**Microsoft WAW02**

Section 26 05 53

Identification for Electrical Systems

**Identification for Electrical Systems**

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# General

## Summary

* + 1. Section Includes:
       1. Identification for raceway.
       2. Identification for conductors and communication and control cable.
       3. Underground-line warning tape.
       4. Warning labels and signs.
       5. Instruction signs.
       6. Equipment identification labels.
       7. Miscellaneous identification products.

## Definitions

* + 1. Refer to Section 26 05 00, “Common Work Results for Electrical” and Section 01 42 00, “References” for common definitions used throughout all specifications.

## References

* + 1. Refer to Section 01 42 00, “References” for common references used throughout all specifications.
    2. Refer to Section 09 90 00, “Painting and Coating” for materials and application for painted identification.

## Submittal Documentation Requirements

* + 1. Refer to Section 26 05 00, “Common Work Results for Electrical” for submittal documentation requirements.

## Submittals

* + 1. Action Submittals:
       1. Product Data: For each electrical identification product indicated.
       2. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.
       3. Schedule: Provide a full schedule of all labels to be provided prior to the manufacture of the labels.
       4. Samples: For each type of label and sign to illustrate size, colors, lettering style, mounting provisions, and graphic features of identification products.

## Site Conditions

* + 1. Refer to Section 26 05 00, “Common Work Results for Electrical” for site conditions applicable to this project.

## Quality Assurance

* + 1. Electrical Components, Devices, and Accessories: CE marking indicating product compliance with EU legislation and EC directives applicable. Compliance of the equipment and components supplied with appropriate EU legislative requirements and standards is the sole responsibility of the Supplier, regardless as to whether the equipment or components in question are sourced from inside or outside the EU, from a sub-supplier or from any other third party.
    2. Comply with European Standards Organisation (ESO’s)
       1. CEN
       2. CENELEC
       3. ETSI
       4. I.S. 10101:2020
    3. Coordination
       1. Coordinate identification names, abbreviations, colours and other features with requirements in the contract documents, shop drawings, manufacturers wiring diagrams, and the Operation and Maintenance Manual, and with those required by applicable codes, standards and 1989/391/EEC. Use consistent designations throughout the project.

## Delivery, Storage and Handling

* + 1. Refer to Section 26 05 00, “Common Work Results for Electrical” for typical requirements.

## Warranty

* + 1. Refer to Section 26 05 00, “Common Work Results for Electrical” for typical warranty requirements.

## Extra Materials (Not required)

# Products

## Raceway Identification Materials

* + 1. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
    2. Color for Printed Legend:
       1. Power Circuits: Black letters on a yellow field.
       2. Legend: Indicate system or service and voltage, if applicable.
    3. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
    4. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
    5. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeves, 50 mmong, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
    6. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 50 mm wide; compounded for outdoor use.

## Conductor and Communication – and Control – Cable Identification Materials

* + 1. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 0.1mm thick by 25 to 50 mm wide.
    2. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
    3. Aluminum Wraparound Marker Labels: Cut from 0.4mm thick aluminum sheet, with stamped, embossed, or scribed legend, and fitted with tabs and matching slots for permanently securing around wire or cable jacket or around groups of conductors.
    4. Metal Tags: Brass or aluminum, 50 by 50 by 1 mm with stamped legend, punched for use with self-locking nylon tie fastener.
    5. Write-On Tags: Polyester tag, 0.4mm thick, with corrosion-resistant grommet and polyester or nylon tie for attachment to conductor or cable.
       1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
    6. Phenolic wire labels: 50mm by 12mm by 1.5mm, phenolic label, attached via cable ties. White Background with Black Letters.

## Warning Labels and Signs

* + 1. Comply with requirements of Directive 1989/391/EEC, IEC 60364 and Applicable Regulations for the rules and requirements around Electrical Installations.
    2. Self-Adhesive Warning Labels: Factory printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment, unless otherwise indicated.
    3. Baked-Enamel Warning Signs: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application. 6 mm grommets in corners for mounting. Nominal size, 175 by 250 mm
    4. Metal-Backed, Butyrate Warning Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 1 mm galvanized-steel backing; and with colors, legend, and size required for application. 6 mm grommets in corners for mounting. Nominal size, 250 by 350 mm.
    5. Warning label and sign shall include, but are not limited to, the following legends:
       1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
       2. Workspace Clearance Warning (Indicate clearance based on location and voltage): "WARNING - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR XX mm."
       3. Arc Flash Hazard: "WARNING – POTENTIAL ARC FLASH HAZARD – APPROPRIATE PPE AND TOOLS REQUIRED WHEN WORKING ON THIS EQUIPMENT." Label shall also indicate the flash protection boundary, flash hazard category, and the minimum arc rating, as well as indicating the PPE required.

## Instruction Signs

* + 1. Engraved, laminated acrylic or melamine plastic, minimum 1.5 mm thick for signs up to 13,000 mm2 and 3 mm thick for larger sizes.
       1. Engraved legend with black letters on white face.
       2. Punched or drilled for mechanical fasteners.
       3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.
       4. 3M adhesive transfer tape 468MP is acceptable.

## Equipment and Component Identification Labels

* + 1. Engraved, Laminated Acrylic or Melamine Label: Attached with permanent adhesive. White letters on a dark-gray background. Minimum letter height shall be 10 mm. Do not fix equipment and component labels to removable or interchangeable covers.
    2. Printed Vinyl Label: Weather- and UV-resistant vinyl label material, white letters on dark-gray background laminated with a clear, weather- and chemical-resistant coating. Attached with permanent adhesive.
    3. Stenciled Legend: In non-fading, waterproof, black ink or paint. Minimum letter height shall be 25 mm.
    4. Color Coding of electrical equipment’s: Weather and UV resistant label material for use on outdoor and indoor equipment’s. Minimum color strip height shall be 100 mm.

## Key Interlock Identification Labels

* + 1. Identify interlock key cylinders using a combination of stampings directly on the cylinder and nameplates as shown in the electrical details.
       1. Stampings on cylinders by manufacturer.
       2. Nameplates furnished and installed by electrical contractor.
       3. Mount nameplates immediately above the cylinder.
       4. White letters on a dark background, 10mm minimum height.
       5. Text on label shall be as shown in the electrical details and shall match labeling of associated key(s).
    2. Identify interlock keys using a combination of stampings directly on the key and key tags as shown in the electrical details.
       1. Stampings on keys by manufacturer.
       2. Key tags furnished and installed by electrical contractor.
       3. Affixed to the key using corrosion-resistant metal split keyring.
       4. Letters to be engraved using minimum 8mm height.
       5. Text on key tag shall be as shown in the electrical details and shall match labeling of associated cylinder(s).
       6. For interlocks between two electrical panels, one panel shall be identified on the obverse, and the other on the reverse of the key tag. Engraving on each side of the tag shall not obscure engraving on the opposite side.

## Miscellaneous Identification Products

* + 1. Cable Ties: Fungus-inert, self-extinguishing, 1-piece, self-locking, Type 6/6 nylon cable ties.
       1. Minimum Width: 4.8 mm .
       2. Tensile Strength: 50 lb,(22.7kg) minimum.
       3. Temperature Range: Minus 40 to Plus 85 deg C.
       4. Cable ties shall be UV and ozone resistant.
       5. Color: Black, except where used for color-coding.
    2. Paint: Paint materials and application requirements are specified in Section 09 90 00, “Painting and Coating.”
       1. Exterior Concrete, Stucco, and Masonry (Other Than Concrete Unit Masonry):
          1. Semi-gloss Acrylic-Enamel Finish: Two finish coat(s) over a primer.

Primer: Exterior concrete and masonry primer.

Finish Coats: Exterior semi-gloss acrylic enamel.

* + - 1. Exterior Concrete Unit Masonry:
         1. Semi-gloss Acrylic-Enamel Finish: Two finish coat(s) over a block filler.

Block Filler: Concrete unit masonry block filler.

Finish Coats: Exterior semi-gloss acrylic enamel.

* + - 1. Exterior Ferrous Metal:
         1. Semi-gloss Alkyd-Enamel Finish: Two finish coat(s) over a primer.

Primer: Exterior ferrous-metal primer.

Finish Coats: Exterior semi-gloss alkyd enamel.

* + - 1. Exterior Zinc-Coated Metal (except Raceways):
         1. Semi-gloss Alkyd-Enamel Finish: Two finish coat(s) over a primer.

Primer: Exterior zinc-coated metal primer.

Finish Coats: Exterior semi-gloss alkyd enamel.

* + - 1. Interior Concrete and Masonry (Other Than Concrete Unit Masonry):
         1. Semi-gloss Alkyd-Enamel Finish: Two finish coat(s) over a primer.

Primer: Interior concrete and masonry primer.

Finish Coats: Interior semi-gloss alkyd enamel.

* + - 1. Interior Concrete Unit Masonry:
         1. Semi-gloss Acrylic-Enamel Finish: Two finish coat(s) over a block filler.

Block Filler: Concrete unit masonry block filler.

Finish Coats: Interior semi-gloss acrylic enamel.

* + - 1. Interior Gypsum Board:
         1. Semi-gloss Acrylic-Enamel Finish: Two finish coat(s) over a primer.

Primer: Interior gypsum board primer.

Finish Coats: Interior semi-gloss acrylic enamel.

* + - 1. Interior Ferrous Metal:
         1. Semi-gloss Acrylic-Enamel Finish: Two finish coat(s) over a primer.

Primer: Interior ferrous-metal primer.

Finish Coats: Interior semi-gloss acrylic enamel.

* + - 1. Interior Zinc-Coated Metal (except Raceways):
         1. Semi-gloss Acrylic-Enamel Finish: Two finish coat(s) over a primer.

Primer: Interior zinc-coated metal primer.

Finish Coats: Interior semi-gloss acrylic enamel.

* + 1. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

# Execution

## Application

* + 1. Accessible Raceways and More Than 600 V: Identify with "DANGER-HIGH VOLTAGE" in black letters at least 75 mm high, with yellow snap-around labels. Repeat legend at 3 meter maximum intervals.
    2. Accessible Raceways 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A: Identify at the source with black letters on yellow snap-around label.
    3. Accessible Raceways and Cables of Auxiliary Systems: Identify the following systems with color-coded, self-adhesive vinyl tape applied in bands:
       1. Fire Alarm System: Red.
       2. Fire-Suppression Supervisory and Control System: Red and yellow.
       3. Mechanical and Electrical Supervisory System: Green and blue.
       4. Telecommunication System: Green and yellow.
       5. Control Wiring: Green and red.
       6. Security conduit: NO color code
    4. Power-Circuit Conductor Identification: For primary and secondary conductors No.  70 mm2 and larger in vaults, pull and junction boxes, manholes, and handholes use aluminum wraparound marker labels. Identify source and circuit number of each set of conductors. For single conductor cables, identify phase in addition to the above.
    5. For all cables except for the final branch circuit conductor, an identification tag shall be provided both at source and load end.
    6. Branch-Circuit Conductor Identification: Where there are conductors for more than three branch circuits in same junction or pull box, use color-coding conductor tape and/OR aluminum wraparound marker labels. Identify each ungrounded conductor according to source and circuit number.
    7. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, signal, sound, intercommunications, voice, and data connections.
       1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and control wire number as indicated on schematic and interconnection diagrams,equipment manufacturer’s shop drawings.
       2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
       3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and Operation and Maintenance Manual.
    8. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting shall be in accordance with CENELEC requirements, IEC 60364 and Applicable Regulations for the rules and requirements around Electrical Installations: Apply self-adhesive warning labels. Identify system voltage with black letters on an orange background. Apply to exterior of door, cover, or other access.
       1. Equipment with Multiple Power or Control Sources: Apply to door or cover of equipment including, but not limited to, the following:
          1. Power transfer switches.
          2. Controls with external control power connections.
       2. Equipment Requiring Workspace Clearance According to local Electrical Code: Unless otherwise indicated, apply to door or cover of equipment but not on flush panelboards and similar equipment in finished spaces.
    9. Instruction Signs:
       1. Operating Instructions: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
       2. Emergency Operating Instructions: Install instruction signs with white legend on a red background with minimum 10 mm high letters for emergency instructions at equipment used for power transfer.
    10. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
        1. Labeling Instructions:
           1. Indoor Equipment: Engraved, laminated acrylic, melamine, or printed vinyl label.
           2. Outdoor Equipment: Stenciled legend 100 mm high indicating equipment name, plus a standard engraved or vinyl nameplate listing detailed information.
           3. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
           4. Unless otherwise indicated, labels shall indicate the equipment tag, line voltage, number of phases, the source panelboard / switchboard, and the circuit number in the source panelboard / switchboard.
           5. The label for all feeder breakers shall indicate the tag number of the load that the individual feeder breaker supplies.
           6. Secure nameplates to outside face of equipment. Unless otherwise specified, use corrosion-resistant screws or adhesive for mounting. For outdoor applications, use corrosion-resistant screws or adhesive especially designed for permanent outdoor installations. Adhesives shall be suitable for use on textured surfaces. This may require an increased adhesive layer thickness.
        2. Equipment To Label:
           1. Panelboards, electrical cabinets, and enclosures.
           2. Access doors and panels for concealed electrical items.
           3. Electrical switchboards.
           4. Transformers.
           5. Emergency system boxes and enclosures.
           6. Disconnect switches.
           7. Enclosed circuit breakers.
           8. Motor starters.
           9. Push-button stations.
           10. Power transfer equipment.
           11. Contactors.
           12. Remote-controlled switches, dimmer modules, and control devices.
           13. Battery inverter units.
           14. Battery racks.
           15. Power-generating units.
           16. Fire-alarm control panel and annunciators.
           17. Security and intrusion-detection control stations, control panels, terminal cabinets, and racks.
           18. Monitoring and control equipment.
           19. Uninterruptible power supply equipment.
           20. Busway.
           21. Load banks.
    11. Arc Flash Warning Labels: On each piece of electrical equipment, install arc flash hazard warning sign indicating flash protection boundary, flash hazard category, and the minimum arc rating, as well as indicating the PPE required, using arc flash hazard data obtained from the Arc Flash Hazard Assessment Study. Indicate the data specific to each piece of equipment, in accordance with IEC 60364 and Applicable Regulations for the rules and requirements around Electrical Installations, and for guidance use requirements outlined in NFPA 70E. Labels for outdoor equipment shall be printed on heavy-duty- UV-resistant and water-resistant vinyl with permanent outdoor grade adhesive. Refer to example labels below:

![A screenshot of a cell phone

Description automatically generated]()![A screenshot of a cell phone

Description automatically generated]()

* + 1. Low Arc Mode Arc Flash Warning Labels: Where it is appropriate, also install an arc flash hazard warning label for the low arc mode. Refer to example labels below:

![A screenshot of a cell phone

Description automatically generated]()![A screenshot of a cell phone

Description automatically generated]()

## Installation

* + 1. Coordinate identification names, abbreviations, colors and other features with requirements in the Contract Documents, Shop Drawings, manufacturer’s wiring diagrams, and the Operation and Manual, and with those required by codes, and standards, . Use consistent designations throughout Project.
    2. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
    3. Coordinate installation of identifying devices with location of access panels and doors.
    4. Install identifying devices before installing acoustical ceilings and similar concealment.
    5. Verify identity of each item before installing identification products.
    6. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
    7. Install nameplates and/or self-adhesive labels parallel to equipment lines
    8. Apply identification devices to surfaces that require finish after completing finish work.
    9. Self-Adhesive Identification Products: Not permitted for labels under 75mm x 75mm . Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
    10. Attach non adhesive signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.
    11. Colour-Coding for Phase and Voltage Level Identification, nominal 400V AC and Less: Follow requirements of harmonized CENELEC standard HD 384.5.514.
        1. Colour shall be factory applied or, for sizes larger than 6 mm2 if authorities having jurisdiction permit, field applied. Color coding as follows, or submit alternate solution.
           1. 230-V Circuits:

L1 Phase: Brown.

Neutral: Blue.

* + - * 1. 400-V Circuits:

L1 Phase: Brown.

L2 Phase: Black

L3 Phase: Grey

Neutral: Blue.

* + - * 1. For all DC Circuits:

Positive (L+): Brown

Negative (L-): Grey

Earthed Positive or Negative (M) - Blue

* + - 1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 150 mm from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
    1. Color-Coding for medium voltage cables:
       1. The color coding for the medium voltage cable shall not be same as the low voltage cables.
       2. The color coding shall follow any local authority requirements.
       3. If there are no local authority requirements, the cable colour shall be black but clearly labelled as L1, L2, L3 at the termination points with robust cable tags.
    2. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.
    3. Painted Identification: Prepare surface and apply paint according to Section 09 90 00, “Painting and Coating.”

## Field Quality Control

* + 1. Refer to the following Specifications:
       1. Section 26 08 00, “Electrical Systems Testing and Commissioning.”
       2. Section 26 08 13, “Electrical Systems Pre-Functional Checklist and Start-ups.”
       3. Section 26 08 16, “Electrical Systems Functional Performance Tests.”

## Typical Nameplates

* + 1. For any miscellaneous equipment type not shown with an example label, provide a similar style label listing comparable information and performance characteristics. Include such labels in equipment submittal for review of format and content. Note that below label tech details are for guidance, and further technical information may be required, as it relates to relevant ratings and references.





















END OF SECTION