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SPECIFICATION DIVISION 26

NUMBER SECTION DESCRIPTION

DIVISION 26 ELECTRICAL
SECTION 260533 - ELECTRICAL MATERIALS AND METHODS

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DIVISION 26 ELECTRICAL
SECTION 260533 - ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Standard General and Supplementary General Conditions, Division 01 Specification Sections, and other applicable Specification Sections, in particular the Related Sections listed below, apply to this Section.

B. Related Sections:

1. Section 260513 - Medium, Low & Control Voltage Cables
2. Section 260526 - Grounding and Bonding for Electrical

1.2 SUMMARY

A. Provide conduits, cable trays, surface raceways, boxes, fittings, and supports to form a complete, coordinated, and continuously grounded raceway system.

1.3 CONDUIT REQUIREMENTS

A. Conduits indoors in general areas shall be electrical metallic tubing (EMT) with steel set screw fittings.

B. Conduits indoors in hazardous areas, encased in concrete floor slabs or subjected to water, physical damage or abuse shall be galvanized rigid steel (RS) or intermediate metal conduit (IMC) with cast or malleable iron threaded fittings and bushings.

C. Conduits indoors for primary power distribution circuits or for fire pump feeders shall be galvanized rigid steel or intermediate metal conduit with cast or malleable iron threaded fittings and bushings. Where the conduits are routed through the building, they shall be encased in 2 inches of concrete.

D. Conduits outdoors shall be galvanized rigid steel or intermediate metal conduit with cast or malleable iron threaded fittings and bushings.

E. Conduits encased in concrete underground shall be Type DB PVC with matching fittings.

F. Conduits direct buried underground shall be Schedule 40 PVC with matching fittings.

G. Conduits in parking structures, steam tunnels and near or in cooling towers shall be fiberglass-reinforced epoxy or Schedule 80 PVC with matching fittings. Exceptions to this requirement are tunnel segments inside building (i.e. mechanical rooms), or in heated rooms of parking structures. In these cases EMT may be used

H. Final connections to recessed lighting fixtures and under-counter lights shall be 1/2" minimum flexible metallic conduit, manufactured wiring systems, or Type MC cable.

1. Manufactured wiring systems shall only be used above accessible ceilings.
2. Terminate Type MC cable with steel set screw connectors that have integral insulating bushings. Self-locking, twist-in type fittings are not acceptable.

I. Final connections to motors, transformers and equipment subject to vibration or removal for maintenance shall be 1/2" minimum liquid tight flexible metallic conduit with steel liquid tight fittings. Transformer connections may be non-liquid tight flexible metallic conduit in electrical rooms only.

J. Connections to recessed power receptacles, and light switches, in areas with accessible ceilings:

1. In new partitions and walls, the final connections may be made with Type MC cable. Type MC cable, shall:
   a. Be run to a box immediately above the accessible ceiling. The box size shall not exceed 4-11/16" square.
   b. Conduit shall be used for the entire run, from this junction box, to the power source, load (lights), etc.
   c. No more than three circuits may be run through any given junction box.
   d. Secure the Type MC cables in the wall cavity.
   e. Type MC cables shall be as short as possible.
2. In existing partitions and walls where the surface is not being otherwise opened up, the final connections to new devices may be made using flexible metallic conduit or Type MC cable.

K. Connections to other recessed devices, (including communication outlet boxes, junction or pull boxes, etc.) shall be with standard conduit of the type appropriate for the wall construction.

1.4 CABLE TRAY REQUIREMENTS

A. Power cable trays shall be aluminum ladder type of the sizes shown on the drawings.

1. For power cable trays intended for medium voltage cables within primary switch or substation rooms, the cable tray width shall be **[36”]**.

B. Telecommunications cable trays shall be aluminum ladder type or zinc plated steel wire mesh type of the sizes shown on the drawings.

C. Center spline telecommunications cable tray may only be used where shown.

D. Changes in cable tray direction or elevation shall be made using standard fittings from the same manufacturer as the cable tray.

E. Barriers shall be installed in cable trays where shown to separate circuits of different voltage levels.

1.5 SURFACE RACEWAY REQUIREMENTS

A. When conduits in finished areas cannot be concealed in walls or above ceilings, surface raceways may be used where shown. Boxes and fittings shall match and be from the same manufacturer as the raceways.

1.6 J-HOOKS

A. Subject to the cable manufacturer's installation requirements, low voltage cables may be installed using J-hooks in rooms above accessible ceilings and in unfinished open ceiling areas. Do not use J-hooks in corridors, in finished open ceiling areas, above inaccessible ceilings or as a substitute for cable trays. Bridle rings shall not be used.

1.7 BOX REQUIREMENTS

A. Provide sheet steel outlet boxes, extensions, and plaster rings for EMT, flexible metal conduit, and Type MC cable.

B. Provide cast or malleable iron outlet boxes and covers for galvanized rigid steel conduits, intermediate metal conduits, and liquid tight flexible metal conduits.

C. Boxes shall be sized for all conductors and devices to be contained within. Box extensions shall not be used to correct for undersized boxes. A single extension may be used as follows only if all free conductors extend at least 3 inches outside of the extension opening.

1. On boxes being flush mounted in masonry walls.
2. On existing boxes in walls that are being furred out.
3. On existing boxes for connecting to an existing circuit.
4. On fire alarm, security and clock system boxes where required by the system manufacturer's instructions.

D. Plaster rings shall not be considered box extensions, but their capacities may be included in box fill calculations.

1.8 SUPPORT REQUIREMENTS

A. Surface mounted equipment shall be secured to steel channels. The channels shall be attached with toggle bolts to hollow tile, block or similar surfaces, and attached with screws or bolts and expansion shields to solid masonry or concrete.

PART 2 - PRODUCTS

2.1 CONDUITS

A. Electrical metallic tubing shall be thin wall steel tubing, electro-galvanized or hot dipped galvanized inside and outside. Fittings and bushings shall be galvanized steel set screw type with two screws per connection for sizes over 2".

B. Galvanized rigid steel conduit and intermediate metal conduit shall be hot dipped galvanized inside and outside, in 10' lengths and threaded on both ends. Fittings and bushings shall be cast or malleable iron, and hot dipped galvanized inside and outside.

C. PVC conduit and fittings shall be Type DB for encasement in concrete, Schedule 40 for direct burial, concealed and exposed work, and schedule 80 in parking structures. Fittings shall be of the same type and from the same manufacturer as the conduit. PVC conduit shall be UL Labeled for 90 degrees C cables. Cantex, Carlon, or National Pipe & Plastic.

D. Fiberglass reinforced epoxy conduit shall be standard wall, iron pipe size, sunlight resistant, gray color, with matching push-fit fittings. FRE or Champion.

E. Flexible metallic conduit shall be galvanized steel or aluminum. Fittings shall be of steel with cadmium or galvanized finish. Fittings shall be machine screw clamp type, single or two-piece. Self-locking, twist-in type fittings are not acceptable.

F. Liquid tight flexible metallic conduit shall consist of a flexible, galvanized steel core, a continuous copper ground strip and a polyvinyl chloride jacket. Fittings shall be steel liquid tight grounding type from the same manufacturer as the conduit.

2.2 CABLE TRAYS

A. Ladder type cable tray shall be aluminum, of the widths shown, with 4" rail height, 13/16" minimum rung width, and 9" maximum rung spacing. The tray with a 10' span shall be capable of sustaining a working load of 145 pounds per lineal foot with a load deflection of 1.0" when tested in accordance with NEMA VE 1. B-Line, Chalfant, Cope, Globetray, Husky, Legrand Cablofil, MonoSystems, or Thomas & Betts.

B. Wire mesh cable tray shall be of high strength steel rods meeting the mechanical properties of ASTM A510, of the widths shown, and with a 4" load depth minimum. Cable tray shall be constructed of wires configured in a 2" x 4" grid pattern with wires welded at intersection points. The ends of the wire grid shall be bent up to form the sides of the tray. Cut ends at the top and end rails shall be free of sharp edges to prevent damage to the cables and injury to installers. The tray shall be zinc electro-plated or zinc galvanized after forming and welding. The tray with a 8' span shall be capable of sustaining a working load of 32 pounds minimum per lineal foot with a load deflection of 1.2" when tested in accordance with NEMA VE 1. B-Line, Basor Electric Inc, Chalfant, Cope, Legrand Cablofil, MonoSystems, MP Husky, or WBT only.

C. Center spline cable tray shall be aluminum, of the width shown, with top mounted rungs, 3” load depth, 13/16” minimum rung width, and 9” maximum rung spacing. The tray with a 10' span shall be capable of sustaining a working load of 145 pounds per lineal foot with a load deflection of 1.0" when tested in accordance with NEMA VE1. B-Line, Legrand Cablofil, MonoSystems, or Thomas & Betts only.

D. Tray fittings including horizontal and vertical bends, tees, crosses, reducers, splice plates, expansion joints and cable roll-outs shall be from the same manufacturer and of the same product line as the tray. Ladder and center spline tray bends, tees, crosses and reducers shall have a 13/16” minimum rung width, a 9" maximum rung spacing, and a 12" minimum bend radius.

E. Tray fasteners shall be galvanized or zinc plated steel.

2.3 SURFACE RACEWAYS

A. Where surface raceways are called for on the drawings, or when conduits in finished areas cannot be concealed in walls or above ceilings, provide surface raceways. Raceway boxes and fittings shall match and be from the same manufacturer as the surface raceway.

B. Surface raceways shall consist of a base and cover, shall be sized for the number of conductors contained within, and shall be complete with all boxes, connectors, fittings, bushings, dividers and mounting hardware. For internal or external elbows, corners, or tees, provide raceway with 1-1/4" full-capacity bend radius.

C. Surface raceways shall be 600 volt rated and in compliance with the applicable paragraphs of NEC Article 352.

D. Surface raceways shall be non-flammable and UL labeled under UL 5 or UL 5A (as applicable).

E. The completed surface raceway system shall be vandal resistant.

F. Surface raceways shall accept receptacles, cover plates, telephone/data jacks and other standard wiring devices as specified elsewhere or shown on the drawings.

G. Cover plates used for wiring devices and telephone/data jacks shall be of the overlapping type and shall therefore cover the cut ends of the raceway cover.

H. Surface raceways shall be white (ivory, brown, gray) in color, have a scuff resistant finish, and be paintable. All components exposed to view shall be of the same color and shade.

I. Barriers shall be provided when necessary to separate conductors of different voltages or services.

J. Surface raceways shall be steel (plastic) as noted below:

1. Metallic
    a. Metallic raceways shall be of .040" thick (minimum) zinc plated or galvanized steel.
    b. The acceptable levels of quality are as provided by:
        1) Wiremold 500 Series and 700 Series for smaller single channel raceway applications,
        2) Wiremold 3000 Series for larger single channel raceway applications, and
        3) Wiremold 4000 Series for larger multi-channel raceway applications.
    c. Manufacturers include Hubbell, MonoSystems, Thomas and Betts, or Wiremold.
2. Plastic
    a. Plastic raceways shall be of a material meeting all of the requirements of UL 5A, (including flammability, resistivity, structural strength, etc.).
    b. The acceptable levels of quality are as provided by:
        1) Panduit Series LDS5 and LDS7, Carlon Series 30 or Wiremold Series PN05 or PN10 for raceway applications when surface raceway replaces conduit in finished areas.
        2) Panduit LD Series, Carlon Series 30 or Wiremold Series PN05 for smaller single channel raceway applications.

3) Panduit Type T-70, Carlon Premiere or Wiremold Type 40N2 for larger single or multi-channel raceway applications.
4) Panduit Twin 70, Carlon Prestige or Wiremold Type 60N2 for larger multi-channel raceway applications.

c. Manufacturers include Carlon, Hubbell, MonoSystems, Panduit or Wiremold.

2.4 J-HOOKS

A. J-hooks shall be zinc electro-plated steel or plastic, UL Listed for use in plenum spaces, with a minimum of a 3/4 inch wide cable support area, and rated for use with Categories 5e and 6 UTP, fire alarm, security, temperature controls and similar low voltage cables. J-hooks shall include a retaining means for closing the hook so the cables do not fall out.

2.5 BOXES

A. Boxes for fixtures, outlets, switches, equipment connections and wire pulling shall be

1. Cast or formed from carbon steel sheets of commercial grade steel not less than 14-gauge,
2. One-piece construction, zinc, or cadmium plated,
3. Tapped for mounting plates and covers as required.

B. Pull and junction boxes shall be

1. Fabricated from galvanized or painted code gauge cold rolled carbon steel sheets.
2. Welded construction with flat removable covers fastened to the box with machine screws.
3. Seams and joints shall be closed and reinforced with flanges formed of the same material from which the box is constructed or by continuous welding which will provide equivalent strength to flange construction.
4. Preferably not provided with 'knockouts'.

C. Box covers shall be fastened in place by machine screws or hinges and latches. Self-tapping or sheet metal fasteners are not acceptable.

2.6 SUPPORTS

A. Hangers and brackets shall be made of steel pipe, channel iron, angle iron or prefabricated steel channel. Prefabricated steel channel shall be by B-Line, Hilti, Powerstrut, or Unistrut.

B. Anchors shall be lead shield anchors or plastic expansion anchors for small loads, and expansion or epoxy anchors for large loads. Powder-driven anchors shall not be used.

2.7 NAMEPLATES, LABELS AND DIRECTORIES

A. Equipment nameplates shall be engraved .125 inch (1/8") thick laminated plastic, white, with black letters. The engraved letters shall be at least one quarter inch (1/4") high.

B. Arc flash hazard warning labels shall be 3" by 5" minimum, white with a yellow, orange or red stripe header and black font, of ultraviolet and weather-resistant nylon, and adhesive backed.

C. Receptacle and light switch plates shall be labeled using clear adhesive backed nylon or Mylar tape with black text permanently laminated to the tape.

D. Panel directories shall be typed on supplied card stock with panel, or card stock similar in thickness and material as those supplied with the panels. Install supplied clear plastic cover, or one of like material.

PART 3 - EXECUTION

3.1 CONDUITS

A. Size conduits in accordance with the NEC, but not less than the sizes shown on the drawings. Minimum power and control conduit size shall be 1/2". Minimum telecommunications conduit size shall be 1".

B. Install concealed and exposed conduits and cable trays parallel to or at right angles to building lines. Conduits shall not be embedded in concrete slabs except where specifically shown. Install surface raceways as close to room corners or trim features as possible to make the surface raceways less obvious. Where conduits are routed over beams and under corrugated decking, conduits shall be offset 3″ below the decking to avoid damage from future decking penetrations.

C. Make directional changes in primary power distribution conduits above ground with sweeps and long radius elbows, and underground with 20' minimum radius bends.

D. Conceal conduits wherever possible and practical. When conduits cannot be concealed in finished areas, use surface raceways with matching boxes from the same manufacturer as the raceways.

E. Metal conduits, fittings, enclosures and raceways shall be mechanically joined together in a firm assembly to form a continuous electrical conductor providing effective electrical grounding continuity.

F. Provide expansion fittings between adjacent buildings, at building expansion joints and in straight runs at the intervals specified in the manufacturer's instructions.

G. Conduits entering panels located outdoors, in parking structures, in steam tunnels and on cooling towers shall enter from the sides, back, or bottom. Conduits shall not enter from the top.

H. Separate raceways from un-insulated steam pipes, hot water pipes, and other hot surfaces by a minimum of 4″ horizontally or 12″ vertically. Separate raceways from ventilation ducts and insulated pipes so that they do not come into contact with each other.

I. Low voltage signal circuits shall be separated or shielded from power circuits to prevent the induction of noise into the signal circuits.

J. EMT entering sheet metal enclosures and outlet boxes shall be secured in place by a connector with a locknut. Rigid conduit shall be secured with locknut inside and outside and a bushing. Sufficient thread on the connector or conduit shall extend into the enclosure so that the bushing will butt tight into the connector or conduit. Bushings shall not be used as jamb nuts or in lieu of locknuts.

K. Flexible metallic conduit to motors and similar equipment shall not exceed 3'-0" in length, and shall have adequate slack to absorb the maximum vibration. Flexible conduit connections to lighting fixtures shall not exceed 6'-0" in length.

3.2 CABLE TRAYS

A. Install cable trays in accordance with NEMA VE 2 and manufacturer instructions. Install trays parallel to or at right angles to building lines. Provide a minimum of 12" working space above and 12" working space along one side for cable installation.

B. Support cable trays with trapeze hangers spaced 10' maximum on center for ladder trays and 8' on center maximum for wire mesh trays. Center hung supports are not allowed.

C. After cable installation, firestop cable tray penetrations in fire rated walls with intumescent fire protective bags, bricks, or sealant in accordance with the appropriate UL approved system.

3.3 SURFACE RACEWAYS

A. Install surface raceways parallel or perpendicular to building lines.

B. Locate surface raceways as close to room corners or vertical breaks in mid wall as is possible.

C. Provide vertical surface raceways to feed cables from junction boxes above the ceiling to horizontal surface raceways. Exposed vertical conduits are not acceptable.

3.4 J-HOOKS

A. Install cables in J-hooks as follows.

1. Install cables parallel or perpendicular to building lines.
2. Space J-hooks in accordance with the cable manufacturers' instructions, but not more than 5 feet apart and not more than 3 feet from both sides of a change in direction.
3. Maintain a minimum separation of 2” from lighting ballasts, transformers, motors, power circuits and similar equipment.
4. Anchor J-hooks to walls or suspend J-hooks using 1/4-inch minimum diameter threaded rod hangers. Do not support J-hooks from ceiling or equipment hangers. J-hooks shall not impede removal of accessible ceiling tiles.
5. Load J-hooks to no more than the maximum fill stated in the J-hook manufacturer's instructions.
6. Cables shall not sag more than 12 inches between J-hooks and shall not impede access to equipment requiring maintenance.
7. Cables in open areas shall be a minimum of 10 feet A.F.F. and a maximum of 16 feet A.F.F.

8. Cables above accessible ceilings shall not touch the ceiling grid or tiles.
9. Cables shall be protected from physical damage.
10. Cables shall be completely accessible for replacement. Cables hidden above ductwork or other obstructions, and cables so high they cannot be reached safely while standing on a ladder shall be replaced with cables in new J-hooks located in a more accessible location.

B. Provide conduit sleeves for cables penetrating walls. If cables in J-hooks penetrate a corridor wall from a room, and the distance from the corridor wall to the corridor cable tray is more than 18 inches, provide conduit stubs through the wall to the cable tray.

C. Contain cables inside J-hooks in accordance with the J-hook manufacturer's instructions so cables do not fall out, but so existing cables can be pulled out and new cables can be pulled in. Cables shall not be strapped to the J-hooks. Bond the conduit stubs to the cable tray.

D. Provide separate J-hooks for each cable system. Cables from one system shall not use the J-hooks of another system.

E. Color code J-hooks to indicate the system of the cables they contain:

1. Telecommunications - silver or gray
2. Fire alarm – red.
3. Temperature controls – blue.
4. Laboratory controls - white.
5. Security & card access control – orange.
6. Audio/visual – yellow.

3.5 MOUNTING HEIGHTS

A. Except where shown otherwise, install equipment and devices at the following heights:

1. Receptacles (Wall Mount): 18" A.F.F. to center
2. Receptacles (Above Counter): 44" A.F.F. to center
3. Receptacles (Unfinished Area): 44" A.F.F. to center
4. Surface Raceway Receptacle Strips: 42" A.F.F. to bottom
5. Light Switches: 44" A.F.F. to center
6. Telephone Outlets (Wall Phone): 44" A.F.F. to center
7. Telephone/Data Outlets: 18" A.F.F. to center
8. Clocks: 88" A.F.F. to bottom
9. Exit Signs: 88" A.F.F. to bottom
10. Emergency Light Wall Packs: 88" A.F.F. to bottom
11. Fire Alarm Pull Stations: 44" A.F.F. to center
12. Fire Alarm Horn/Strobes and Speaker/Strobes: Entire strobe lens at a uniform height between 80" A.F.F. and 96" A.F.F.
13. Card Readers (Wall Mount): 42" A.F.F. to center
14. Card Readers (Pedestal Mount): 36" A.F.F. to center
15. Door Actuator Pushbutton (Wall and Pedestal Mount): 36" A.F.F. to center
16. Card Reader and Door Actuator Pushbutton (Stacked Vertically): Card Reader 42" A.F.F. to center and Pushbutton 36" A.F.F. to center
17. Security System Controls: 44” A.F.F. to center
18. Thermostats/HVAC Controls: 44” A.F.F. to center

19. Electrical Panels: 72" A.F.F. to top
20. Safety Switches/Motor Starters/Variable Frequency Drives: 72" A.F.F. to top (except top of handle shall not exceed 78" A.F.F.)
21. Motor Control Pushbuttons: 60" A.F.F. to center

3.6 SUPPORTS

A. Provide 4" thick concrete housekeeping pads for floor-mounted equipment.

B. Support all electrical items independently of supports provided by the other trades.

C. Support conduits and boxes using steel conduit straps or 1/4-inch minimum diameter threaded rod hangers. Suspended ceiling hangers or hanger wire shall not be used.

D. Support cable trays with support brackets or 3/8" diameter minimum threaded rod hangers at intervals not exceeding 10'-0" for ladder cable trays and 8'-0" for wire mesh cable trays. Additional supports shall be provided at tray fittings.

E. Hangers shall be of sufficient strength that their deflection at mid span does not exceed 1/240 of the hanger span length after the cables are installed.

F. Route flexible metallic conduit, manufactured wiring systems and Type MC cable parallel to or perpendicular to building lines, and in a neat and workmanlike manner. Coil the excess and support independently of the ceiling grid system.

3.7 PENETRATIONS, SLEEVES, AND FIRE SEALS

A. Cut floor and wall penetrations neatly and to the minimum size required for installation of the equipment and raceways.

B. Provide galvanized steel pipe sleeves for all conduits penetrating floors, exterior walls and roofs.

1. Extend floor sleeves above the floor a minimum of 2 inches.
2. Embed sleeves in new concrete or step-core concrete and grout sleeves into existing concrete with epoxy grout.
3. Seal floor sleeves using fire-sealing systems approved by a Nationally Recognized Testing Laboratory.
4. Seal exterior wall and roof penetrations water tight.

C. Patch both sides of wall penetrations cut for electrical equipment and raceways to seal against the passage of air, sound and fire.

1. Seal cable tray penetrations in fire rated walls using fire sealant bags approved by a Nationally Recognized Testing Laboratory.
2. Seal conduit penetrations in fire rated walls using fire-sealing caulk approved by a Nationally Recognized Testing Laboratory.
3. Seal conduit penetrations in non-rated walls using masonry materials that match the wall construction.
4. Fire seal between recessed outlet boxes located on opposite sides of a fire rated wall if the box openings are over 16 square inches and the boxes are less than 24 inches apart.

3.8 EXPANSION FITTINGS

A. Provide expansion fittings at all building expansion joints. Expansion fittings shall be bonded to the raceway on both sides.

B. Provide expansion fittings, in accordance with manufacture recommendations, in all areas subject to swings in temperature of more than 15 degrees C.

C. Install expansion fittings in all locations were expected expansion difference is 1/4", or more, between boxes.

3.9 IDENTIFICATION

A. Provide nameplates and labels in accordance with Article 2.7.

1. Laminated plastic labels shall be mechanically secured in place with sheet metal screws and/or bolts and nuts.
2. Labels shall be neatly centered. Place labels in like positions on similar equipment.

B. Color code wiring in accordance with Section 260513.

C. Color code junction boxes and box covers of emergency and fire alarm circuits with red paint. Color code junction boxes and box covers of temperature control circuits with blue paint.

D. Mark junction box covers in indelible ink with the panel and breaker numbers of the circuits contained within.

E. Provide generic "Warning - Arc Flash Hazard" labels on equipment with an arc flash incident energy level exceeding 1.2 calories/square centimeter and likely to require examination, adjustment, servicing or maintenance while energized. This includes but is not limited to automatic transfer switches, switchboards, panelboards, transformers, storage batteries, battery chargers, inverters, control panels, variable speed drives, motor controllers, circuit breakers and disconnect switches. Provide labels for the line and load sides of fused disconnect switches and circuit breakers 800 amps and above, and for the primary and secondary sides of transformers.

1. Contractor-provided labels are not required on primary switchgear or unit substations. U-M Plant Operations will provide device-specific labels on this equipment.
2. Contractor-provided labels are not required on equipment that is factory labeled by the manufacturer.
3. Center the labels horizontally and vertically on the outsides of panel doors, covers, etc. to ensure they are visible to maintenance personnel before the equipment is opened up.

3.10 FIELD QUALITY CONTROL

A. Perform visual inspections to verify the following:

1. The equipment is properly installed and anchored.
2. The equipment is free from damage and defects.
3. Electrical terminations have been properly tightened.
4. The equipment has been thoroughly cleaned inside and outside.
5. The equipment is properly labeled and labels are correct.

END OF SECTION 260533