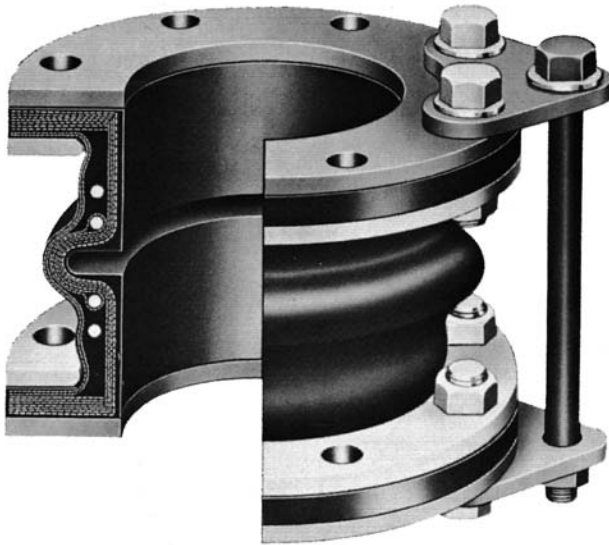


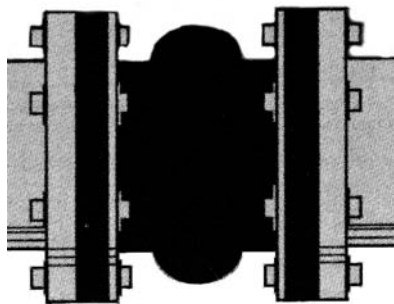
Non-Metallic Expansion Joints



A BIG RELIEF FROM STRESSES AT PIPE FLANGES



Cross sectional view of spool-type joint showing Double Protected Construction.



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HOLZ EXPANSION JOINTS are designed specifically to absorb motion and displacement between pipe flanges. These hand-crafted, one-piece elastomeric expansion joints feature an exclusive H-R Double Protected Construction. Used and proven in tough services since 1962, Holz Non-Metallic Expansion Joints incorporate the finest materials in combination with painstaking fabrication techniques.

Holz Elastomeric Expansion Joints help prevent pipe buckling or fracture in several important ways:

1. Axial stresses, whether due to expansion or contraction, are easily absorbed.
2. Misalignments are compensated, including those caused by angular motion or displacements.
3. Shock, vibration and any random oscillatory motions are effectively damped out.
4. Holz Non-Metallic Expansion Joints are non-conductive and stop propagation of electrolytic action at any point where they are installed.
5. Flexible design permits absorption of pressure surges, isolating pipe noise at the source.

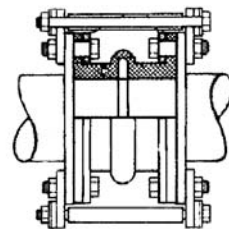
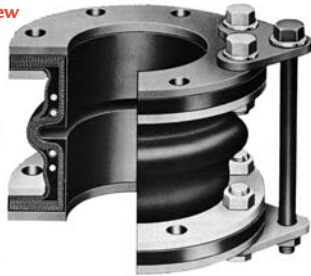
Piping systems gain efficiency, longer service life, higher shock and vibration resistance, while greatly reducing chances of catastrophic failure, with lightweight Holz Elastomeric Expansion Joints.

Holz has a wide variety of designs, permitting optimum selection of materials and construction, for many ranges of temperature and pressure. Our standard "in-stock" expansion joints constructed of EPDM polyester are recommended to 300°F. *Teflon lined, special covers and tubes are also available for chemical service or specific requirements.*

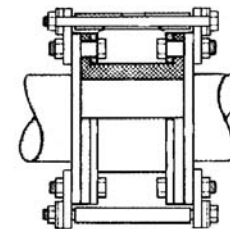
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E-mail: sales@holzrubber.com
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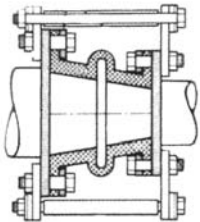
Cross Sectional View



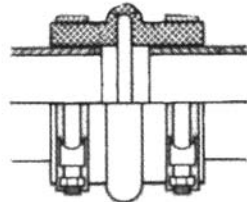
Arch Type
Styles 215, 300, 200, 3000



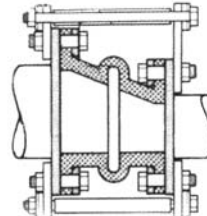
U-Type
Styles 420, 430, 450



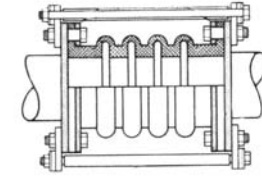
Concentric Reducers
Styles 215TC, 300TC, 200TC



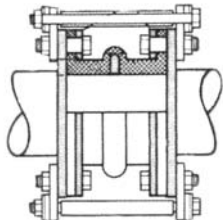
Sleeves for Flangeless Pipe
Styles 215S, 300S, 200S



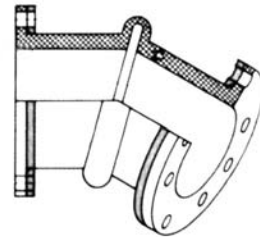
Eccentric Reducers
Styles 215TE, 300TE, 200TE



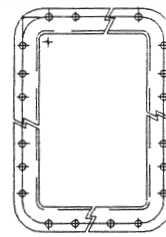
Multiple Arch for Movements
Styles 215, 300, 200, 3000



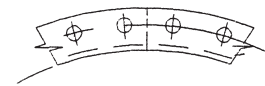
Filled Arch Type
Styles 215, 300, 200, 3000



Offset For Piping Misalignment
Styles 215, 300, 200



Turbine to Condenser
Styles 730, 740



Turbine to Condenser
Styles 730, 740

**Table 1: Pressure/Vacuum Ratings
Arch and U-Type Expansion Joints**

ARCH TYPE	3000		200		300		215		730	
U-TYPE	—		420		430		450		740	
NOM. PIPE SIZE I.D. OF EXP. JT.	PRESSURE		PRESSURE		PRESSURE		PRESSURE		PRESSURE	
	POS. PSIG	NEG. HG	POS. PSIG	NEG. HG	POS. PSIG	NEG. HG	POS. PSIG	NEG. HG	POS. PSIG	NEG. HG
1/2 to 3	325	30"	250	30"	180	30"	25	15"	30	30"
3 1/2 to 4	300	30"	250	30"	165	30"	25	15"	30	30"
4 1/2 to 6	300	30"	215	30"	155	30"	25	15"	30	30"
6-1/2 to 10	275	30"	215	30"	145	30"	25	15"	30	30"
11 to 12	250	30"	215	30"	140	30"	25	15"	30	30"
13 to 14	225	15"	150	30"	125	30"	25	15"	30	30"
15 to 16	200	15"	120	30"	75	30"	25	15"	30	30"
17 to 18	200	15"	120	30"	75	30"	25	15"	30	30"
19 to 20	200	15"	120	30"	75	30"	25	15"	30	30"
21 to 24	150	15"	110	30"	70	30"	25	15"	30	30"
25 to 28	110	15"	100	30"	60	30"	25	15"	30	30"
29 to 40	110	15"	95	30"	60	30"	25	15"	30	30"
42 to 48	110	15"	85	15"	60	30"	25	15"	30	30"
50 to 66	100	15"	85	15"	60	30"	15	15"	30	30"
68 to 96	90	15"	75	15"	50	30"	15	15"	30	30"
98 to 108	80	15"	70	15"	45	30"	15	15"	30	30"

General Ratings are based on standard materials at 180°F. At higher operating temperatures, ratings will decrease slightly. Ratings of a product utilizing a specific elastomer or fabric may vary from the data above. Contact Holz.

POS. (Positive)
NEG. (Negative)

CUSTOM DESIGNED FOR YOUR PIPING APPLICATION
Modifications Available to the Engineer For Holz "Arch" or "U" Type Expansion Joints

HOLZ RUBBER NON-METALLIC EXPANSION JOINTS
TABLE 3: LENGTHS • MOVEMENTS • FORCES • DIMENSIONS

NOMINAL PIPE SIZE I.D. OF EXP. JOINT	HOLZ STYLES: 200-215-300-3000										HOLZ SINGLE OPEN ARCH STYLES: 200-300				HOLZ STYLES: 200-215-300 420-430-3000			
	(F) RECOMMENDED LENGTH Ⓢ "FACE TO FACE" DIMENSION IN INCHES					MOVEMENT CAPABILITY Ⓢ BASED ON ONE SINGLE OPEN ARCH					LOAD REQUIRED FOR FULL DEFLECTION TOTAL FORCE POUNDS Ⓢ				FLANGE DIMENSIONS & DRILLING EXPANSION JOINT • RINGS • RODS Ⓢ			
	SINGLE ARCH	MULTIPLE ARCHES MORE MOVEMENTS			MINIMUM LENGTH 1-ARCH	IN. OF AXIAL COMPRESSION	IN. OF AXIAL EXTENSION	IN. OF LATERAL DEFLECTION	ANGULAR (DEGREES) Ⓢ	TORSIONAL (DEGREES) Ⓢ	LBS. MAX. COMPRESSION	LBS. MAX. EXTENSION	LBS. MAX. DEFLECTION	FT. LBS. MAX ANGULAR	THRUST FACTOR Ⓢ	BOLT CIRCLE	NUMBER OF HOLES	SIZE OF HOLES ★
		TWO ARCH	THREE ARCH	FOUR ARCH														
1/2	★6	★10	★12	★14	4 3/4	★1/2	★1/4	★1/2	★30.0	★3	80	50	60	1	5	2 3/8	4	5/8
3/4	★6	★10	★12	★14	4 7/8	★1/2	★1/4	★1/2	★30.0	★3	100	65	75	1	6	2 3/4	4	5/8
1	★6	★10	★12	★14	5	★1/2	★1/4	★1/2	★27.5	★3	115	75	90	1	7	3 1/8	4	5/8
1 1/4	6	10	★12	★14	5	★1/2	★1/4	★1/2	★22.0	★3	130	85	100	2	8	3 1/2	4	5/8
1 1/2	6	10	★12	★14	5 1/8	★1/2	★1/4	★1/2	★18.5	★3	195	125	155	3	13	3 7/8	4	5/8
2	6	10	★12	★14	5 1/4	1/2	1/4	1/2	14.5	3	210	140	175	4	16	4 3/4	4	3/4
2 1/2	6	10	12	★14	5 1/4	1/2	1/4	1/2	11.5	3	260	175	220	6	20	5 1/2	4	3/4
3	6	10	12	★14	5 1/4	1/2	1/4	1/2	10.0	3	315	210	265	8	24	6	4	3/4
3 1/2	6	10	12	★14	5 1/4	1/2	1/4	1/2	8.3	3	380	245	310	11	29	7	8	3/4
4	6	10	12	14	5 1/4	1/2	1/4	1/2	7.5	3	425	285	355	14	34	7 1/2	8	3/4
5	6	10	12	14	5 1/4	1/2	1/4	1/2	6.0	3	530	355	445	22	45	8 1/2	8	7/8
6	6	10	12	16	5 1/2	1/2	1/4	1/2	5.0	3	635	425	530	32	57	9 1/2	8	7/8
8	6	10	14	16	5 3/4	3/4	3/8	1/2	5.5	3	1060	710	710	70	96	11 3/4	8	7/8
10	8	12	14	16	6	3/4	3/8	1/2	4.5	3	1325	885	690	109	133	14 1/4	12	1
12	8	12	14	16	6	3/4	3/8	1/2	3.8	3	1590	1060	825	158	177	17	12	1
14	8	12	16	20	7	3/4	3/8	1/2	3.3	2	1390	925	965	160	254	18 3/4	12	1 1/8
16	8	12	16	20	7	3/4	3/8	1/2	2.8	2	1590	1060	1100	209	315	21 1/4	16	1 1/8
18	8	12	16	20	7 1/2	3/4	3/8	1/2	2.5	1	1785	1090	1240	266	381	22 3/4	16	1 1/4
20	8	12	16	20	8	7/8	7/16	1/2	2.5	1	2320	1545	1380	381	453	25	20	1 1/4
22	10	14	18	22	8	7/8	7/16	1/2	2.3	1	2550	1700	1240	463	531	27 1/4	20	1 3/8
24	10	14	18	22	8	7/8	7/16	1/2	2.0	1	2780	1855	1355	549	616	29 1/2	20	1 3/8
26	10	14	18	22	8	1	1/2	1/2	2.3	1	3060	2040	1465	659	731	31 3/4	24	1 3/8
28	10	14	18	22	8	1	1/2	1/2	2.0	1	3295	2195	1580	765	830	34	28	1 3/8
30	10	14	18	22	8	1	1/2	1/2	2.0	1	3530	2355	1690	879	935	36	28	1 3/8
32	10	14	18	22	8 1/4	1	1/2	1/2	1.8	1	3770	2515	1805	1020	1047	38 1/2	28	1 5/8
34	10	14	18	22	8 1/2	1	1/2	1/2	1.8	1	4000	2665	1915	1130	1165	40 1/2	32	1 5/8
36	10	14	18	22	8 1/2	1	1/2	1/2	1.5	1	4240	2825	2030	1266	1289	42 3/4	32	1 5/8
38	10	14	18	22	8 1/2	1	1/2	1/2	1.5	1	4480	2985	2145	1438	1419	45 1/4	32	1 5/8
40	10	14	18	22	8 1/2	1	1/2	1/2	1.5	1	4710	3140	2255	1563	1556	47 1/4	36	1 5/8
42	12	14	18	24	8 3/4	1 1/8	1/2	1/2	1.5	1	5010	3340	2005	1745	1736	49 1/2	36	1 5/8
44	12	14	18	24	8 3/4	1 1/8	9/16	1/2	1.5	1	5250	3500	2100	1906	1886	51 3/4	40	1 5/8
46	12	14	18	24	8 3/4	1 1/8	9/16	1/2	1.3	1	5495	3665	2200	2135	2044	53 3/4	40	1 5/8
48	12	14	18	24	8 3/4	1 1/8	9/16	1/2	1.3	1	5725	3820	2290	2282	2207	56	44	1 5/8
50	12	14	18	24	9	1 1/8	9/16	1/2	1.3	1	5965	3975	2385	2460	2377	58 1/4	44	1 7/8
52	12	14	18	24	9	1 1/8	9/16	1/2	1.3	1	6210	4140	2480	2725	2553	60 1/2	44	1 7/8
54	12	14	18	24	9	1 1/8	9/16	1/2	1.3	1	6445	4295	2575	2885	2735	62 3/4	44	1 7/8
56	12	14	18	24	9	1 1/8	9/16	1/2	1.3	1	6680	4455	2670	3081	2923	65	48	1 7/8
58	12	14	18	24	9	1 1/8	9/16	1/2	1.0	1	6925	4620	2765	3395	3118	67 1/4	48	1 7/8
60	12	14	18	24	9	1 1/8	9/16	1/2	1.0	1	7160	4775	2860	3537	3319	69 1/4	52	1 7/8
66	12	14	18	24	9	1 1/8	9/16	1/2	1.0	1	7875	5250	3150	4288	3960	76	52	1 7/8
72	12	14	18	24	9	1 1/8	9/16	1/2	0.9	1	8590	5725	3435	5113	4658	82 1/2	60	1 7/8
78	12	16	18	24	9 1/4	1 1/8	9/16	1/2	0.9	1	9305	6205	3720	5959	5412	89	64	2 1/8
84	12	16	18	24	9 1/4	1 1/8	9/16	1/2	0.8	1	10020	6680	4005	6932	6222	95 1/2	64	2 1/8
90	12	16	18	24	9 1/4	1 1/8	9/16	1/2	0.7	1	10775	7185	4310	8193	7090	102	68	2 3/8
96	12	16	18	24	9 1/4	1 1/8	9/16	1/2	0.7	1	11455	7635	4580	9128	8013	108 1/2	68	2 3/8
102	12	16	20	24	11 1/4	2	1	3/4	1.1	1	20880	13435	7000	17363	9078	114 1/2	72	2 5/8
108	12	16	20	24	11 1/4	2	1	3/4	1.0	1	22915	14905	7725	20394	10120	120 3/4	72	2 5/8

NOTES:

- ① Lengths shown are for new design. Replacement parts should be ordered to the exact "F" dimension. ★ Items are not normally supplied in multiple "open" arches, as squirm can occur. Minimum length of "face to face" can be reduced by eliminating the arch. Specify Styles 420-430. Number of arches required depends upon anticipated total movement of the expansion joint. See Movement Capability heading.
- ② Multiple arch movement = above movement x no. of arches. "Filled Arch" construction reduces movements by 50%. ★ Items are normally furnished with "Filled Arch" and movement shown should be reduced accordingly.
- ③ The degree of angular movement is based on the maximum extension, as shown.
- ④ Torsional movement is expressed when the expansion joint is at neutral length.
- ⑤ Forces are based on one single open arch at zero pressure conditions, therefore should be considered only as approximate. Contact Holz for forces of multiple and filled arch products. For Style 215, use 0.8 multiplier, for Style 3000 use 1.3 multiplier to compute movement force. Angular force is expressed in "foot pounds". For "spring rates" contact Holz.
- ⑥ Thrust factor times maximum operating pressure equals total end thrust in pounds. Applies to Holz open arch styles.
- ⑦ Flange dimensions shown are in accordance with 125/150 pound standards of ANSI B16.1, B16.5, AWWA C-207 Table 3 Class E, AWWA C-207 Table 1 and 2 Class D. Retaining ring width is 3/8" all sizes. Flange thickness is Holz' standard.

SPECIFY HOLZ ENGINEERED:

Arch Type Connectors: when compression, elongation, lateral or angular movements are a consideration of the installation.

U-Type Connectors: when ONLY vibration or sound limiting characteristics are a consideration of the installation.

#300-Pressure/Vacuum Service. Holz Arch Type for General Service features steel body rings held in place with exclusive ring enveloper system. Can be specified for service in most application. U-Type #430

#200-High Pressure Service. Engineered for high pressure service, U-Type: #420

#3000-Very High Pressure. For extreme pressure applications. Not available in more than two arches. Tapers not available.

#215-Low Pressure Service. For pressures less than 25 PSIG and limited vacuum. U-Type: #450

All styles listed conform to U.S. Coast Guard and ASTM F-1123-87.

EXTENDED SERVICE LIFE

With Holz Engineered Design, Quality Materials and Workmanship

- ELASTOMER COVER** selected for resistance to the atmosphere around the product. Choice of natural, neoprene, nitrile, butyl, Hypalon*, EPDM and Viton*.
- REINFORCING RINGS** of heavy-duty solid steel embedded in elastomer for maximum pressure service.
- BODY RING ENVELOPER**, exclusive with Holz, ties rings on one side of the arch to the other. Prevents ring migration during pressure surges and excessive movements. Extra fabric plies over the arch add to total pressure rating.
- ELASTOMER FILLER** between reinforcing rings absorbs vibrations, sounds and electrolysis.
- STANDARD BODY FABRIC**, elastomer impregnated, is a high tensile polyester. Other fabrics are available. Engineered relationship of fabric plies to the body reinforcing rings determines positive/negative pressures of the product.
- EXTRA FLANGE PLYS** built in, for greater strength of the integral to the body retaining flange.
- LEAK FREE ONE-PIECE TUBE** selected for resistance against medium pumped/piped. Wide choice of elastomers including Teflon*. See Holz "Elastomer Specification Tables", for engineered recommendations.
- RETAINING RINGS** for flanged products. Split steel; plated for corrosion resistance. Required for all installations.
- CONTROL UNIT ASSEMBLIES** prevent over extension of expansion joint. Recommended for most applications. Optional sleeve prevents over compression.

* Registered trademark of E.I. DuPont de Nemours & Co., Inc.

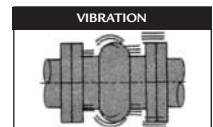
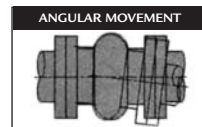
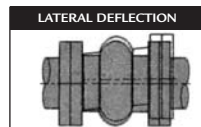
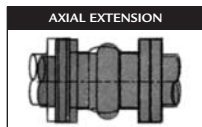
NOM. PIPE SIZE	MAX/DESIGN OR TEST PRESSURE OF SYSTEM - PSIG				
	Number of Control Units Required				
	2	3	4	6	8
1/2	1328	—	—	—	—
3/4	1106	—	—	—	—
1	949	—	—	—	—
1 1/4	830	—	—	—	—
1 1/2	*510	—	—	—	—
2	*661	—	—	—	—
2 1/2	*529	—	—	—	—
3	*441	—	—	—	—
3 1/2	365	547	729	—	—
4	*311	467	622	—	—
5	*235	353	470	—	—
6	*186	278	371	—	—
8	*163	244	326	—	—
10	163	244	325	488	—
12	*160	240	320	481	—
14	*112	167	223	335	—
16	113	170	227	340	453
18	94	141	187	281	375
20	79	118	158	236	315
22	85	128	171	256	342
24	74	110	147	221	294
26	62	93	124	186	248
28	65	98	130	195	261
30	70	105	141	211	281
32	*63	94	125	188	251
34	*72	107	143	215	286
36	*69	103	138	207	276
38	*63	94	125	188	251
40	—	*63	85	127	169
42	—	*72	96	144	192
44	—	*66	88	133	177
46	—	*61	82	122	163
48	—	*60	81	121	161
50	—	56	75	112	150
52	—	53	70	105	140
54	—	*64	86	128	171
56	—	60	80	120	160
58	—	*56	75	113	150
60	—	*53	71	106	141
62	—	—	*66	100	133
66	—	—	*59	89	119
72	—	—	*50	75	101
78	—	—	*56	84	112
84	—	—	*49	73	98
90	—	—	*53	79	106
96	—	—	*58	86	115
102	—	—	*51	76	102
108	—	—	*46	68	91

NOTES:

1. Calculations are based on 65% of yield of the rod.

2. See Table #3 of this brochure.

* FSA recommended minimum number of rods for indicated pipe size.



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