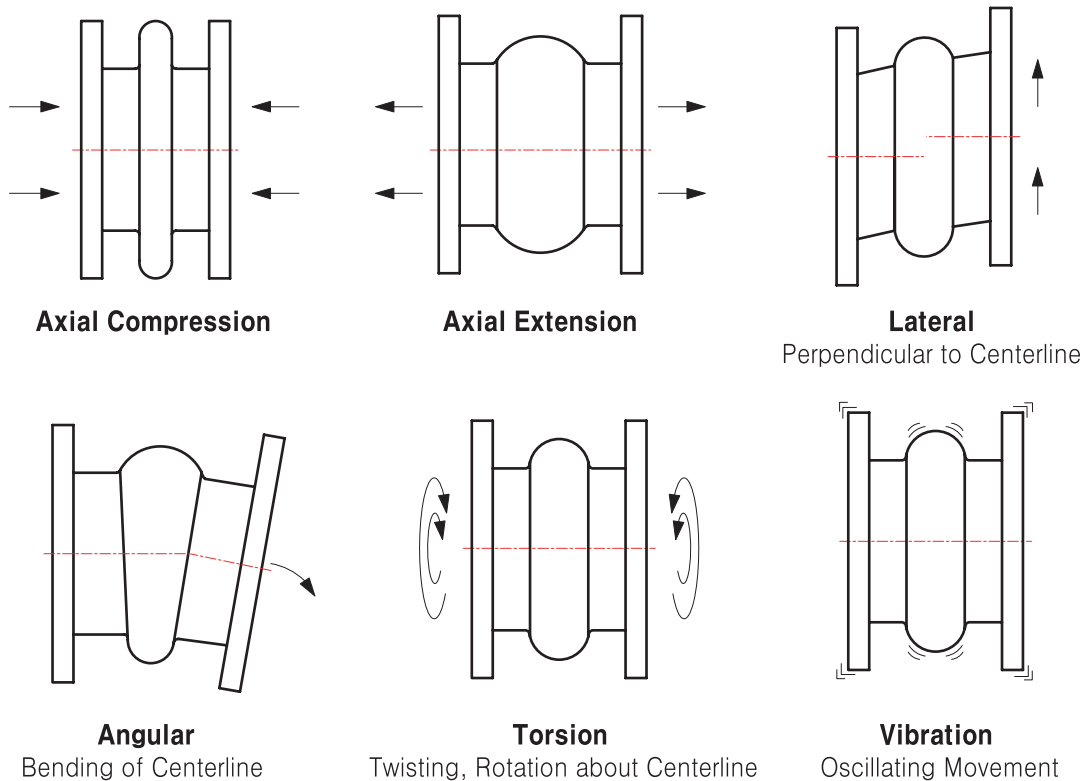
Movement · Spring Rate · Pressure Rating

Nominal Size		Min. Length		Movement Capability				Spring Rates			Max. Pressure (bar)	Vacuum Rating (mmHg)
DN	inch	mm	inch	Comp. (mm)	Ext. (mm)	Lat. (mm)	Ang. (deg.)	Comp. (kg/mm)	Ext. (kg/mm)	Lat. (kg/mm)		
25	1	150	6	20	10	12	38.2	2.4	3.5	4.3	12	760
32	1.25	150	6	20	10	12	32.2	2.4	3.5	4.4	12	760
40	1.5	150	6	20	10	12	27.7	2.7	3.9	4.8	12	760
50	2	150	6	35	17	16	34.6	2.9	4.3	5.3	12	760
65	2.5	150	6	35	17	16	28.9	3.4	4.9	6.1	12	760
80	3	150	6	35	17	16	24.7	3.8	5.5	6.9	12	760
100	4	150	6	35	17	16	19.0	4.4	6.3	7.8	12	760
125	5	150	6	40	20	18	17.5	5.1	7.4	9.2	12	760
150	6	150	6	40	20	18	14.7	6.8	9.9	12.6	12	760
200	8	150	6	40	20	18	11.1	8.6	12.4	15.9	10	760
250	10	200	8	40	20	18	8.9	10.3	15.0	19.1	10	760
300	12	200	8	40	20	20	7.5	13.3	19.4	25.4	10	760
350	14	200	8	40	20	20	6.4	15.2	22.1	29.0	10	760
400	16	200	8	40	20	20	5.6	17.1	24.9	32.6	8	760
450	18	200	8	40	20	20	5.0	19.0	27.6	36.2	8	760
500	20	200	8	40	20	20	4.5	20.9	30.4	39.8	8	760
550	22	250	10	50	25	23	5.1	24.6	35.7	49.2	8	760
600	24	250	10	50	25	23	4.7	26.6	38.6	53.3	8	760
650	26	250	10	50	25	23	4.3	28.7	41.6	57.3	7	760
700	28	250	10	50	25	23	4.0	30.7	44.5	61.4	7	760
750	30	250	10	50	25	23	3.8	32.7	47.4	65.4	7	760
800	32	250	10	50	25	23	3.5	34.7	50.4	69.5	7	760
850	34	250	10	50	25	23	3.3	36.8	53.3	73.5	7	760
900	36	250	10	50	25	23	3.1	38.8	56.2	77.6	7	760
950	38	250	10	50	25	23	3.0	40.8	59.2	81.6	7	760
1000	40	250	10	50	25	23	2.8	42.8	62.1	85.7	7	760
1050	42	300	12	60	30	25	3.2	44.9	65.1	89.7	6	760
1100	44	300	12	60	30	25	3.1	46.9	68.0	93.8	6	760
1150	46	300	12	60	30	25	2.9	42.6	61.7	93.7	6	760
1200	48	300	12	60	30	25	2.8	44.3	64.3	97.5	6	760
1250	50	300	12	60	30	25	2.7	46.1	66.8	101.4	6	760
1300	52	300	12	60	30	25	2.6	47.8	69.3	105.2	6	760
1350	54	300	12	60	30	25	2.5	49.6	71.9	109.1	6	760
1400	56	300	12	60	30	25	2.4	51.3	74.4	112.9	6	760
1450	58	300	12	60	30	25	2.3	53.1	76.9	116.7	6	760
1500	60	300	12	60	30	25	2.3	54.8	79.5	120.6	6	760
1650	66	300	12	60	30	25	2.0	60.1	87.1	132.1	6	760
1800	72	300	12	60	30	25	1.9	65.3	94.7	143.7	5	760
1950	78	300	12	60	30	25	1.7	76.9	111.5	169.2	5	700
2100	84	300	12	60	30	25	1.6	85.8	124.3	188.7	5	700
2250	90	300	12	60	30	25	1.5	91.7	132.9	201.7	4	700
2400	96	300	12	60	30	25	1.4	97.6	141.5	214.7	4	700
2550	102	300	12	60	30	25	1.3	106.8	154.8	234.9	4	700
2700	108	300	12	60	30	25	1.3	112.9	163.6	248.3	4	700
3000	120	300	12	60	30	25	1.1	125.0	181.3	275.1	3	700
3300	132	300	12	60	30	25	1.0	137.2	198.9	301.8	3	700
3600	144	300	12	60	30	25	0.9	149.4	216.6	328.6	3	700

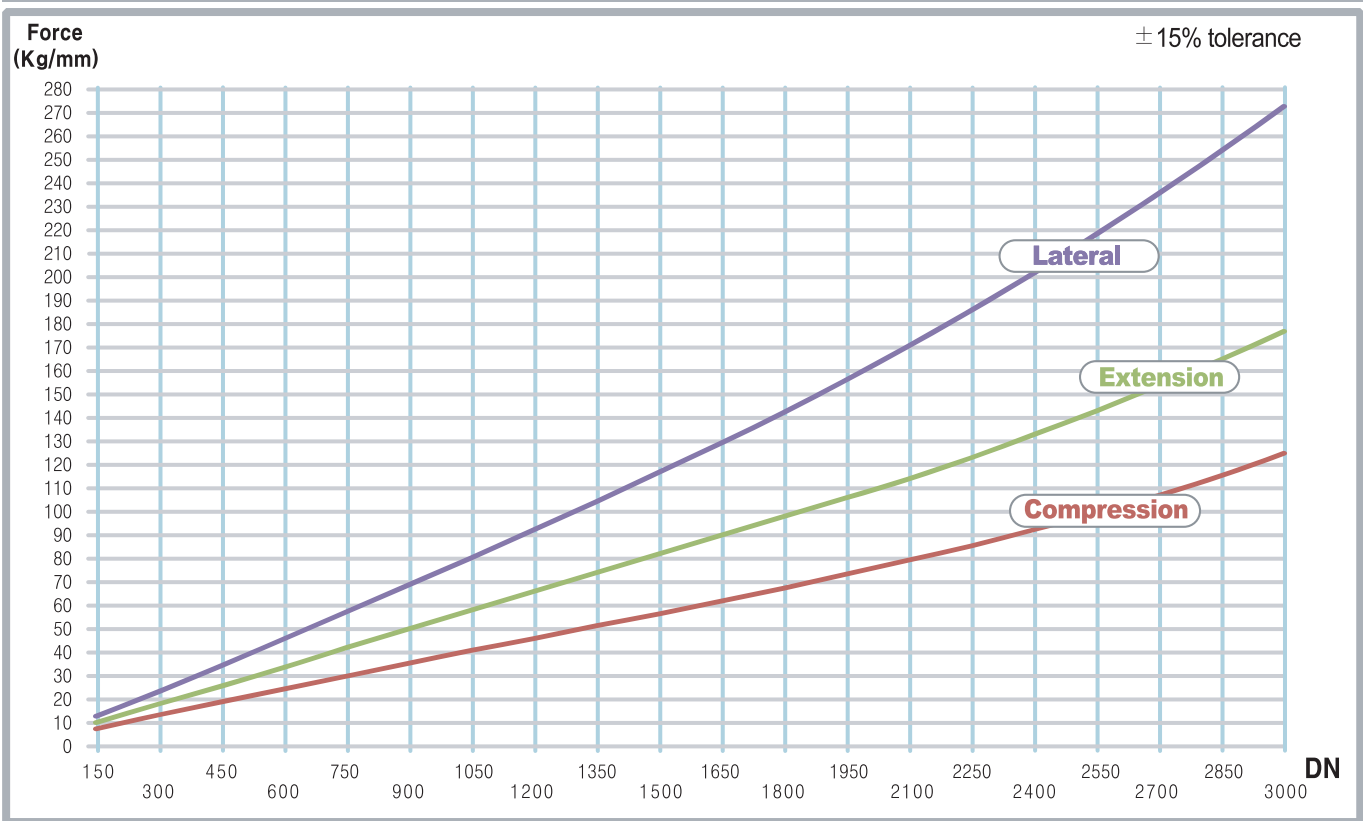
1. Spring rates are based on single open arch at zero pressure conditions. They should be considered as approximates which may vary with elastomers and fabrics used in fabrication and specific construction design.
2. Contact Kurbo for spring rates of multiple and filled arch products.
3. The expansion joints can be manufactured in different lengths.

Different Types of Movements that the 20W Absorb...

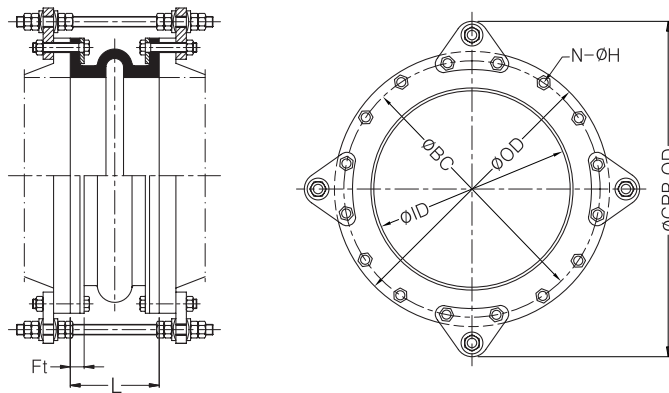
Rubber expansion joints are capable of axial compression, axial extension, lateral and angular movement. In many cases, these movements are all taking place at a time. Winflex 20W are designed to absorb different movements concurrently. Other main job is to reduce noise and vibration by creating a discontinuity between piping materials.



Spring Rate Curve of 21W



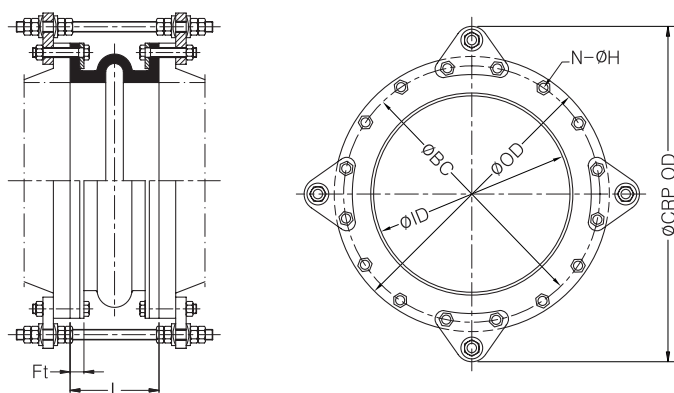
KURBO WinFlex



Dimension and Weight - ANSI 150 lbs Drill

Nominal Size		Min. Length		Dimensions - ANSI 150 lbs							Weights (kg)		
DN	inch	mm	inch	Ft (mm)	I.D (mm)	O.D. (mm)	B.C. (mm)	No. of Holes(N)	Hole Dia. (ØH)	CRP O.D.	Exp Joint	Retaining Ring Set	Control Rod Set(1)
25	1	150	6	22	25	108	79.4	4	16	184	0.6	0.8	1.2
32	1.25	150	6	22	32	118	88.9	4	16	195	0.7	1.0	1.3
40	1.5	150	6	22	38	127	98.4	4	16	203	0.8	1.1	1.3
50	2	150	6	22	51	152	120.7	4	19	241	1.1	1.6	2.2
65	2.5	150	6	22	64	178	139.7	4	19	269	1.5	2.2	2.4
80	3	150	6	22	76	191	152.4	4	19	279	1.7	2.3	2.5
100	4	150	6	22	102	229	190.5	8	19	318	2.3	3.3	2.0
125	5	150	6	24	127	254	215.9	8	22	343	3.0	3.5	2.2
150	6	150	6	24	152	279	241.3	8	22	369	3.5	3.9	2.6
200	8	150	6	27	203	343	298.5	8	22	447	5.2	5.9	3.8
250	10	200	8	27	254	406	362.0	12	25	518	8.1	7.8	5.5
300	12	200	8	27	305	483	431.8	12	25	607	11.3	11.4	6.9
350	14	200	8	30	356	533	476.3	12	29	658	13.8	12.7	7.6
400	16	200	8	30	406	597	539.8	16	29	734	16.1	16.0	8.5
450	18	200	8	30	457	635	577.9	16	32	771	16.3	14.7	9.0
500	20	200	8	33	508	699	635.0	20	32	835	19.5	17.9	8.7
550	22	250	10	33	559	749	692.2	20	35	897	25.2	18.3	12.9
600	24	250	10	33	610	813	749.3	20	35	962	28.7	21.5	13.4
650	26	250	10	33	660	870	806.5	24	35	1017	32.7	23.6	13.1
700	28	250	10	33	711	927	863.6	28	35	1085	35.4	25.9	16.4
750	30	250	10	33	762	984	914.4	28	35	1154	38.4	29.4	19.2
800	32	250	10	33	813	1060	977.9	28	41	1230	42.7	37.5	20.9
850	34	250	10	33	864	1111	1028.7	32	41	1292	45.7	37.8	24.0
900	36	250	10	33	914	1168	1085.9	32	41	1363	49.0	40.2	25.9
950	38	250	10	33	965	1238	1149.4	32	41	1431	53.8	50.0	26.5
1000	40	250	10	33	1016	1289	1200.2	36	41	1459	56.3	50.9	23.4
1050	42	300	12	38	1067	1346	1257.3	36	41	1528	76.6	52.6	25.6
1100	44	300	12	38	1118	1403	1314.5	40	41	1586	80.8	56.3	25.3
1150	46	300	12	38	1168	1454	1365.3	40	41	1637	85.4	57.9	25.6
1200	48	300	12	38	1219	1511	1422.4	44	41	1704	89.6	63.1	28.5
1250	50	300	12	38	1270	1568	1479.6	44	48	1762	92.9	63.3	30.3
1300	52	300	12	38	1321	1626	1536.7	44	48	1819	97.8	70.1	30.7
1350	54	300	12	38	1372	1683	1593.9	44	51	1904	106.5	73.8	39.8
1400	56	300	12	38	1422	1746	1651.0	48	48	1965	112.9	80.4	38.9
1450	58	300	12	38	1473	1803	1708.2	48	48	2022	118.0	86.7	39.4
1500	60	300	12	38	1524	1854	1759.0	52	51	2074	122.8	86.7	42.5
1650	66	300	12	38	1676	2032	1930.4	52	51	2252	144.7	107.0	43.3
1800	72	300	12	38	1829	2197	2095.5	60	51	2417	167.0	121.9	42.7
1950	78	300	12	38	1981	2362	2260.6	64	54	2611	192.0	136.1	53.4
2100	84	300	12	38	2134	2534	2425.7	64	54	2783	210.1	150.1	63.7
2250	90	300	12	38	2286	2705	2591.0	68	60	2979	227.6	198.4	84.2
2400	96	300	12	38	2438	2877	2755.9	68	60	3165	253.9	241.4	98.5
2550	102	300	12	38	2591	3048	2908.3	72	67	3336	271.9	248.2	103.5
2700	108	300	12	38	2743	3219	3067.1	72	67	3506	295.1	265.6	105.6
3000	120	300	12	38	3048	3562	3371.9	76	73	3849	339.3	330.6	113.3
3300	132	300	12	38	3353	3905	3702.1	80	79	4205	385.6	400.8	116.9
3600	144	300	12	38	3658	4248	4019.6	84	86	4523	433.1	464.0	126.0

- Flange dimensions shown are in accordance with 150 lbs. standards of ANSI/ASME B16.5 Class 150, ANSI/ASME B16.47 Class 150 Series A and AWWA C207 Class D 150lbs.
- Weights of expansion joint, retaining ring and control rod set are based on Kurbo standard construction and may vary with selection of rubber/steel material and amount of reinforcements.
- 1 Control rod set consists of 1 control rod, 2 control rod plates, 4 washers and 8 nuts.
- Control rods are recommended for all applications. To ensure correct length, customer should provide thickness of mating flange or flange specification.

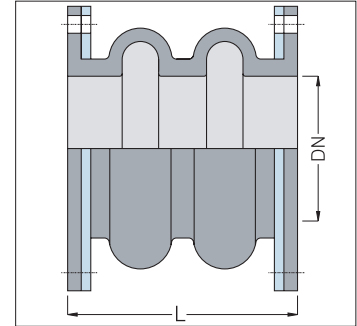


Dimension and Weight - PN 10 Drill

Nominal Size		Min. Length		Dimensions - PN 10								Weights (kg)		
DN	inch	mm	inch	Ft (mm)	I.D (mm)	O.D. (mm)	B.C. (mm)	No. of Holes(N)	Hole Dia. (øN)	CRP O.D.	Exp Joint	Retaining Ring Set	Control Rod Set(1)	
25	1	150	6	22	25	115	85	4	14	190	0.6	1.1	1.1	
32	1.25	150	6	22	32	140	100	4	18	217	0.9	1.6	1.4	
40	1.5	150	6	22	38	150	110	4	18	226	1.0	1.9	1.3	
50	2	150	6	22	51	165	125	4	18	254	1.2	2.2	1.8	
65	2.5	150	6	22	64	185	145	4	18	274	1.6	2.5	2.0	
80	3	150	6	22	76	200	160	8	18	290	1.8	2.7	1.6	
100	4	150	6	22	102	220	180	8	18	310	2.2	2.9	1.7	
125	5	150	6	24	127	250	210	8	18	340	3.0	3.4	1.8	
150	6	150	6	24	152	285	240	8	22	375	3.6	4.4	2.3	
200	8	150	6	27	203	340	295	8	22	445	5.2	5.7	3.2	
250	10	200	8	27	254	395	350	12	22	507	7.8	7.0	4.4	
300	12	200	8	27	305	445	400	12	22	568	10.0	7.3	5.3	
350	14	200	8	30	356	505	460	16	22	629	12.6	8.8	5.1	
400	16	200	8	30	406	565	515	16	26	701	14.6	10.7	6.7	
450	18	200	8	30	457	615	565	20	26	750	16.2	12.0	6.5	
500	20	200	8	33	508	670	620	20	26	806	18.9	13.9	6.7	
550	22	250	10	33	559	730	675	20	30	879	21.8	15.7	10.3	
600	24	250	10	33	600	780	725	20	30	928	28.2	18.4	10.5	
650	26	250	10	33	650	835	780	24	30	983	32.3	19.0	10.2	
700	28	250	10	33	700	895	840	24	30	1053	35.6	22.6	13.2	
750	30	250	10	33	750	965	900	24	33	1134	39.7	28.3	16.0	
800	32	250	10	33	800	1015	950	24	33	1186	42.2	30.1	16.5	
900	36	250	10	33	900	1115	1050	28	33	1303	47.9	33.0	20.1	
1000	40	250	10	33	1000	1230	1160	28	36	1407	54.6	40.4	21.4	
1100	44	300	12	38	1100	1340	1270	32	36	1522	78.0	43.4	21.8	
1200	48	300	12	38	1200	1455	1380	32	39	1649	88.1	51.8	25.9	
1300	52	300	12	38	1300	1575	1490	32	42	1769	100.0	62.7	27.6	
1400	56	300	12	38	1400	1675	1590	36	42	1896	110.1	66.6	33.4	
1500	60	300	12	38	1500	1785	1700	36	42	2006	121.7	74.1	36.8	
1600	64	300	12	38	1600	1915	1820	40	48	2134	138.7	89.5	40.2	
1800	72	300	12	38	1800	2115	2020	44	48	2335	155.3	98.6	40.3	
2000	80	300	12	38	2000	2325	2230	48	48	2557	174.7	113.3	52.3	
2200	88	300	12	38	2200	2550	2440	52	56	2802	202.8	133.9	68.3	
2400	96	300	12	38	2400	2760	2650	56	56	3018	223.9	151.9	73.9	
2600	104	300	12	38	2600	2960	2850	60	56	3216	242.0	163.6	76.1	
2800	112	300	12	38	2800	3180	3070	64	56	3436	272.8	190.9	78.3	
3000	120	300	12	38	3000	3405	3290	68	62	3660	298.7	218.5	83.7	

1. Flange dimensions shown are in accordance with ISO PN10
2. Weights of expansion joint, retaining ring and control rod set are based on Kurbo standard construction and may vary with selection of rubber/steel material and amount of reinforcements.
3. 1 Control rod set consists of 1 control rod, 2 control rod plates, 4 washers and 8 nuts.
4. Control rods are recommended for all applications. To ensure correct length, customer should provide thickness of mating flange or flange specification.

Type 22W Two Open Wide Arch

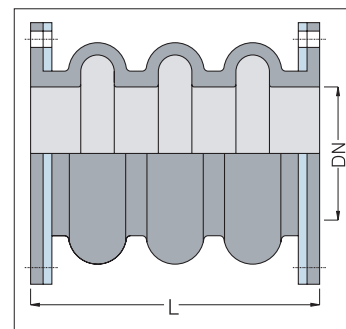


Movement • Pressure • Weight

Nominal Size		Min. Length		Movement Capability				Max. Pressure (bar)	Vacuum Rating (mmHg)	Weights (kg)		
DN	inch	mm	inch	Comp. (mm)	Ext. (mm)	Lat. (mm)	Ang. (deg.)			Exp Joint	Retaining Ring Set	Control Rod Set (1)
25	1	250	10	40	20	24	57.6	12	600	0.8	0.8	1.3
32	1.25	250	10	40	20	24	51.6	12	600	1.0	1.0	1.4
40	1.5	250	10	40	20	24	46.4	12	600	1.2	1.1	1.4
50	2	250	10	70	35	32	54.0	12	600	1.5	1.6	2.3
65	2.5	250	10	70	35	32	47.8	12	600	2.2	2.2	2.6
80	3	250	10	70	35	32	42.6	12	600	2.5	2.3	2.6
100	4	250	10	70	35	32	34.6	12	600	3.3	3.3	2.2
125	5	250	10	80	40	36	32.2	12	600	4.3	3.5	2.4
150	6	250	10	80	40	36	27.7	12	600	5.0	3.9	2.8
200	8	250	10	80	40	36	21.5	10	600	7.4	5.9	4.1
250	10	350	14	80	40	36	17.5	10	600	12.4	7.8	6.1
300	12	350	14	80	40	40	14.7	10	600	17.1	11.4	7.5
350	14	350	14	80	40	40	12.7	10	600	20.9	12.7	8.2
400	16	350	14	80	40	40	11.1	8	600	24.2	14.7	9.3
450	18	350	14	80	40	40	9.9	8	600	24.9	16.0	9.7
500	20	350	14	80	40	40	8.9	8	600	29.1	17.9	9.5
550	22	400	16	100	50	46	10.1	8	600	36.2	18.3	13.8
600	24	400	16	100	50	46	9.3	8	600	40.8	21.5	14.3
650	26	400	16	100	50	46	8.6	7	600	46.5	23.6	14.1
700	28	400	16	100	50	46	8.0	7	600	50.3	25.9	17.6
750	30	400	16	100	50	46	7.5	7	500	54.3	29.4	20.6
800	32	400	16	100	50	46	7.0	7	500	59.7	37.5	22.3
850	34	400	16	100	50	46	6.6	7	500	64.2	37.8	25.7
900	36	400	16	100	50	46	6.2	7	500	68.5	40.2	27.8
950	38	400	16	100	50	46	5.9	7	500	74.4	50.0	28.4
1000	40	400	16	100	50	46	5.6	7	500	77.9	50.9	24.8
1050	42	400	16	120	60	50	6.4	6	400	90.8	52.6	26.9
1100	44	400	16	120	60	50	6.1	6	400	95.6	56.3	26.5
1150	46	400	16	120	60	50	5.9	6	400	102.1	57.9	26.8
1200	48	400	16	120	60	50	5.6	6	400	107.1	63.1	29.9
1250	50	400	16	120	60	50	5.4	6	400	111.0	63.3	31.7
1300	52	400	16	120	60	50	5.2	6	400	116.7	70.1	32.1
1350	54	400	16	120	60	50	5.0	6	400	127.7	73.8	41.7
1400	56	450	18	120	60	50	4.8	6	400	149.5	80.4	41.5
1450	58	450	18	120	60	50	4.7	6	400	156.0	86.7	41.9
1500	60	450	18	120	60	50	4.5	6	400	162.7	86.7	45.1
1650	66	450	18	120	60	50	4.1	6	400	190.1	107.0	45.9
1800	72	450	18	120	60	50	3.8	5	400	217.2	121.9	45.2
1950	78	450	18	120	60	50	3.5	5	400	249.7	136.1	56.9
2100	84	450	18	120	60	50	3.2	5	400	271.3	150.1	67.2
2250	90	450	18	120	60	50	3.0	4	400	293.2	198.4	88.7
2400	96	450	18	120	60	50	2.8	4	400	329.2	241.4	103.6
2550	102	450	18	120	60	50	2.7	4	300	351.9	248.2	108.6
2700	108	450	18	120	60	50	2.5	4	300	379.8	265.6	110.8
3000	120	450	18	120	60	50	2.3	3	300	433.3	330.6	118.4
3300	132	450	18	120	60	50	2.0	3	300	489.0	400.8	122.0
3600	144	450	18	120	60	50	1.9	3	300	545.9	464.0	129.7

1. All flange drilling available with different length, different arch shapes
2. Higher pressure and vacuum rating available upon request
3. Movements of the Type F22W, two filled arch design are 50% of movement capabilities of the 22W.
4. Weights of expansion joint, retaining ring and control rod set are based on Kurbo standard construction with ANSI 150 lbs drill pattern and may vary with selection of rubber/steel material and amount of reinforcements.
5. Control rods are recommended for all applications. To ensure correct length, customer should provide thickness of mating flange or flange specification.

Type 23W Three Open Wide Arch

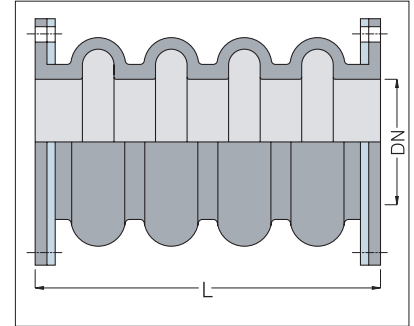


Movement • Pressure • Weight

Nominal Size		Min. Length		Movement Capability				Max. Pressure (bar)	Vacuum Rating (mmHg)	Weights (kg)		
DN	inch	mm	inch	Comp. (mm)	Ext. (mm)	Lat. (mm)	Ang. (deg.)			Exp Joint	Retaining Ring Set	Control Rod Set (1)
25	1	350	14	60	30	36	67.1	12	400	1.0	0.8	1.4
32	1.25	350	14	60	30	36	62.1	12	400	1.3	1.0	1.5
40	1.5	350	14	60	30	36	57.6	12	400	1.5	1.1	1.5
50	2	350	14	105	52	48	64.2	12	400	2.0	1.6	2.5
65	2.5	350	14	105	52	48	58.8	12	400	2.8	2.2	2.7
80	3	350	14	105	52	48	54.0	12	400	3.3	2.3	2.8
100	4	350	14	105	52	48	45.9	12	400	4.3	3.3	2.4
125	5	350	14	120	60	54	43.4	12	400	5.6	3.5	2.5
150	6	350	14	120	60	54	38.2	12	400	6.6	3.9	2.9
200	8	350	14	120	60	54	30.6	10	400	9.6	5.9	4.4
250	10	450	18	120	60	54	25.3	10	400	15.2	7.8	6.4
300	12	450	18	120	60	60	21.5	10	400	20.8	11.4	7.9
350	14	450	18	120	60	60	18.6	10	400	25.3	12.7	8.6
400	16	450	18	120	60	60	16.5	8	400	29.2	16.0	9.8
450	18	450	18	120	60	60	14.7	8	400	30.4	14.7	10.3
500	20	450	18	120	60	60	13.3	8	400	35.2	17.9	10.0
550	22	500	20	150	75	69	15.0	8	400	43.3	18.3	14.5
600	24	500	20	150	75	69	13.8	8	400	48.5	21.5	15.0
650	26	500	20	150	75	69	12.8	7	400	55.1	23.6	14.7
700	28	500	20	150	75	69	11.9	7	400	59.5	25.9	18.4
750	30	500	20	150	75	69	11.1	7	300	64.2	29.4	21.6
800	32	500	20	150	75	69	10.5	7	300	70.2	37.5	23.3
850	34	500	20	150	75	69	9.9	7	300	75.5	37.8	26.8
900	36	500	20	150	75	69	9.3	7	300	80.5	40.2	29.2
950	38	500	20	150	75	69	8.8	7	300	87.0	50.0	29.7
1000	40	500	20	150	75	69	8.4	7	300	91.2	50.9	25.8
1050	42	550	22	180	90	75	9.6	6	300	115.2	52.6	28.5
1100	44	550	22	180	90	75	9.1	6	300	121.1	56.3	28.2
1150	46	550	22	180	90	75	8.8	6	300	130.0	57.9	28.5
1200	48	550	22	180	90	75	8.4	6	300	136.2	63.1	31.9
1250	50	550	22	180	90	75	8.1	6	300	141.4	63.3	33.7
1300	52	550	22	180	90	75	7.8	6	300	148.3	70.1	34.0
1350	54	550	22	180	90	75	7.5	6	250	163.1	73.8	44.2
1400	56	600	24	180	90	75	7.2	6	250	186.2	80.4	44.1
1450	58	600	24	180	90	75	7.0	6	250	194.0	86.7	44.5
1500	60	600	24	180	90	75	6.7	6	250	202.7	86.7	47.6
1650	66	600	24	180	90	75	6.1	6	250	235.5	107.0	48.4
1800	72	600	24	180	90	75	5.6	5	250	267.3	121.9	47.8
1950	78	600	24	180	90	75	5.2	5	250	307.5	136.1	60.4
2100	84	600	24	180	90	75	4.8	5	250	332.5	150.1	70.7
2250	90	600	24	180	90	75	4.5	4	250	358.7	198.4	93.2
2400	96	600	24	180	90	75	4.2	4	250	404.5	241.4	108.7
2550	102	600	24	180	90	75	4.0	4	250	431.9	248.2	113.8
2700	108	600	24	180	90	75	3.8	4	250	464.5	265.6	115.9
3000	120	600	24	180	90	75	3.4	3	250	527.4	330.6	123.5
3300	132	600	24	180	90	75	3.1	3	250	592.4	400.8	127.2
3600	144	600	24	180	90	75	2.8	3	250	658.7	464.0	134.9

1. All flange drilling available with different length, different arch shapes
2. Higher pressure and vacuum rating available upon request
3. Movements of the Type F23W, three filled arch design are 50% of movement capabilities of the 23W.
4. Weights of expansion joint, retaining ring and control rod set are based on Kurbo standard construction with ANSI 150 lbs drill pattern and may vary with selection of rubber/steel material and amount of reinforcements.
5. Control rods are recommended for all applications. To ensure correct length, customer should provide thickness of mating flange or flange specification.

Type 24W Four Open Wide Arch

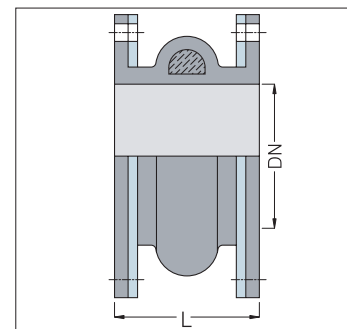
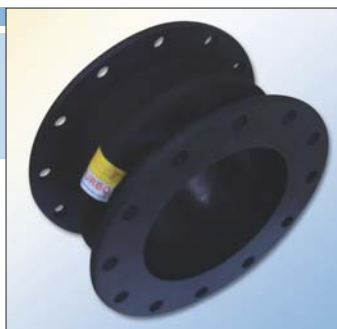


Movement · Pressure · Weight

Nominal Size		Min. Length		Movement Capability				Max. Pressure (bar)	Vacuum Rating (mmHg)	Weights (kg)		
DN	inch	mm	inch	Comp. (mm)	Ext. (mm)	Lat. (mm)	Ang. (deg.)			Exp Joint	Retaining Ring Set	Control Rod Set (1)
25	1	400	16	80	40	48	72.4	12	400	1.1	0.8	1.5
32	1.25	400	16	80	40	48	68.4	12	400	1.4	1.0	1.5
40	1.5	400	16	80	40	48	64.5	12	400	1.7	1.1	1.6
50	2	450	18	140	70	64	70.1	12	400	2.4	1.6	2.7
65	2.5	450	18	140	70	64	65.6	12	400	3.5	2.2	2.9
80	3	450	18	140	70	64	61.4	12	400	4.0	2.3	3.0
100	4	450	18	140	70	64	54.0	12	400	5.3	3.3	2.5
125	5	450	18	160	80	72	51.6	12	400	6.9	3.5	2.7
150	6	450	18	160	80	72	46.4	12	400	8.1	3.9	3.1
200	8	450	18	160	80	72	38.2	10	400	11.7	5.9	4.7
250	10	500	20	160	80	72	32.2	10	400	16.4	7.8	6.6
300	12	500	20	160	80	80	27.7	10	400	22.3	11.4	8.2
350	14	500	20	160	80	80	24.2	10	400	27.0	12.7	8.9
400	16	500	20	160	80	80	21.5	8	400	31.1	16.0	10.1
450	18	500	20	160	80	80	19.3	8	400	32.7	14.7	10.6
500	20	500	20	160	80	80	17.5	8	400	37.8	17.9	10.3
550	22	600	24	200	100	92	19.7	8	400	50.3	18.3	15.2
600	24	600	24	200	100	92	18.2	8	400	56.3	21.5	15.7
650	26	600	24	200	100	92	16.8	7	400	63.7	23.6	15.4
700	28	600	24	200	100	92	15.7	7	400	68.7	25.9	19.3
750	30	600	24	200	100	92	14.7	7	300	74.1	29.4	22.6
800	32	600	24	200	100	92	13.8	7	300	80.7	37.5	24.3
850	34	600	24	200	100	92	13.0	7	300	86.7	37.8	28.0
900	36	600	24	200	100	92	12.3	7	300	92.4	40.2	30.5
950	38	600	24	200	100	92	11.7	7	300	99.6	50.0	31.1
1000	40	600	24	200	100	92	11.1	7	300	104.4	50.9	26.8
1050	42	700	28	240	120	100	12.7	6	300	139.6	52.6	30.2
1100	44	700	28	240	120	100	12.1	6	300	146.7	56.3	29.9
1150	46	700	28	240	120	100	11.6	6	300	158.0	57.9	30.2
1200	48	700	28	240	120	100	11.1	6	300	165.4	63.1	33.8
1250	50	700	28	240	120	100	10.7	6	300	171.8	63.3	35.6
1300	52	700	28	240	120	100	10.3	6	300	179.8	70.1	36.0
1350	54	700	28	240	120	100	9.9	6	250	198.4	73.8	46.8
1400	56	750	30	240	120	100	9.6	6	250	222.9	80.4	46.6
1450	58	750	30	240	120	100	9.3	6	250	231.9	86.7	47.0
1500	60	750	30	240	120	100	8.9	6	250	242.6	86.7	50.2
1650	66	750	30	240	120	100	8.1	6	250	280.9	107.0	51.0
1800	72	750	30	240	120	100	7.5	5	250	317.5	121.9	50.3
1950	78	750	30	240	120	100	6.9	5	250	365.2	136.1	63.9
2100	84	750	30	240	120	100	6.4	5	250	393.7	150.1	74.1
2250	90	750	30	240	120	100	6.0	4	250	424.2	198.4	97.7
2400	96	750	30	240	120	100	5.6	4	250	479.8	241.4	113.9
2550	102	750	30	240	120	100	5.3	4	250	511.9	248.2	118.9
2700	108	750	30	240	120	100	5.0	4	250	549.1	265.6	121.0
3000	120	750	30	240	120	100	4.5	3	250	621.4	330.6	128.7
3300	132	750	30	240	120	100	4.1	3	250	695.8	400.8	132.3
3600	144	750	30	240	120	100	3.8	3	250	771.5	464.0	140.0

1. All flange drilling available with different length, different arch shapes
2. Higher pressure and vacuum rating available upon request
3. Movements of the Type F24W, four filled arch design are 50% of movement capabilities of the 24W.
4. Weights of expansion joint, retaining ring and control rod set are based on Kurbo standard construction with ANSI 150 lbs drill pattern and may vary with selection of rubber/steel material and amount of reinforcements.
5. Control rods are recommended for all applications. To ensure correct length, customer should provide thickness of mating flange or flange specification.

Type F21W One Filled Arch



Features

- Used to reduce flow turbulence and prevent collection of solid material inside the arch, ensuring free fluid flow.
- Ideal for lines carrying heavy slurry or suspension.
- Also recommended for systems where high flow velocity and high abrasion conditions exist.
- The same movements as single open spool arch type joints

Movement • Pressure • Weight

Nominal Size		Min. Length		Movement Capability				Max. Pressure (bar)	Vacuum Rating (mmHg)	Weights (kg)		
DN	inch	mm	inch	Comp. (mm)	Ext. (mm)	Lat. (mm)	Ang. (deg.)			Exp Joint	Retaining Ring Set	Control Rod Set (1)
25	1	150	6	10	5	6	21.5	12	760	0.7	0.8	1.2
32	1.25	150	6	10	5	6	17.5	12	760	0.8	1.0	1.3
40	1.5	150	6	10	5	6	14.7	12	760	0.9	1.1	1.3
50	2	150	6	17	8	8	19.0	12	760	1.3	1.6	2.2
65	2.5	150	6	17	8	8	15.4	12	760	1.8	2.2	2.4
80	3	150	6	17	8	8	12.9	12	760	2.1	2.3	2.5
100	4	150	6	17	8	8	9.8	12	760	2.7	3.3	2.0
125	5	150	6	20	10	9	8.9	12	760	3.8	3.5	2.2
150	6	150	6	20	10	9	7.5	12	760	4.4	3.9	2.6
200	8	150	6	20	10	9	5.6	10	760	6.4	5.9	3.8
250	10	200	8	20	10	9	4.5	10	760	9.5	7.8	5.5
300	12	200	8	20	10	10	3.8	10	760	13.4	11.4	6.9
350	14	200	8	20	10	10	3.2	10	760	16.2	12.7	7.6
400	16	200	8	20	10	10	2.8	8	760	18.9	16.0	8.5
450	18	200	8	20	10	10	2.5	8	760	19.3	14.7	9.0
500	20	200	8	20	10	10	2.3	8	760	22.8	17.9	8.7
550	22	250	10	25	12	11	2.6	8	760	31.1	18.3	12.9
600	24	250	10	25	12	11	2.3	8	760	35.0	21.5	13.4
650	26	250	10	25	12	11	2.2	7	760	39.5	23.6	13.1
700	28	250	10	25	12	11	2.0	7	760	42.7	25.9	16.4
750	30	250	10	25	12	11	1.9	7	760	46.1	29.4	19.2
800	32	250	10	25	12	11	1.8	7	760	50.9	37.5	20.9
850	34	250	10	25	12	11	1.7	7	760	54.4	37.8	24.0
900	36	250	10	25	12	11	1.6	7	760	58.2	40.2	25.9
950	38	250	10	25	12	11	1.5	7	760	63.5	50.0	26.5
1000	40	250	10	25	12	11	1.4	7	760	66.4	50.9	23.4
1050	42	300	12	30	15	12	1.6	6	760	88.3	52.6	25.6
1100	44	300	12	30	15	12	1.5	6	760	93.0	56.3	25.3
1150	46	300	12	30	15	12	1.5	6	760	98.1	57.9	25.6
1200	48	300	12	30	15	12	1.4	6	760	102.9	63.1	28.5
1250	50	300	12	30	15	12	1.4	6	760	106.7	63.3	30.3
1300	52	300	12	30	15	12	1.3	6	760	112.2	70.1	30.7
1350	54	300	12	30	15	12	1.3	6	760	124.6	73.8	39.8
1400	56	300	12	30	15	12	1.2	6	760	131.6	80.4	38.9
1450	58	300	12	30	15	12	1.2	6	760	137.5	86.7	39.4
1500	60	300	12	30	15	12	1.1	6	760	142.8	86.7	42.5
1650	66	300	12	30	15	12	1.0	6	760	166.7	107.0	43.3
1800	72	300	12	30	15	12	0.9	5	760	190.9	121.9	42.7
1950	78	300	12	30	15	12	0.9	5	760	217.8	136.1	53.4
2100	84	300	12	30	15	12	0.8	5	760	241.3	150.1	63.7
2250	90	300	12	30	15	12	0.8	4	760	261.0	198.4	84.2
2400	96	300	12	30	15	12	0.7	4	760	289.4	241.4	98.5
2550	102	300	12	30	15	12	0.7	4	760	309.6	248.2	103.5
2700	108	300	12	30	15	12	0.6	4	760	334.9	265.6	105.6
3000	120	300	12	30	15	12	0.6	3	760	383.4	330.6	113.3
3300	132	300	12	30	15	12	0.5	3	760	434.0	400.8	116.9
3600	144	300	12	30	15	12	0.5	3	760	485.8	464.0	126.0

1. Weights of expansion joint, retaining ring and control rod set are based on Kurbo standard construction with ANSI 150 lbs drill pattern and may vary with selection of rubber/steel material and amount of reinforcements.
 2. Control rods are recommended for all applications. To ensure correct length, customer should provide flange specification.

Control Units with Rubber Flanged Expansion Joint



Control Units

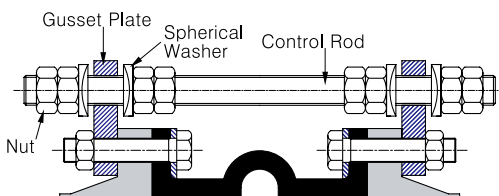
Control units are designed to minimize possible failure of the expansion joint from excessive motions caused by failure of anchoring/guiding, abnormal thermal fluctuation and pressure surge etc. Control unit assemblies can be set at the maximum allowable extension and compression of rubber expansion joint and absorb static pressure thrust developed at the expansion joint. When used in this manner, control units are additional safety factor and can minimize possible damage to adjacent equipment.

Use of Control Units

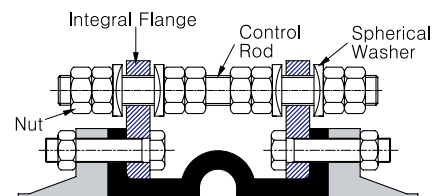
Rubber expansion joints must be installed between two fixed anchor points in piping and piping anchors must take end thrusts produced by internal pressure or thermal changes. When it is impossible to provide adequate anchors, control units must be used to restrain the piping system

Kurbo supplies various control unit configurations for individual piping system as shown below.

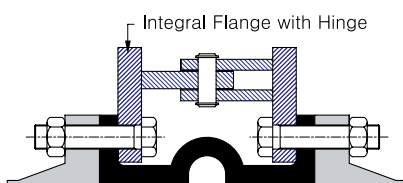
GP : Gusset Plate with control rod



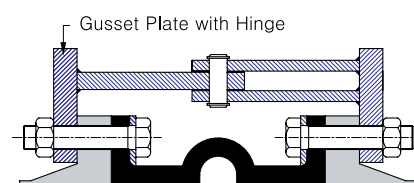
IF : Integral Flange with control rod



HG-I : Hinge with integral gusset

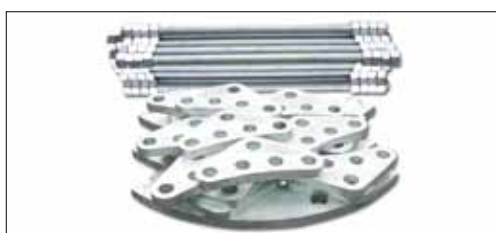


HG-S : Hinge with separate gusset



Features

- Protect expansion joints from over-extension and over-compression
- Galvanized carbon steel rods are standard. Stainless steel and other materials available as material selection varies with environmental conditions
- Optional internal nuts or compression sleeves available : To prevent over-compression. Double nuts are recommended for field adjustment and compression sleeve shall be field trimmed
- Available with rubber washers/grommets : To isolate vibration.
- Available with spherical washers : To prevent binding during offset.
- Available with hinges with integral gusset or separate gusset : To allow for angular movement in one plane.
- Gimbals available : To allow for angular movement in two directions.
- Available with integral flange : To provide equal distribution of forces and prevent stress concentration. Also to prevent any transmission of noise and vibration to mating flange.



HG-S



Kurbo Control Unit Dimensions and Rating

Nominal Pipe Size		Dimensions (mm)			Number of Control Rod Required									
		Plate O.D.	Plate Thick.	Dia. Rod	Max. Pressure of System-bar									
DN	inch									2	3	4	6	8
25	1	184	10	M12	78.7									
32	1.25	195	10	M12	65.4									
40	1.5	203	10	M12	55.2									
50	2	241	10	M16	59.8									
65	2.5	269	10	M16	47.2									
80	3	279	10	M16	38.1									
100	4	318	10	M16	26.4	39.7	52.9							
125	5	343	10	M16	17.4	26.1	34.7							
150	6	369	12	M16	13.5	20.2	26.9							
200	8	447	12	M20	14.1	21.2	28.2							
250	10	518	19	M22	12.2	18.3	24.4	36.6						
300	12	607	19	M24	10.2	15.3	20.4	30.5						
350	14	658	19	M24	7.9	11.8	15.8	23.7						
400	16	734	19	M27	8.0	12.0	15.9	23.9	31.9					
450	18	771	19	M27	6.5	9.8	13.0	19.5	26.0					
500	20	835	19	M27	5.4	8.1	10.8	16.3	21.7					
550	22	897	25	M30	5.5	8.2	11.0	16.4	21.9					
600	24	962	25	M30	4.7	7.0	9.4	14.1	18.8					
650	26	1017	25	M30	4.1	6.1	8.2	12.2	16.3					
700	28	1085	32	M33	4.4	6.6	8.8	13.3	17.7					
750	30	1154	32	M36	4.6	6.9	9.1	13.7	18.3					
800	32	1230	32	M36	4.1	6.1	8.1	12.2	16.3					
850	34	1292	38	M39	4.4	6.6	8.8	13.1	17.5					
900	36	1363	38	M39	3.9	5.9	7.9	11.8	15.8					
950	38	1431	38	M39	3.6	5.3	7.1	10.7	14.3					
1000	40	1459	38	M39		4.9	6.5	9.7	13.0					
1050	42	1528	38	M39		4.3	5.7	8.6	11.4					
1100	44	1586	38	M39		3.9	5.3	7.9	10.5					
1150	46	1637	38	M39		3.6	4.8	7.3	9.7					
1200	48	1704	38	M42		3.9	5.2	7.8	10.4					
1250	50	1762	38	M42		3.6	4.8	7.2	9.6					
1300	52	1819	38	M42		3.4	4.5	6.7	9.0					
1350	54	1904	38	M48		4.0	5.3	8.0	10.6					
1400	56	1965	38	M48		3.7	5.0	7.4	9.9					
1450	58	2022	38	M48		3.5	4.7	7.0	9.3					
1500	60	2074	45	M48		3.3	4.4	6.6	8.7					
1550	62	2137	45	M48			4.1	6.2	8.2					
1650	66	2252	50	M48			3.7	5.5	7.3					
1800	72	2417	50	M48			3.1	4.7	6.2					
1950	78	2611	50	M56			3.7	5.6	7.4					
2100	84	2783	55	M56			3.2	4.9	6.5					
2250	90	2979	65	M64				3.7	5.5	7.4				
2400	96	3165	65	M68				3.8	5.7	7.5				
2550	102	3336	65	M68				3.4	5.0	6.7				
2700	108	3506	65	M68				3.0	4.5	6.0				
2850	114	3686	65	M68				2.7	4.1	5.4				
3000	120	3849	65	M68				2.5	3.7	4.9				
3300	132	4205	65	M68				2.1	3.1	4.1				
3600	144	4523	65	M68				1.7	2.6	3.5				

WARNING : Control Units must be used to protect expansion joints from excessive movements if piping is not properly anchored. Expansion joint may operate in pipelines or equipment carrying fluid and/or gases at elevated temperatures and pressures, so precaution should be taken to make sure these parts are installed and inspected regularly. Care is required to protect personnel in the event of leakage or splash.

- The values are based on mild steel material and 65% of yield strength of the Rod. Number of rods are depending upon maximum test pressure. Dimensions will change when using high tensile steel. For more details and proper installation, contact Kurbo.
- Plate O.D. is based on Kurbo standard design and 150lbs standards of ANSI/ASME B16.5 Class 150, ANSI/ASME B16.47 Class 150 Series A and AWWA C207 Class D 150lbs.
- For control unit length, customer should provide flange specification or mating flange thickness.