

**MINIMUM LENGTH OF PIPE (FEET) TO BE RESTRAINED**

(SOURCES: EBAA IRON RESTRAINT LENGTH CALCULATION PROGRAM FOR PVC PIPE, RELEASE 3.1, AND  
DIPRA THRUST RESTRAINT FOR DUCTILE IRON PIPE, RELEASE 3.2)

FITTING TYPE		PIPE SIZE											
		4"	6"	8"	10"	12"	16"	20"	24"	30"	36"	42"	48"
90° HORIZONTAL BEND		14	20	25	30	35	45	54	62	73	84	93	101
45° HORIZONTAL BEND		6	8	11	13	15	19	22	26	30	35	38	42
22.5° HORIZONTAL BEND		3	4	5	6	7	9	11	12	15	17	18	20
11.25° HORIZONTAL BEND		1	2	3	3	4	4	5	6	7	8	9	10
90° VERTICAL OFFSET	UPPER BEND	55	79	103	125	147	189	228	266	319	368	412	454
	LOWER BEND	22	38	49	59	69	88	106	123	145	165	184	201
45° VERTICAL OFFSET	UPPER BEND	22	32	42	51	60	77	93	109	131	151	170	187
	LOWER BEND	10	14	19	23	28	35	43	50	59	67	75	82
22.5° VERTICAL OFFSET	UPPER BEND	7	12	17	21	26	34	42	49	60	70	78	87
	LOWER BEND	2	4	6	8	10	14	17	21	25	29	33	36
11.25° VERTICAL OFFSET	UPPER BEND	3	4	6	9	11	15	19	22	28	32	37	41
	LOWER BEND	1	1	1	2	3	5	7	8	10	12	14	16
PLUG (DEAD END)		32	45	59	70	83	107	129	151	190	220	244	270
IN-LINE VALVE		32	45	59	70	83	107	129	151	100	110	125	135
TEE (BRANCH RESTRAINT)	4" x 0	23											
	6" x 0	21	35										
	8" x 0	18	34	47									
	10" x 0	16	32	46	58								
	12" x 0	13	30	44	57	69							
	16" x 0	7	26	41	55	67	90						
	20" x 0	1	21	38	52	65	88	109					
	24" x 0	1	16	34	49	62	86	108	129				
	30" x 0	8	28	44	58	83	106	127	154				
	36" x 0	1	1	22	39	54	80	103	124	153	179		
	42" x 0	1	1	15	33	49	77	100	122	151	177	201	
	48" x 0	1	1	7	27	44	73	97	120	149	176	200	222
REDUCER (LARGER PIPE RESTRAINT)	6" x 0	23											
	8" x 0	38	25										
	10" x 0	57	43	24									
	12" x 0	72	60	44	41								
	16" x 0	99	90	78	75	45							
	20" x 0	123	116	107	105	81	45						
	24" x 0	146	140	132	131	111	82	45					
	30" x 0	157	153	148	141	133	113	87	56				
	38" x 0	182	179	175	169	163	147	126	101	56			
	42" x 0	205	202	199	194	189	175	158	138	100	54		
	48" x 0	226	224	221	217	213	201	187	169	138	98	53	

**NOTES:**

- THE DATA IN THE ABOVE TABLE ARE BASED UPON THE FOLLOWING INSTALLATION CONDITIONS:
  - SOIL TYPE-SAND
  - TEST PRESSURE-150 PSI
  - DEPTH OF BURY-4'
  - TRENCH TYPE-3
  - SAFETY FACTOR-1.5
  - VERTICAL OFFSET-3'
  - MINIMUM PIPE LENGTH ALONG TEE RUN-5'
- THE RESTRAINED PIPE LENGTHS APPLY TO DUCTILE IRON AND PVC PIPE.
- ALL JOINTS BETWEEN UPPER AND LOWER BENDS SHALL BE RESTRAINED.
- RESTRAINED PIPE LENGTHS APPLY TO PIPE ON BOTH SIDES OF VALVES AND FITTINGS.

ITEM	CROSS REF.	SPEC. REF.

 <p>MIAMI-DADE COUNTY Delivering Excellence Every Day WATER &amp; SEWER DEPARTMENT</p>	ISSUE DATE	APPROVED BY	STANDARD DETAIL <b>STANDARD REQUIREMENTS FOR WATER AND SEWER MECHANICAL THRUST RESTRAINT</b>	GS 2.0 SHEET 1 OF 1
	04/10/2014	J.F.		
	07/20/2016	D.V.		