

SECTION 26 10 00

ELECTRICAL BASIC MATERIALS & METHODS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. All work specified in this Section shall comply with the provisions of Section 26 01 00.
- B. This Section describes the basic electrical materials and installation methods that are acceptable and applicable to Division 26.

PART 2 - PRODUCTS

2.1 CONDUIT

- A. Galvanized rigid steel conduit shall be low carbon, hot-dipped galvanized both inside and out with threaded joints.
- B. Intermediate metal conduit (IMC) shall be steel, galvanized both inside and out with threaded joints.
- C. Electrical metallic tubing (EMT) shall be steel, galvanized both inside and out.
- D. Plastic conduit (PVC) shall be schedule 40 PVC heavy wall type. A grounding conductor shall be provided.
- E. Electrical non-metallic tubing (ENT) shall be of such material that it is resistant to moisture, chemical atmospheres and is flame retardant. A grounding electrode conductor shall be provided.
- F. Flexible metal conduit shall be flexible steel conduit tubing and shall meet Underwriters Laboratories Standard for Flexible Steel Conduit.
- G. Liquid-tight flexible metal conduit and liquid-tight non-metallic conduits shall be liquid-tight and sunlight resistant.
- H. Steel conduit approved manufacturers are Allied, Triangle and Republic.
- I. PVC and ENT conduit approved manufacturers are Carlon and Triangle.

2.2 CONDUIT FITTINGS

- A. Rigid conduit and IMC conduit fittings shall be zinc-coated, ferrous metal and taper threaded type.
- B. EMT fittings shall be zinc-coated steel and hexnut compression or set-screw type. EMT connectors shall have insulated throats.
- C. PVC fittings, elbows and cement shall be produced by the same manufacturer. All joints shall be solvent welded in accordance with the manufacturer's recommendations.
- D. Conduit connections to switchboards, motor control centers, transformers, panel cabinets, and pull boxes shall have grounding wedge lugs between the bushing and the box or locknuts designed to bite into the metal.
- E. Each conduit end shall be provided with either an insulated throat connector or separate locknut and insulated bushing. Bushing shall be installed before any wire is pulled.
- F. Conduit fittings approved manufacturers are Raco, Steel City, O.Z. Gedney, Thomas & Betts and Appleton.
- G. Expansion fittings shall be provided in all conduit which crosses and expansion joint.

2.3 CONDUCTORS

- A. Conductors shall be copper of 98% conductivity, 600 volt insulation. Sizes specified are AWG gauge for No. 4/0 and smaller and circular mils (MCM) for all sizes larger than no. 4/0. Conductors No. 10 and smaller shall be solid and type "THHN" or "THWN" insulation. No. 8 and larger shall be stranded and type "THW" or "XHHW" insulation.
- B. Aluminum conductors may be used for service lateral conductor if the same or larger capacity of the conductors specified. Aluminum conductors shall be Alcan 8000 series, Stabiloy or approved equal.

2.4 OUTLETS

- A. Outlet boxes and covers shall be of such form and dimensions as to be adapted to their specified usage, locations, size and quantity of conduit, and size and

quantity of conductors entering the boxes. In special "Fire Rated" partitions, outlets shall comply with ASTM No. E119.

- B. Flush ceiling outlets for surface or pendant mounted lighting fixtures shall be one-piece 4" square or octagonal pressed steel boxes. Boxes for devices in unfinished masonry walls or stud walls shall be pressed steel, square corner, sectional switch boxes, or shall be 4" square box with a square cornered tile wall cover, set flush with masonry construction. Boxes in concrete ceiling slab shall be octagonal, shallow concrete boxes. Welded boxes are not acceptable.
- C. All outlet boxes in plaster or masonry walls or ceiling shall be provided with plaster rings.
- D. Junction boxes and all outlets not indicated as containing wiring devices or lighting fixtures shall have covers. Covers for outlets in walls shall be as specified for wall switches and receptacles.
- E. Outlet boxes exposed to the weather and outlet boxes for vaportight lighting fixtures and devices shall be of cast iron corrosion resistant type.
- F. Outlet box approved manufacturers are Appleton, Racor, Steel City, or Crouse-Hinds.

2.5 DISCONNECT SWITCHES

- A. Disconnect switches shall be "heavy-duty" type, enclosed switches of quick-make, quick-break construction. Switches shall be horsepower rated for 600 volts AC as required. Lugs shall be UL listed for copper and aluminum.
- B. Padlocking provisions shall be provided for padlocking in the OFF position.
- C. Switches shall be furnished in NEMA 1 General purpose enclosure unless noted otherwise. Switches located on the exterior of the building or in "wet" locations shall have NEMA 3R enclosures.
- D. Fused disconnect switches shall have rejection type fuse clips with dual element, current limiting fuses of rating shown.
- E. Disconnect switches shall be mounted to structure. Disconnect switches shall not be mounted to mechanical equipment or ductwork.

2.6 NAMEPLATES

- A. Nameplates shall have 3/8" high engraved letters.
- B. 120 or 208 volts: white core laminated bakelite with black finish.
- C. 277 or 480 or higher volts: white core laminated bakelite with red finish.
- D. Nameplate shall indicate the panel name and the name of the device or equipment where the power supply/feeder originates.

2.7 WALL SWITCHES

- A. Wall switches shall be plastic, totally enclosed, quiet type, self-grounding, 277 volts and 20A rating and shall match existing if possible and equal the following (or equal by Leviton, P&S, or Cooper):
 - 1. Single Pole: Hubbell No. CS1221
 - 2. Double Pole: Hubbell No. CS1222
 - 3. Three-Way: Hubbell No. CS1223
 - 4. Four-Way: Hubbell No. CS1224
- B. Color shall be as selected by architect.
- C. Flush motor switches with red pilot light and with overload protection for fractional horsepower motors shall be Hubbell No. HBL1221PL.
- D. Key switches shall be Hubbell No. HBL1221L 20A Series or approved equal by P&S or Leviton.

2.8 WALL MOUNTED OCCUPANCY SWITCHES

- A. The passive infrared sensor shall be a completely self-contained control system that replaces a standard toggle switch. Sensor shall have ground wire for safety. Switching mechanism shall be a latching air gap relay, compatible with electronic ballasts, compact fluorescent and inductive loads. Triac and other harmonic generating devices shall not be allowed.
- B. Sensor shall cover up to 1000 sq. ft. for walking motion, with a field of view of 180 degrees.
- C. Sensor shall have system which provides superior 180 degree coverage.
- D. Sensor shall operate at 120 VAC or 277 VAC.

- E. Sensor shall have no minimum load requirement and shall be capable of switching from 0 to 500 watt incandescent; 0 to 800 watts fluorescent or 1/6 hp @ 120 VAC, 60 Hz; and 0 to 1200 watts fluorescent or 1/3 hp @ 277 VAC, 60 Hz.
- F. For accuracy and consistency, sensor shall have a DIP switch controlled, digital time delay adjustable from 15 seconds to 30 minutes.
- G. Sensor shall have standard 5 year warranty and shall be UL and CUL listed.
- H. Sensor shall be Wattstopper WI Series, Leviton Decora Series, or approved equal by engineer.

2.9 RECEPTACLES

- A. Duplex receptacles shall be plastic, two-pole, three wire, self-grounding, side wired, 125 volts and 15A rating and shall match existing if possible and be equal to the following (or equal by Leviton, P&S, or Cooper):
 - 1. Standard receptacle: Hubbell No. 5362 Series
 - 2. Tamper resistant type: Hubbell No. CR20*TR Series
 - 3. Isolated ground type: Hubbell No. CR5352IG Series
 - 4. Hospital grade (HG) type: Hubbell No. HBL8300 Series
 - 5. HG Tamper resistant type: Hubbell No. HBL8300SG Series
 - 6. GFCI: Hubbell No. GF20*LA Series
 - 7. GFCI HG: Hubbell No. GFR8300H*LA
 - 8. GFCI HG tamper resistant: Hubbell No. GFR8300H*TR
- B. Single receptacles shall be two-pole, three wire, self-grounding, side wired, 125 volts and 20A rating and shall be equal to the following (or equal by Leviton, P&S, or Cooper):
 - 1. Standard receptacle: Hubbell No. HBL5361 Series
 - 2. Isolated ground type: Hubbell No. IG5361 Series
- C. Color shall be as selected by the Architect.
- D. Receptacles in all patient care areas shall be hospital grade type per NEC article 517.18.
- E. Receptacles in all pediatric care areas shall be tamper resistant type per NEC article 517.18(C).

2.10 COVERPLATES

- A. Coverplates for flush mounted devices shall be brushed finished stainless steel standard size, Hubbell "P" Series or equal by Leviton, P&S, or Cooper.
- B. Telephone and data outlet coverplates shall have same finish as above.
- C. Coverplates for exterior devices shall be self-closing, die-cast aluminum Hubbell WP8M or equal by Leviton, P&S, or Cooper.

2.11 PLYWOOD BACKBOARDS

- A. Provide plywood backboards where shown. Backboards shall be minimum 3/4" thick and sized as shown or to accommodate equipment indicated to be mounted thereon.
- B. Secure plywood to the building structure and paint with two coats of gray paint.

2.12 SMOKE AND FIRE STOP FITTINGS

- A. Smoke and Fire Stop Fittings shall be UL listed for that purpose. The fittings used to seal conduit either on the outside of the conduit, busway or cable or internally shall have heat activated intumescent material, which expands to fill all voids. Smoke and fire stop fittings shall be O.Z./Gedney "FIRE-SEAL" or Dow Corning silicone RTV foam with an hourly fire-rating equal to or higher than the rating of the floor, ceiling or wall through which the cable or conduit passes. The seals for conduit shall be of the flanged type.

2.13 FLOOR OUTLETS

- A. Floor outlets shall be single gang floor boxes, Hubbell B2436 Series, complete with cast iron body, vertical angular adjustment, brushed brass frame, brushed brass floor plate and gasket. Larger than standard tapings shall be furnished where required. Adjacent boxes shall be installed on minimum 7" centers.
- B. Duplex floor receptacle outlets shall have Hubbell No. S3825 floor plate, a No. SB3083 carpet plate where installed in carpeted floor and a Hubbell CR5262 Series duplex receptacle. Single floor receptacle outlets shall have a S2625 plate and Hubbell single receptacle. Equal manufacturers shall be Leviton, P&S, or Cooper.

2.14 FUSES

- A. Provide all fuses. All fuses shall be of the same manufacturer. All fuses shall be of the high interrupting rating (200,000 Amps), current limiting type and manufactured by Bussmann. Fuses shall be provided for each fuse cutout and the specified quantity of fuses shall be furnished for spares.
- B. Circuits 0 to 600 ampere shall be protected by rejection type, current limiting BUSSMANN LOWPEAK Dual Element Fuses LPN-RK (250 volts) or LPS-RK (600 volts). All dual-element fuses shall have separate overload and short-circuit clearing chamber. The fuse must hold 500% of rated current for a minimum of 10 seconds and be listed by Underwriter's Laboratories, Inc., with an interrupting rating of 200,000 amperes RMS symmetrical. The fuses shall be UL Class RK-1.
- C. Circuits 601 to 6000 ampere shall be protected by current limiting BUSSMANN HI-CAP Time-Delay Fuses KRP-C. Fuses shall employ "O" rings as positive seals between the end bells and the glass melamine fuse barrel. The terminals shall be opened. Fuses shall be time-delay and must hold 500% of rated current for a minimum of 4 seconds, clear 20 times rated current in 0.1 seconds or less and be listed by Underwriter's Laboratories, Inc., with an interrupting rating of 200,000 amperes RMS symmetrical. The fuses shall be UL Class L.
- D. Furnish and turn over to the Owner a minimum of one (1) set of spare fuses (set consisting of three fuses) for each type and rating of fuse used. When the number of fuse sets of the same type and rating actually installed exceeds five (5) sets, furnish an additional spare set of fuses for each five (5) or fraction thereof.
- E. Provide a cabinet in which to store all spare fuses, Bussmann Catalog No. SFC
- F. Acceptable manufacturers are Bussmann or equal by Littelfuse.

PART 3 - EXECUTION

3.1 CONDUIT

- A. Rigid steel (or IMC) shall be used for service entrance and all feeders and branch circuits where exposed to damage.
- B. EMT shall be used for branch circuits, fire alarm and telephone when not underground or in concrete in contact with the earth.
- C. Schedule 40 PVC may be used for all underground feeders, service entrance

conductors when encased in 4" of concrete on all sides, or under the lowest floor slab.

ENT may be used for branch circuits in concealed areas which is not used as an environmental air plenum.

- D. Conduit shall be continuous from outlet to outlet, from outlet to cabinet, junction box and pull box. Conduit shall enter and be secured to all boxes, etc., in such a manner that each system will be electrically continuous from service to all outlets such that a good ground is provided. All conduit from cabinets and junction boxes shall terminate in approved outlet boxes or conduit fittings. Conduit connections to any box which has no threaded hub shall be double locknuttetted.
- E. Provide junction boxes or pull boxes where shown and where necessary to avoid excessive runs or too many bends between outlets. The conduit sizes shown may increase if desired to facilitate the pulling of cables.
- F. All conduit shall be concealed unless indicated otherwise. Install exposed conduit parallel with or at right angles to the building walls and support from walls or ceilings at intervals required by Code with approved galvanized iron clamps or hangers. Concealed conduit above the ceiling shall be supported independent of ceiling construction. Where ceilings of lay-in type are used, conduit must be installed high enough to permit removal of ceiling panels and lighting fixtures. Use threaded rods and hangers for supporting single conduit. Use trapeze hangers consisting of double-nuttetted threaded rods and "Unistrut" channels or angles of 12 gauge minimum steel for supporting multiple conduit.
- G. Minimum size conduit for branch circuits shall not be smaller than 1/2". Home runs shall extend from outlets shown to panel designated. Home runs shown shall not be combined. Home run conduit shall not be smaller than 3/4".
- H. At couplings, conduit ends shall be threaded so that they meet in the coupling. Right and left hand couplings shall not be used; conduit couplings of the Erikson Type shall be used at locations requiring such joints.
- I. All conduit for future use, for telephone wire, or for data communication cable, shall be left with No. 16 gauge wire pulled in them or a pull line as manufactured by Ideal, and the ends securely corked or capped.
- J. Expansion fittings shall be installed in all conduit which pass through the cross-sectional area of expansion joints.

- K. Provide non-hardening elastic type duct seal compound, Neer No. DC., 3M Co. "Scotchfil", or Gardner Bender duct seal, for each conduit entering the building from outside and for each conduit passing from one space into another which is normally at a lower temperature.
- L. Provide watertight conduit hubs on conduit terminating in a box or cabinet exposed to the weather.
- M. Space in sleeves or around conduit that pass through fire resistive or fire rated walls, partitions, floors or ceilings shall be closed by packing with an unlabelled fire resistive material that will maintain the rating of the barrier penetrated.

3.2 FLEXIBLE CONDUIT

- A. PVC extruded cover flexible conduit shall be used in making short flexible connections to rotating or vibrating machinery or equipment. The flexible conduit at these locations shall be as short as possible, but shall have a minimum length of 12".
- B. A green stranded bonding jumper shall be installed outside of all flexible conduit that extends directly from a non-flex conduit to a rotating or vibrating machine. Where a junction box is used, the green stranded bonding jumper shall be installed inside the flexible conduit and attached to the junction box and to the machine. When the bonding jumper is installed outside of the flexible conduit, plastic wire straps shall be used 6" o.c. to secure the jumper to the flexible conduit.
- C. Flexible metal (MC) conduit system may be utilized where concealed in walls and/or millwork only. MC Cable shall run from point of exit from wall or millwork to nearest structurally supported junction box. MC cable will not be permitted to be installed in the above ceiling space and shall not pass through a fire rated partition. Conductor colors of the MC cable shall comply with 26 10 00 3.4 D.
 - 1. MC cable shall be constructed to have an insulated, copper ground conductor. Sheathing with a bare aluminum conductor shall not be used as the ground.
 - 2. MC cable in patient care areas shall be hospital grade (HCF) to comply with NEC 517.13.

3.3 CONDUIT PROTECTION

- A. All conduit installed in the ground outside the building exterior line (with the exception of exterior lighting circuits) shall be encased in 4" of concrete on all sides. Concrete shall be a minimum of 3000 P.S.I. mix. All threaded joints in rigid conduit that is encased in concrete shall have a U.L. listed joint compound applied. All conduit installed outside the building underground shall be buried a minimum of 30" below finished grade but in no case shall be buried deeper than 48". Where conduit is installed below the ground floor slab inside the building exterior line, the conduit shall be run between the floor slab and the vapor barrier. These conduits shall be installed in the slab itself where feasible. When a conduit duct bank must be installed then the entire duct bank shall be encased in concrete and installed per Appendix B of the NEC. Derating of conductors in the underslab duct bank shall be the responsibility of the contractor. Conduit installed in any slab, where permitted above, shall be above the bottom steel and below the top steel.
- B. Conduit shall be secured in place and protected where necessary to prevent damage to work during construction. The ends of all conduit shall be plugged to avoid filling with any foreign matter. All conduit shall be blown out and swabbed clear of water and trash prior to pulling wire.
- C. Provide identifying marker tape the entire length of each conduit installed in the ground outside the building. The tape shall be constructed of inert polyethylene, resistant to acids, alkalis, etc., in the soil, and shall be a minimum 4 mil thickness. The tape shall be yellow, 6" wide, and shall have the words, "CAUTION - ELECTRIC LINE BURIED BELOW," imprinted with contrasting permanent ink. The imprint shall repeat itself for the entire length of the tape. The tape shall be buried at a maximum of 18" below finished grade, above a portion of the earth fill shall be "Terra Tape" as manufactured by Reef Industries, Inc., P.O. Box 33248, Houston, Texas 77033 (1-800-231-6074).

3.4 WIRING

- A. All conductors shall be installed in conduit. No conductors shall be pulled into the conduit until the conduit system is complete and plaster had dried. Wire pulling lubricants shall be Gardner-Bender "Wireaide" or Ideal "Yellow 77".
- B. Conductors shall be continuous from outlet to outlet and from outlet to junction box or pull box. All splices and joints shall be carefully and securely made to be mechanically and electrically solid with pressure type connectors, Gardner Bender "Winggard" or Ideal "Wingnut". Tape shall be "Scotch" No. 33 for indoor and No. 88 for outdoor or Gardner Bender No. 95-661. Where

connection is made to any terminals of more than 30 amperes capacity and where conductors larger than No. 10 are connected to any terminal, copper terminal lugs shall be bolted to the conductors. Where multiple connections are made to the same terminal, individual lugs for each conductor shall be used. Aluminum conductors, if used for service conductors, shall be made with high compression lugs as manufactured by Square D, Ideal or MAC.

- C. Each conduit shall have a minimum of two (2) conductors pulled in unless that particular conduit is noted as being for systems other than electrical circuitry and/or future use or unless noted otherwise.
- D. Conductors for lighting and receptacle circuits shall have color coded jackets. The wiring shall be color coded with the same color used with its respective phase through the entire job as follows:

208/120 Volt System

Phase A - Black
Phase B - Red
Phase C - Blue
Neutral - White
Ground - Green

480/277 Volt System

Phase A - Brown
Phase B - Orange
Phase C - Yellow
Neutral - Gray
Ground - Green

- E. The feeder and service entrance conductors shall be color coded by the use of colored plastic tape applied within 6" of each conductor end.
- F. Branch circuit conductors shall not be smaller than No. 12 and where the home run from center of load exceeds 100'-0", the conductors from home run outlet to panel shall be No. 10 minimum.
- G. For branch circuits terminating in outlet without device, leave minimum of 12" of slack wire coiled for connection of equipment. All conductors shall be identified with proper circuit numbers at terminals, junction boxes at panelboards within 6" of conductor ends.

3.5 OUTLETS

- A. Provide galvanized steel or cast type boxes for all outlets.
- B. Where outlet boxes are used to support lighting fixtures, the outlet box shall be anchored to the structural members of the building per NEC 370-13.
- C. Outlet boxes shall be flush mounted unless they are specifically shown as being

used with exposed conduit or are located above a ceiling.

- D. Where outlets are supplied from conduit run in or below floor slabs, the conduit shall be stubbed up at the location shown and the wall built up around the conduit.
- E. Cuts for outlet boxes in masonry walls shall be made so that the coverplate will completely cover the cut. The mounting height of switch, receptacle and other outlets may be varied slightly, with the Architect's approvals, so that the outlet box, top or bottom, will occur at a masonry joint.
- F. The edge of all outlet boxes shall be flush with the surface in which they are recessed. The devices that fit into the outlet boxes shall be screwed tight before the coverplate is installed and the coverplate shall not be used as a means of tightening the devices in place.
- G. Where outlets are shown as being adjacent and different mounting heights are specified for each, they shall be mounted one directly over the other, on the centerline of the group.

3.6 NAMEPLATES

- A. Provide specified nameplates on the main switchboard, distribution panels, feeder switches, feeder breakers, panelboards motor control centers, disconnect switches, contactors, starters, transformers, start-stop push buttons and motor switches.
- B. Provide nameplates on every device in the main switchboard, distribution panels and motor control centers.
- C. Nameplates for surface mounted equipment shall be installed on the exterior of equipment with sheetmetal screws. Nameplates for flush or recessed mounted equipment shall be installed on the inside of the panel door or cover with epoxy cement.

3.7 WALL SWITCHES AND RECEPTACLES

- A. Where more than one device is indicated at a location, the devices shall be gang-mounted in combined multi-gang boxes and covered jointly by a common coverplate. Provide barriers as required by the devices and voltages being used.

3.8 COVERPLATES

- A. All junction boxes, outlet boxes, multi-gang switch boxes, utility boxes, etc., shall be covered with a coverplate. The coverplate shall be a finished plate as specified unless designated otherwise.
- B. Coverplates shall be mounted vertically unless designated otherwise.

3.9 GROUNDING

- A. Ground connections shall be in accordance with the 2023 National Electrical Code.
 - 1. Provide a grounding electrode system consisting of a minimum of three (3) copperweld rods, 3/4" x 10'-0", driven 24" below grade a minimum of 72" apart in the form of an equilateral triangle, bonded together with No. 4/0 conductors. Install rods a minimum of 36" clear of foundation walls to effect the building ground. If the resistance to ground exceeds 25 ohms, additional rods shall be driven and bonded together until a reading of 25 ohms or less to ground is obtained. After completion of the grounding system, measure the system ground resistance with a "Megger Earth Tester". Submit directly to the Architect two (2) copies of each test report certified by the testing technician and the Owner's representative.
 - 2. Extend from the electrodes to the main service disconnect with a No. 4/0 copper insulated ground conductor in a 1" conduit and connect to the neutral bar, housing and frame.
 - 3. Provide a No. 4/0 copper insulated conductor across the water meter with the conductor attached with clamps to the water line on each side of the meter.
 - 4. Provide a No. 4/0 copper insulated ground conductor in a 1" conduit from cold water entrance pipe ahead of first valve to the main service disconnect and connect to the neutral bar, housing and frame.
 - 5. Where nonmetallic insulating couplings or dielectric flanges are used in metallic water piping systems, provide a No. 4/0 copper, insulated ground conductor across the couplings with the conductor attached with clamps to the water line on each side of the coupling.
 - 6. All ground connections in the building system ground shall be done with Cadweld.

7. All ground clamps shall be equipped with compression type cable lugs independent of the compression device clamping the pipe or rod.
 8. All steel conduit entering the main service disconnect shall have threaded conduit insulated grounding bushings. All bushings shall be bonded together and bonded to the main grounding bus with a No. 4 bare conductor.
- B. Provide an insulated green bonding jumper from the grounding lug of all receptacles to a Steel City "GEE" clip or a sheet metal screw in the outlet box. The ground wire installed behind the device mounting screws will not be acceptable.
- C. Provide one (1) #6 AWG ground in 3/4" conduit from the system ground to the telephone company main distribution frame or service cabinet and to each telephone backboard.
- D. Provide a signal reference grounding grid under the raised floor in the computer room. The signal reference grid shall be as manufactured by Cadweld and shall include the following as a minimum:
1. The signal reference grid shall be 2" wide, 26 AWG gage copper strips on 2' centers in both directions. The grid shall be laid out such that the raised floor pedestals are centered in each 2' x 2' square.
 2. All crossovers shall have a welded joint.
 3. The grid shall be in sections (16' wide as a maximum and rolled on tubes with the outside of the roll protected for shipment.
 4. A 2" wide, 26 AWG gage x 72" copper strip with 5/16" hole in one end (for connection to the computer equipment) shall be installed for each piece of equipment and the connection to the equipment provided.
 5. All ground connections shall be the Cadweld process.
 6. Every sixth pedestal in each direction shall be connected to the grid using #6 AWG, 7 strand copper conductor.
 7. The grid is not required to be bonded to the floor. However, if any section does not lie flat, a mastic may be used. Consider this step only after all connections are made.

8. All columns within and at the perimeter of the room shall be bonded to the grid at the shortest path using a #6 AWG, 7 strand copper conductor.
9. All conduits, pipes, ducts, miscellaneous steel, etc., shall be bonded to the grid using a #6 AWG, 7 strand copper conductor.
10. The installation of the signal reference grid shall be in compliance with Cadweld's installation recommendations.

3.10 TELEPHONE CONDUIT SYSTEM

- A. Telephone service shall include wood backboards and equipment cabinets with service entrance conduit as shown.
- B. Telephone service entrance cable, all branch cabling and telephone instruments shall be provided by the telephone equipment vendor.
- C. Provide an outlet and conduit system for the telephones as shown and leave the same in readiness for wiring by others. Provide pull line in all telephone conduit. Terminate all conduit at a uniform height with smooth insulated bushings at the telephone wood backboards.
- D. Telephone wall outlets shall be pressed steel sectional switch boxes, wall mounted at the locations indicated. Coverplate shall have a bushed hole.
- E. Telephone floor outlets shall be floor boxes as specified at the locations indicated.

3.11 CONNECTION TO EQUIPMENT

- A. Equipment furnished by the Owner or under other Sections, such as mechanical equipment, elevators, escalators, signs, kitchen equipment, etc., will be installed by others. Provide electrical service and make the electrical circuit connection to this equipment.
- B. Provide PVC insulated flexible cord sets for all cord and plug connected building appliances and equipment. Cords shall be sized in accordance with electrical circuits indicated. Multiple conductor cords shall be "SO" cable with PVC jacket and green insulated ground conductor.

3.12 CORING, CUTTING AND PATCHING

- A. Set sleeves for conduit accurately before the concrete floors are poured, or set boxes on the forms so as to leave openings in the floors in which the required sleeves can be subsequently located. Fill in the voids around the sleeves with concrete.
- B. Should the performance of this preliminary work be neglected and should cutting be required in order to install conduit, then the expense of the cutting and restoring of surfaces to their original conditions shall be accomplished without incurring additions to the Contract.

3.13 EQUIPMENT ANCHORING

- A. All items of electrical equipment, such as switchboards, motor control centers, transformers, standby generator, etc., shall be securely anchored to the building structure. The anchoring shall be accomplished by utilizing a minimum size of 3/8" steel anchor bolts in the structure and to the item of equipment. A minimum of two (2) anchor bolts shall be provided on each side of each item of equipment with the following exceptions:

Exception No. 1: If the equipment manufacturer includes more than two (2) anchor holes per side in the base or base frame of the equipment item, then there shall be one anchor for each anchor hole.

Exception No. 2: If the equipment manufacturer recommends a particular quantity greater than two (2) per side, then that quantity of anchors shall be provided.

END OF SECTION