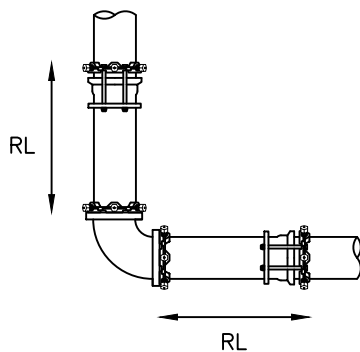


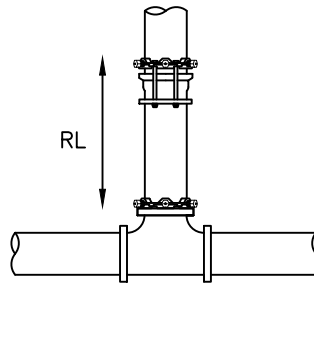
RESTRAINED LENGTH FOR DUCTILE IRON PIPE (FEET)							
FITTING SIZE	11.25° BEND	22.5° BEND	45° BEND	90° BEND	TEE	DEAD END	VALVE
4"	1	2	4	10	1	20	20
6"	2	3	6	14	8	28	28
8"	2	4	8	18	16	37	37
10"	2	5	9	21	23	45	45
12"	3	5	10	24	31	52	52
14"	3	6	12	27	38	60	60
16"	3	6	13	31	45	67	67
18"	4	7	14	34	52	74	74
24"	5	9	18	42	72	94	94

RESTRAINED LENGTH FOR PVC PIPE (FEET)							
FITTING SIZE	11.25° BEND	22.5° BEND	45° BEND	90° BEND	TEE	DEAD END	VALVE
4"	2	3	5	12	1	32	32
6"	2	4	7	16	12	45	45
8"	3	5	9	21	26	59	59
10"	3	5	11	25	37	71	71
12"	3	6	12	29	49	83	83
14"	4	7	14	34	63	97	97
16"	4	8	16	37	72	107	107
18"	4	8	17	40	83	118	118
24"	5	10	21	50	115	151	151

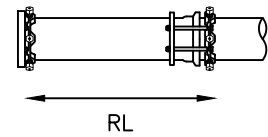
RESTRAINED LENGTH CALCULATED USING THE FOLLOWING ASSUMPTIONS: SOIL TYPE = WELL GRADED SAND, SAFETY FACTOR = 1.5, TRENCH TYPE = 4 (PIPE BEDDED IN SAND WITH COMPACTED BACKFILL ABOVE), DEPTH OF BURY = 3 FT, TEST PRESSURE = 150 PSI. RESTRAINED LENGTH SHOWN FOR TEES CORRESPONDS TO INLET TEE BRANCH ONLY.



HORIZONTAL BEND



TEE (BRANCH)



DEAD END OR VALVE

NOTES:

1. ALL JOINTS AND FITTINGS WITHIN DESIGNATED RESTRAINED LENGTH SHALL BE RESTRAINED. IF THRUST BLOCKS ARE INSTALLED PER FOWD STD-1, MECHANICAL RESTRAINT IS NOT REQUIRED UNLESS OTHERWISE SPECIFIED.
2. RESTRAINING DEVICES FOR MECHANICAL JOINT FITTINGS INCLUDE EBAA 1100 MEGALUG, STAR PIPE PRODUCTS STARGRIP 3000, OR SIGMA ONE-LOK SLDE. FOR PVC PIPE, USE EBAA 2000PV MEGALUG, STAR PIPE PRODUCTS STARGRIP 4000, OR APPROVED EQUAL.
3. RESTRAINING DEVICES FOR PUSH-ON JOINTS FOR DUCTILE IRON INCLUDE US PIPE FIELD LOK GASKETS, US PIPE HDSS RESTRAINED PIPE, OR APPROVED EQUAL. FOR PVC PIPE, USE EBAA 1900 JOINT RESTRAINT, STAR PIPE PRODUCTS SERIES 1100 JOINT RESTRAINT, OR APPROVED EQUAL.
4. FOR CROSSES OR TEE FITTINGS, USE RESTRAINED LENGTH FOR 90° BEND FROM THE ABOVE TABLES.
5. FOR VERTICAL BENDS, RESTRAINED LENGTH SHALL BE DESIGNED BY THE CIVIL ENGINEER OF RECORD.
6. RESTRAINED LENGTHS NOT SPECIFIED ON THE PLANS SHALL BE DESIGNED BY THE CIVIL ENGINEER OF RECORD.
7. RESTRAINED LENGTHS ARE BASED ON 150 PSI TEST PRESSURE. IF HIGHER PRESSURES ARE ANTICIPATED, THIS TABLE SHALL NOT APPLY AND RESTRAINED LENGTHS SHALL BE DESIGNED BY THE CIVIL ENGINEER OF RECORD.

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PIPE RESTRAINED LENGTH

STANDARD DRAWING 1-1

APPROVED: B. CHETCUTI
DRAWN BY: D. LEE
DRAWING: STD-1-1
REVISED: JUNE 2026
SCALE: NONE

STANDARD SPECIFICATIONS