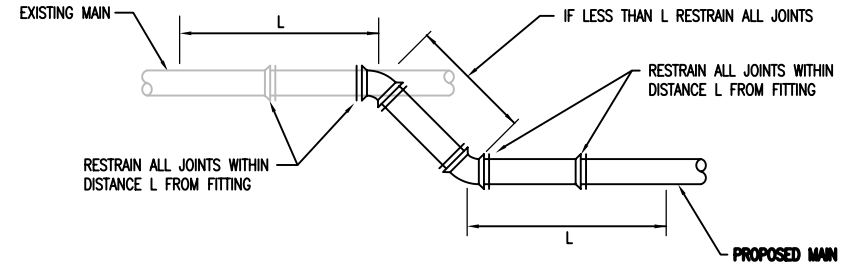


**MINIMUM LENGTH OF PIPE WITH  
RESTRAINED JOINTS (L) IN FEET  
FOR DUCTILE IRON PIPE  
(SEE NOTE 4 FOR PVC)**

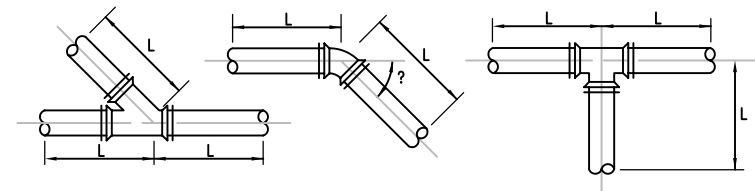
TEST PRESSURE 200 PSI										
PIPE SIZE	HORIZONTAL				VERTICAL				VALVE OR DEAD END	TEE OR WYE
	1 1/4"	2 1/2"	45°	90°	1 1/4"	2 1/2"	45°	90°		
4"	10	10	10	18	10	10	17	NOT ALLOWED	29'	10'
6"	10	10	10	25	10	12	25	"	41'	10'
8"	10	10	14	33	10	16	32	"	54'	14'
10"	10	10	16	40	10	19	39	"	65'	16'
12"	10	10	19	47	11	22	46	"	77'	19'
14"	10	11	22	54	13	25	53	"	89'	22'
16"	10	12	25	61	14	29	60	"	101'	25'
18"	10	13	28	67	16	32	67	"	112"	28'
20"	10	15	31	74	17	35	73	"	124'	31'
24"	10	17	36	86	20	41	86	"	146'	36'

TEST PRESSURE 250 PSI										
PIPE SIZE	HORIZONTAL				VERTICAL				VALVE OR DEAD END	TEE OR WYE
	1 1/4"	2 1/2"	45°	90°	1 1/4"	2 1/2"	45°	90°		
4"	10	10	10	22	10	10	22	NOT ALLOWED	36'	10'
6"	10	10	13	31	10	15	31	"	51'	13'
8"	10	10	17	41	10	19	40	"	68'	17'
10"	10	10	21	50	12	23	49	"	81'	21'
12"	10	12	24	59	14	28	58	"	97'	24'
14"	10	13	28	67	16	32	66	"	111'	28'
16"	10	15	31	76	18	36	75	"	126'	31'
18"	10	17	35	84	20	40	83	"	140'	35'
20"	10	18	38	92	22	44	91	"	155'	38'
24"	11	21	45	108	26	52	108	"	183'	45'

**RESTRAINING DEVICE EXAMPLE**



**MECHANICAL RESTRAINING DEVICE DETAILS AND NOTES**



**NOTE:**

1. RESTRAINING DEVICES OR RESTRAINED JOINTS SHALL HAVE A WORKING PRESSURE OF 250 PSI WITH A MINIMUM SAFETY FACTOR OF 2.
2. RESTRAINED LENGTH SHOWN IS BASED ON 3' OF COVER, SOILTYPE CL, TRENCH TYPE 4, 2:1 SAFETY FACTOR, AND DUCTILE IRON PIPE.
3. VALVES SHALL BE RESTRAINED BASED ON RESTRAINED LENGTH FOR DEAD ENDS.
4. FOR PVC PIPE, INCREASE LENGTH "L" BY 25% FOR HORIZONTAL BENDS, AND INCREASE LENGTH "L" BY 100% FOR VERTICAL BENDS AND DEADENDS.
5. EXISTING PIPE ADJACENT TO PROPOSED BENDS, WYES, VALVES, TEES, AND PLUGS SHALL BE UNCOVERED AND THE JOINTS RESTRAINED FOR THE LENGTHS INDICATED. IF THE EXISTING PIPE IS UNABLE TO ACCEPT THE MECHANICAL JOINT RESTRAINING MECHANISM, THE EXISTING PIPE SHALL BE REPLACED WITH DUCTILE IRON WATER MAIN IN ACCORDANCE WITH THE SPECIFICATIONS AND RESTRAINED FOR THE LENGTH INDICATED. IN LIEU OF RESTRAINING JOINTS OF EXISTING PIPE A BULKHEAD ANCHOR AS SHOWN IN DETAIL CA-5 MAY BE USED.
6. FIRE HYDRANTS SHALL BE RESTRAINED AT EACH JOINT IN THE ASSEMBLY.
7. ALL JOINTS WITHIN CASING PIPES SHALL BE RESTRAINED.
8. IF A CASING PIPE FALLS WITHIN THE RESTRAINED LENGTH "L", THIS REQUIRED RESTRAINED LENGTH "L" SHALL BE INCREASED BY THE LENGTH OF THE CASING.

**AUGUSTA COUNTY SERVICE AUTHORITY  
VERONA, VIRGINIA**

SCALE: NONE

DRAWN BY:

DATE: AUG. 2004

REVISED: JAN. 2011

TYPICAL RESTRAINING DEVICE

DRAWING NUMBER: W-14

PAGE: 1 OF 1