

University of Houston Master Specification

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SECTION 26 0553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

Maintain Section format, including the UH master spec designation and version date in the center columns of the header and footer. Complete the header and footer with Project information.

Revise this Section by deleting and inserting text to meet Project-specific requirements.

This Section uses the terms "Architect" and "Engineer." Change this term to match that used to identify the design professional as defined in the General and Supplementary Conditions.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

Delete hidden text after this Section has been edited for the Project.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. The Contractor's attention is specifically directed, but not limited, to the following documents for additional requirements:
 - 1. The current version of the *Uniform General Conditions for Construction Contracts*, State of Texas, available on the web site of the Texas Facilities Commission.
 - 2. The University of Houston's *Supplemental General Conditions and Special Conditions for Construction*.

1.2 DESCRIPTION OF WORK

- A. Work Included: Provide identification for electrical systems as shown, scheduled, indicated, and specified.
- B. Types: The types of identification for electrical systems required for the Project include, but are not limited to:
 - 1. Electrical system identification.
 - 2. Warning signs and operational tags.
 - 3. Cleaning and painting of electrical work.

1.3 QUALITY ASSURANCE

- A. Comply with ANSI A13.1 and IEEE C2.
- B. Comply with NFPA 70 and 70E.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Comply with NFPA 70 and NFPA 70E requirements for ARC-flash warning labels.

1.4 SUBMITTALS

- A. Shop drawing submittals shall include, but not be limited to, the following:

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1. Cut sheets and samples of Electrical System Identification products.
2. Additional information as required in Section 26 0001 "Electrical General Provisions."

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver components in factory-fabricated water resistant packaging.
- B. Handle components carefully to avoid damage to components, enclosures, and finish.
- C. Store components in a clean, dry space and protect from weather.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Refer to PART 3 - EXECUTION of this Section and other Division 26 sections for basic electrical products and materials.

PART 3 - EXECUTION

3.1 ELECTRICAL SYSTEM IDENTIFICATION

- A. Identification of Equipment:
 1. All pieces of major electrical equipment shall have a manufacturer's label identifying the manufacturer's address, equipment model and serial numbers, equipment size, and other pertinent data. Care shall be taken not to obliterate this nameplate in any way.
 2. The Contractor shall make it possible for the personnel operating and maintaining the equipment and systems in this Project to readily identify the various pieces of equipment, junction boxes, etc., by marking them. All items of equipment, pull boxes, junction boxes, etc., shall be clearly marked using engraved nameplates as hereinafter specified. The item of equipment shall indicate the same number as shown on the Drawings, where applicable.
 3. White background and black letters equipment nameplates shall be three ply laminated plastic, a minimum of 3/32 inch thick, black background, white letters for normal power, orange background, white letters for emergency power, and blue-white-blue for UPS power. Letters shall be similar to Roman Gothic of a size that is legible (1/2 inch minimum for main nameplates and 3/8 inch minimum for branch device nameplates) and appropriate to the application. Attachment of nameplates shall be by stainless steel screws. Rivets or adhesives are not acceptable. **[Nameplates on equipment installed in finished areas shall be installed inside equipment. Verify location with the Engineer.]**
 - a. Electrical equipment to be identified includes: All **[switchgear,]** switchboards, **[unit substations,]** distribution panels, transformers, motor control centers, panelboards, **[automatic transfer switches,]** **[busway plugs,]** disconnect switches, motor controller/starters, **[lighting control panels,]** pull boxes, junction boxes, relays, and similar equipment.
 4. Nameplates on **[switchgear,]** switchboards, **[unit substations,]** **[automatic transfer switches,]** transformers, distribution panels, motor control centers, disconnect switches, motor controller/starters, relays, and panelboards shall provide voltage and current characteristics, the source feeding the panel, short circuit current, and other electrical system characteristics as required by the manufacturer. Current characteristics shall

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indicate the size of the overcurrent devices serving the equipment and not the equipment current rating.

Example: PANEL 1LA
120/208V, 3 PH, 4 W, 225A
Fed from DPA-3
Room 1.102

5. Arc flash labels shall meet all of the following requirements per NFPA 70 and 70E. Per NFPA 70E, equipment labeling, item 3 shall contain available incident energy and the corresponding working distance only. Arc flash greater than 40 cal/cm² shall be color coded red with additional notes that equipment shall not be operated. Arc flash labels shall comply with Owner's Arc flash label standard. Refer to Section 26 0573 "Power Systems Studies" for additional information.
 - a. Individual overcurrent devices and pilot lights in **[switchgear,]** switchboards, **[unit substations,]** distribution panels, motor control centers, power generating equipment, and similar equipment shall have nameplates showing the load served and its location, where remote. Nameplates on motor starters shall indicate variable speed, time delay operation, etc., where applicable.
 - b. Blank nameplates shall be mounted on each spare or bussed space in motor control centers, and on each spare or space in distribution panels.
 - c. Branch circuit panelboards shall have neatly typed circuit directories behind clear plastic. Identify circuits by room numbers. Room numbers shall be those finally selected by the Owner; not necessarily those given on Drawings. Spares and spaces shall be indicated with erasable pencil; not typed. Circuit numbers shall be provided in the directory and at each circuit breaker.
- C. Conduit Systems: Provide adequate marking of major conduit that is exposed or concealed in accessible spaces, to distinguish each run as either a normal power, emergency power, fire alarm, control wiring or voice/data conduit. Except as otherwise indicated, use white banding with black lettering except that emergency power shall use orange and white and fire alarm conduit markers shall use red banding. Provide self-adhesive or snap-on type plastic markers. Indicate voltage ratings of conductors exceeding 250 volts. Locate markers at ends of conduit runs, near switches and other control devices, near items of equipment served by the conductors, at points where conduit passes through walls or floors, or enters non-accessible construction and at spacing of not more than 30 feet along each run of exposed conduit.
- D. Cable Tray Systems: Provide engraved nameplates identifying cable tray systems as to use, on maximum 50-foot centers on all tray systems and whenever a tray enters a room or concealed accessible location. Nameplate text shall be submitted to the Engineer for review. Conductors over 600V AC shall be marked per NEC Article 392.
- E. Underground Cable Identification: Bury a continuous, preprinted, red and silver metallic ribbon cable marker, Brady No. 91600 Series or an approved equal, with each underground cable (or group of cables), regardless of whether conductors are in conduit or direct buried. Locate each directly over cables, 12 inches above cable below finished grade. Ribbons shall be detectable from above grade using a pipe or cable locator.

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F. Cable/Conductor Identification: Coordinate a uniform and consistent scheme of color identification of power wiring throughout the building system. Identification shall be by the permanent color of the selected covering. On large conductors, secure identification by means of painted color banding or plastic tape.

- 1. Color scheme shall be as follows [or as required to match the existing color coding in the building; for 120/240 V systems with high leg provide Orange for phase B]:

Table with 4 columns: Phase, 208/120 Volt, 480/277 Volt, 5 kV/15 kV. Rows include Phase A, B, C, Neutral, and Ground with corresponding color codes.

- 2. Wiring for switches shall be same color as phase wire.
3. Colored insulation in sizes up through #4. Conductors #3 and larger may have black insulation, but color coded with 1/2 inch wide band of colored tape, at accessible locations. Wrap conductor minimum 6 inch width.
4. Feeder cables shall be tagged in pull boxes, wireways, wiring gutters of panels, and at other accessible locations. Tags shall be fireproof, nonconductive material, approved by Architect.
5. Maintain same conductor color from service entrance to last device.

G. Phase Rotation: Phase rotation shall be maintained throughout the Project.

- 1. Phase rotation shall be clockwise or counterclockwise, per power company standards, A-B-C, and identified as such left-to-right, top-to-bottom, and front-to-back with color coding as specified above at switchboards, panelboards, substations, switchgears, transformers, motor control centers, motor starters, and similar locations. Power system phasing shall be as indicated on the Drawings.
2. Motor phase reversal, if necessary, shall be made at motor controller unless approved by the Owner.

H. Branch Circuit and Control Wiring Tags: All branch circuit and control wiring conductors shall be tagged using self-sticking vinyl cloth or mylar cloth wire markers. Embossed pressure sensitive plastic or metal ribbon markers will not be accepted. Tags shall be installed at all wiring splice, tap and termination points and shall correspond to the designations shown on the control wiring diagrams or panel schedules.

I. Branch Circuit Pull Boxes and Junction Boxes: Branch circuit pull boxes shall be neatly stenciled with a black permanent marker indicating the panel name and branch circuit number. Boxes on emergency power systems shall be painted orange prior to marking. Boxes on fire alarm power systems shall be painted red prior to marking.

J. Miscellaneous Switch Plates or Device Plates: Device and switch plates for all [15 and 20 amp devices circuited to "emergency"] [and "normal"] [circuits,] special purpose outlets, pilot lights, remote operated light switches, all remote control devices, and other devices noted on the Drawings shall be identified by engraving the switch plate or device plate.

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1. Nomenclature shall include the panel and circuit of the outlet or switch, or the indication of the pilot, or the area of control, or equipment served. Consult the Architect/Engineer for label nomenclature.
2. Plates shall be as specified in Section 26 2726 "Wiring Devices."
3. Engraving shall be 3/16 inch condensed Gothic and shall be filled with black enamel.

- K. Manufacturers: Provide electrical identification products as manufactured by Ideal, T&B, 3M, Panduit, Seton or an approved equal.

3.2 WARNING SIGNS AND OPERATIONAL TAGS

- A. Warning Signs: Provide warning signs where there is hazardous exposure associated with access to or operation of electrical facilities. Provide text of sufficient clarity and lettering of sufficient size to convey adequate information at each location; mount permanently in an appropriate and effective location. Comply with recognized industry standards for color and design.
- B. Operational Tags: Where needed for proper and adequate information on operation and maintenance of electrical systems, provide tags of plasticized card stock, preprinted. Tags shall convey the message, example: "DO NOT OPEN THIS SWITCH WHEN BURNER IS OPERATING".

3.3 CLEANING AND PAINTING OF ELECTRICAL WORK

- A. Prime, protective and touch-up painting is included in the Work of this Division. Finish painting in equipment spaces, concealed locations, and other locations not exposed to the view of building occupants is included in the work of this Division. Finished painting in areas exposed to the view of building occupants is specified under Division 9.
- B. All equipment and materials furnished by the electrical subcontractor shall be delivered to the job with suitable factory protective finish.
- C. All electrical equipment such as switchgear, disconnect switches, contactors, etc., with suitable factory-applied finishes shall not be repainted, except for aesthetic reasons where located in finished areas as directed by the Architect and in a color selected by the Architect. Where factory-applied finishes are damaged in transit, storage or installation, or before final acceptance, they shall be restored to factory-fresh condition by competent refinishers using the spray process.
- D. All equipment not finished at the factory shall be given a prime coat and then finish painted with two coats of enamel in a color as directed by the Architect/Engineer. No nameplates on equipment shall be painted, and suitable protection shall be afforded such plates to prevent their being rendered illegible during the painting operations.
- E. The surfaces to be finish-painted shall first be prepared as follows:
1. Galvanized and black steel surfaces shall first be painted with one coat of galvanized metal primer.
 2. Aluminum surfaces shall first be painted with one coat of zinc chromate primer.
- F. All ferrous metal surfaces without a protective finish and not galvanized in exposed and concealed areas including chases, under floor and above ceilings shall be painted with two coats of zinc chromate primer as the construction progresses to protect against deterioration.

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- G. All junction and pull boxes and covers that are part of raceway systems distributing emergency power shall be painted orange. Where a multiple branch emergency power system is installed, the branch designation (LS, CB or EQ) shall be stenciled on the box cover in minimum one inch (1 inch) high white letters.
- H. All junction and pull boxes and covers and terminal cabinets that are part of the raceway/wiring system for emergency alarm wiring shall be painted orange and fire alarm wiring shall be painted red. A system designation (FA) shall be stenciled on the box or cabinet cover in minimum one inch (1 inch) high white letters.
- I. **[All conduit exposed to view shall be finish painted as directed by the Architect/ Engineer.]**
- J. Before painting, all surfaces to be painted shall be suitably prepared. This shall include removing all oil, rust, scale, dirt, and other foreign material. Surfaces shall be made smooth by grinding, filing, brushing, or other approved method. In the painting operations, the primer for metal surfaces shall be of the zinc dust type unless specified otherwise, and where finish painting is specified, it shall be painted using materials and colors selected and approved by the Architect/Engineer. Refer to Division 9 for additional requirements.

END OF SECTION 26 0553

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