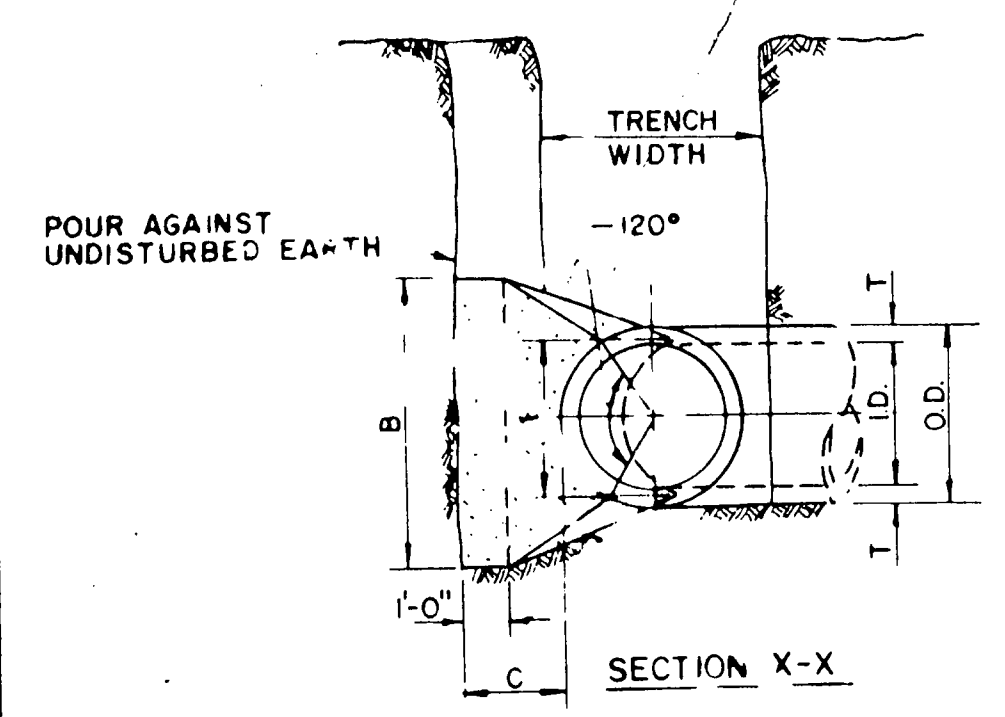
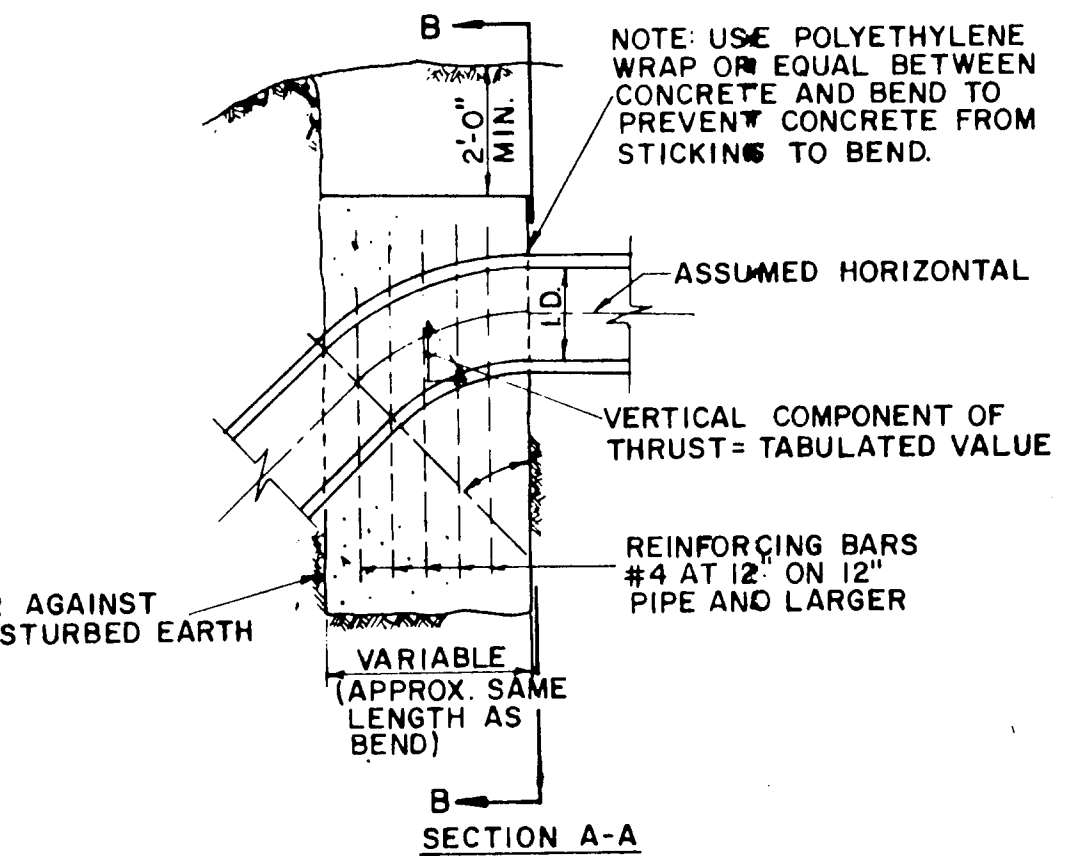
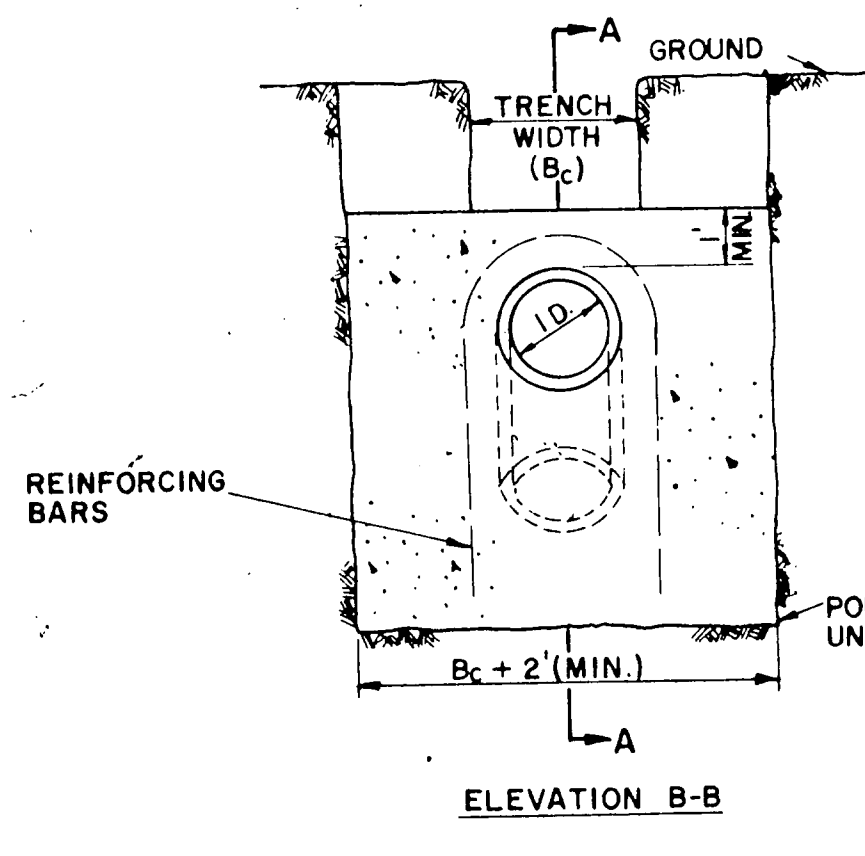


I.D. (IN.)	T (IN.)	C 11.25° FT.		C 22.50° FT.		E FT.
		A	B	A	B	
4.6,8	0.4	1.5	1.5	1.5	0.9	
10,12	0.5	1.5	1.5	1.5	1.2	
16,18	0.6	1.5	1.5	1.5	1.6	
20	0.7	1.5	1.5	1.5	1.8	
24	0.9	1.5	1.5	1.5	2.1	
30	2.9	1.5	1.9	2.6	2.6	
36	4.5	1.5	2.3	3.3	3.3	
42	5.0	1.8	2.6	3.8	3.8	
48	5.5	2.0	3.0	4.3	4.3	
54	6.0	2.3	3.4	4.8	4.8	
60	6.5	2.5	3.8	5.3	5.3	
66	6.8	2.8	4.1	5.7	5.7	
72	7.5	3.0	4.5	6.3	6.3	
78	7.5	3.3	4.9	6.7	6.7	
84	8.0	3.5	5.3	7.2	7.2	
90	8.5	3.8	5.6	7.7	7.7	
96	9.0	4.0	6.0	8.2	8.2	



I.D. (IN.)	G FT.	THRUST TONS	EARTH			ROCK			I.D. (IN.)	G FT.	THRUST TONS	EARTH			ROCK		
			A FT.	B FT.	VOL. C.Y.	A FT.	B FT.	VOL. C.Y.				A FT.	B FT.	VOL. C.Y.	A FT.	B FT.	VOL. C.Y.
4.6,8	0.4	1.0	1.0	1.5	0.1	1.0	1.0	0.1	4.6,8	0.8	2.0	1.5	1.5	0.1	1.0	1.0	0.1
10,12	0.6	2.2	1.5	1.5	0.1	1.0	1.5	0.1	10,12	1.1	4.4	2.0	2.5	0.3	1.5	1.5	0.1
16,18	0.8	5.0	2.0	2.5	0.3	1.5	2.0	0.2	16,18	1.6	9.9	3.0	3.5	0.6	2.0	2.5	0.3
20	0.9	6.2	2.0	3.5	0.4	1.5	3.0	0.3	20	1.8	12.3	3.5	3.5	0.7	2.0	3.5	0.4
24	1.1	8.9	3.0	3.0	0.5	1.5	3.0	0.3	24	2.2	17.7	4.0	4.5	1.0	3.0	3.0	0.5
30	1.4	10.4	3.0	3.5	0.6	2.0	3.5	0.4	30	2.7	20.7	5.0	4.5	1.5	3.0	4.0	0.8
36	1.7	15.0	3.5	4.5	0.9	2.0	4.0	0.5	36	3.3	29.8	5.5	5.5	2.3	4.0	4.0	1.3
42	1.9	20.4	4.5	5.0	1.5	2.5	5.0	0.8	42	3.8	40.5	7.0	6.0	3.9	4.5	5.0	2.1
48	2.2	26.6	4.5	6.0	2.0	3.0	6.0	1.1	48	4.4	52.9	8.0	7.0	5.7	4.8	6.0	2.8
54	2.5	33.7	6.0	6.0	3.0	6.0	1.4	5.4	4.9	67.0	9.0	8.0	8.0	6.0	6.0	6.0	4.1
60	2.7	41.6	6.0	7.0	3.8	7.0	1.8	6.0	5.5	82.7	9.5	9.0	10.6	6.0	7.0	5.3	5.3
66	3.0	50.3	6.5	8.0	5.1	3.5	8.0	2.7	66	6.0	100.1	10.5	10.0	14.1	6.5	8.0	7.2
72	3.3	59.9	7.5	8.0	6.3	4.0	8.0	3.7	72	6.6	119.1	11.0	11.0	17.6	7.5	8.0	9.1
78	3.6	70.2	8.0	9.0	6.1	4.0	9.0	3.9	78	7.1	139.6	12.0	12.0	22.5	8.0	9.0	11.7
84	3.8	81.5	8.5	10.0	10.3	4.5	10.0	5.3	84	7.6	162.1	13.0	12.5	27.2	8.5	10.0	14.8
90	4.1	93.5	9.5	10.0	12.2	5.0	10.0	6.3	90	8.2	186.1	14.0	13.5	33.7	9.5	10.0	17.7
96	4.4	106.4	10.0	11.0	15.0	5.0	11.0	7.4	96	8.7	211.7	15.0	14.5	41.2	10.0	11.0	21.8

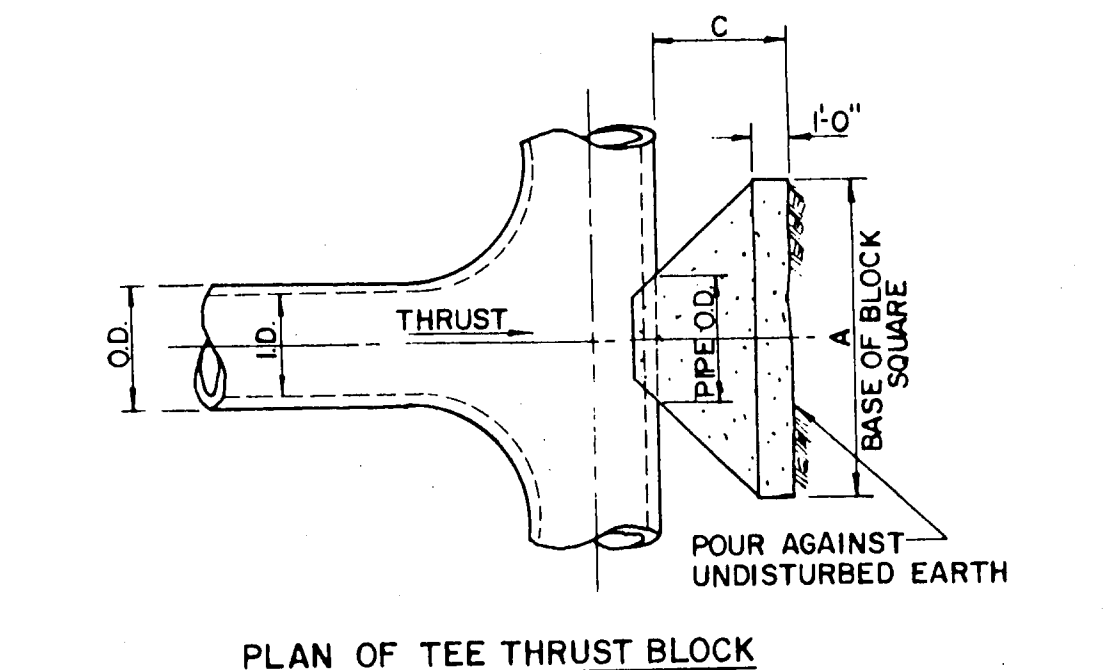
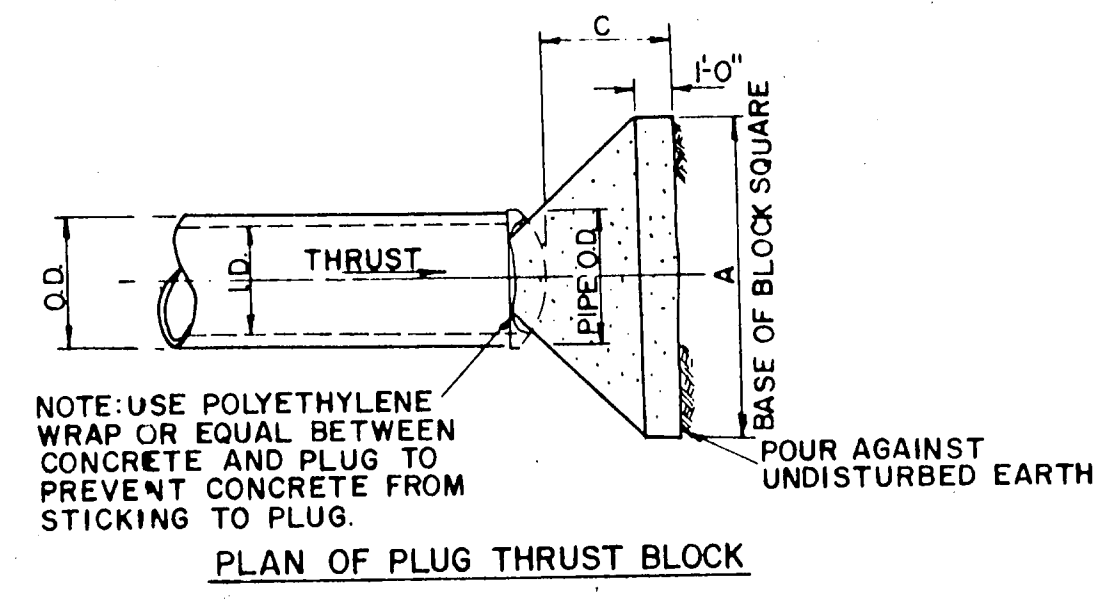
**HORIZONTAL BEND THRUST BLOCK**



I.D. (IN.)	THRUST TONS	VOL. C.Y.	22.50°			30°			45°			67.50°			90°		
			THRUST TONS	VOL. C.Y.	THRUST TONS	VOL. C.Y.	THRUST TONS	VOL. C.Y.	THRUST TONS	VOL. C.Y.	THRUST TONS	VOL. C.Y.	THRUST TONS	VOL. C.Y.	THRUST TONS	VOL. C.Y.	
4.6,8	1.0	0.5	2.0	1.0	2.5	1.3	3.6	1.8	4.6	2.3	5.0	2.5	4.5	8			
10,12	2.2	1.1	4.3	2.2	5.7	2.8	8.0	4.0	10.5	5.2	11.3	5.7	10,12				
16,18	5.0	2.5	9.7	4.9	12.7	6.4	18.0	9.0	23.5	11.8	25.5	12.7	16,18				
20	6.1	3.1	12.0	6.0	15.7	7.9	22.2	11.1	29.2	14.5	31.4	15.7	20				
24	8.2	4.4	17.3	8.7	22.6	11.3	32.0	16.0	41.8	20.9	45.2	22.6	24				
30	10.5	5.2	20.3	10.1	26.5	13.3	37.5	18.8	49.0	24.5	53.1	26.5	30				
36	14.9	7.5	29.2	14.6	38.2	19.1	54.0	27.0	70.5	35.3	76.4	38.2	36				
42	20.3	10.1	39.8	19.9	52.0	26.0	73.5	36.7	96.0	48.0	104.0	52.0	42				
48	26.5	13.2	51.9	26.0	67.9	33.9	96.0	48.0	126.0	62.7	136.0	67.9	48				
54	33.5	16.8	65.7	32.9	85.9	42.9	122.0	60.7	159.0	79.4	172.0	85.9	54				
60	41.4	20.7	81.2	40.6	106.0	53.0	150.0	73.0	196.0	98.0	212.0	106.0	60				
66	50.1	25.0	99.2	49.1	128.0	64.2	182.0	90.7	237.0	119.0	257.0	128.0	66				
72	59.6	29.8	117.0	58.4	153.0	76.3	216.0	108.0	282.0	141.0	305.0	153.0	72				
78	69.9	35.0	137.0	68.6	179.0	90.0	254.0	127.0	331.0	166.0	358.0	179.0	78				
84	81.1	40.5	159.0	79.5	208.0	104.0	294.0	147.0	384.0	192.0	416.0	208.0	84				
90	93.1	46.5	183.0	91.3	239.0	119.0	337.0	169.0	441.0	221.0	477.0	239.0	90				
96	106.0	53.0	208.0	104.0	272.0	136.0	384.0	192.0	502.0	251.0	545.0	272.0	96				

GENERAL NOTES - FOR ALL THRUST BLOCKS  
 1. All Calculations Are Based On Internal Pressure Of 200 P.S.I. For 24" I.D. Pipe And Smaller And 150 P.S.I. On 30" I.D. And Larger.  
 2. Volumes Of Vertical Bend Thrust Blocks Are Net Volumes Of Concrete To Be Furnished. The Corresponding Weight Of The Concrete (Class F) Is Equal To Or Greater Than The Vertical Component Of Thrust On The Vertical Bend.  
 3. Wall Thickness (T) Assumed Here For Estimating Purposes Only.  
 4. Concrete For Blocking Shall Be Class B Concrete.  
 5. Dimensions May Be Varied As Required By Field Conditions Where And As Directed By The Engineer. The Volume Of Concrete Blocking Shall Not Be Less Than Shown Here.

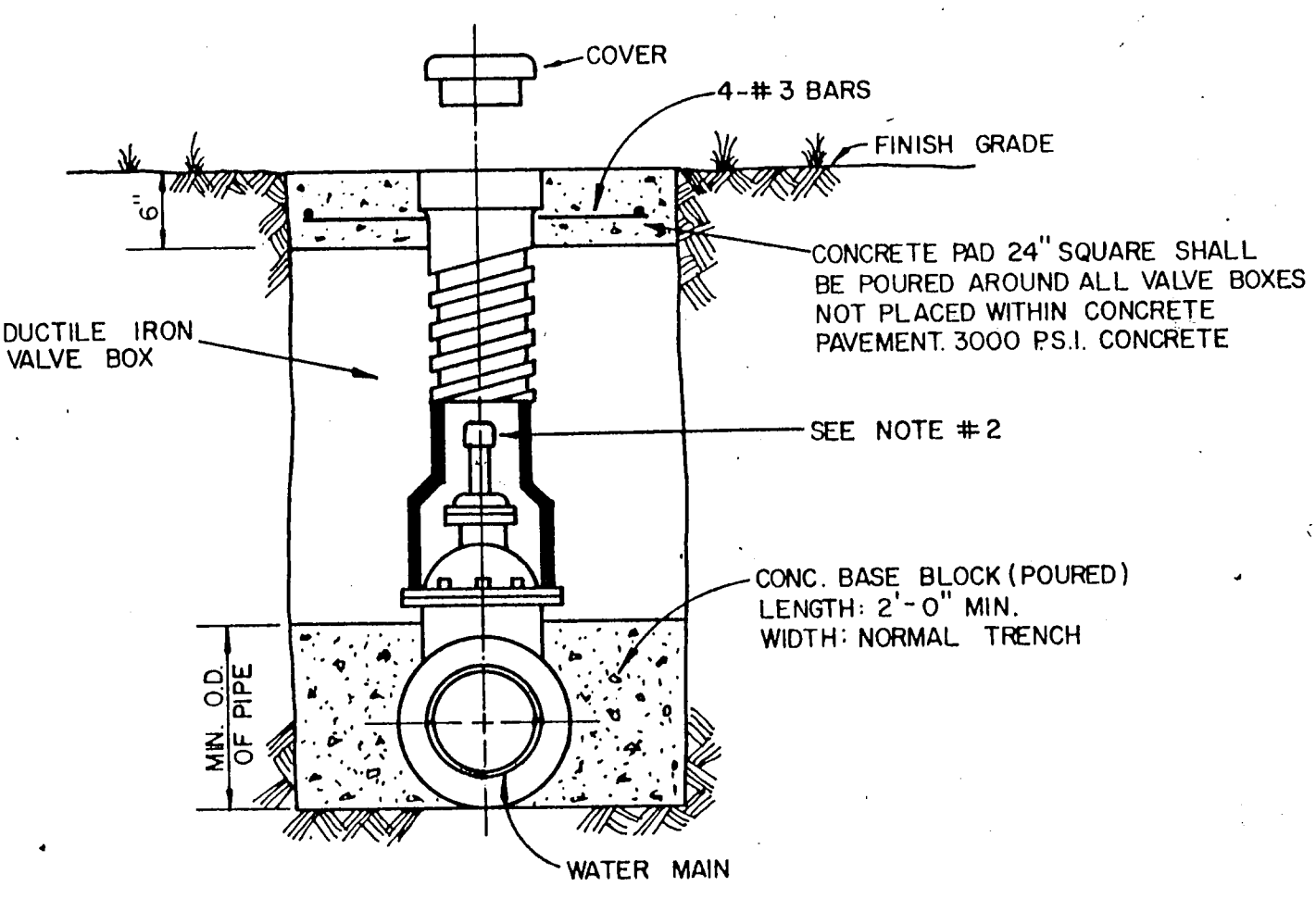
**VERTICAL BEND THRUST BLOCK**



I.D. (IN.)	THRUST TONS	C FT.	EARTH		ROCK	
			A VOL. C.Y.	B VOL. C.Y.	A VOL. C.Y.	B VOL. C.Y.
4.6,8	1.1	1.5	2.5	0.3	2.0	0.2
10,12	2.3	1.5	3.5	0.6	2.5	0.3
16,18	5.5	2.0	5.5	1.6	4.0	0.9
20	6.1	2.0	6.0	1.9	4.0	0.9
24	8.2	2.5	7.0	3.1	5.0	1.7
30	10.5	3.0	7.5	4.1	5.5	2.4
36	14.9	4.0	9.0	7.3	6.5	4.2
42	20.3	4.5	10.5	11.0	7.5	6.2
48	26.5	5.0	12.0	15.6	8.5	8.7
54	33.5	5.5	13.5	21.4	9.5	11.9
60	41.4	6.0	15.0	28.4	10.5	15.7
66	50.1	6.5	16.5	36.8	11.5	20.5
72	59.6	7.5	17.5	47.2	12.5	27.2
78	69.9	8.0	19.0	58.9	13.5	33.7
84	81.1	8.5	20.5	72.3	14.5	41.2
90	93.1	9.0	22.0	87.7	15.5	49.7
96	106.0	9.5	23.5	104.8	16.5	61.0

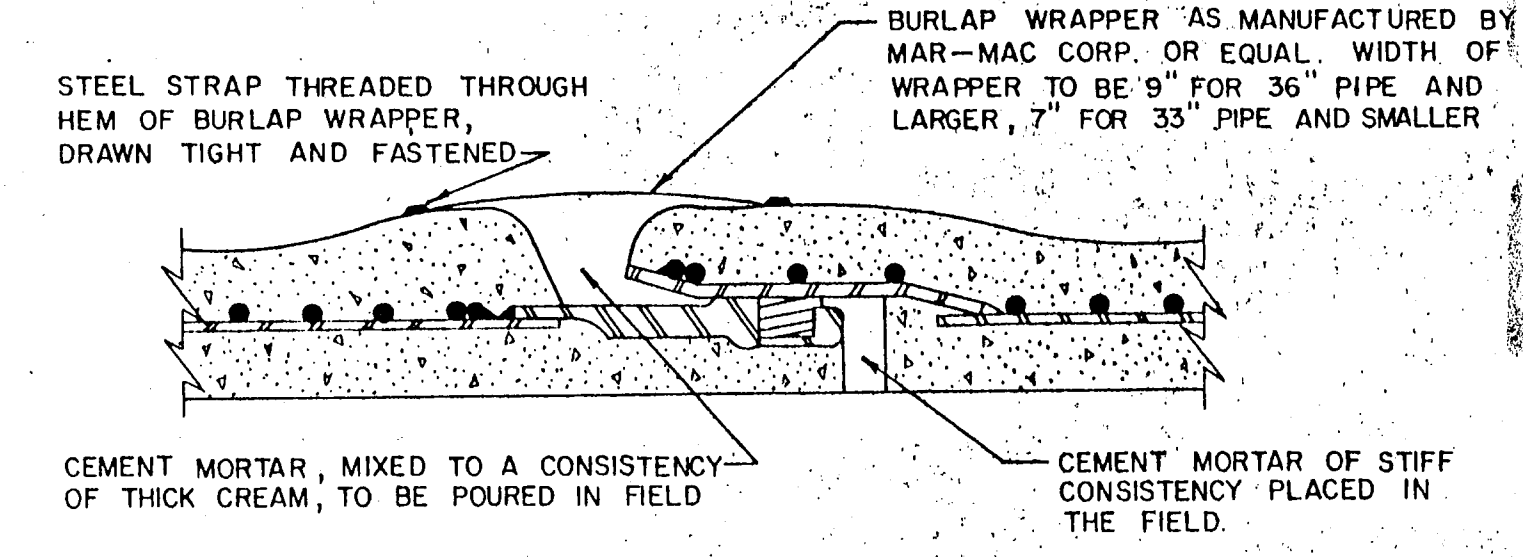
**PLUG & TEE THRUST BLOCK**

**TYPICAL VALVE SETTING AND BOX**



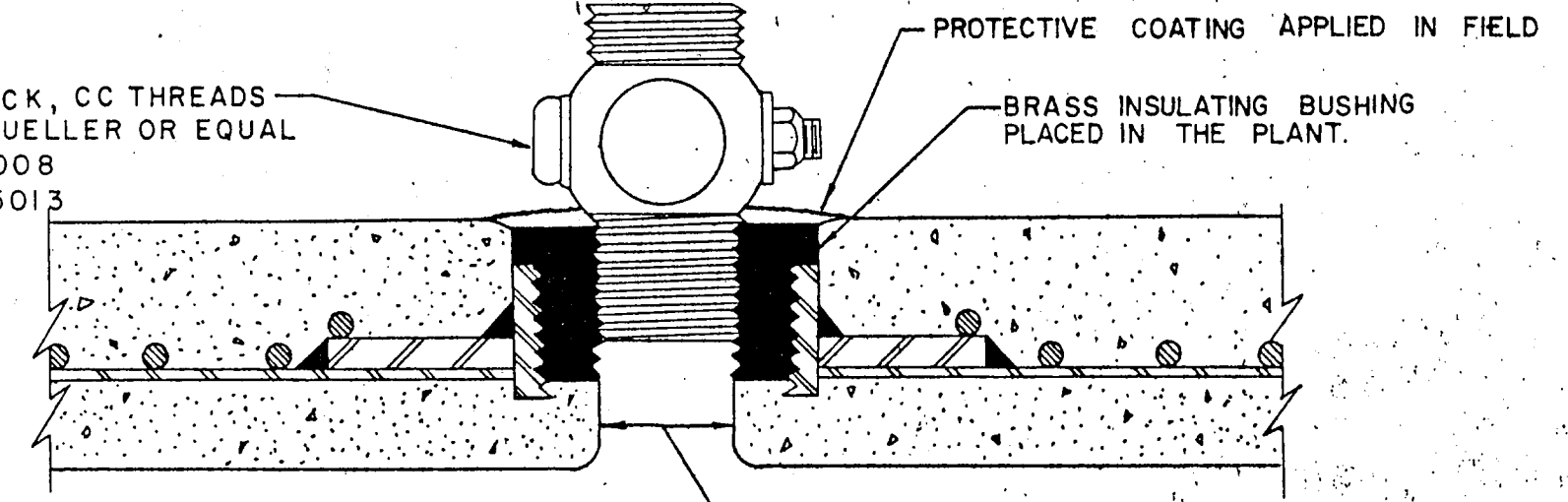
NOTE:  
 1. GATE VALVES SHALL BE IN ACCORDANCE WITH AWWA STANDARD C-509-80 OR LATEST THEREOF. ALL VALVES SHALL BE "MULLER" OR APPROVED EQUAL.  
 2. A PERMANENTLY ATTACHED VALVE EXTENSION STEM SHALL BE REQUIRED FOR ANY VALVE THATS OPERATING NUT IS LOCATED IN EXCESS OF 4 FEET BELOW THE TOP OF VALVE BOX. THIS EXTENSION SHALL BE OF SUFFICIENT LENGTH TO INSURE THAT ITS TOP IS WITHIN 4' OF VALVE BOX LID. MANUFACTURED VALVE STACK DUCTILE IRON PIPE TO BE USED FOR EXTENSION GREATER THAN 4'-0" BELL END OF STACK TO BE FITTED OVER VALVE. VALVE AND VALVE STACK IS TO BE POLY WRAPPED.  
 3. VALVES SHALL BE OF DUCTILE IRON W/RUBBER ENCAPSULATED DISK BODY BOLTS SHALL BE STAINLESS STEEL OF SAME SIZE ON EACH VALVE.

NOTE:  
 PROVIDE 1" MINIMUM THICKNESS CONCRETE OR CEMENT MORTAR COATING IN THE FIELD FOR THE PROTECTION OF ALL EXPOSED STEEL SUCH AS FLANGES, CAULKED JOINTS, THREADED OUTLETS, CLOSURES, ETC. THE CEMENT MORTAR USED SHALL CONSIST OF ONE PART PORTLAND CEMENT TO TWO AND ONE-HALF PARTS OF FINE, SHARP (PLASTER) SAND. WHERE SHOWN, COATING IS TO BE REINFORCED WITH WIRE MESH.

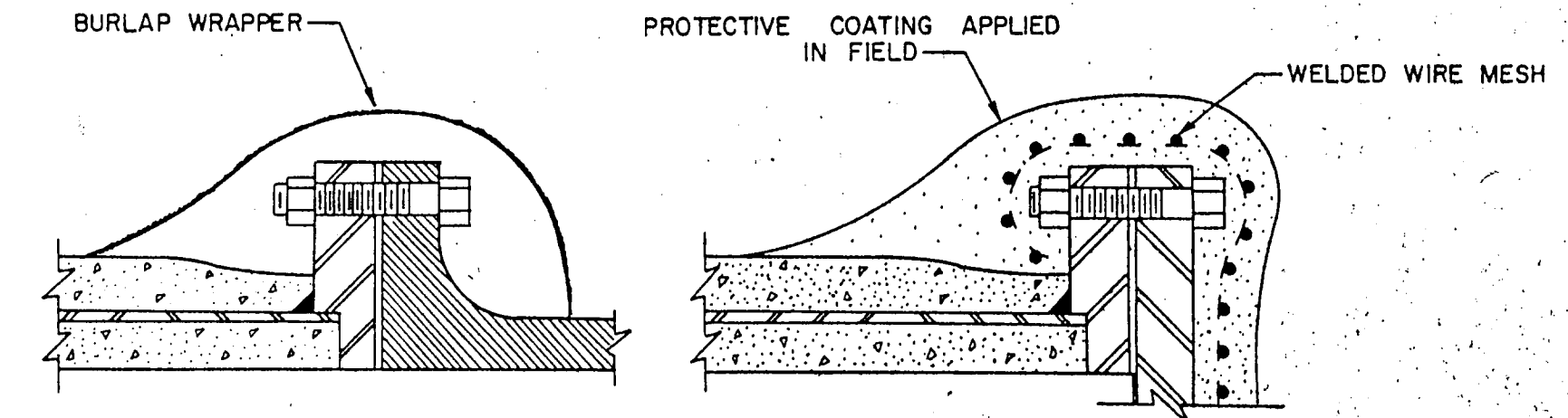


**STANDARD RUBBER GASKET JOINT**

NOTE: ALL CLOSURE SECTIONS SHALL BE FABRICATED WITH HAND HOLES TO ALLOW WIPING INSIDE OF JOINTS AFTER CLOSURE IS IN PLACE



**THREADED CONNECTION**



**FLANGED CONNECTIONS**

**REINFORCED CONCRETE CYLINDER PIPE DETAILS**

TOWN OF ADDISON, TEXAS  
 DEPARTMENT OF ENGINEERING  
**STANDARD CONSTRUCTION DETAILS**  
**WATER**  
**THRUST BLOCKS**

Designed - Drawn - Date - AUGUST, 1991 Job No. - 90025-5  
 Approved - Checked - Scale - Sheet - D-9 of 10