ASSEMBLY OF 2"-24" PUSH-ON PIPE (Page 2 of 3)

Figure 6. Fork-Tool Method of Assembly

For joint assemblies 8" and smaller a fork-type tool is recommended. Fork is placed in back of bell of last laid pipe. The choker sling is double-wrapped around the plain end of the entering pipe. The eye on one end of the sling is hooked to the sliding choker hook on the top of the pipe. The eye on the other end of the sling is placed over the hook on the fork handle. Plain end is moved into socket by pulling on handle.

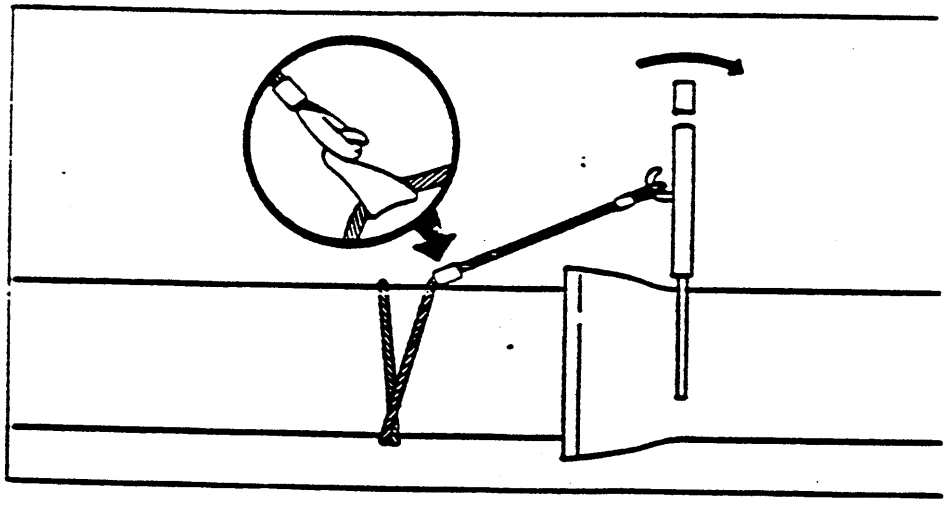


Figure 7. Fork-Tool Method of Disassembly

Joints 8" and smaller may be disassembled by placing fork flush with face of bell, wrapping the sling three times around the plain end, placing one eye over hook on handle, holding free end of cable and pulling on handle to back out plain end.

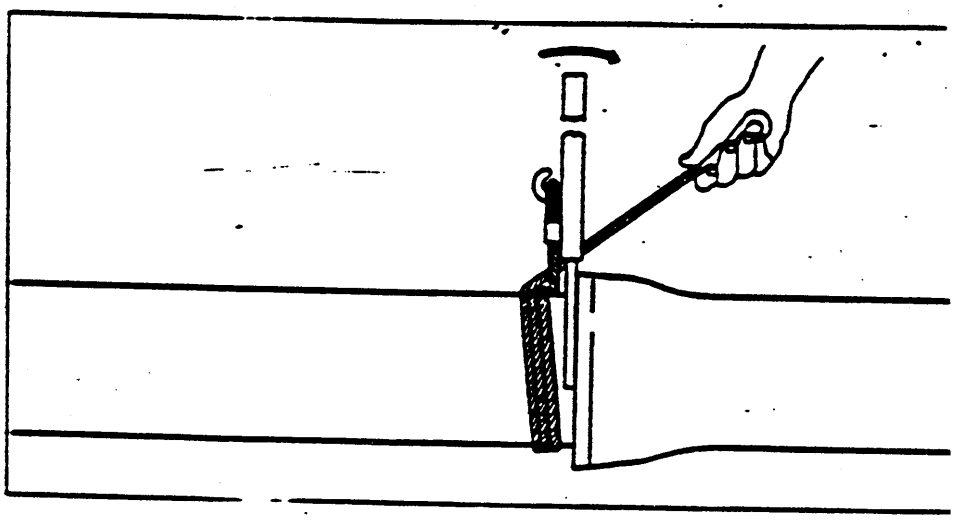
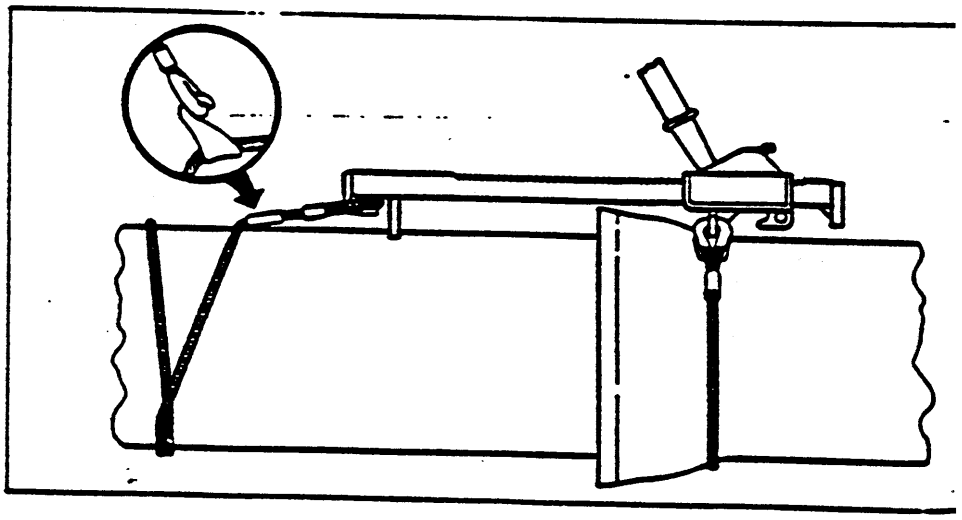


Figure 8. Jack Method of Assembly

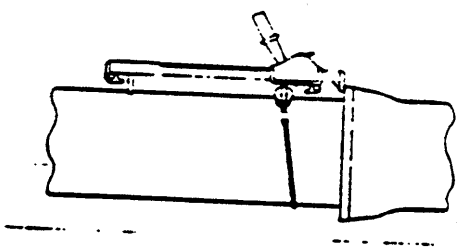
For joint assemblies 10" thru 24" a jack-type tool may be used to make up the joint. The jack is placed on top of the pipe with the double hooks on the bottom of the jack placed immediately in back of the bell of the next adjoining pipe and with the hook on the rack extending over the plain end of the entering pipe. The bell sling is placed under and around the pipe below the double hooks and eyes of the sling placed over the hooks. The choker sling is double-wrapped around the plain end (as described with fork-type tool) with one eye hooked to the end of the rack. Plain end is socketed by movement of the jack handle.



ASSEMBLY OF 2"-24" PUSH-ON PIPE (Page 3 of 3)

Figure 9. Jack Method of Disassembly

Joints 10" thru 24" may be disassembled by placing jack on plain end as indicated with lug on back end of rack bearing on face of bell. Motion of jack handle causes lug on rack to push against face of bell and move plain end out of socket.

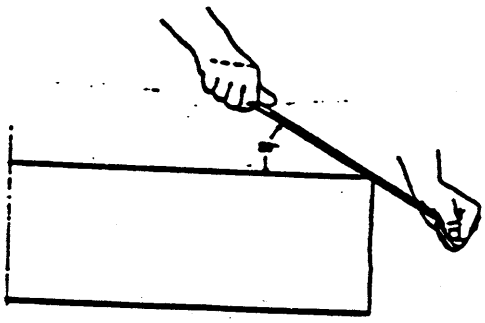


Assembly with Field Cut Pipe

When pipe are cut in the field, the cut end may be readily conditioned so that it can be used to make up the next joint. The outside of the cut end should be beveled about ¼-inch at an angle of about 30 degrees with the center line of the pipe (Fig. 10). This can be done quite easily with a coarse file or a portable grinder. The operation removes any sharp, rough edges which otherwise might injure the gasket.

Figure 10. Conditioning Field Cut Plain End

The outside edge of field cut plain end pipe may be conditioned for use by filing or grinding a small bevel at an angle of about 30°.



Maximum Deflection Full Length Pipe

Size of Pipe	Maximum Joint Deflection in Degrees	Deflection in Inches	Approximate Radius in Feet of Curve Produced by Succession of Joints
		18 ft. Length	18 ft. Length
4	5°	19	205
6	5°	19	205
8	5°	19	205
10	5°	19	205
12	5°	19	205
14	4°	15	260
16	4°	15	260
18	3°	11	345
20	3°	11	345
24	3°	11	345
30	3°	11	345
36	3°	11	345
42	3°	12*	382*
48	3°	12*	382*
54	3°	12*	382*

*20-foot length

ASSEMBLY OF 30" and 36" PUSH-ON PIPE. Note that the procedures in figures 1 thru 3 on the assembly of push-on pipe in sizes 2"-24", should be followed before proceeding with the step shown in figure 1 below.

Tools Needed for Final Assembly:

Figure 1.

Two 2½-ton chain hoists, with 25 ft. of chain, two (2) bell choker slings.

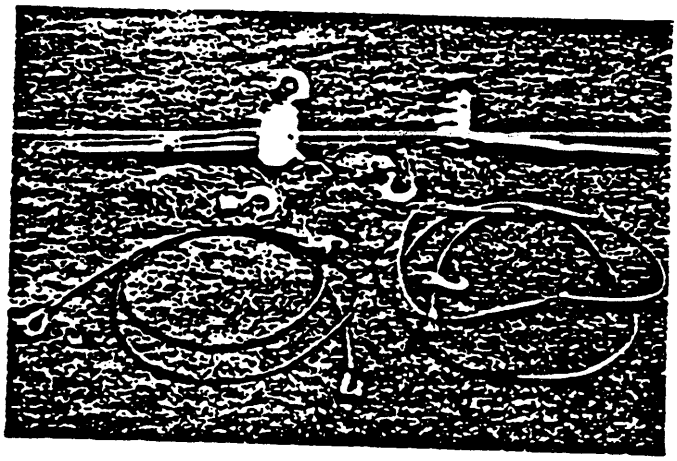


Figure 2.

Place the bell choker slings behind the bell with the free ends located on the horizontal centerlines on opposite sides of the bell with the loose ends projecting in front of the bell face.

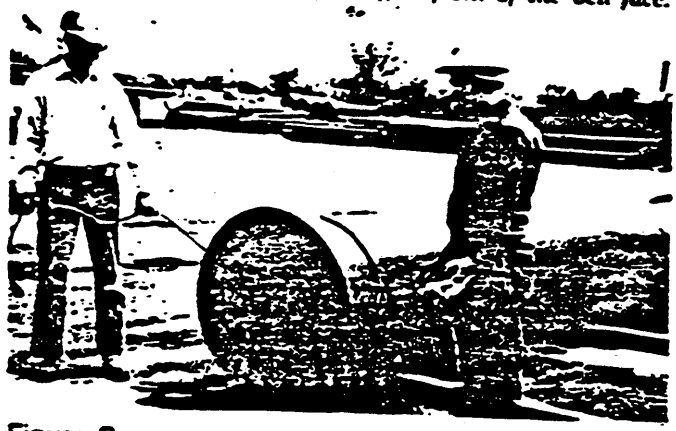


Figure 3.

Double-wrap the chains of the two 2½-ton chain hoists around the spigot end approximately six feet from the spigot end. Position the hooks of the chain hoists on the horizontal centerlines on opposite sides of the spigot.

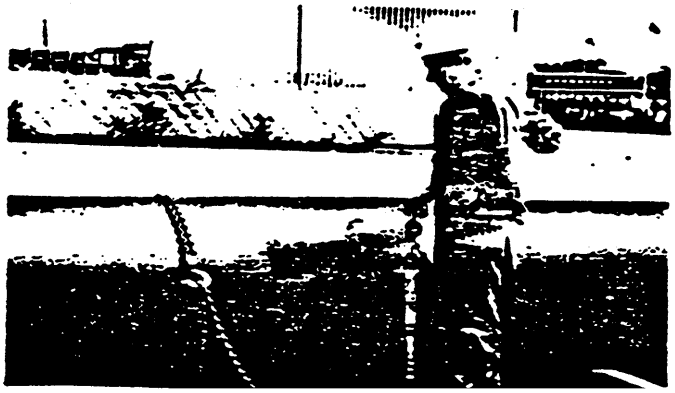


Figure 4.

Attach the hook of each chain hoist into the eye of th respective cables.

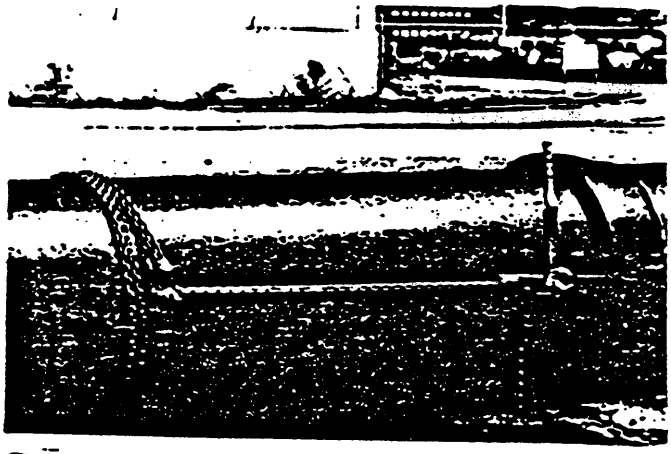
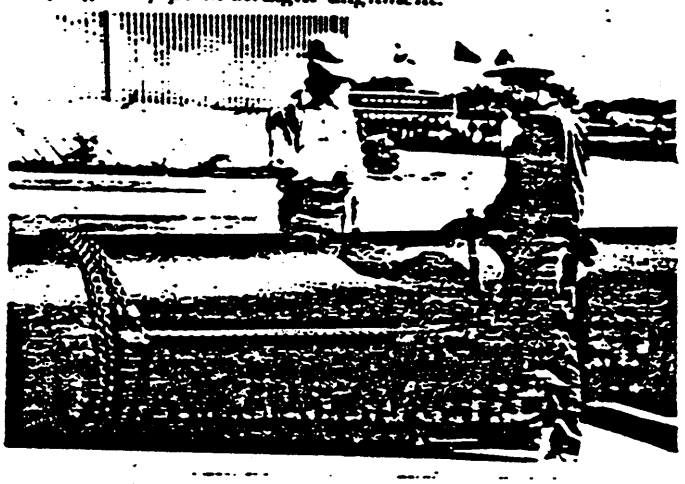


Figure 5.

Assemble the joint by pulling evenly with both chain hoists keeping the pipe in straight alignment.



NOTE: This method applicable to other size pipe by using bell choker slings of the following lengths.

Size	Bell Choker Sling
14" thru 20"	5/16" dia. by 84" long
24" and 30"	⅜" dia. by 120" long
36"	⅜" dia. by 144" long
42"	⅜" dia. by 164" long
48"	⅜" dia. by 184" long
54"	⅜" dia. by 206" long

V. INSTALLATION OF MECHANICAL JOINT FITTINGS

The inside of the bell mechanical joint and the outside of the spigot end of the pipe (8 inch length) shall be thoroughly cleaned to remove oil, grit, excess coating and other foreign matter, and then painted with a soap solution made by dissolving one half cup of granulated soap in one gallon of water.

A. Installing Plain Glands

The gland and then the gasket shall be slipped over the plain end of the pipe. The small side of the gasket and the lip side of the gland shall face the socket. The gasket shall then be painted with soapy water or gasket lubricant such as that used for "push-on" joint pipe.

The entire section of the pipe shall be pushed forward to seat the spigot end in the bell. The gasket shall then be pressed into place within the bell.
NOTE: CARE SHOULD BE TAKEN TO LOCATE THE GASKET EVENLY AROUND THE JOINT.

The gland shall be moved along the pipe into position for bolting. All of the bolts shall be inserted and the nuts screwed up tightly with the fingers.

Using a CALIBRATED TORQUE LIMITING WRENCH, all of the nuts shall be tightened to a torque of 85 foot pounds. Nuts spaced 180 degrees apart shall be tightened alternately to produce an equal pressure on all parts of the gland.

B. Installing Retainer Glands

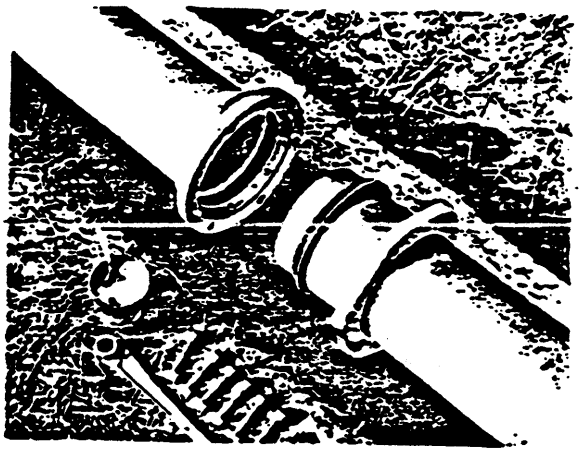
Follow the same procedure specified in (A) for plain glands with the additional requirement that the set screws shall be back set to clear the pipe prior to slipping the retainer gland on the plain end of the pipe.

Any desired joint deflection shall be made prior to tightening the set screws.

The set screws shall be tightened by hand until all screw points bear against the pipe barrel. Using a CALIBRATED TORQUE LIMITING WRENCH, all of the set screws shall be tightened to a torque of 75 foot pounds. The set screws shall be alternately tightened, 180 degrees apart.

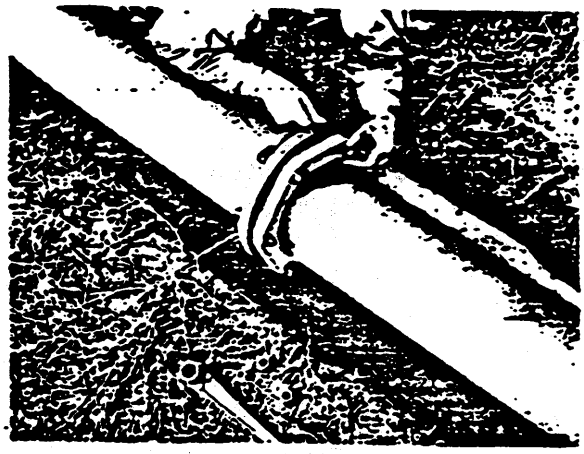
The mechanical joint bolts shall not be retightened after the set screws have been torqued. If joint bolts must be retightened after assembly, first loosen the set screws, retighten the joint bolts, and then retighten the set screws to 75 foot pounds torque. (See next page.)

STEPS IN ASSEMBLY OF MECHANICAL JOINT PIPE

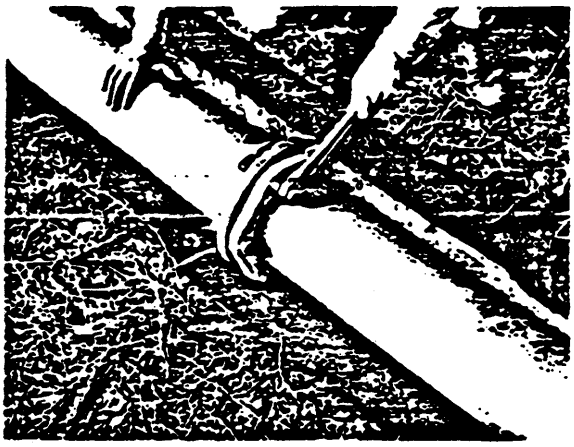


1. *Brush socket, plain end and gasket with soapy water, then slip gland and gasket over plain end. Small side of gasket, and lip side of gland, face the socket.*

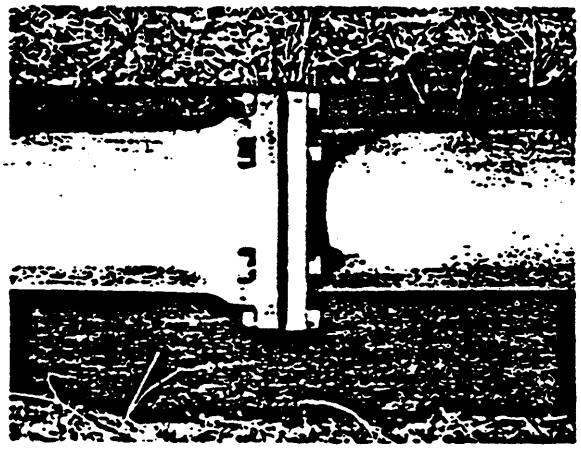
2. *Insert plain end into socket. Push gasket into position with fingers, making sure it is evenly seated.*



3. *Slide gland into position, insert bolts and tighten nuts by hand.*



4. *With ordinary ratchet wrench, tighten up bolts* alternately (bottom then top, and so on; all around).*



5. *The completed mechanical joint—bottle-tight under all rated working pressures, flexible, time-saving.*

*Range of bolt torques to be applied

Bolt Size (In.)	Range of Torque (Ft-Lb)
⅝	45- 60
¾	75- 90
1	100-120

CITY OF NEW YORK

BUREAU OF WATER SUPPLY

MANUAL OF PROCEDURES

DATE ISSUED TITLE
October 1976 Standard Drawings
REV. B APRIL 1986

PROCEDURE NUMBER
1000.05

I PURPOSE

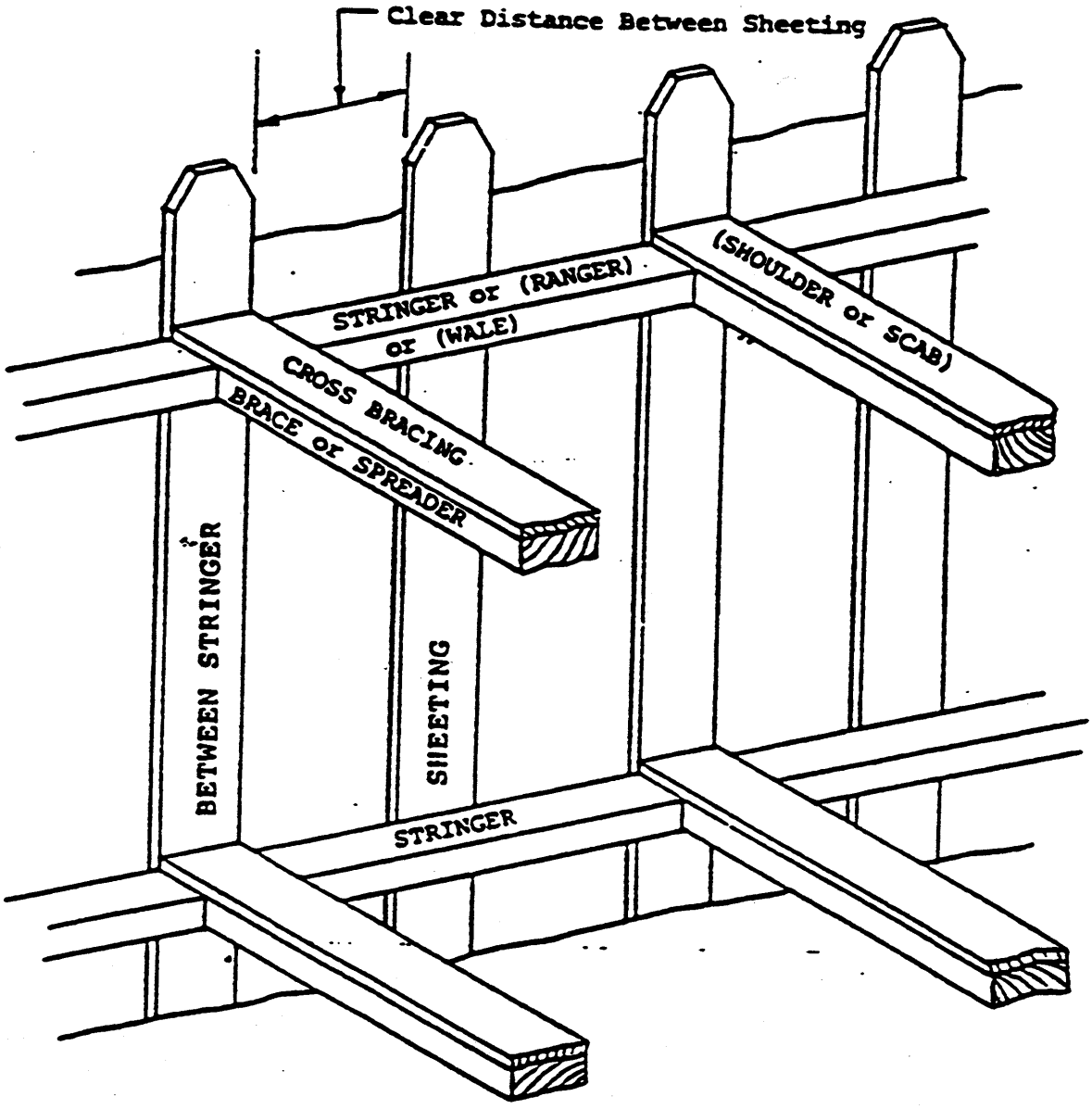
The following drawings and sketches are the minimum list of Standard Drawings with which each Inspector and Engineer should be familiar and which each Inspector and Engineer should have available for reference at the job site.

SKETCH TITLE		SHEET PAGE NUMBER (S)	
Q.	METHOD OF PROTECTION FOR D.I. WATER MAINS WITH LESS THAN 24" COVER	28	
	TITLE	**DRAWING NUMBER**	**REVISION DATE**
A.	SIZE OF OPENINGS FOR WET CONNECTIONS	10200-Z	2/43
B.	BANDS & RODS FOR CAST IRON MAINS	10238-A-Z	5/64
C.	VALVE BOX SKIRT, CAST IRON	10240-A-Z	1/83
D.	HYDRANT VALVE BOX, CAST IRON	10241-A-Z	1/83
E.	FOUNDATIONS FOR VALVE BOXES	11576-A-Z	2/84
F.	METHODS, INST. SVCE. PIPES, WET CONN., ETC.	11633-Z	
G.	MANHOLE HEAD AND COVER, WIDE FLANGE	13547-B-Z	1/83
H.	STANDARD METHODS FOR RECONSTRUCTING CATCH BASIN CONNECTIONS	19841-Z	1/52
I.	STANDARD METHOD OF CONNECTING BETWEEN STEEL AND C. I. PIPE	20731-Z-C	3/65
J.	HYDRANT DRAIN BASE	22809-Z	1/31
K.	STANDARD METHOD OF SETTING HYDRANT ON DRAIN BASE	22810-Z	1/31
L.	TYPICAL CONSTRUCTION FOR SUPPORTING C.I. WATER PIPES FOR VARIOUS SUBSURFACE CONDITIONS	24926-Y	1/49
M.	STANDARD SYMBOLS	26438-Z	10/85
N.	STANDARD METHODS FOR HYDRANT DRAINAGE	31050-Z	2/48
O.	EXCAVATIONS FOR WET CONNECTIONS	39674-Z	8/64
P.	SUPPORTS FOR WATER MAIN OVER PIPE CROSSING	40868-Z	1/67
Q.	SHALLOW CROSSING FOR WATER MAINS 24" DIAMETER AND SMALLER	42063-Y	3/77
R.	LOW PRESSURE HYDRANT BOX EXT. RISER	42997	11/84
S.	STD. LOW PRESSURE HYDRANT, TYPE D-2-LP	43142-Z	11/76

T.	STD. DOUBLE NOZZLE HYDRANT, TYPE S-2-LP	43250-Z	11/76
U.	MAT SUPPORT WITH PIPE LAID OVER SUBWAY OR ON EXTREMELY YIELDING GROUND FOR FLANGED & WELDED JOINT STEEL PIPE	43587-Y	1/78
V.	MAT SUPPORT WITH PIPE LAID OVER SUBWAY OR ON EXTREMELY YIELDING GROUND FOR CONCRETE OR DUCTILE IRON PIPE	43692-Y	1/78
W.	GRAVEL OR BROKEN STONE BEDDING AND FILTER FABRIC INSTALLATION FOR DUCTILE CAST IRON PIPES	44292-A-Z	11/85
X.	RODDING ALL SPECIAL CASTINGS, LEAD & MECHANICAL JOINTS ON LOW PRESSURE WATER SYSTEM (Supercedes 33672-Z & 43479-Z)	44387-Z-A	4/86
Y.	RODDING ALL SPECIAL CASTINGS, LEAD & MECHANICAL JOINTS ON INTERMED. PRESS. MAINS PUSH-ON JOINT PIPE	44564-Z	8/79
Z.	RODDING ALL SPECIAL CASTINGS, LEAD & MECHANICAL JOINTS ON HIGH PRESS. MAINS PUSH-ON JOINT PIPE	44565-Z	8/79
AA.	STANDARD STEEL HYDRANT FENDER	45161-Z	4/86
BB.	RETAINER GLAND INSTALLATION ON HIGH PRESSURE WATER MAINS	45688-Z	5/84

TYPICAL NOMENCLATURE

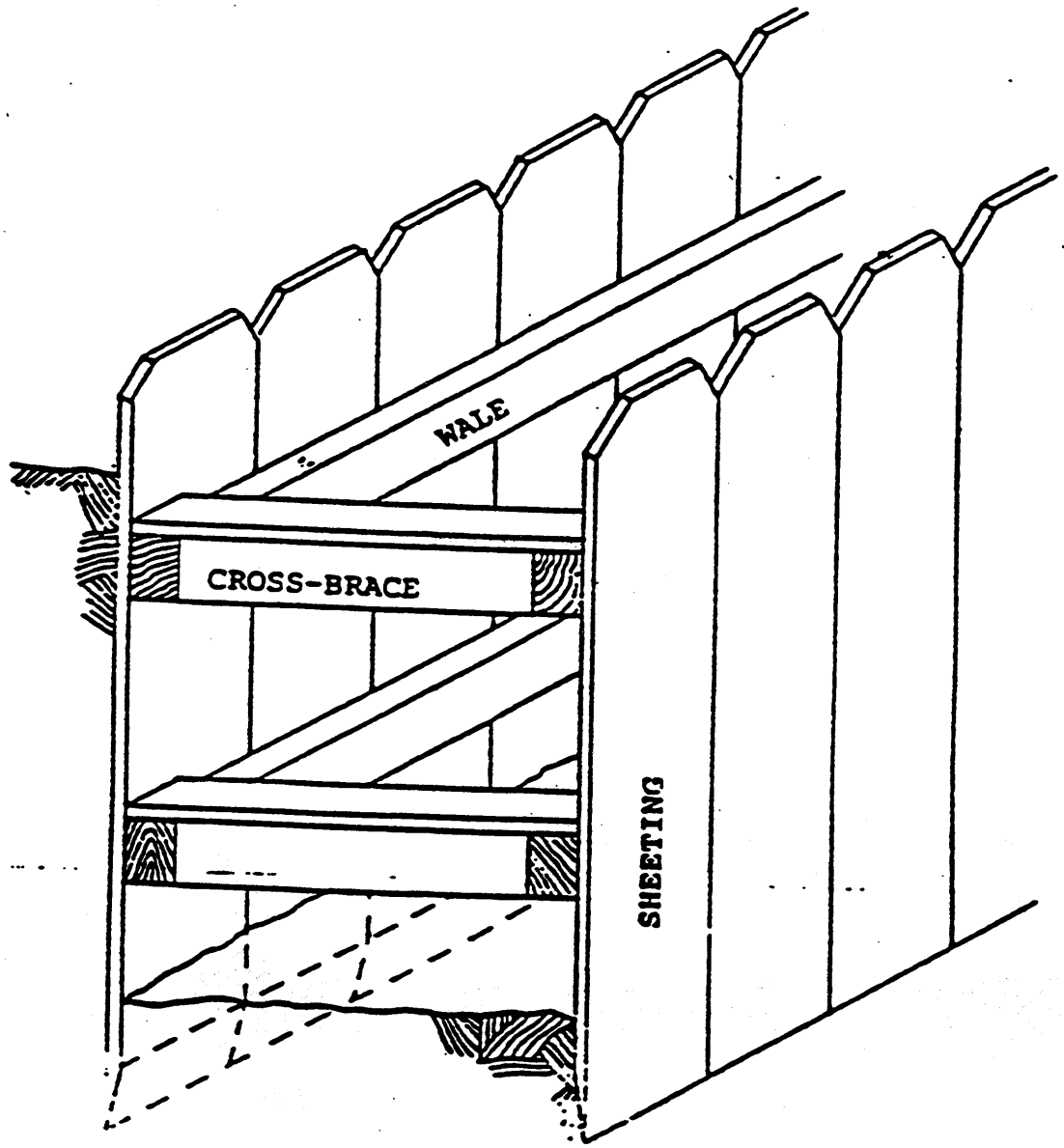
SKELETON SHEETING



Size and Spacing to be in accordance with the latest Code Requirements.

TYPICAL NOMENCLATURE

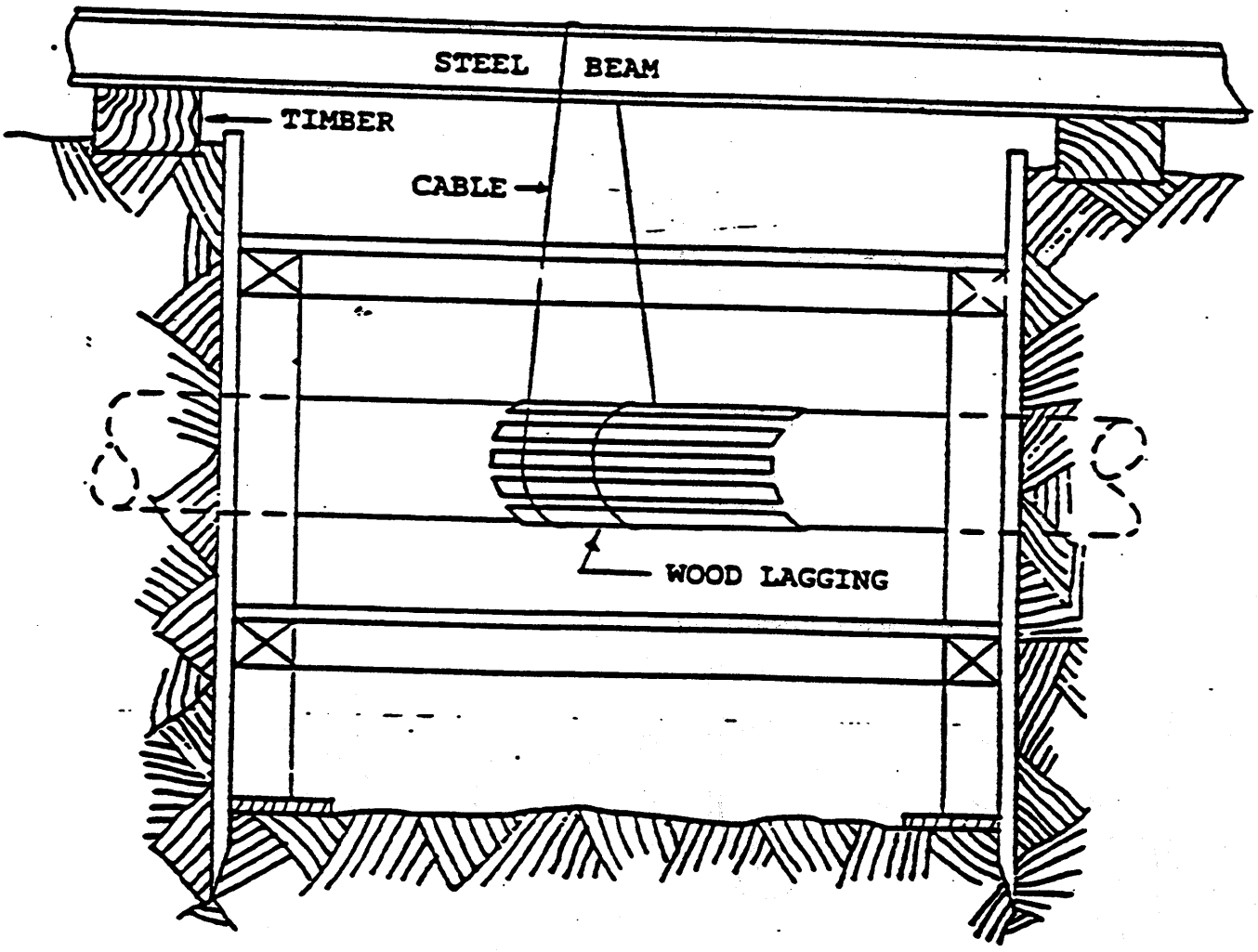
TIGHT SHEETING



Size to be in accordance with latest Code Requirements.

TYPICAL NOMENCLATURE

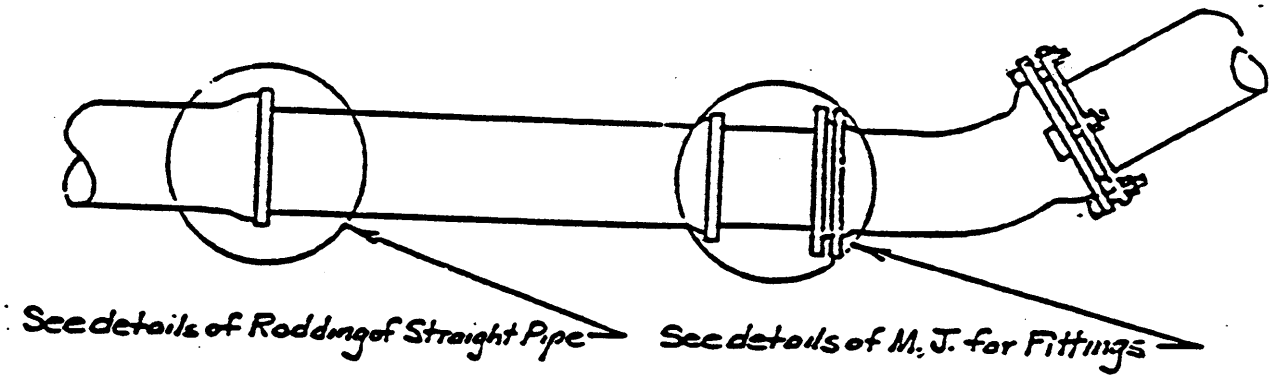
TYPICAL TEMPORARY SUPPORT OF WATER MAINS UP TO 20" DIAMETER



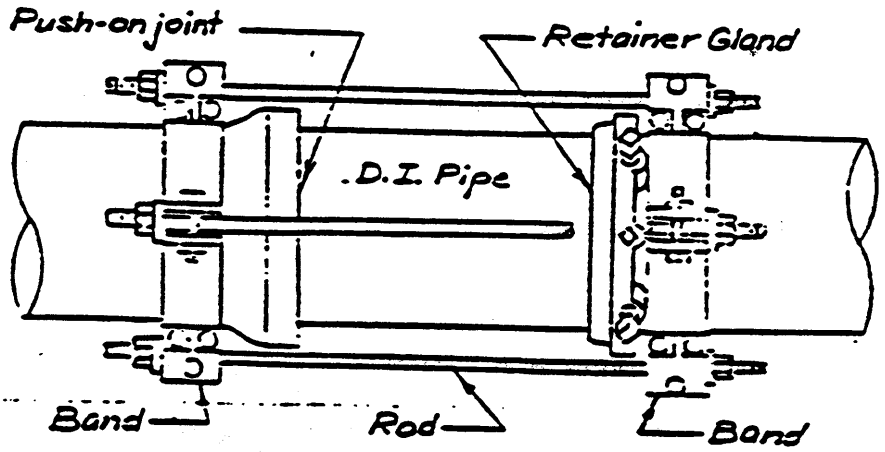
Beam, Cable Sizes and Spacing to be approved by Engineer

METHOD OF JOINT RESTRAINT-TYPICAL

RODDING

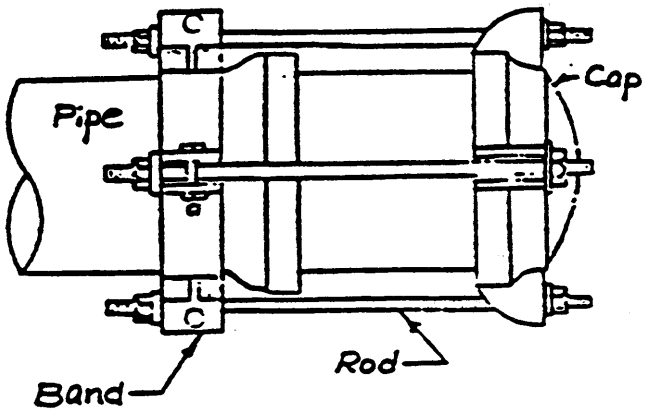


RODDING OF STRAIGHT PIPE

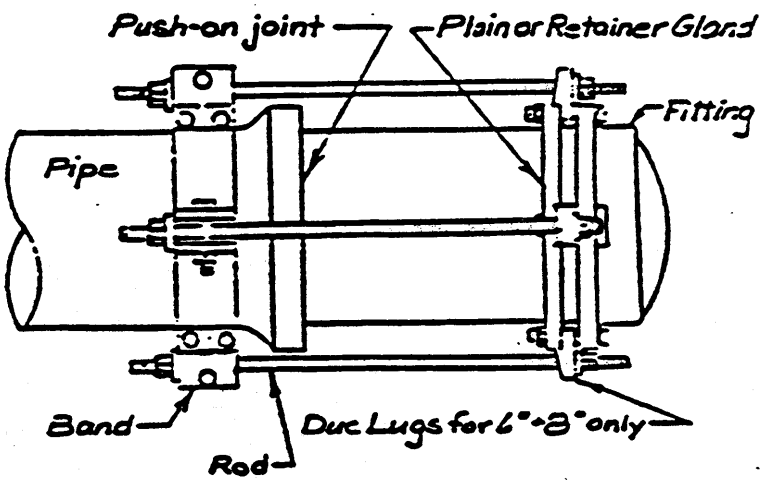


METHOD OF JOINT RESTRAINT-TYPICAL

RODDING LEAD JOINT FITTING

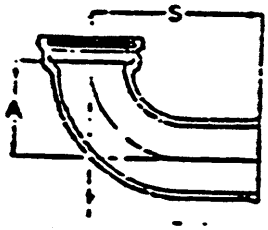


RODDING MECHANICAL JOINT FITTING USING DUC LUGS

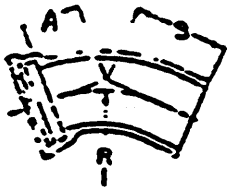


FITTINGS-LEAD JOINT-TYPICAL

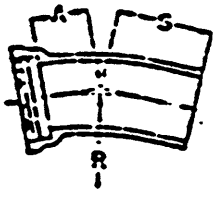
Bell and Spigot Read.
Lead Joint



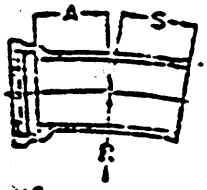
90° Bell & Spigot.



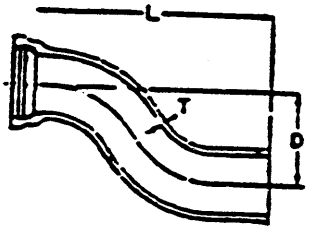
45° Bell & Spigot.



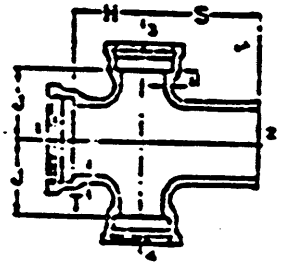
22½° Bell & Spigot



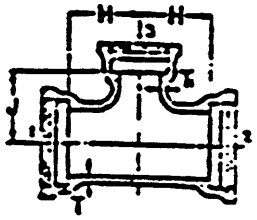
7½°. Bell & Spigot



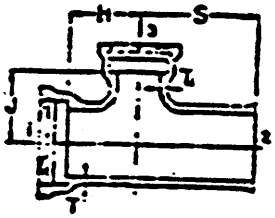
Bell and Spigot Offsets



Bell, Spigot, Bell & Bell.

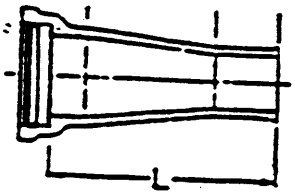


All Bell.

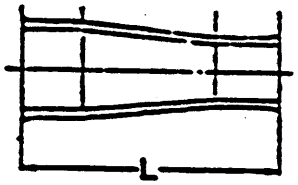


Bell, Spigot & Bell.

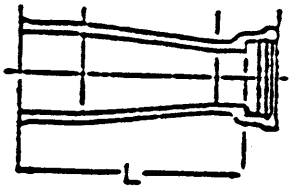
Bell and Spigot Reducers



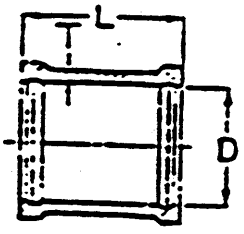
Large End Bell.



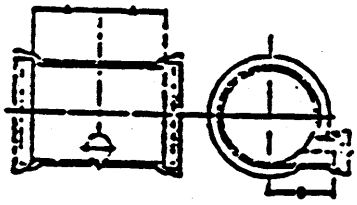
Spigot and Spigot.



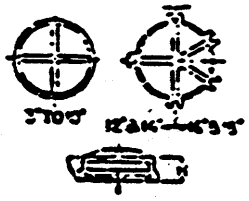
Small End Bell.



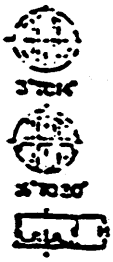
Solid Sleeve.

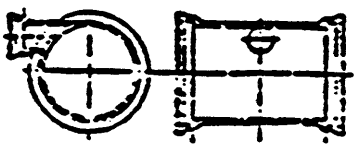

Blow-Off Branch.

CAPS


Stop

PLUGS

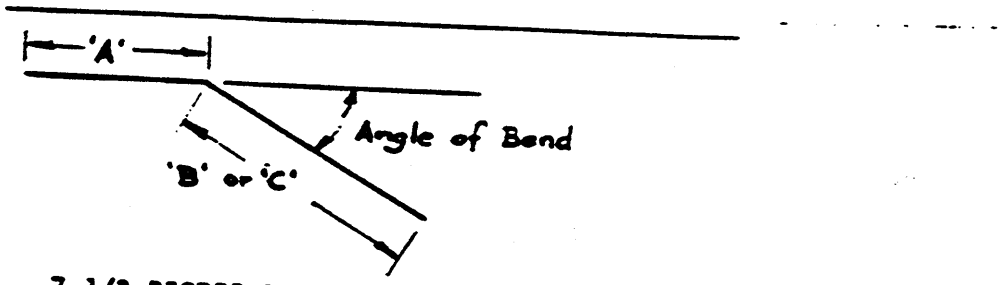

Square


Air-Cock

LEAD JOINT APPURTENANT DIMENSIONS

BENDS

NOTE: END MAY BE PLAIN ('B' DIMENSION) OR LUG ('C' DIMENSION).



7 1/2 DEGREE BEND

PIPE SIZE	'A'	'B'	'C'
6"	2"	15"	20"
8"	2"	15"	20"
12"	3"	15"	20"
20"	4"	17"	20"

45 DEGREE BEND

PIPE SIZE	'A'	'B'	'C'
6"	4"	16"	23"
8"	5"	17"	24"
12"	7"	---	26"
20"	10 1/2"	---	27 1/2"

22 1/2 DEGREE BEND

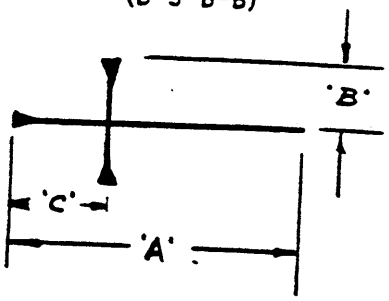
PIPE SIZE	'A'	'B'	'C'
6"	3"	15"	21"
8"	3"	15"	21"
12"	4 1/2"	16 1/2"	22 1/2"
20"	6"	---	24"

90 DEGREE BEND

PIPE SIZE	'A'	'B'	'C'
6"	14"	22"	31"
8"	16"	24"	33"
12"	18"	---	33"
20"	22"	---	37"

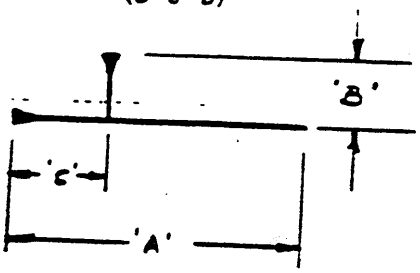
LEAD JOINT APPURTENANT DIMENSIONS

4-WAY (B-S-B-B)



'1'	'2'	'A'	'B'	'C'
8	6	36	12	12
8	8	36	12	12
12	6	40	13	13
12	8	40	13	13
12	12	40	13	13
16	6	44	15	15
16	8	44	15	15
16	12	44	15	15
16	16	44	15	15
20	6	39	17	13
20	8	39	17	13
20	12	39	17	13
20	16	47	17	17
20	20	47	17	17

3-WAY (B-S-B)



'1'	'2'	'A'	'B'	'C'
8	6	36	12	12
8	8	36	12	12
12	6	40	13	13
12	8	40	13	13
12	12	40	13	13
16	6	44	15	15
16	8	44	15	15
16	12	44	15	15
16	16	44	15	15
20	6	39	17	13
20	8	39	17	13
20	12	39	17	13
20	16	47	17	17
20	20	47	17	17

AIRCOCK

24	6	9	9	16
24	6	9	9	18

3-WAY (B-B-B)

8	6	9	9	9
12	6	12	12	12

LEAD JOINT APPURTENANT DIMENSIONS

REDUCERS

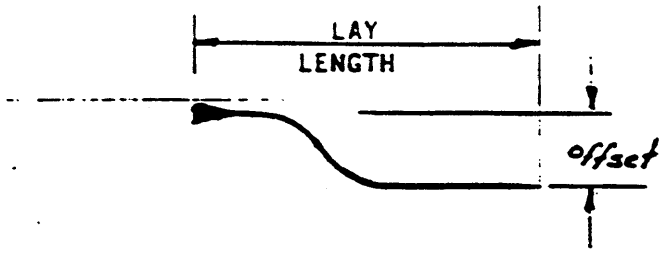
REDUCER			
8 X 6	20"	16"	16"
12 X 6	36"	32"	32"
12 X 8	28"	24"	24"
20 X 12	44"	40"	40"
20 X 16	28"	24"	24"
16 X 6	52"	48"	48"
16 X 8	44"	40"	40"
16 X 12	28"	24"	24"

VALVES & DOUBLE HUBS

PIPE SIZE	DOUBLE HUB	VALVES	HEIGHT *
6"	1"=0.1'	4 3/4"=0.4'	17.05"
8"	1"=0.1'	5 1/2"=0.44'	19.97"
12"	1"=0.1'	6 1/4"=0.52'	25.03"
16"	1"=0.1'	7 5/8"=0.64'	
20"	1"=0.1'	14 3/4"=1.23'	39.00"

* DISTANCE FROM TOP OF PIPE BARREL TO THE TOP OF THE OPERATING NUT.

OFFSETS



OFFSET	PLAIN			
	LAY LENGTH	C.L. LENGTH	LAY LENGTH	C.L. LENGTH
6 X 12	2.5'	2.9'	3.2'	3.6'
6 x 18	2.7'	3.6'	3.3'	4.2'
6 X 24	3.3'	4.0'	3.7'	4.4'
8 X 12	2.7'	3.0'	3.3'	3.7'
8 X 18	2.8'	3.6'	3.5'	4.3'
8 X 24	3.6'	4.0'	3.7'	4.1'
12 X 12	2.8'	3.2'	3.5'	3.9'
12 X 18	3.0'	3.7'	3.7'	4.4'
12 X 24	3.9'	4.5'	4.3'	4.9'
20 X 12	---	---	4.1'	4.4'
20 X 18	---	---	4.6'	5.1'
20 X 24	---	---	4.8'	5.6'

NOTE: FIRST NUMBER INDICATES PIPE SIZE IN INCHES. SECOND NUMBER SHOWS OFFSET FROM CENTERLINE IN INCHES.

LEAD JOINT APPURTENANT DIMENSIONS

RODDING

PIPE SIZE IN INCHES	LENGTH TO BE RODDED IN FEET					
	CAP	OUTLET END OF 3-WAY	BENDS			
			90	45	22 1/2	7 1/2
6"	12'	0'	---	---	---	---
8"	21'	0'	---	---	---	---
12"	30'	18'	18'	12'	---	---
16"	37'	24'	24'	12'	---	---
20"	45'	30'	30'	15'	12'	---

STANDARD DRAWINGS

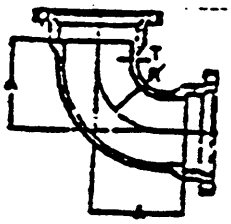
4 WAY	10232-Z	DOUBLE HUBS	24270-Z
3 WAY	10230-Z	REDUCERS	10222-A-Z
BENDS	10225-Z, 10226-Z 10227-Z, 10228-Z	RODDING	44387-Z-A
VALVES	10755-Z	OFFSETS	10229-Z

CONVERSION OF INCHES TO FEET

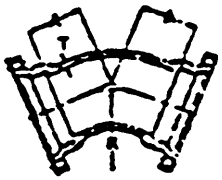
INCHES	= FEET	(Actual)	INCHES	= FEET	(Actual)
1"	= 0.1'	(0.0833)	7"	= 0.6'	(0.5833)
2"	= 0.2'	(0.1667)	8"	= 0.7'	(0.6667)
3"	= 0.3'	(0.2500)	9"	= 0.8'	(0.7500)
4"	= 0.3'	(0.3333)	10"	= 0.8'	(0.8333)
5"	= 0.4'	(0.4167)	11"	= 0.9'	(0.9167)
6"	= 0.5'	(0.5000)	12"	= 1.0'	(1.0000)

FITTINGS-MECHANICAL JOINT-TYPICAL

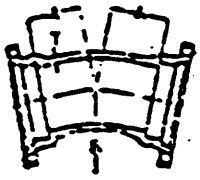
Mechanical Joint Bends



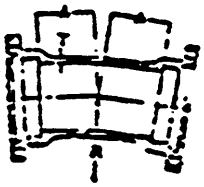
MJ-MJ
90° Bends



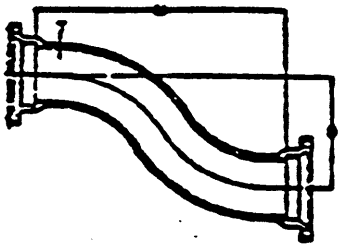
MJ-MJ
45° Bends



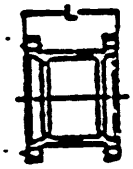
MJ-MJ
22½° Bends



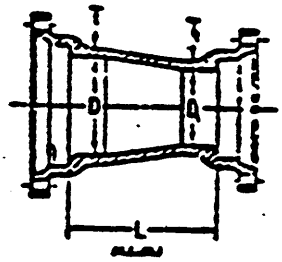
MJ-MJ
11¼° Bends



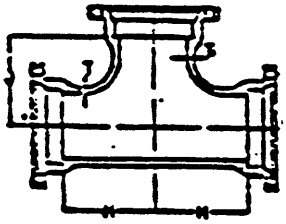
Mechanical Joint Offsets
MJ-MJ



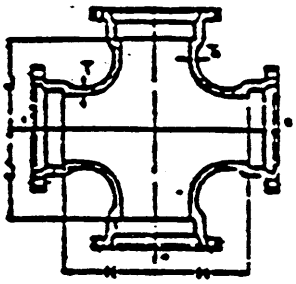
MJ Sleeve



Mechanical Joint Reducers

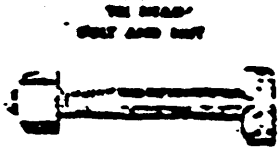


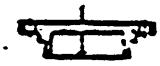
MJ
MJ-MJ
3-Way
SOLID GLAND



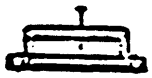
MJ-MJ-
MJ-MJ
4-Way

PLAIN
RUBBER
GASKET



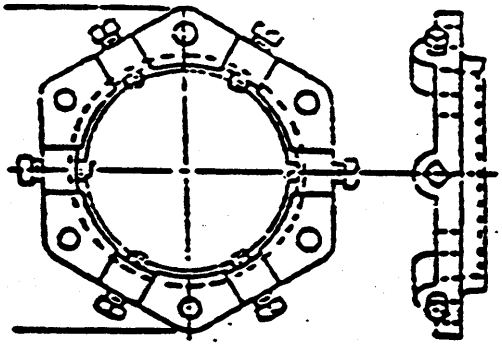


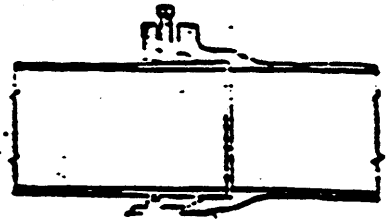
Plugs



Caps

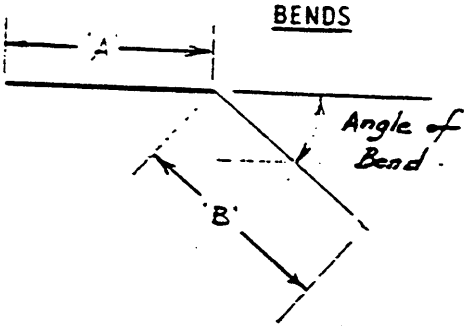
MECHANICAL JOINT RETAINER GLAND





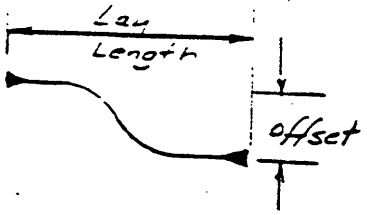
MECHANICAL JOINT APPURTENANT DIMENSIONS

BENDS



ANGLE DEGREES	PIPE SIZE	'A' DIM.	'B' DIM.
11 1/4	6"	5"	5"
	8"	5 1/2"	5 1/2"
	12"	7 1/2"	7 1/2"
	20"	9 1/2"	9 1/2"
22 1/2	6"	5"	5"
	8"	5 1/2"	5 1/2"
	12"	7 1/2"	7 1/2"
	20"	9 1/2"	9 1/2"
45	6"	5"	5"
	8"	5 1/2"	5 1/2"
	12"	7 1/2"	7 1/2"
	20"	9 1/2"	9 1/2"
90	6"	8"	8"
	8"	9"	9"
	12"	12"	12"
	20"	18"	18"

OFFSETS

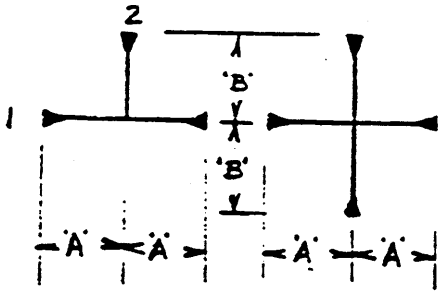


SIZE*	LAY LENGTH	LENGTH
6" X 6"	20"	
6" X 12"	26"	
6" X 18"	33"	
6" X 24"	33.8"	
8" X 6"	21"	
8" X 12"	28"	
8" X 18"	35"	
8" X 24"	33"	
12" X 6"	26"	
12" X 12"	37"	
12" X 18"	48"	
12" X 24"	49.7"	
20 X 6"		
20" X 12"		
20" X 18"		
20" X 24"		

NOTE: FIRST NUMBER INDICATES PIPE SIZE. SECOND NUMBER SHOWS OFFSET FROM CENTER LINE IN INCHES.

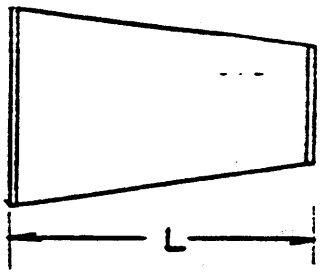
MECHANICAL JOINT APPURTENANT DIMENSIONS

3- AND 4-WAYS



'1'	'2'	'A'	'B'
8"	6"	9"	9"
8"	8"	9"	9"
12"	6"	12"	12"
12"	8"	12"	12"
12"	12"	12"	12"
20"	6"	14"	17"
20"	8"	14"	17"
20"	12"	14"	17"
20"	20"	18"	18"

REDUCERS



SIZE	LENGTH
8" X 6"	11"
12" X 6"	14"
12" X 8"	14"
16" X 6"	18"
16" X 8"	18"
16" X 12"	18"
20" X 12"	20"
20" X 12"	20"

VALVES & SLEEVES

SIZE	VALVE	SLEEVE	
		SM.	LONG
6"	5.25	7 1/2"	12"
8"	6.5	7 1/2"	12"
12"	7.0	7 1/2"	12"
20"	10.0	25"	20"

BOLTS & SCREWS

PIPE SIZE	BOLTS		SCREWS	
	NO.	LENGTH	NO.	LENGTH
6"	6	3 1/2"	6	2"
8"	6	4"	6	2"
12"	8	4"	16	2 1/2"
20"	14	4 1/2"		
24"	16	4 1/2"		

NOTE: BOLTS ARE 3/4" DIAMETER FOR PIPE. SET SCREWS ARE 5/8" DIAMETER FOR RETAINER GLANDS.

MECHANICAL JOINT FITTINGS

FITTINGS, RETAINER GLANDS, RUBBER GASKETS AND THE COUNT OF 3/4" T-BOLTS AND NUTS

FITTING	SIZE	RETAINER GLAND	RUBBER GASKETS	3/4" T-BOLTS AND NUTS
CAPS	6"	1	1	6-3 1/2"
	8"	1	1	6-4"
	12"	1	1	8-4"
	16"	1	1	12-4 1/2"
	20"	1	1	14-4 1/2"
	24"	1	1	16-5"
SLEEVES	6"	2	2	12-3 1/2"
	8"	2	2	12-4"
	12"	2	2	16-4"
	16"	2	2	24-4 1/2"
	20"	2	2	28-4 1/2"
	24"	2	2	32-5"
REDUCERS (B-B)	8" X 6"	1-8" + 1-6"	1-8" + 1-6"	6-3 1/2" + 6-4"
	12" X 6"	1-12" + 1-6"	1-12" + 1-6"	6-3 1/2" + 8-4"
	12" X 8"	1-12" + 1-8"	1-12" + 1-8"	14-4"
	16" X 6"	1-16" + 1-6"	1-16" + 1-6"	6-3 1/2" + 12-4 1/2"
	16" X 8"	1-16" + 1-8"	1-16" + 1-8"	6-4" + 12-4 1/2"
	16" X 12"	1-16" + 1-12"	1-16" + 1-12"	8-4" + 12-4 1/2"
	20" X 12"	1-20" + 1-12"	1-20" + 1-12"	8-4" + 14-4 1/2"
	20" X 16"	1-20" + 1-16"	1-20" + 1-16"	26-4 1/2"
	24" X 12"	1-24" + 1-12"	1-24" + 1-12"	8-4" + 16-5"
	24" X 16"	1-24" + 1-16"	1-24" + 1-16"	12-4 1/2" + 16-5"
	24" X 20"	1-24" + 1-20"	1-24" + 1-20"	14-4 1/2" + 16-5"
BENDS (B-B) 11 1/2 DEGREES	6"	2	2	12-3 1/2"
	8"	2	2	12-4"
	12"	2	2	16-4"
	16"	2	2	24-4 1/2"
	20"	2	2	28-4 1/2"
	24"	2	2	32-5"
22 1/2 DEGREES	6"	2	2	12-3 1/2"
	8"	2	2	12-4"
	12"	2	2	16-4"
	16"	2	2	24-4 1/2"
	20"	2	2	28-4 1/2"
	24"	2	2	32-5"

MECHANICAL JOINT FITTINGS

FITTINGS, RETAINER GLANDS, RUBBER GASKETS AND THE COUNT OF 3/4" T-BOLTS AND NUTS

FITTING	SIZE	RETAINER GLAND	RUBBER GASKETS	3/4" T-BOLTS AND NUTS
BENDS (B-B) 45 DEGREES	6"	2	2	12-3 1/2"
	8"	2	2	12-4"
	12"	2	2	16-4"
	16"	2	2	24-4 1/2"
	20"	2	2	28-4 1/2"
	24"	2	2	32-5"
90 DEGREES	6"	2	2	12-3 1/2"
	8"	2	2	12-4"
	12"	2	2	16-4"
	16"	2	2	24-4 1/2"
	20"	2	2	28-4 1/2"
	24"	2	2	32-5"
3-WAY (BBB)	6" X 6"	3-6"	3-6"	18-3 1/2"
	8" X 6"	2-8" + 1-6"	2-8" + 1-6"	6-3 1/2" + 12-4"
	8" X 8"	3-8"	3-8"	18-4"
	12" X 6"	2-12" + 1-6"	2-12" + 1-6"	6-3 1/2" + 16-4"
	12" X 8"	2-12" + 1-8"	2-12" + 1-8"	22-4"
	12" X 12"	3-12"	3-12"	24-4"
	16" X 6"	2-16" + 1-6"	2-16" + 1-6"	6-3 1/2" + 24 4 1/2"
	16" X 8"	2-16" + 1-8"	2-16" + 1-8"	6-4" + 24 4 1/2"
	16" X 12"	2-16" + 1-12"	2-16" + 1-12"	8-4" + 24-4 1/2"
	16" X 16"	3-16"	3-16"	36-4 1/2"
	20" X 6"	2-20" + 1-6"	2-20" + 1-6"	6-3 1/2" + 28-4 1/2"
	20" X 8"	2-20" + 1-8"	2-20" + 1-8"	6-4" + 28-4 1/2"
	20" X 12"	2-20" + 1-12"	2-20" + 1-12"	8-4" + 28-4 1/2"
	20" X 16"	2-20" + 1-16"	2-20" + 1-16"	40-4 1/2"
	20" X 20"	3-20"	3-20"	42-4 1/2"
	24" X 6"	2-24" + 1-6"	2-24" + 1-6"	6-3 1/2" + 32-5"
	24" X 8"	2-24" + 1-8"	2-24" + 1-8"	6-4" + 32-5"
	24" X 12"	2-24" + 1-12"	2-24" + 1-12"	8-4" + 32-5"
	24" X 16"	2-24" + 1-16"	2-24" + 1-16"	12-4 1/2" + 32-5"
	24" X 20"	2-24" + 1-20"	2-24" + 1-20"	14-4 1/2" + 32-5"
	24" X 24"	3-24"	3-24"	48-5"

MECHANICAL JOINT FITTINGS

FITTINGS, RETAINER GLANDS, RUBBER GASKETS AND THE COUNT OF 3/4" T-BOLTS AND NUTS

FITTING	SIZE	RETAINER GLAND	RUBBER GASKETS	3/4" T-BOLTS AND NUTS
4-WAY (BBBB)	8" X 6"	2-8" + 2-6" 4-8"	2-8" + 2-6" 4-8"	12-4" + 12-3 1/2" 24-4"
	8" X 8"			16-4" + 12-3 1/2"
	12" X 6"	2-12" + 2-6"	2-12" + 2-6"	16-4" + 12-4" 32-4"
	12" X 8"	2-12" + 2-8" 4-12"	2-12" + 2-8" 4-12"	24-4 1/2" + 12-4"
	12" X 12"			24-4 1/2" + 16-4" 48-4 1/2"
	16" X 8"	2-16" + 2-8"	2-16" + 2-8"	28-4 1/2" + 12-4"
	16" X 12"	2-16" + 2-12" 4-16"	2-16" + 2-12" 4-16"	28-4 1/2" + 16-4" 52-4 1/2" 56-4 1/2"
	16" X 16"			32-5" + 12-4"
	20" X 8"	2-20" + 2-8"	2-20" + 2-8"	32-5" + 16-4"
	20" X 12"	2-20" + 2-12"	2-20" + 2-12"	32-5" + 24-4 1/2"
	20" X 16"	2-20" + 2-16" 4-20"	2-20" + 2-16" 4-20"	32-5" + 28-4 1/2" 64-5"
	20" X 20"			
	24" X 8"	2-24" + 2-8"	2-24" + 2-8"	
	24" X 12"	2-24" + 2-12"	2-24" + 2-12"	
	24" X 16"	2-24" + 2-16"	2-24" + 2-16"	
	24" X 20"	2-24" + 2-20"	2-24" + 2-20"	
	24" X 24"	4-24"	4-24"	
OFFSETS (B-B)	NOTE: FIRST NUMBER INDICATES PIPE SIZE. SECOND NUMBER INDICATES OFFSET FROM CENTER.			
	6" X 12"	2	2	12-3 1/2"
	6" X 18"	2	2	12-3 1/2"
	6" X 24"	2	2	12-3 1/2"
	8" X 12"	2	2	12-4"
	8" X 18"	2	2	12-4"
	8" X 24"	2	2	12-4"
	12" X 12"	2	2	16-4"
	12" X 18"	2	2	16-4"
	12" X 24"	2	2	16-4"
	20" X 12"	2	2	28-4 1/2"
	20" X 18"	2	2	28-4 1/2"
	20" X 24"	2	2	28-4 1/2"
	24" X 12"	2	2	32-5"
	24" X 18"	2	2	32-5"
	24" X 24"	2	2	32-5"
VALVES	6"	2	2	12-3 1/2"
	8"	2	2	12-4"
	12"	2	2	16-4"
	20"	2	2	28-4 1/2"
HYDRANT	6"	1	1	6-3 1/2"

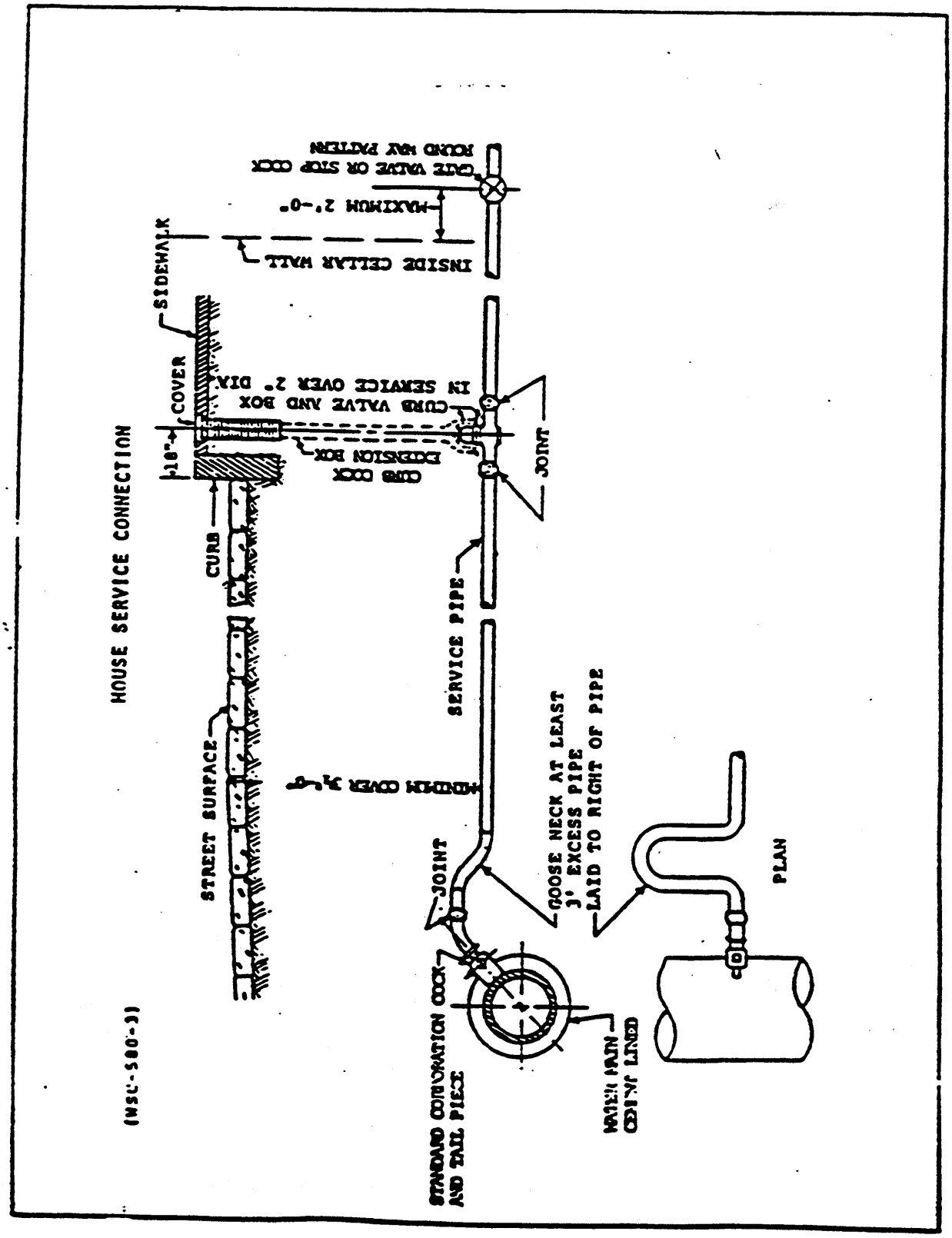
TITLE
Standard Drawings

METHOD OF CONNECTING SERVICE PIPE

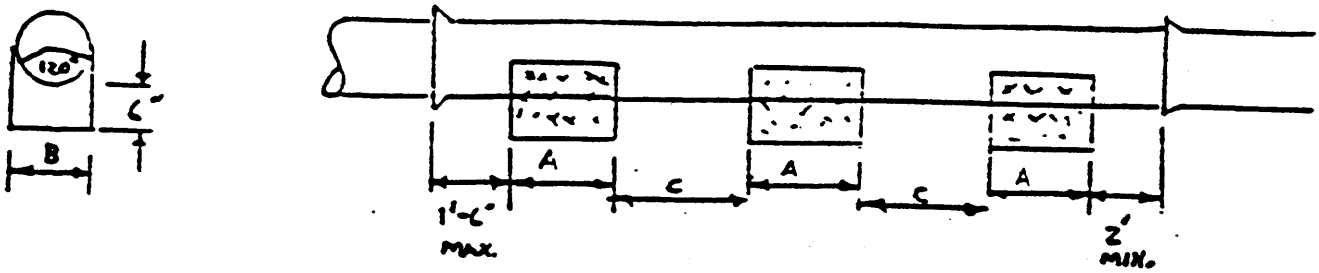
METHODS FOR CONNECTING SERVICE PIPE

(WSC-588-1)

METHOD OF CONNECTING HOUSE SERVICE CONNECTION



SIZE & SPACING OF CONCRETE CRADLES FOR PIPE LAID ON ROCK OR ON OTHER UNYIELDING GROUND



PIPE SIZE IN INCHES	'A'	'B'	'C'	NUMBER OF CRADLES 18 FOOT LENGTHS
6	8"	10"	3' - 4"	5
8	10"	1' - 0"	3' - 2"	5
12	1' - 6"	1' - 4"	4' - 6"	3
16	2' - 3"	1' - 7"	3' - 9"	3
20	2' - 8"	1' -11"	3' - 4"	3
24	2' -10"	2' - 3"	3' - 2"	3
30	3' - 0"	2' - 8"	3' - 6"	SEE
36	3' - 6"	3' - 2"	2' - 6"	SPECIFIC
48	9' - 0"	4' - 1"	3' - 0"	SPECIFICATIONS

REFERENCE DRAWING 24926-Y

MAIN STERILIZATION WITH CHLORINE COMPOUNDS

AMOUNTS REQUIRED FOR STERILIZING VARIOUS LENGTHS OF WATER MAINS BASED ON A DOSAGE OF 50 P.P.M.

PIPE SIZE IN INCH	25 PERCENT CHLORINE CHLORINATED LIME		
	LBS. PER 100 FT.	LENGTH PER OZ.	LENGTH PER LB.
4	0.114	53 FT.	848 FT.
6	0.256	24 FT.	384 FT.
8	0.453	13 FT.	208 FT.
10	0.710	9 FT.	144 FT.
12	1.023	6 FT.	96 FT.
16	1.818	3.7 FT.	59 FT.
20	2.840	2.2 FT.	35 FT.
24	4.090	1.5 FT.	24 FT.

PIPE SIZE IN INCH	65 PERCENT CHLORINE HIGH TEST HYPOCHLORITE		
	LBS. PER 100 FT	LENGTH PER OZ	LENGTH PER LB.
4	0.042	144 FT.	2304 FT.
6	0.094	64 FT.	1024 FT.
8	0.167	36 FT.	576 FT.
10	0.262	24 FT.	384 FT.
12	0.377	16 FT.	256 FT.
16	0.670	10 FT.	160 FT.
20	1.050	6 FT.	96 FT.
24	1.510	4 FT.	64 FT.

PIPE SIZE IN INCH	10 PERCENT CHLORINE LAUNDRY BLEACH		
	LBS. PER 100 FT.	LENGTH PER PT.	LENGTH PER QT.
4	0.013	769 FT.	1538 FT.
6	0.3	334 FT.	668 FT.
8	0.5	200 FT.	400 FT.
10	0.8	125 FT.	250 FT.
12	1.2	83 FT.	166 FT.
16	2.1	48 FT.	96 FT.
20	3.3	30 FT.	60 FT.
24	4.7	21 FT.	42 FT.

HYDRANT IDENTIFICATION

A THREE PART DESIGNATION HAS BEEN ADOPTED, IN THE FORM OF LETTER-NUMBER-LETTE TO IDENTIFY THE TYPE OF HYDRANT.

(A) INITIAL LETTER DENOTES MANUFACTURER, i.e.
- S = SMITH DIVISION OF U.S. PIPE
- D = DRESSER MANUFACTURING COMPANY

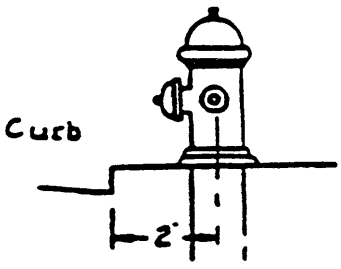
(B) NUMBER DENOTES TYPE OF BARREL AND NOZZLE SIZES, i.e.
- 1-6: SOLID BARREL, WITH 4 1/2 INCH AND 2 1/2 INCH NOZZLES, 6 INCH HUB.
- 2- BREAKAWAY BARREL, 6 INCH DIAMETER, WITH 4 1/2 INCH AND 2 1/2 INCH NOZZLES AND 6 INCH HUB.
- 3- BREAKAWAY BARREL, 8 INCH DIAMETER, WITH TWO 4 1/2 INCH NOZZLES AND 8 INCH HUB.

(C) END LETTERS DENOTE SYSTEM USE, i.e.
- LP = FOR LOW PRESSURE SYSTEM.
- HP = FOR HIGH PRESSURE SYSTEM AND SUPER PUMPER USE.

NOTE: WE WILL HAVE MOSTLY IN THE CITY:

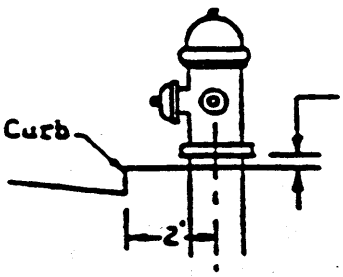
- S-1-LP = SMITH SOLID BARREL, 4 1/2" & 2 1/2" NOZZLES
- S-2-LP = SMITH BREAKAWAY, 4 1/2" & 2 1/2" NOZZLES
- D-2-LP = DRESSER BREAKAWAY, 4 1/2" & 2 1/2" NOZZLES
- S-3-HP = SMITH BREAKAWAY, TWO 4 1/2" NOZZLES
- D-3-HP = DRESSER BREAKAWAY, TWO 4 1/2" NOZZLES

SOLID BARREL

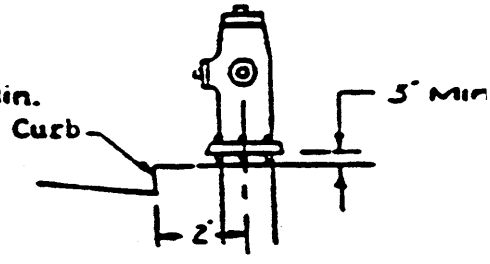


S-1-LP

BREAKAWAY BARREL

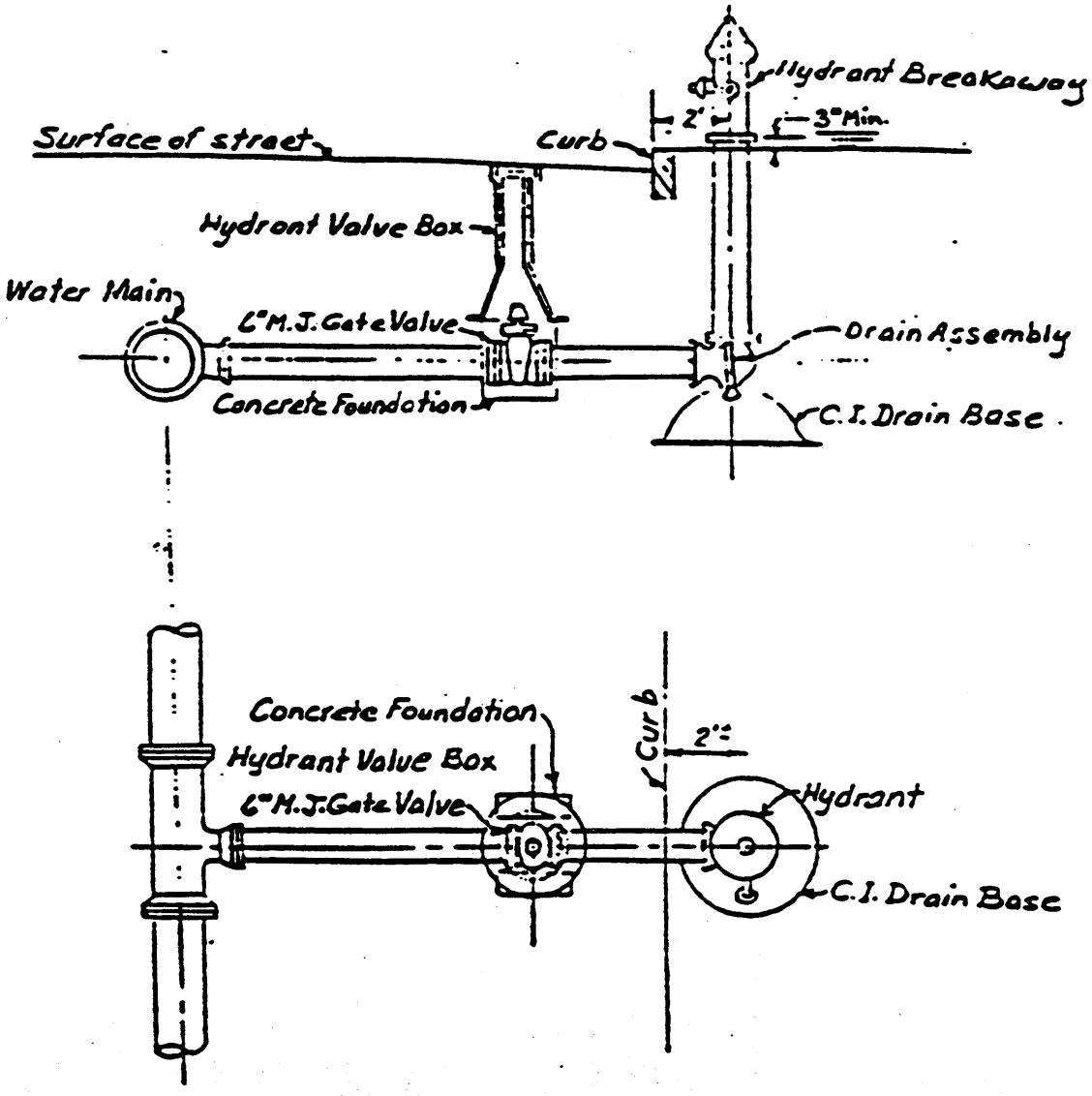


S-2-LP
S-3-HP



D-2-LP
D-3-HP

TYPICAL HYDRANT INSTALLATION



HYDRANT INSTALLATION
USING MECHANICAL JOINT FITTINGS WITH DUC LUGS