

C. ANGULAR EXPANSION JOINT

MEGAFLEXON standard angular expansion joints are available in two types.

Angular expansion joint type MANW & MANF is designed with flat steel fittings which are fitted through the flanges and welded onto them on the outside.

A cylindrical bolt, which allows angular movement in several planes, above center line of the bellows.

The expansion joint is made with 1 bellows. The MEGAFLEXON expansion joint type MANW is fitted with flat iron fittings which are fitted through the flanges and welded onto them on the outside.

The fittings are secured to a middle ring with cylindrical bolts, which allow angular movement in several planes, above the center line of the bellows.

The expansion joint is made with a single bellows.

Common to both types is the fact that the fittings have the task of absorbing the tensile forces arising from the operating pressure.

The fitting make axial expansions impossible, which means that the expansion joint can only absorb bending forces.

Angular expansion joints are suitable for installations where it is not possible to create sturdy fixing points, and in pipe systems where bending occurs.

Since the angular expansion joints can only absorb bending, at least, 2 or 3 angular expansion joints are required everytime to ensure correct absorption of the movements.

Two angular expansion joints correspond functionally to one lateral expansion joint, for which reason angular expansion joints are often used in pairs.

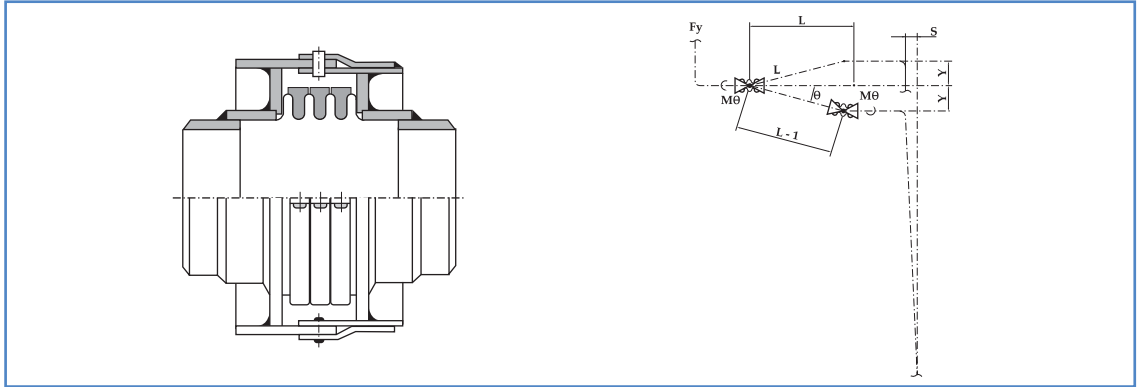
a) Advantage

- Absorb a relatively large movement by means of combination of this type of expansion joint
- A largely reduced load on fix point

b) Disadvantage

- The change of flow direction
- Relatively large space required on designing and installation

Single Hinge Type Expansion Joint

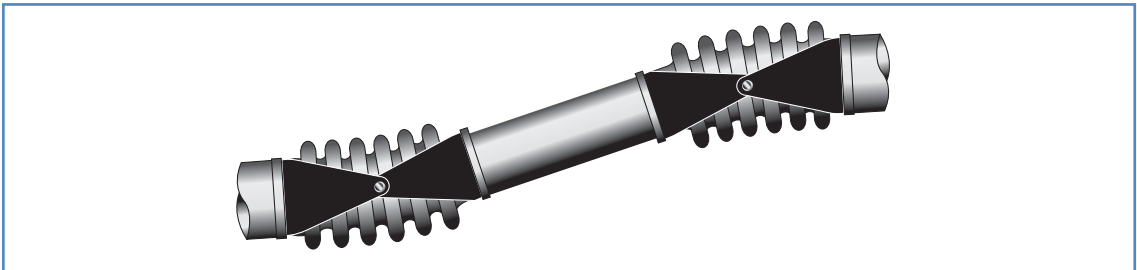


Dual Type Hinged Expansion Joints

MEGAFLEXON double hinged expansion joints have two bellows separated by a center spool pipe to absorb a large lateral movements.

The ability to resist pressure thrust is provided by a hinge assembly at each bellows, which also permits angular movement in a single plane.

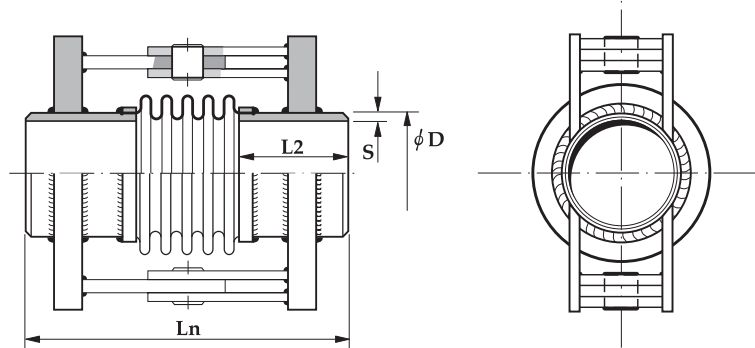
Unlike the tied lateral expansion joint, the thermal expansion of the entire expansion joint is applied to the piping.



DN	No of Convolution	single Type		Dual Type Overall Length (mm)						
		Overall Length (mm)	Angular Rotation (Deg.)	Lateral Deflection (Y) (mm)						
				1000	1500	2000	2500	3000	3500	4000
200	3+3	310	4.3	52	90	128	153	203	240	278
250		320	5.3	63	109	155	201	248	295	341
300		365	6.0	66	118	170	222	274	326	377
350		380	5.5	59	107	155	203	251	298	346
400		405	4.6	48	88	117	169	210	250	290
450		425	4.2	42	78	115	151	187	224	260
500		445	4.0		74	108	142	178	213	247
600		510	3.6		63	95	126	159	190	222
700		550	3.1		52	79	107	135	162	189
800		550	2.9			70	95	119	143	167
900		550	2.5			64	85	107	129	150
1000		650	2.3			53	73	94	113	133

Product that aren't described above table will be manufactured case by case up to 5000A.

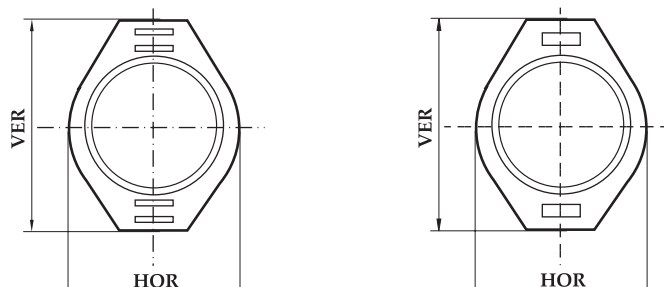
Angular-expansion joints with hinge and welding ends



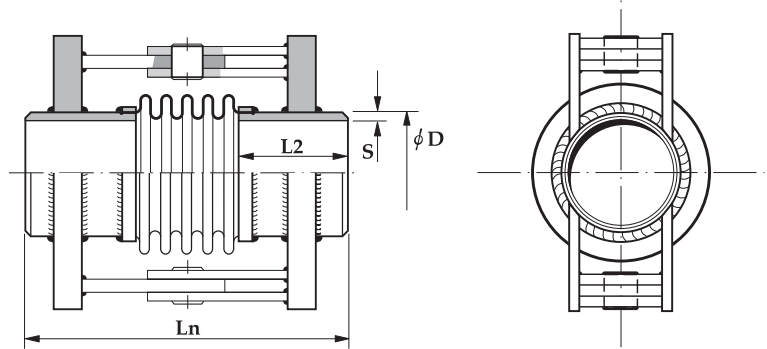
■ Design Pressure

150Lbf/in²

DN	TYPE	Movement	Ln	Springrate	Welding ends			Dimensions		Bellows		Bellow-areas	Weight Approx
		+/-ANG		ANG	φ D	L2	S	HOR	VER	Di	Do		
		(deg)	(mm)	[kgf.mm/deg]	(mm)	[mm]	[mm]	[mm]	[mm]	(mm)	(mm)	(mm ²)	(kg)
40	MANW-0040-015-10	15	300	106.12	48.3	110	2.6	90	140	40.5	57.7	1893	2.9
40	MANW-0040-020-10	20	375	49.48	48.3	110	2.6	90	140	40.5	57.7	1893	3.4
50	MANW-0050-015-10	15	300	181.63	60.3	110	2.9	100	150	52.5	69.7	2932	3.4
50	MANW-0050-020-10	20	375	84.79	60.3	110	2.9	100	150	52.5	69.7	2932	3.7
65	MANW-0065-015-10	15	295	239.48	76.1	110	2.9	115	170	68.3	87.5	4766	4.2
65	MANW-0065-020-10	20	370	111.73	76.1	110	2.9	115	170	68.3	87.5	4766	4.7
80	MANW-0080-015-10	15	320	480.10	88.9	110	3.2	130	180	79.1	100.9	6362	5.0
80	MANW-0080-020-10	20	415	224.08	88.9	110	3.2	130	180	79.1	100.9	6362	5.8
100	MANW-0100-015-10	15	315	753.57	114.3	110	3.6	155	210	104.6	130.2	10825	6.2
100	MANW-0100-020-10	20	405	351.63	114.3	110	3.6	155	210	104.6	130.2	10825	7.1
125	MANW-0125-015-10	15	315	156.83	139.7	110	4.0	180	280	130.2	157.8	16286	13.6
125	MANW-0125-020-10	20	405	501.73	139.7	110	4.0	180	280	130.2	157.8	16286	15.8
150	MANW-0150-015-10	15	315	1803.67	168.3	110	4.5	230	315	155.0	186.6	22912	17.1
150	MANW-0150-020-10	20	405	819.79	168.3	110	4.5	230	315	155.0	186.6	22912	19.3
175	MANW-0175-014-10	14	315	2624.79	193.7	110	5.6	255	350	180.6	212.2	30295	20.0
175	MANW-0175-020-10	20	405	1193.06	193.7	110	5.6	255	350	180.6	212.2	30295	22.3
200	MANW-0200-014-10	14	315	3094.89	219.1	110	5.6	280	390	206.1	239.7	39022	25.4
200	MANW-0200-020-10	20	405	1406.83	219.1	110	5.6	280	390	206.1	239.7	39022	27.8
250	MANW-0250-010-10	10	335	5787.24	273.0	120	6.3	355	455	260.0	293.6	60176	35.1
250	MANW-0250-020-10	20	455	2225.91	273.0	120	8.0	355	455	260.0	293.6	60176	38.7
300	MANW-0300-009-10	9	340	12199.28	323.9	120	8.0	425	560	311.1	347.5	85167	68.8
300	MANW-0300-020-10	20	500	4066.42	323.9	120	8.0	425	560	311.1	347.5	85167	83.47



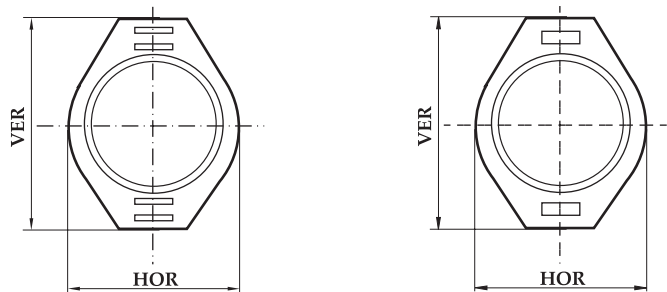
Angular-expansion joints with hinge and welding ends



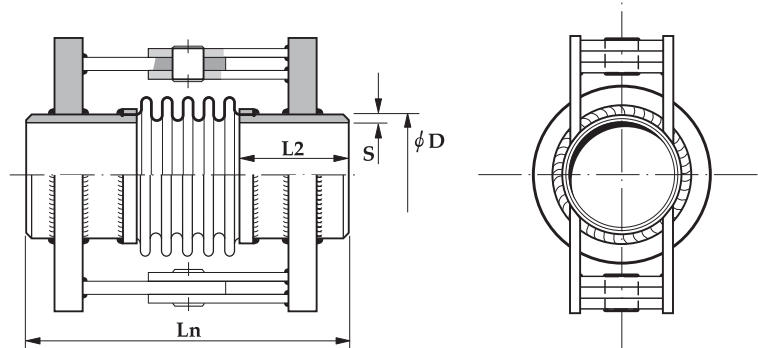
■ Design Pressure

150Lbf/in²

DN	TYPE	Movement	Ln	Spring rates	Welding ends			Dimensions		Bellows		Bellow-areas	Weight
		+/-ANG		ANG	phi D	L2	S	HOR	VER	Di	Do		
		(deg)	(mm)	[kgf.mm/deg]	(mm)	(mm)	(mm)	[mm]	[mm]	(mm)	(mm)	(mm ²)	(kg)
350	MANW-0350-008-10	8	340	15961.42	355.6	120	8.0	455	590	342.8	379.2	102354	74.1
350	MANW-0350-020-10	20	500	5320.51	355.6	120	8.0	455	590	342.8	379.2	102354	89.2
400	MANW-0400-010-10	10	365	15584.28	406.4	120	8.0	505	645	389.9	437.1	134289	92.6
400	MANW-0400-020-10	20	530	5993.87	406.4	120	8.0	505	645	389.9	437.1	134289	111.1
450	MANW-0450-008-10	8	395	27408.46	457.2	135	8.0	575	710	440.5	489.5	169823	112.7
450	MANW-0450-015-10	15	520	12458.36	457.2	135	8.0	575	710	440.5	489.5	169823	129.6
500	MANW-0500-011-10	11	435	32153.77	508.0	135	8.0	630	755	485.4	536.4	205004	123.9
500	MANW-0500-020-10	20	595	14615.40	508.0	135	8.0	630	755	485.4	536.4	205004	142.8
550	MANW-0550-010-10	10	435	42034.18	559.0	135	10.0	680	805	536.4	587.4	247975	147.0
550	MANW-0550-014-10	14	540	23299.48	559.0	135	10.0	680	805	536.4	587.4	247975	157.3
600	MANW-0600-007-10	7	405	85920	609.9	135	10.0	750	885	585.6	645.6	297637	188.3
600	MANW-0600-020-10	20	610	28641.02	609.9	135	10.0	750	885	585.6	645.6	297637	217.5
700	MANW-0700-006-10	6	410	114728.06	711.0	135	10.0	870	1035	587.5	756.5	409415	278.4
700	MANW-0700-019-10	19	615	38242.65	711.0	135	10.0	870	1035	587.5	756.5	409415	322.4
800	MANW-0800-005-10	5	440	163319.38	813.0	150	10.0	995	1150	789.5	858.5	533267	371.1
800	MANW-0800-016-10	16	645	54439.79	813.0	150	10.0	995	1150	789.5	858.5	533267	418.9
900	MANW-0900-004-10	4	440	225555.81	914.0	150	10.0	1095	1250	890.5	959.5	672006	411.7
900	MANW-0900-015-10	15	645	75185.30	914.0	150	10.0	1095	1250	890.5	959.5	672006	466.0
1000	MANW-1000-004-10	4	440	303678.06	1016.0	150	10.0	1215	1365	992.5	1061.5	828382	516.3
1000	MANW-1000-013-10	13	645	101226.02	1016.0	150	10.0	1215	1365	992.5	1061.5	828382	577.7



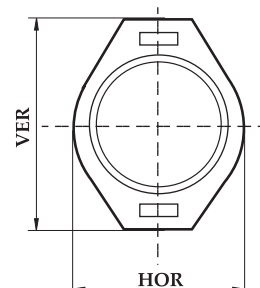
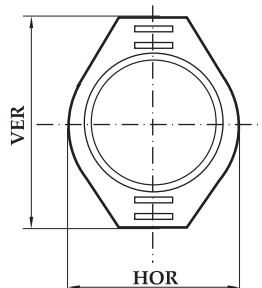
Angular-expansion joints with hinge and welding ends



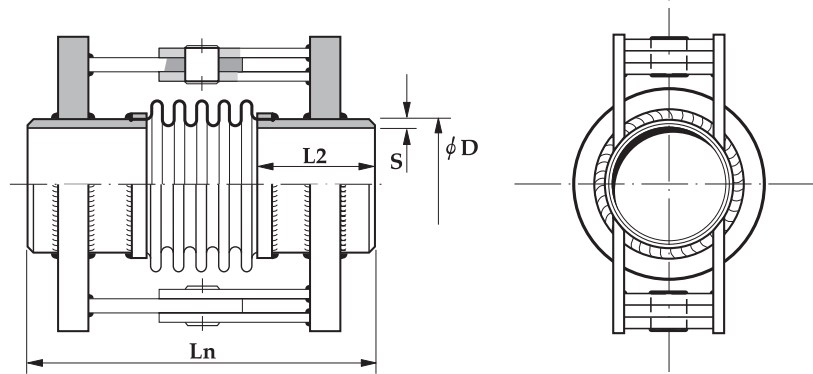
■ Design Pressure

300Lbf/in²

DN	TYPE	Movement	Ln	Spring rates	Welding ends			Dimensions		Bellows		Bellow-areas	Weight Approx
		+/-ANG		ANG	φ D	L2	S	HOR	VER	Di	Do		
		(deg)	(mm)	[kgf.mm/deg]	(mm)	(mm)	(mm)	[mm]	[mm]	(mm)	(mm)	(mm ²)	(kg)
40	MANW-0040-015-20	15	280	148.57	48.3	110	2.6	140	90	40.5	57.7	1893	2.9
40	MANW-0040-020-20	20	315	82.55	48.3	110	2.6	140	90	40.5	57.7	1893	3.1
50	MANW-0050-015-20	15	280	417.75	60.3	110	2.9	150	100	52.5	70.3	2961	3.6
50	MANW-0050-020-20	20	365	160.71	60.3	110	2.9	150	100	52.5	70.3	2961	4.2
65	MANW-0065-015-20	15	280	534.38	76.1	110	2.9	170	115	68.3	88.1	4803	4.2
65	MANW-0065-020-20	20	340	242.85	76.1	110	2.9	170	115	68.3	88.1	4803	4.7
80	MANW-0080-015-20	15	290	868.36	88.9	110	3.2	230	150	79.1	100.7	6348	11.3
80	MANW-0080-020-20	20	365	394.69	88.9	110	3.2	230	150	79.1	100.7	6348	12.7
100	MANW-0100-015-20	15	295	1650.71	114.3	110	3.6	260	175	104.6	131.0	10899	13.3
100	MANW-0100-020-20	20	370	750.30	114.3	110	3.6	260	175	104.6	131.0	10899	15.1
125	MANW-0125-012-20	12	295	2825.30	139.7	110	4.0	285	200	130.2	156.6	16151	17.1
125	MANW-0125-020-20	20	395	1086.63	139.7	110	4.0	285	200	130.2	156.6	16151	19.7
150	MANW-0150-015-20	15	345	4707.65	168.3	120	4.5	325	250	155.0	186.2	22859	23.7
150	MANW-0150-020-20	20	450	2139.79	168.3	120	4.5	325	250	155.0	186.2	22859	26.9
175	MANW-0175-014-20	14	345	6714.69	193.7	120	5.6	360	275	180.6	211.8	30233	27.5
175	MANW-0175-020-20	20	450	3052.14	193.7	120	5.6	360	275	180.6	211.8	30233	30.9
200	MANW-0200-015-20	15	350	8426.73	219.1	120	6.3	450	320	206.2	242.2	39479	55.3
200	MANW-0200-020-20	20	460	3830.30	219.1	120	6.3	450	320	206.2	242.2	39479	63.1



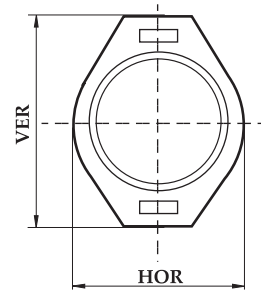
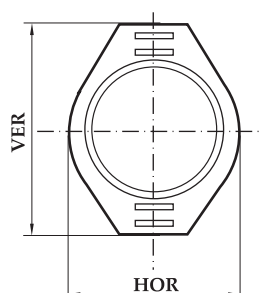
Angular-expansion joints with hinge and welding ends



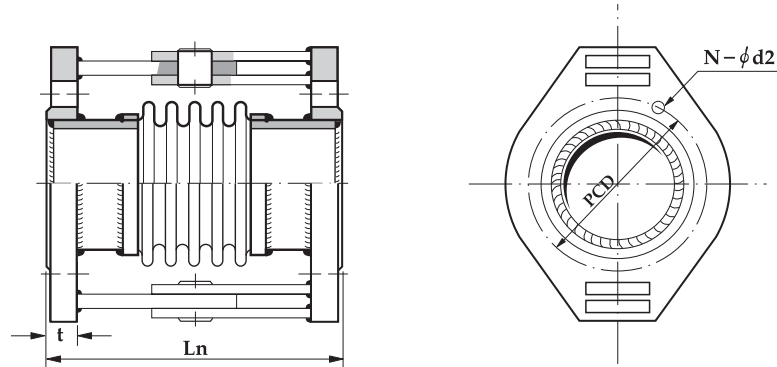
Design Pressure

300Lbf/in²

DN	TYPE	Movement	Ln	Spring rates	Welding ends			Dimensions		Bellows		Bellow-areas	Weight Approx
		+/-ANG		ANG	φ D	L2	S	HOR	VER	Di	Do		
		(deg)	(mm)	[kgf.mm/deg]	(mm)	(mm)	(mm)	[mm]	[mm]	(mm)	(mm)	(mm ²)	(kg)
250	MANW-0250-012-20	12	380	14962.75	273.0	135	71	515	395	260.3	296.3	60830	78.3
250	MANW-0250-020-20	20	490	6801.22	273.0	135	71	515	395	260.3	296.3	60830	87.0
300	MANW-0300-008-20	8	380	30607.85	323.9	135	8.0	570	445	311.2	349.2	85634	96.7
300	MANW-0300-015-20	15	450	17004.38	323.9	135	8.0	570	445	311.2	349.2	85634	102.8
350	MANW-0350-007-20	7	380	39959.79	355.6	135	8.0	610	495	343.0	381.0	102922	112.2
350	MANW-0350-013-20	13	450	22199.89	355.6	135	8.0	610	495	343.0	381.0	102922	118.6
400	MANW-0400-010-20	10	415	45668.67	406.4	135	10.0	720	565	393.9	443.9	137819	177.5
400	MANW-0400-019-20	19	510	24775.71	406.4	135	10.0	720	565	393.9	443.9	137819	192.5
450	MANW-0450-009-20	9	450	64981.22	457.2	150	10.0	785	635	441.5	494.5	172021	227.8
450	MANW-0450-017-20	17	550	36100.71	457.2	150	10.0	785	635	441.5	494.5	172021	245.9
500	MANW-0500-012-20	12	490	81412.75	508.0	150	10.0	830	690	486.5	541.5	207499	266.5
500	MANW-0500-017-20	17	550	58151.93	508.0	150	10.0	830	690	486.5	541.5	207499	277.3
550	MANW-0550-011-20	11	490	104057.14	559.0	150	10.0	885	740	537.8	592.8	250985	296.3
550	MANW-0550-015-20	15	550	74326.63	559.0	150	10.0	885	740	537.8	592.8	250985	308.4
600	MANW-0600-012-20	12	535	130934.89	609.6	150	12.0	950	810	586.6	651.6	301031	387.6
600	MANW-0600-018-20	18	615	93524.89	609.6	150	12.0	950	810	586.6	651.6	301031	407.0



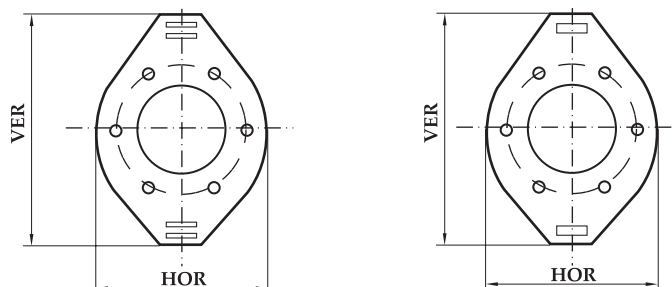
Angular-expansion joints with hinge fixed flange ends



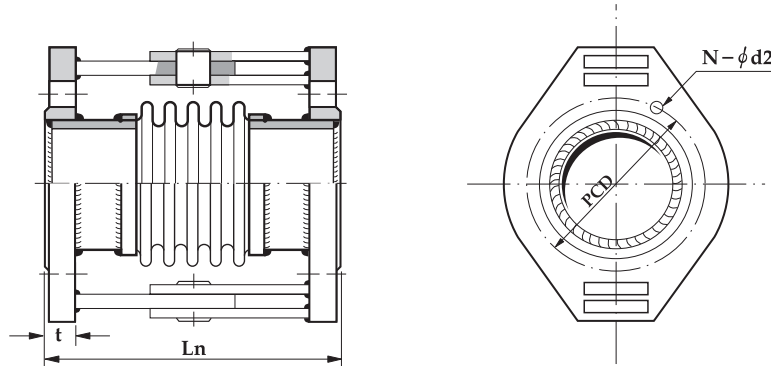
■ Design Pressure

150Lbf/in²

DN	TYPE	Movement	Ln	Spring rates	Flanges acc. to ANSI B16.5				Dimensions		Bellows		Bellow-areas	Weight Approx
		+/-ANG		ANG	t	PCD	N	φ d2	HOR	VER	Di	Do		
		(deg)	(mm)	[kgf.mm/deg]	[mm]	[mm]	[EA]	[mm]	[mm]	[mm]	(mm)	(mm)	(mm ²)	(kg)
40	MANF-0040-015-10	15	95	106.12	17.5	98.4	4	16	150	215	40.5	57.7	1893	2.8
40	MANF-0040-020-10	20	170	49.48	17.5	98.4	4	16	150	215	40.5	57.7	1893	3.2
50	MANF-0050-015-10	15	95	181.63	19.5	120.6	4	20	165	230	52.5	69.7	2932	3.1
50	MANF-0050-020-10	20	170	84.79	19.5	120.6	4	20	165	230	52.5	69.7	2932	3.5
65	MANF-0065-015-10	15	90	239.48	22.5	139.7	4	20	185	250	68.3	87.5	4766	3.8
65	MANF-0065-020-10	20	165	111.73	22.5	139.7	4	20	185	250	68.3	87.5	4766	4.2
80	MANF-0080-015-10	15	115	480.10	24	152.4	4	20	200	265	79.1	100.9	6362	4.2
80	MANF-0080-020-10	20	210	224.08	24	152.4	4	20	200	265	79.1	100.9	6362	5.0
100	MANF-0100-015-10	15	110	753.57	24	190.5	8	20	220	285	104.6	130.2	10825	4.5
100	MANF-0100-020-10	20	200	351.63	24	190.5	8	20	220	285	104.6	130.2	10825	5.4
125	MANF-0125-015-10	15	115	1075.20	24	215.9	8	23	250	365	130.2	157.8	16286	8.0
125	MANF-0125-020-10	20	210	501.73	24	215.9	8	23	250	365	130.2	157.8	16286	10.3
150	MANF-0150-015-10	15	120	1803.67	25.5	241.3	8	23	285	400	155.0	186.6	22912	13.2
150	MANF-0150-020-10	20	210	819.79	25.5	241.3	8	23	285	400	155.0	186.6	22912	15.4
200	MANF-0200-014-10	14	130	3094.89	29.0	298.4	8	23	340	475	106.1	239.7	39022	21.1
200	MANF-0200-020-10	20	220	1406.83	29.5	298.4	8	23	340	475	206.1	239.7	39022	23.6
250	MANF-0250-010-10	10	130	5787.24	30.5	361.9	12	26	395	530	260.0	293.6	60176	23.8
250	MANF-0250-020-10	20	250	2225.91	30.5	361.9	12	26	395	530	260.0	293.6	60176	27.3



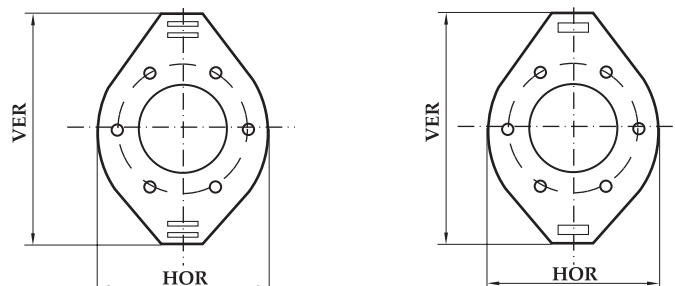
Angular-expansion joints with hinge fixed flange ends



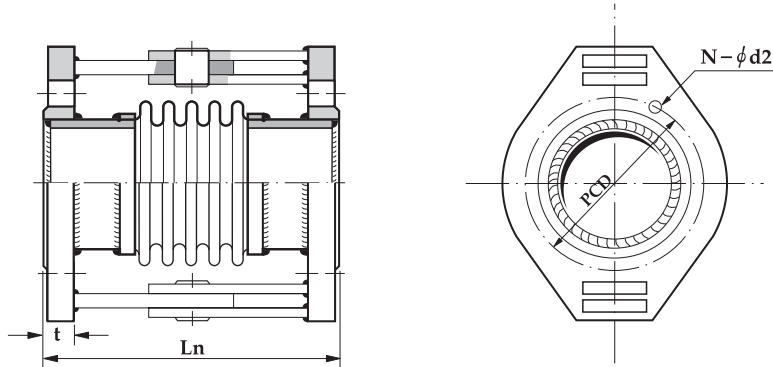
■ Design Pressure

150Lbf/in²

DN	TYPE	Movement	Ln	Spring rates	Flanges acc. to ANSI B16.5				Dimensions		Bellows		Bellow- areas	Weight Approx
		+/-ANG		ANG	t	PCD	N	φ d2	HOR	VER	Di	Do		
		(deg)	(mm)	[kgf.mm/deg]	[mm]	mm	[EA]	[mm]	[mm]	[mm]	(mm)	(mm)	(mm ²)	(kg)
300	MANF-0300-009-10	9	145	12199.28	32	431.8	12	26	445	630	311.1	347.5	85167	49.2
300	MANF-0300-020-10	20	305	4066.42	32	431.8	12	26	445	630	311.1	347.5	85167	63.8
350	MANF-0350-008-10	8	145	15961.42	35	476.2	12	29	505	690	342.8	379.2	102354	57.1
350	MANF-0350-020-10	20	305	5320.51	35	476.2	12	29	505	690	342.8	379.2	102354	72.2
400	MANF-0400-010-10	10	180	15584.28	37	539.7	16	29	565	760	389.9	437.1	134289	77.7
400	MANF-0400-020-10	20	345	5993.97	37	539.7	16	29	565	760	389.9	437.1	134289	96.1
450	MANF-0450-008-10	8	180	27408.46	40	577.8	16	32	615	810	440.5	489.5	169823	82.0
450	MANF-0450-015-10	15	305	12458.36	43	577.8	16	32	615	810	440.5	489.5	169823	98.9
500	MANF-0500-011-10	11	220	32153.77	43	635	20	32	670	865	485.4	536.4	205004	88.5
500	MANF-0500-020-10	20	380	14615.40	43	635	20	32	670	865	485.4	536.4	205004	107.4
600	MANF-0600-007-10	7	200	85920	43	749.3	20	35	780	985	585.6	645.6	297637	114.4
600	MANF-0600-020-10	20	405	28640	43	749.3	20	35	780	985	585.6	645.6	297637	143.6
700	MANF-0700-006-10	6	215	114728.06	71	863.6	24	35	895	1140	687.5	756.5	409415	179.4
700	MANF-0700-019-10	19	420	38242.65	71	863.6	24	35	895	1140	687.5	756.5	409415	223.5
800	MANF-0800-005-10	5	225	163319.38	81	978	28	41	1015	1280	789.5	858.5	533267	229.6
800	MANF-0800-016-10	16	430	54439.79	81	978	28	41	1015	1280	789.5	858.5	533267	277.4
900	MANF-0900-004-10	4	235	225555.81	90	1085	32	41	1115	1390	890.5	959.5	672006	268.3
900	MANF-0900-015-10	15	440	75185.30	90	1085	32	41	1115	1390	890.5	959.5	672006	322.6
1000	MANF-1000-004-10	4	245	303678.06	90	1200	36	41	1230	1515	992.5	1061.5	828382	337.3
1000	MANF-1000-013-10	13	450	101226.02	90	1200	36	41	1230	1515	992.5	1061.5	828382	398.6



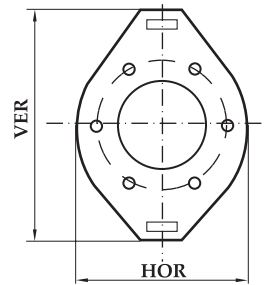
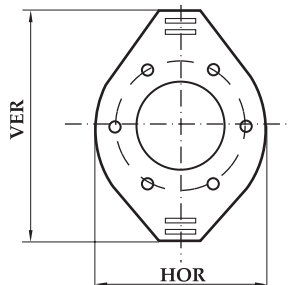
Angular-expansion joints with hinge fixed flange ends



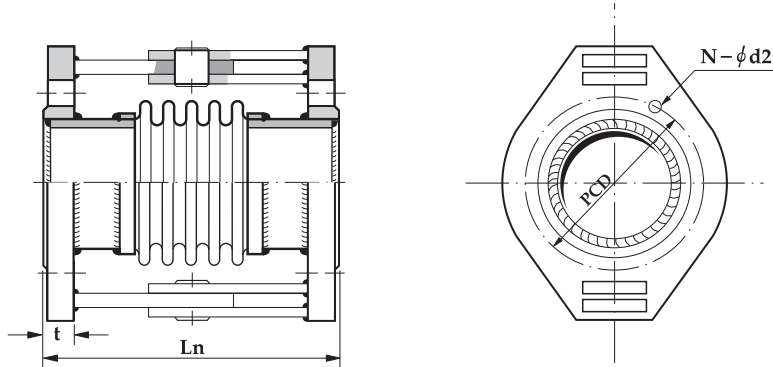
■ Design Pressure

300Lbf/in²

DN	TYPE	Movement	Ln	Spring rates	Flanges acc. to ANSI B16.5				Dimensions		Bellows		Bellow-areas	Weight Approx
		+/--ANG		ANG	t	PCD	N	φ d2	HOR	VER	Di	Do		
		(deg)	(mm)	[kgf.mm/deg]	[mm]	[mm]	[EA]	[mm]	[mm]	[mm]	(mm)	(mm)	(mm ²)	(kg)
40	MANF-0040-015-20	15	75	148.57	21	114.3	4	23	150	215	40.5	57.7	1893	2.7
40	MANF-0040-020-20	20	110	82.55	21	114.3	4	23	150	215	40.5	57.7	1893	2.9
50	MANF-0050-015-20	15	75	417.75	22.5	127	8	20	165	230	52.5	70.3	2961	3.2
50	MANF-0050-020-20	20	160	160.71	22.5	127	8	20	165	230	52.5	70.3	2961	3.8
65	MANF-0065-015-20	15	85	534.38	25.5	149.2	8	23	185	260	68.3	88.1	4803	5.7
65	MANF-0065-020-20	20	145	242.85	25.5	149.2	8	23	185	260	68.3	88.1	4803	6.2
80	MANF-0080-015-20	15	95	868.36	29.0	168.3	8	23	200	315	79.1	100.7	6348	9.7
80	MANF-0080-020-20	20	170	394.69	29.0	168.3	8	23	200	315	79.1	100.7	6348	11.1
100	MANF-0100-015-20	15	110	1650.71	32.0	200	8	23	235	360	104.6	131.0	10899	15.6
100	MANF-0100-020-20	20	185	750.30	32.0	200	8	23	235	360	104.6	131.0	10899	17.4
125	MANF-0125-012-20	12	110	2825.30	35.0	234.9	8	23	270	395	130.2	156.6	16151	17.7
125	MANF-0125-020-20	20	210	1086.63	35.0	234.9	8	23	270	395	130.2	156.6	16151	20.3
150	MANF-0150-015-20	15	140	4707.65	37.0	269.9	12	23	300	425	155.0	186.2	22859	21.3
150	MANF-0150-020-20	20	245	2139.79	37.0	269.9	12	23	300	425	155.0	186.2	22859	24.4



Angular-expansion joints with hinge fixed flange ends



■ Design Pressure

300Lbf/in²

DN	TYPE	Movement	Ln	Springrate	Flanges acc. to ANSI B16.5			Dimensions		Bellows		Bellow-areas	Weight Approx	
		+/-ANG		ANG	t	PCD	N	φ d2	HOR	VER	Di			Do
		(deg)	(mm)	[kgf.mm/deg]	[mm]	[mm]	[EA]	[mm]	[mm]	[mm]	(mm)	(mm)	(mm ²)	(kg)
200	MANF-0200-015-20	15	165	8426.73	41.5	330.2	12	26	360	555	206.2	242.2	39479	57.3
200	MANF-0200-020-20	20	275	3830.30	41.5	330.2	12	26	360	555	206.2	242.2	39479	65.2
250	MANF-0250-012-20	12	165	14962.75	48.0	387.3	16	29	425	620	260.3	296.3	60830	66.7
250	MANF-0250-020-20	20	275	6801.22	48.0	387.3	16	29	425	620	260.3	296.3	60830	75.4
300	MANF-0300-008-20	8	175	30607.85	51.0	450.8	16	32	485	690	311.2	349.2	85634	85.8
300	MANF-0300-015-20	15	245	17004.38	51.0	450.8	16	32	485	690	311.2	349.2	85634	91.9
350	MANF-0350-007-20	7	185	39959.79	54.0	514.3	20	32	555	770	343.0	381.0	102922	122.1
350	MANF-0350-013-20	13	255	22199.89	54.0	514.3	20	32	555	770	343.0	381.0	102922	128.5
400	MANF-0400-010-20	10	230	45668.67	57.5	571.5	20	35	620	885	393.9	443.9	137819	193.1
400	MANF-0400-019-20	19	325	24775.71	57.5	571.5	20	35	620	885	393.9	443.9	137819	208.0
500	MANF-0500-012-20	12	285	81412.75	63.5	685.8	24	35	730	1005	486.5	541.5	207499	252.8
500	MANF-0500-017-20	17	345	58151.93	63.5	685.8	24	35	730	1005	486.5	541.5	207499	263.6
600	MANF-0600-012-20	12	340	28894.08	70.0	812.8	24	42	845	1120	586.6	651.6	301031	360.5
600	MANF-0600-018-20	18	420	93524.89	70.0	812.8	24	42	845	1220	586.6	651.6	301031	379.9

