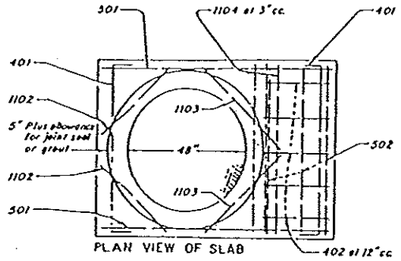
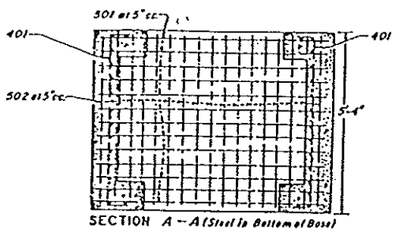
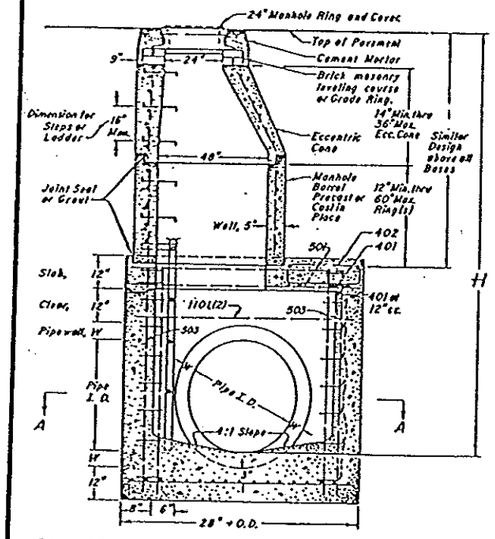


PLAN VIEW OF SLAB

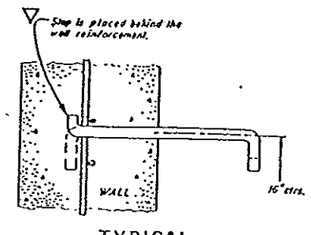


SECTION A – A (Steel in Bottom of Base)



CONCRETE MANHOLE AND BOX BASE

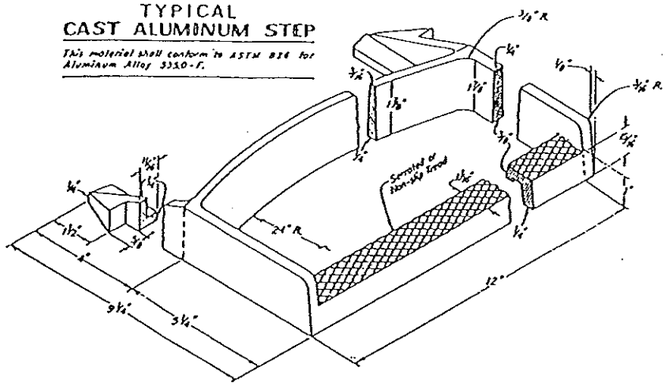
(Typical for Conduit 60" I.D. and Larger.)



TYPICAL STEP INSTALLATION FOR BAR STEPS

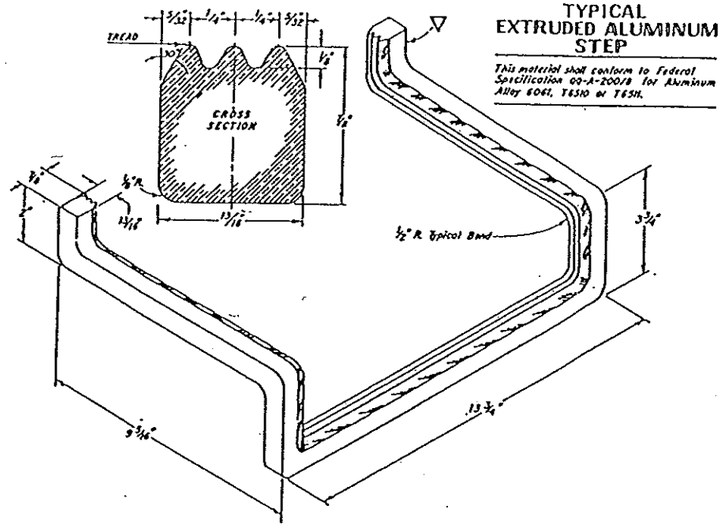
TYPICAL CAST ALUMINUM STEP

This material shall conform to ASTM B26 for Aluminum Alloy 355.0-F.



TYPICAL EXTRUDED ALUMINUM STEP

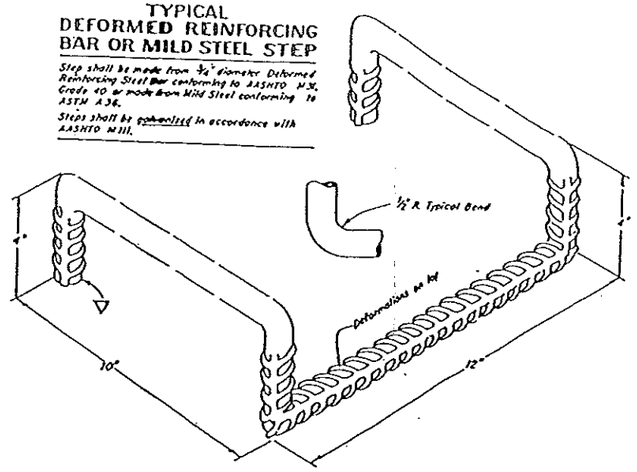
This material shall conform to Federal Specification QQ-A-200/8 for Aluminum Alloy 6061, T6510 or T6511.

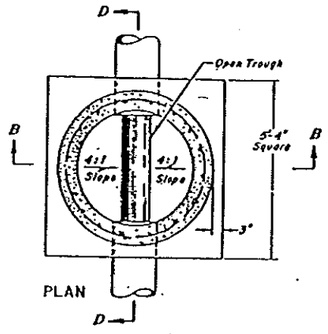


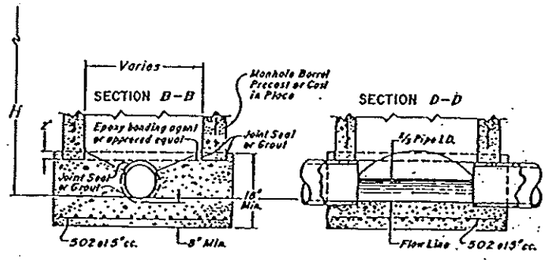
TYPICAL DEFORMED REINFORCING BAR OR MILD STEEL STEP

Step shall be made from 3/8" diameter Deformed Reinforcing Steel Bar conforming to AASHTO M 31, Grade 40 or made from Mild Steel conforming to ASTM A36.

Steps shall be galvanized in accordance with AASHTO M111.







CONCRETE SLAB BASE

(Typical for Conduit Smaller than 60" I.D.)

QUANTITIES FOR CONCRETE MANHOLE BOX BASE

MARK	SIZE	TYPE	Lb./Ft.	BARS	I.D. ⌀ 36"	48"	60"	72"	84"	96"
401	4	II	0.67	NO. REQ'D.	15	18	20	22	25	27
				LENGTH	6'-3"	6'-3"	6'-3"	6'-3"	6'-3"	6'-3"
				WEIGHT, lbs.	70.4	79.2	88.0	96.8	110.0	118.8
402	4	III	0.67	NO. REQ'D.	0	0	5	5	5	5
				LENGTH	0	0	4'-10"	7'-2"	8'-4"	9'-6"
				WEIGHT, lbs.	0	0	16.2	23.3	27.8	31.7
501	5	I	1.04	NO. REQ'D.	17	17	17	17	17	17
				LENGTH	5'-8"	6'-10"	8'-0"	9'-2"	10'-4"	11'-6"
				WEIGHT, lbs.	100.3	121.2	141.9	162.5	183.2	203.9
502	5	I	1.04	NO. REQ'D.	15	19	23	27	31	34
				LENGTH	5'-0"	5'-0"	5'-0"	5'-0"	5'-0"	5'-0"
				WEIGHT, lbs.	78.2	99.1	120.0	140.8	161.7	177.3
503	5	I	1.04	NO. REQ'D.	30	30	30	30	30	30
				LENGTH	4'-2"	5'-4"	6'-6"	7'-8"	8'-10"	10'-0"
				WEIGHT, lbs.	193.0	233.5	265.0	302.5	339.5	373.5
1101	H	I	5.31	NO. REQ'D.	4	4	4	4	4	4
				LENGTH	5'-8"	6'-10"	8'-0"	9'-2"	10'-4"	11'-6"
				WEIGHT, lbs.	120.3	145.2	170.0	195.8	219.6	244.4
1102	H	I	5.31	NO. REQ'D.	2	2	2	2	2	2
				LENGTH	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"
				WEIGHT, lbs.	26.6	26.6	26.6	26.6	26.6	26.6
1103	H	I	5.31	NO. REQ'D.	2	2	2	2	2	2
				LENGTH	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"
				WEIGHT, lbs.	37.2	37.2	37.2	37.2	37.2	37.2
1104	H	I	5.31	NO. REQ'D.	3	3	3	3	3	3
				LENGTH	5'-0"	5'-0"	5'-0"	5'-0"	5'-0"	5'-0"
				WEIGHT, lbs.	79.7	79.7	79.7	79.7	79.7	79.7
REINFORCING STEEL — Pounds — Total					706.1	833.9	949.1	1064.8	1185.3	1295.1
CONCRETE — Cubic Yards — Total					4.2	5.3	6.6	8.0	9.5	11.1

NOTE: Quantities are based on same size pipe entrance to and exit from base and a 4'll. manhole entrance into top slab of base.

FORMULAS

401 Number Bars Required = $\left(\frac{12 + I.D. + 2W}{6}\right) + 6$

402 Bar Length = I.D. + 2W

501 Bar Length = 24" + I.D. + 2W

502 Number Bars Req'd. = $\left(\frac{17 + I.D. + 2W}{5}\right) + \left(\frac{I.D. - 36}{12}\right) + 3$

503 Bar Length = 30" + I.D. + 2W

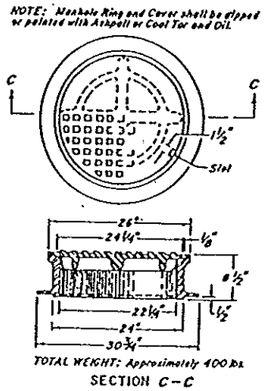
1101 Bar Length = 24" + I.D. + 2W

BENDING

TYPE I — Straight

TYPE II — 59", 10"

TYPE III — I.D. + 2W − 38"; 7"; 1'-12"; 1'-12"



TOTAL WEIGHT: Approximately 400 lbs.

SECTION C–C

NOTE: Manhole Ring and Cover shall be dipped or painted with Asphalt or Coal Tar and Oil.

MANHOLE RING AND COVER

GENERAL NOTES

All work shall be done in accordance with the Standard Specifications applicable to the project.

Since all pipe entries into the base are variable, the dimensions shown are typical. Actual dimensions and quantities for concrete and reinforcement shall be as required in the work.

Design is based on straight runs of conduit or change in direction under 45°.

All bars shall be a minimum 2" clear.

Precast Manholes shall conform to ASTM Designation C 478.

Cast in place Manholes shall be Class A or B concrete.

The following alternate materials for Manholes may be used when design details for construction are included in the plans:

MATERIAL	CONFORMANCE DESIGNATION
Clay or Shale Brick	AASHTO . . . M 91
Concrete Brick	ASTM . . . C 55, Grade P-I or P-II
Concrete Masonry Block	ASTM . . . C 139
Corrugated Steel Unit	AASHTO . . . M 36

All pipe entries into the base of Manhole shall be connected by open gutter adjusted for pipe size, shape, slope and direction of flow.

Alternate designs will be permitted after approval by the Division.

Steps or Ladder will be required when Manhole depth exceeds 5'-6".

REFERENCE: Colorado Department of Highways Standard M-604-E and M-604-DA

STORM DRAINAGE DESIGN AND TECHNICAL CRITERIA

STORM SEWER MANHOLE

STANDARD DETAIL SD-6