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LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

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I. GENERAL REQUIREMENTS FOR ALL ELECTRICAL WORK

The location of all conductors, conduits, junction boxes, ground boxes, electrical services and transformer stations is diagrammatic only and may be shifted by the Engineer to accommodate local conditions.

Materials shall be new and unused, and materials and installation shall comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards and be Underwriters Laboratories (UL) Listed. Faulty fabrication or poor workmanship in any material, equipment or installation shall be justification for rejection.

SUBMITTALS:

The contractor shall submit for approval no less than five (5) copies of catalog cut sheets on electrical services, ground boxes, including loading capicity certification, breakaway disconnects, heat shrink tubing and heat shrink filler tape, photocells, and, when required, verification of available fault current. Submittals shall be legible and shall be marked to indicate which product on a cut-sheet is to be supplied. Where manufacturers provide warranties and guarantees as a customary trade practice, Contractor shall furnish to the State such warranties or guarantees.

Grounding shall be as shown on the plans and in accordance with the NEC. Metallic conduit, lighting poles and luminaires on bridge structures shall be bonded to the system grounding conductor and to a ground rod in each ground box or junction box at the bridge ends, and in each ground box installed for underpass lighting. The grounding conductor shall be bare or, if insulated, shall be green. Ground rods, connectors, and bonding jumpers will not be paid for separately, but will be subsidiary to the various bid items.

II. CONDUIT

A. MATERIALS

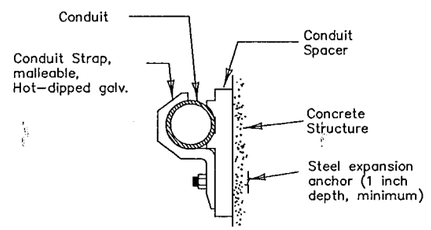
1. Conduit and fittings shall be UL Listed for the intended use shown on plan sheets.
2. Neither aluminum conduit, electrical metallic tubing (EMT), nor intermediate metal conduit (IMC) shall be permitted as a substitute for rigid metal conduit (RMC).
3. All exposed conduits shall be (RMC), unless otherwise specifically shown on the plans.
4. Fittings for RMC shall be steel or malleable iron, threaded, or threadless compression type, rain-tight, and shall be UL Listed for the intended use.
5. Expansion joints for metallic conduit shall be Appleton UNYL 50 Series, OZ/Gedney AX Series, or equal.
6. Junction box minimum sizes shall be in accordance with the following table which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, the conductors shall be counted as if all are of the larger size. Situations not applicable to the table shall be sized in accordance with NEC 370-28.

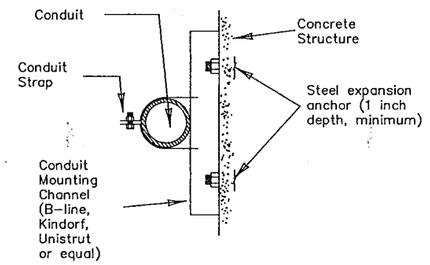
AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

7. RMC system junction boxes surface mounted and containing conductors #8 or larger, shall be hot dipped galvanized cast iron, or aluminum, minimum wall thickness shall be 3/16 inch, and shall have mounting lugs, (Crouse Type WAB, OZ/Gedney Type YS, Adalet Type 3R, or approved equal).
8. Junction boxes containing only #10 and #12 AWG conductors shall be Crouse Hinds Type GRFX, Appleton Type JBOX, two-gang FD, or similar approved cast iron. Boxes shall be sized according to NEC Table 370-16(a).
9. Junction boxes in EMT conduit systems shall be made from galvanized sheeting and shall be UL Listed as approved for outdoor use, unless otherwise noted on the plans. Sheet metal junction boxes shall be sized in accordance with the NEC.
10. Junction boxes in PVC conduit systems shall be PVC, UL Listed for outdoor use, unless otherwise noted on the plans.
11. Elbows in PVC conduit systems one inch and larger shall be rigid metal. Rigid metal elbows buried less than 18 inches underground shall be grounded. Elbows installed at ground boxes and foundations shall be extended with rigid metal conduit to the inside of the ground box or the top of the foundation. At that point a grounding bushing shall be installed.

B. CONSTRUCTION METHODS

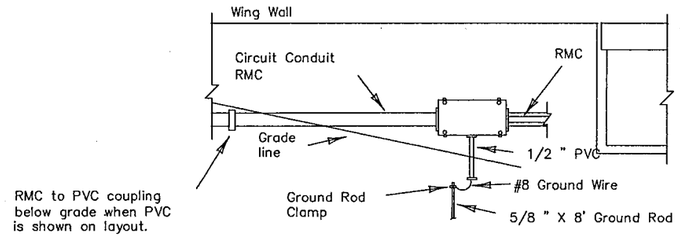
1. Conduit in structures shall have expansion fittings at structure expansion joints.
2. Conduit supports shall be spaced at maximum intervals of 5 feet. Conduit spacers shall be used with metal conduit placed on surfaces of concrete structures (See conduit mounting options).
3. Conduit supports shall not be attached directly to prestressed concrete beams except as shown specifically in the plans and approved by the Engineer.
4. Unless otherwise shown on the plans, conduit placed beneath existing roadways, driveways, or sidewalks, or after the base or surfacing operation has begun, shall be accomplished by jacking or boring. The Contractor shall back fill and compact the bore pits to the bottom of the conduit prior to installing connecting conduit or duct cable to prevent bending of the connection.
5. Conduit trenched in the subgrade of new roadways shall be back filled with excavated material, unless otherwise noted on the plans. Conduit trenched in the sub-base of new roadways shall be back filled with cement-stabilized base.
6. Open ends of all conduit and raceways shall be fitted with temporary caps or plugs to prevent entry of dirt, debris and rodents during construction. The temporary cap may be constructed of duct tape, but in all cases shall be tightly fixed to the conduit and shall be durable. The contractor shall clean out the conduit and prove it clear in accordance with Standard Specifications Item 618.3 prior to installing any conductors.
7. Conduit entry into the top of junction boxes and enclosures shall be made weathertight using threaded hubs.
8. A bonding jumper shall be installed from each grounding bushing to the nearest grounding rod, grounding lug, and/or system grounding conductor. At electrical services, grounding electrode conductor shall be #6 AWG. All other jumpers shall be the same size as supply conductors. Conduit used as casing under roadways for duct cable need not be grounded if duct extends full length through the casing.
9. Metal junction boxes shall be bonded to the grounding conductor in accordance with the NEC.
10. Conduits entering ground boxes shall be placed so that the conduit ends shall be not less that 5 inches nor more than 9 inches from the box cover (See ground box detail on sheet ED(2)).
11. Conduit ends shall be sealed with heat shrink boots with sealant, silicone caulking, urethane foam, or by other methods approved by the Engineer. Sealing shall be done after completion of any required pull tests. Duct tape shall not be used as a permanent conduit sealant.





CONDUIT MOUNTING OPTIONS

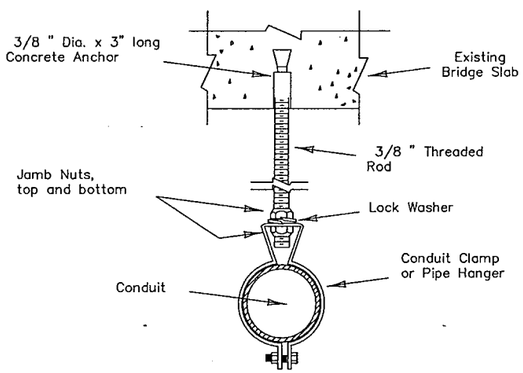
(Attachment to concrete surfaces)
(See para. II.B.2)



NOTES

1. Conduit shall be 2" RMC for duct cable entry to junction box.
2. Ground rod clamp to be Blackburn GG 5/8H, Weaver W5/8 or equal.
3. Surface mounting shown, for conduit to be placed in structure use flush-mounted box.
4. Bond junction box to grounding conductor.

TYPICAL CONDUIT ENTRY TO BRIDGE STRUCTURE DETAIL



CONDUIT HANGER DETAIL

(Attachment to horizontal surfaces)
(See para. II.B.2)

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

ELECTRICAL DETAILS-CONDUIT

ED(1)-98

©TxDOT January 1992	DN-KB	CK:-JM	DW-DN	CK:-KB	MEG NO.:
REVISIONS 5-93 10-93 4-98	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT		SHEET
	DALLAS	6	CM 97 (449)		74
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
	DALLAS		8050	18	034	BELT LINE

71A