

# PIPE RESTRAINT TABLES

## PVC

Minimum length of pipe restrained (feet)

SIZE	HORIZONTAL BENDS			VERTICAL BENDS				DEAD ENDS
	90°	45°	22.5°	45°		22.5°		
	Lr	Lr	Lr	Lhs	Lis	Lhs	Lis	
6"	20	8	4	18	6	9	3	44
8"	26	11	5	24	8	11	4	58
10"	32	13	6	29	10	14	5	69
12"	37	16	7	34	12	16	6	82
14"	43	18	9	39	13	19	6	94
16"	48	20	10	44	15	21	7	106
20"	59	24	12	53	19	26	9	129
24"	69	29	14	62	22	30	11	151

Pipe

RUN SIZE

BRANCH SIZE	RUN SIZE								Lbr
	6"	8"	10"	12"	14"	16"	20"	24"	
6"	*	*	*	*	*	*	*	*	
8"	8	*	*	*	*	*	*	*	
10"	30	18	5	*	*	*	*	*	
12"	49	39	28	18	7	*	*	*	
14"	66	57	48	39	30	20	1	*	
16"	81	74	66	58	50	42	25	8	
20"	110	104	97	91	85	78	65	51	
24"	135	130	125	120	115	109	98	87	

TEES

Minimum length of pipe restrained (feet)(Lbr)

LARGE SIZE

REDUCTION SIZE	LARGE SIZE								Ls L <sub>1</sub>
	6"	8"	10"	12"	14"	16"	20"	24"	
6"	X	32 24	70 43	117 60	172 75	236 89	387 116	570 140	
8"		X	29 23	65 43	107 61	156 77	271 106	412 132	
10"			X	29 24	62 44	101 63	193 95	306 123	
12"				X	28 24	61 45	138 81	231 111	
14"					X	28 24	93 64	173 98	
16"						X	57 45	127 82	
20"							X	55 45	
24"								X	

REDUCERS

Minimum length of pipe restrained (L<sub>1</sub>)(feet)

## DUCTILE IRON

Minimum length of pipe restrained (feet)

SIZE	HORIZONTAL BENDS			VERTICAL BENDS				DEAD ENDS
	90°	45°	22.5°	45°		22.5°		
	Lr	Lr	Lr	Lhs	Lis	Lhs	Lis	
6"	21	9	4	12	6	6	3	28
8"	27	11	5	15	8	7	4	37
10"	33	14	7	18	10	9	5	44
12"	39	16	8	22	12	10	6	52
14"	44	18	9	25	13	12	6	60
16"	50	21	10	28	15	13	7	68
20"	61	25	12	34	18	16	9	82
24"	72	29	14	40	22	19	10	96

Pipe

RUN SIZE

BRANCH SIZE	RUN SIZE								Lbr
	6"	8"	10"	12"	14"	16"	20"	24"	
6"	9	3	*	*	*	*	*	*	
8"	22	18	13	8	3	*	*	*	
10"	33	29	25	21	17	13	5	*	
12"	42	39	36	33	30	26	20	13	
14"	51	49	46	43	41	38	32	26	
16"	60	58	56	53	51	48	43	38	
20"	76	75	73	71	69	67	63	59	
24"	91	90	88	87	85	84	80	77	

TEES

Minimum length of pipe restrained (feet)(Lbr)

LARGE SIZE

REDUCTION SIZE	LARGE SIZE								Ls L <sub>1</sub>
	6"	8"	10"	12"	14"	16"	20"	24"	
6"	X	20 16	45 27	75 38	111 48	151 57	248 74	366 89	
8"		X	19 15	42 28	69 39	100 49	174 68	264 84	
10"			X	18 15	40 28	65 40	124 60	196 78	
12"				X	18 15	39 29	88 51	148 71	
14"					X	18 15	59 41	110 62	
16"						X	37 29	81 52	
20"							X	35 29	
24"								X	

REDUCERS

Minimum length of pipe restrained (L<sub>1</sub>)(feet)

## DUCTILE IRON W/POLYETHYLENE WRAP

Minimum length of pipe restrained (feet)

SIZE	HORIZONTAL BENDS			VERTICAL BENDS				DEAD ENDS
	90°	45°	22.5°	45°		22.5°		
	Lr	Lr	Lr	Lhs	Lis	Lhs	Lis	
6"	36	15	7	28	11	14	5	68
8"	48	20	10	37	15	18	7	89
10"	57	24	11	44	18	21	9	107
12"	68	28	13	52	21	25	10	126
14"	78	32	15	60	24	29	12	144
16"	88	36	17	67	27	32	13	163
20"	107	44	21	82	33	39	16	198
24"	125	52	25	96	39	46	19	232

Pipe

RUN SIZE

BRANCH SIZE	RUN SIZE								Lbr
	6"	8"	10"	12"	14"	16"	20"	24"	
6"	21	7	*	*	*	*	*	*	
8"	53	42	31	19	7	*	*	*	
10"	79	70	60	51	42	32	12	*	
12"	102	95	87	80	72	64	47	30	
14"	124	118	111	105	98	91	77	63	
16"	145	140	134	128	122	116	104	92	
20"	184	180	175	171	166	161	152	142	
24"	220	217	213	209	205	202	194	186	

TEES

Minimum length of pipe restrained (feet)(Lbr)

LARGE SIZE

REDUCTION SIZE	LARGE SIZE								Ls L <sub>1</sub>
	6"	8"	10"	12"	14"	16"	20"	24"	
6"	X	49 37	108 66	181 92	266 115	365 137	599 178	883 215	
8"		X	45 36	101 67	166 94	241 119	419 163	637 203	
10"			X	44 37	96 68	156 97	299 146	472 189	
12"				X	43 37	93 69	212 124	356 171	
14"					X	42 37	143 99	266 150	
16"						X	88 70	195 126	
20"							X	84 69	
24"								X	

REDUCERS

Minimum length of pipe restrained (L<sub>1</sub>)(feet)

Ls : If a specified length of pipe, Ls (feet) on the small side of the reducer is free of bends, valves, tees, or other fittings, restraints are not necessary for the reducer; otherwise the larger side of the reducer shall be restrained the minimum length (L<sub>1</sub>)(feet).

STANDARD DRAWING NO. 6a  
CITY OF BOWLING GREEN  
NOVEMBER 1997