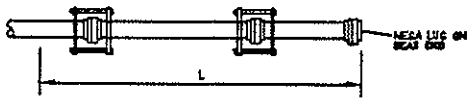
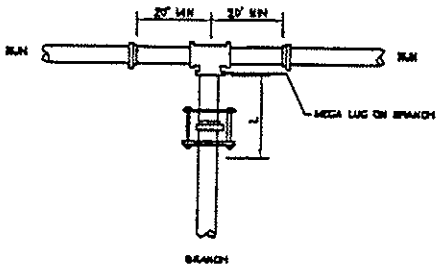
IN LINE VALVE/DEAD END ON PVC PIPE



1. ALL JOINTS WITHIN LENGTH "L" MUST BE RESTRAINED. USE RETAINER GLAND AT MECHANICAL JOINTS AND HARNESS WITH PUSH-ON PIPE PER SPECIFICATION.
2. FOR TEST PRESSURES AND LAYING CONDITIONS SEE SECTION ON GENERAL NOTES FOR USE OF RESTRAINED JOINT LENGTHS.

4	6	8	10	12	14	16	18	20
44	62	82	89	118	130	103	146	167

RESTRAINED LENGTHS "L" (IN FEET)



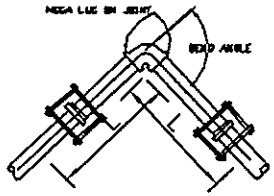
BRANCH SIZE \ RUN SIZE DIAMETER	4	6	8	10	12	14	16	18	20	24
4	*	*	*	*	*	*	*	*	*	*
6	X	*	*	*	*	*	*	*	*	*
8	X	X	*	*	*	*	*	*	*	*
10	X	X	X	18	*	*	*	*	*	*
12	X	X	X	X	26	12	4	*	*	*
14	X	X	X	X	X	46	31	17	3	*
16	X	X	X	X	X	X	62	48	37	11
18	X	X	X	X	X	X	X	76	67	44
20	X	X	X	X	X	X	X	X	98	74
24	X	X	X	X	X	X	X	X	X	127

* - FOR THIS CONDITION NEED ONLY RESTRAIN THE BRANCH OUTLET OF THE TEE.

RESTRAINED LENGTHS, "L" (IN FEET)

1. RESTRAIN THE TWO MECHANICAL JOINTS ON THE RUN SIDE OF THE TEE. THERE SHOULD BE A FULL 20' LENGTH OF PIPE INSTALLED ON EACH SIDE OF THE RUN.
2. ALL JOINTS WITHIN THE LENGTH "L" ON THE BRANCH MUST BE RESTRAINED. USE RETAINER GLAND AT MECHANICAL JOINTS AND HARNESS ON PUSH-ON PIPE PER CITY SPECIFICATION.
3. FOR TEST PRESSURES AND LAYING CONDITIONS SEE SECTION ON GENERAL NOTES FOR USE OF RESTRAINED JOINT LENGTHS.

HORIZONTAL BEND

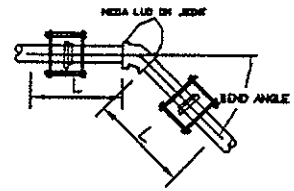


1. ALL JOINTS WITHIN LENGTH "L" MUST BE RESTRAINED. USE RETAINER GLAND AT MECHANICAL JOINTS AND HARNESS WITH PUSH-ON PIPE PER CITY SPECIFICATION.
2. FOR TEST PRESSURES AND LAYING CONDITIONS SEE SECTION ON GENERAL NOTES FOR USE OF RESTRAINED JOINT LENGTHS.

BEND ANGLE \ SIZE DIAMETER	4	6	8	10	12	14	16	18	20
11.25	3	3	4	4	5	6	7	7	8
22.5	4	6	7	8	10	12	13	16	16
45	8	12	15	18	21	24	28	30	33
60	30	28	37	44	52	56	67	73	81

RESTRAINED LENGTHS "L" (IN FEET)

VERTICAL DOWN BEND



1. ALL JOINTS WITHIN LENGTH "L" MUST BE RESTRAINED. USE RETAINER GLAND AT MECHANICAL JOINTS AND HARNESS WITH PUSH-ON PIPE PER CITY SPECIFICATION.
2. FOR TEST PRESSURES AND LAYING CONDITIONS SEE SECTION ON GENERAL NOTES FOR USE OF RESTRAINED JOINT LENGTHS.

BEND ANGLE \ SIZE DIAMETER	4	6	8	10	12	14	16	18	20
11.25	6	8	10	12	14	15	17	20	20
22.5	11	16	18	23	27	31	36	40	40
45	23	31	40	48	56	64	72	80	80

RESTRAINED LENGTHS "L" (IN FEET)

RESTRAINED JOINT LENGTHS USAGE GENERA NOTES

RESTRAINED LENGTH CALCULATIONS ARE BASED ON THE FOLLOWING DESIGN TYPICALLY USED WITH BACKFILL IN FRESNO.

1. THREE (3) FEET MINIMUM DEPTH OF COVER.
2. A SAFETY FACTOR OF 1.5
3. SOIL TYPE SANDY CLAY
4. TYPE 5 TRENCH COMPACTION FROM FOUR (4) INCHES MINIMUM UNDER THE PIPE TO THE CENTER LINE OF THE PIPE AND COMPACTED GRANULAR OR SELECTED MATERIAL FROM THE CENTER LINE OF THE PIPE TO THE TOP OF THE PIPE (90 PERCENT STANDARD PROCTOR DENSITY, AASHTO T-99).
5. 200 PSI TEST PRESSURES FOR FOUR (4) THROUGH SIXTEEN (16) INCH SIZE PIPES.

IF ACTUAL CONDITIONS DIFFER FROM THOSE LISTED ABOVE OR THE REQUIRED RESTRAINED LENGTH CANNOT BE MET, THE RESTRAINED JOINT LENGTH SHALL BE DETERMINED BY THE WATER AND POWER ENGINEER.

RESTRAINED PIPE JOINTS

(P.V.C.)

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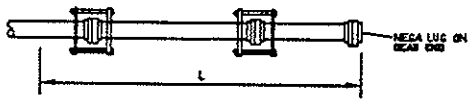
IN LINE VALVE/DEAD END ON PVC PIPE



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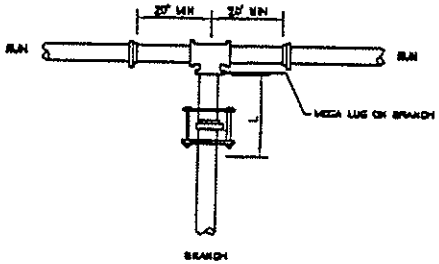
2. FOR TEST PRESSURES AND LAYING CONDITIONS SEE SECTION ON GENERAL NOTES FOR USE OF RESTRAINED JOINT LENGTHS.

4	6	8	10	12	14	16	18	20
33	33	45	52	62	71	80	84	98

RESTRAINED LENGTHS "L" (IN FEET)



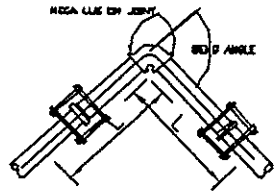
BRANCH SIZE \ RUN SIZE DIAMETER	4	6	8	10	12	14	16	18	20	24
4	*	*	*	*	*	*	*	*	*	*
6	X	*	*	*	*	*	*	*	*	*
8	X	X	*	*	*	*	*	*	*	*
10	X	X	X	10	3	*	*	*	*	*
12	X	X	X	X	16	12	4	*	*	*
14	X	X	X	X	X	28	22	13	8	*
16	X	X	X	X	X	X	37	31	26	13
18	X	X	X	X	X	X	X	46	41	30
20	X	X	X	X	X	X	X	X	55	46
24	X	X	X	X	X	X	X	X	X	72

* – FOR THIS CONDITION NEED ONLY RESTRAIN THE BRANCH OUTLET OF THE TEE.

RESTRAINED LENGTHS, "L" (IN FEET)

1. RESTRAIN THE TWO MECHANICAL JOINTS ON THE RUN SIDE OF THE TEE. THERE SHOULD BE A FULL 20' LENGTH OF PIPE INSTALLED ON EACH SIDE OF THE RUN.
2. ALL JOINTS WITHIN THE LENGTH "L" ON THE BRANCH MUST BE RESTRAINED. USE RETAINER GLAND AT MECHANICAL JOINTS AND HARNESS ON PUSH-ON PIPE PER CITY SPECIFICATION.
3. FOR TEST PRESSURES AND LAYING CONDITIONS SEE SECTION ON GENERAL NOTES FOR USE OF RESTRAINED JOINT LENGTHS.

HORIZONTAL BEND



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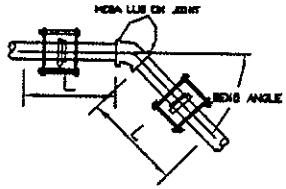
2. FOR TEST PRESSURES AND LAYING CONDITIONS SEE SECTION ON GENERAL NOTES FOR USE OF RESTRAINED JOINT LENGTHS.

BEND ANGLE \ SIZE DIAMETER	4	6	8	10	12	14	16	20
11.25	3	3	3	3	4	4	5	6
22.5	3	4	7	7	8	9	10	12
45	8	9	12	14	16	19	21	28
90	16	21	28	34	40	46	51	62

RESTRAINED LENGTHS "L" (IN FEET)

VERTICAL DOWN BEND



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BEND ANGLE \ SIZE DIAMETER	4	6	8	10	12	14	16	20
11.25	3	5	7	9	9	10	11	13
22.5	6	10	11	14	18	18	22	26
45	14	18	24	26	33	36	43	53

RESTRAINED LENGTHS "L" (IN FEET)

RESTRAINED JOINT LENGTHS USAGE GENERA NOTES

RESTRAINED LENGTH CALCULATIONS ARE BASED ON THE FOLLOWING DESIGN TYPICALLY USED WITH BACKFILL IN FRESNO.

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IF ACTUAL CONDITIONS DIFFER FROM THOSE LISTED ABOVE OR THE REQUIRED RESTRAINED LENGTH CANNOT BE MET, THE RESTRAINED JOINT LENGTH SHALL BE DETERMINED BY THE WATER AND POWER ENGINEER.

RESTRAINED PIPE JOINTS

(DUCTILE IRON)

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