

## SECTION 27 05 26

GROUNDING AND BONDING FOR TELECOMMUNICATIONS  
SYSTEMS

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## PART 1 - GENERAL

## 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to the work of this Section.

## 1.02 SUMMARY

- A. Provide all materials and labor for the installation of a grounding and bonding system for communications infrastructure. This section includes requirements for providing a permanent grounding and bonding infrastructure for communications circuits, raceways, and cable tray. These requirements are in addition to any that may exist in Section 16 – “Grounding.”
- B. Related Sections
  - 1. Division 26 Section — "Basic Electrical Materials and Methods"
  - 2. Division 27 Section — "Conduit Raceway and Back Boxes for Communications Circuits Systems"
  - 3. Division 27 Section — "Inside Plant Communications Circuits Systems"
  - 4. Division 27 Section — "Outside Plant Communications Underground Ducts and Raceways for Communications Systems Circuits"

## 1.03 REFERENCES

- A. The applicable portions of the following specifications, standards, codes and regulations shall be incorporated by reference into these specifications.
  - 1. General:
    - a. National Electrical Code (NEC)
    - b. National Electrical Safety Code (NESC)
    - c. Occupational Safety and Health Act (OSHA)
  - 2. Communications:
    - a. TIA/EIA - 568: Commercial Building Telecommunications Cabling Standard
    - b. TIA/EIA - 569: Commercial Building Standard for Telecommunication Pathways and Spaces
    - c. TIA/EIA - 606: The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
    - d. TIA/EIA - 607: Commercial Building Grounding and Bonding Requirements for Telecommunications
    - e. ISO/IEC IS 11801: Generic Cabling for Customer Premises
    - f. BICSI: BICSI Telecommunications Cabling Installation Manual
    - g. BICSI: BICSI Telecommunications Distribution Methods Manual (TDMM)

- h. BICSI: BICSI Customer-Owned Outside Plant Design Manual (CO-OSP)

#### 1.04 DEFINITIONS

- A. "TMGB" shall mean *Telecommunications Main Grounding Busbar*. There is typically one TMGB per building, located in the main telecommunications room. This busbar is directly bonded to the electrical service ground.
- B. "TGB" shall mean *Telecommunications Grounding Busbar*. There is typically one TGB per telecommunications room. The TGB is connected both to the TMGB and to building structural steel or other permanent metallic systems.
- C. "TBB" shall mean *Telecommunications Bonding Backbone*. The TBB is a conductor used to connect TMGBs to TGBs.

#### 1.05 SYSTEM DESCRIPTION

- A. Furnish, install, and place into satisfactory and successful operation all materials, devices, and necessary appurtenances to provide a complete, permanent Grounding and Bonding infrastructure for communications circuits, raceways, and cable trays as hereinafter specified and/or shown on the Contract Documents. The Grounding and Bonding system shall support an ANSI/TIA/EIA and ISO/IEC compliant communications Structured Cabling System (SCS).
- B. The work shall include materials, equipment and apparatus not specifically mentioned herein or noted on the plans but which are necessary to make a complete working ANSI/TIA/EIA and ISO/IEC compliant Grounding and Bonding system.

#### 1.06 SUBMITTAL INFORMATION

- A. Product Data Submittals: Provide submittal information for review before materials are delivered to the job site. Provide product data submittals for all products at the same time.
  - 1. Submit a letter stating that the materials will be provided as specified, and specifically listing any items that will not be provided as specified. The letter shall also state that the Contractor has reviewed the specified items and agrees that they are applicable to this project in all respects.
  - 2. For those items noted as allowing "or equal," and which are not being provided as specifically named, submit standard manufacturer's cut sheets or other descriptive information, along with a written description detailing the reason for the substitution.
  - 3. Provide standard manufacturer's cut sheets and the operating and maintenance (O&M) instructions at the time of submittal review for each device in the system, regardless of whether it is submitted as specified or as an approved equal. These instructions shall detail how to install and service the equipment and shall include information necessary for rough-in and preparation of the building facilities to receive the materials.
- B. Closeout Submittals: Provide submittal information for review as follows:
  - 1. O&M Manual for Communications - At the completion of the project, submit O&M information from product data submittals (above), updated to reflect any changes during the course of construction, to the Designer in the

- telecommunications-specific O&M Manual for Communications binder labeled with the project name and description.
2. Records - Maintain at the job site a minimum of one set of Record Drawings, Specification, and Addenda. Record Drawings shall consist of redline markups of drawings, specifications and spreadsheets.
    - a. Document changes to the system from that originally shown on the Contract Documents and clearly identify system component labels and identifiers on Record Drawings.
    - b. Keep Record Drawings at the job site and make available to the Owner and Designer at any time.
    - c. Keep Record Drawings current throughout the course of construction. ("Current" is defined as not more than one week behind actual construction).
    - d. Show identifiers for major infrastructure components on Record Drawings.

#### 1.07 SEQUENCING

#### 1.08 CONTRACTOR WARRANTY:

- A. Provide a Contractor-endorsed two-year service warranty against defects in materials and workmanship.
  1. Provide labor attributable to the fulfillment of this warranty at no cost to the Owner.
  2. The Contractor Warranty period shall commence upon Owner acceptance of the work.

### PART 2 - PRODUCTS

#### 2.01 GENERAL

- A. Materials shall consist of busbars, supports, bonding conductors and other incidentals and accessories as required.

#### 2.02 MATERIALS

- A. Grounding/Bonding:
  1. Telecommunications Main Grounding Bus Bar (TMGB):
    - a. Large (20" x 4" x 1/4"), Pre-drilled: CPI 10622-020, or equal
    - b. Small (10" x 4" x 1/4"), Pre-drilled: CPI 10622-010, or equal
  2. Telecommunications Grounding Bus Bar (TGB):
    - a. Large (20" x 4" x 1/4"), Pre-drilled: CPI 10622-020, or equal
    - b. Small (10" x 4" x 1/4"), Pre-drilled: CPI 10622-010, or equal
  3. Telecommunications Bonding Backbone: #6 AWG insulated (green in color) copper conductor.
  4. Grounding Conductor: #6 AWG insulated (green in color) copper conductor.
- B. Firestopping material: Conform to both Flame (F) and Temperature (T) ratings as required by local building codes and as tested by nationally accepted test agencies per ASTM E814 or UL 1479 fire test in a configuration that is representative of the actual field conditions.

- C. Labels: As recommended in ANSI/TIA/EIA 606. Permanent (i.e. not subject to fading or erasure), permanently affixed, and created by a hand-carried label maker or a computer/software-based label making system. Handwritten labels are not acceptable.
  - 1. Hand-carried label maker:
    - a. Brady: ID Pro Plus (or approved equal).
  - 2. Labels:
    - a. Brady: Bradymaker Wire Marking Labels WML-511-292 (or approved equal)

### PART 3 - EXECUTION

#### 3.01 GENERAL

- A. The Contractor is solely responsible for the safety of the public and workers in accordance with all applicable rules, regulations, building codes and ordinances.
- B. All work shall comply with applicable safety rules and regulations including OSHA. All work shall comply with the requirements of the National Electrical Safety Code (NEC) and the NEC except where local codes and/or regulations are more stringent, in which case the local codes and/or regulations shall govern.
- C. All work shall comply with the standards, references and codes listed in PART 1 -- REFERENCES above. Where questions arise regarding which standards, references, or codes apply, the more stringent shall prevail.
- D. All work shall comply with the requirements and recommendations of the product manufacturers. Where questions arise regarding which requirements and recommendations apply, the more stringent shall prevail.
- E. Replace and/or repair to original (or better) condition any existing structures, materials, equipment, etc. inadvertently demolished or damaged by the Contractor during the course of construction at no additional cost to the Owner.
- F. Install the grounding and bonding system in a manner ensuring that communications circuits, when installed, are able to fully comply with the ANSI/TIA/EIA and other references listed in Part 1 — References, above.
- G. Remove surplus material and debris from the job site and dispose of legally.

#### 3.02 INSTALLATION

- A. The grounding and bonding infrastructure system shall not make use of the building plumbing system, unless required to do so by the NEC.
  - 1. Coordinate the installation of the grounding and bonding system with the electrical power distribution system grounding infrastructure.
- B. Ground/Bonding:
  - 1. TMGB: Provide a minimum of one TMGB per telecommunications entrance room for each building and as shown on the Contract Documents. Install TMGB(s) and directly bond TMGB(s) to electrical service ground and to associated TBB(s). Group protector, busbar bonding, and approved building

grounding conductors toward one end of the TMGB and leave space for equipment grounding conductors on the other end.

2. TGB: Provide a minimum of one TGB per telecommunications room for each building and as shown on the Contract Documents and as required by the standards, references and codes listed in PART 1 -- REFERENCES above. Directly bond each TGB to its associated TBB and to the nearest building structural steel or other permanent metallic system. Group protector, busbar bonding, and approved building grounding conductors toward one end and leave space for equipment grounding conductors on the opposite end.
3. TBB(s) and Grounding Conductors: Provide TBB(s) and grounding conductors as shown on the Contract Documents and as required to bond all non-current carrying metal telecommunications equipment and materials to the nearest TGB. Use TBB(s) to connect the TMGB to each TGB. Route along the shortest and straightest path possible with minimal bends. Bends shall be sweeping. Insulate TBB(s) and conductors from their support. TBB(s) and grounding conductors shall be continuous (without splices).
  - a. Ensure that bonding breaks through paint to bare metallic surface of all painted metallic hardware.

C. Firestopping

1. Only employees trained/certified by the firestopping manufacturer shall apply firestopping materials.
2. Maintain the fire rating of all penetrated fire barriers. Fire stop and seal all penetrations made during construction.
  - a. Provide firestopping material for through and membrane penetrations of fire-rated barriers.
  - b. Install firestops in strict accordance with manufacturer's detailed installation procedures.
  - c. Install firestops in accordance with fire test reports, fire resistance requirements, acceptable sample installations, manufacturer's recommendations, local fire and building authorities, and applicable codes and standards referenced in PART 1 – REFERENCES. Apply of sealing material in a manner acceptable to the local fire and building authorities.
  - d. For demolition work, apply firestopping to open penetrations in fire rated barriers where cable is removed. Apply firestopping regardless of whether or not the penetrations are used for new cable or left empty after construction is complete.
  - e. Firestopping material used to seal open penetrations through which cable passes shall be re-usable/re-enterable.

D. Labels:

1. Label TMGB(s) with "TMGB"
2. Label TGB(s) with "TGB".
3. Label TBB(s) and bonding conductors "WARNING! TELECOMMUNICATIONS BONDING CONDUCTOR. DO NOT REMOVE OR DISCONNECT!"