

University of Houston Master Specification

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SECTION 28 0526 - GROUNDING AND BONDING FOR ELECTRONIC SAFETY AND SECURITY

These specifications provide basic minimum criteria to be met in preparing the final specifications for this Section, which is the responsibility of the Designer. Revise this Section by deleting and inserting text to meet Project-specific requirements.

Maintain Section format, including the UH Master Spec designation and version date in bold in the center columns in the header and footer. Complete the header and footer with Project information.

Designer is required to adhere to the University's "Electronic Access Control Design Guide" and "Network Infrastructure Design Standards" available in Owner's Design Guidelines on the Facilities Planning and Construction web site.

This Section uses the term "Architect" or "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 work of 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 SECTION INCLUDES

- A. Security and Communications system grounding.

1.3 SUMMARY

- A. Work covered by this Section consists of furnishing labor, equipment, supplies, materials, and testing unless otherwise specified, and in performing the following operations recognized as necessary for the installation, termination, and labeling of grounding and bonding infrastructure as described on the Drawings and/or required by these specifications.

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- B. Extend the Telecommunications Bonding Backbone into the Security Room, install a Telecommunication Grounding Bus bar (TGB) and bond all Security elements in the Security Room to the TGB with minimum 6 AWG bonding conductor.

1.4 DEFINITIONS

- A. TO - Telecommunications Outlet: Point of connectivity for voice, data or video on the wall or in the floor. Refer to Telecommunications Drawings and Symbol sheet(s) for quantities and types of media at each outlet.
- B. BDF - Building Distribution Frame: A termination frame for unshielded twisted pair cable, usually providing a connection field for PBX telephone ports and feeder/riser cables to IDF's.
- C. IDF - Intermediate Distribution Frame: A termination frame for unshielded twisted pair cabling providing a connection field for horizontal wiring from the workstation and feeder/riser cables extended from the BDF.
- D. TMGB - Telecommunications Main Grounding Busbar: The dedicated extension of the building grounding electrode system for the telecommunications infrastructure.
- E. TGB - Telecommunications Grounding Busbar: The grounding connection point for telecommunications systems and equipment in the area served by an IDF.
- F. TBB - Telecommunications Bonding Backbone: A bonding conductor that provides direct connection between the TGB's and TMGB.

1.5 REFERENCES

- A. Follow Section 01 4200 "References" and the following:
- B. American Society for Testing and Materials (ASTM):
 - 1. B 3 Soft or Annealed Copper Wires.
 - 2. B 8 Concentric-Lay-Stranded Copper Conductors, Hard, Medium Hard, Soft.
 - 3. B 33 Tinned Soft or Annealed Copper Wire for Electrical Purposes.
- C. Institute of Electrical and Electronics Engineers (IEEE):
 - 1. 142-82 Recommended Practice for Grounding of Industrial and Commercial Power Systems.
 - 2. 1100 Recommended Practice for Powering and Grounding Sensitive Electronic Equipment in Industrial and Commercial Power Systems.
- D. Underwriters' Laboratories (UL):
 - 1. 83 Thermoplastic Insulated Wire and Cables
 - 2. 96 Lightning Protection Components.
 - 3. 96A System Installation.

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4. 467 Grounding and Bonding Equipment.
- E. National Fire Protection Association (NFPA):
 1. 780 Lightning Protection Code.
 2. 70 National Electrical Code (NEC).
 - a. a.NEC Article No. 250 - Grounding
- F. American National Standards Institute/Telecommunications Industry Association/Electronic Industries Alliance (ANSI/TIA/EIA):
 1. J-STD-607- C Commercial Building Grounding and Bonding Requirements.
 2. Telcordia – Network Equipment Building Systems (NEBS) GR-1275.
- G. Building Industry Consulting Services International (BICSI):
 1. Telecommunications Distribution Methods Manual.
 2. Customer Owned Outside Plant Design Manual.

PART 2 - PRODUCTS

2.1 GROUNDING BUSBARS

- A. Telecommunications Main Grounding Busbar (TMGB)
 1. Chatsworth #10622-0 20 ground busbar with Chatsworth #10622-000 busbar insulators.
- B. Telecommunications Grounding Busbar (TGB)
 1. Chatsworth #10622-012 ground busbar with Chatsworth #10622-000 busbar insulators.
- C. Substitutions
 1. Refer to Section 01 2500 "Substitution Procedures."

2.2 GROUNDING JOINTS AND SPLICES

SELECT FIRST OR SECOND PARAGRAPH AND RELATED SUBPARAGRAPHS BELOW TO SUIT PROJECT.

- A. Grounding conductor joints/splices shall be mechanical type, copper alloy, with a minimum of two bolts and a separate section for each conductor. Acceptable products:
 1. Burndy "QPX", OZ/Gedney "XTP" or "PMX."
 2. Penn-Union "VX."
- B. Grounding conductor joints/splices shall be copper compression type with two indents. Acceptable products:
 1. Burndy.

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- 2. T&B.
- 3. Blackburn.

SELECT FIRST OR SECOND PARAGRAPH AND RELATED SUBPARAGRAPHS BELOW TO SUIT PROJECT.

C. Grounding conductor terminations (lugs) shall be single barrel, mechanical screw type, copper alloy with machined contact surfaces. Acceptable products:

- 1. OZ type "SL."
- 2. T&B.
- 3. Burndy.

D. Grounding conductor terminations (lugs) shall be copper compression type with two indents. Acceptable products:

- 1. Burndy.
- 2. T&B.
- 3. Blackburn.

2.3 BONDING CONDUCTORS

A. Cable Tray Bonding Conductor:

- 1. Green # 6 AWG insulated bonding jumper (12 inch maximum) with appropriate lugs or manufactured braided copper grounding jumper. Acceptable products:
 - a. B-Line #CAM-GJ.
 - b. T&B #BD12.
 - c. OZ/Gedney type "FB."
 - d. Mono-Systems.

B. Equipment Frame Bonding Conductor:

- 1. Panduit #TRGK672 Telecommunications Rack Grounding Kit.

C. Bonding Conductor (BC):

- 1. Green insulated copper bonding conductor, size as required by NEC.
- 2. The BC shall be, at a minimum, the same size as the TBB.

D. Telecommunications Bonding Backbone (TBB):

- 1. Green insulated copper conductor, minimum size of No. 6 AWG. The TBB shall be sized at 2 kcmil per linear foot of conductor length up to a maximum size of 3/0 AWG. Insulation shall meet fire ratings of its pathway.

a.	TBB length (feet)	TBB Size (AWG)
1)	Less than 13	6
2)	14-20	4
3)	21-26	3
4)	27-33	2

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5)	34-41	1
6)	42-52	1/0
7)	53-66	2/0
8)	Greater than 66	3/0

PART 3 - EXECUTION

3.1 TELECOMMUNICATIONS INSTALLATION

A. Installation of the TMGB:

1. Install the TMGB at the bottom of plywood backboard near the outside plant entrance conduits in the BDF.
2. Install TMGB so that the BC for telecommunications is as short and straight as possible.
3. Install conductor in continuous 3/4 inch conduit.

B. Installation of the TGB:

1. Install the TGB at the bottom of plywood backboard near the copper riser terminations in each IDF and Security Room.
2. Install TGB so that the TBB for telecommunications is as short and straight as possible.

C. Installation of the TBB:

1. Install green insulated copper grounding conductor (refer to Bonding Conductors paragraph 2.3.D for conductor size). Homerun from the TMGB to each TGB or as approved by TIA 607-C.

D. Installation of Grounding Conductor Joints/Splices:

1. Install mechanical type, copper alloy, with a minimum of two bolts and a separate section for each conductor or copper compression type with two indents.
2. Install manufactured insulating cover or heavy tape insulation over joints/splices.

E. Grounding of Cable Tray:

1. Install green #6 AWG bonding jumper (12 inches maximum) with appropriate lugs at each cable tray joint or install manufactured braided copper grounding jumper.
2. Install Green #6 AWG grounding conductor with appropriate lugs from side of cable tray down to TMGB or TGB. Drill and tap side of cable tray (for appropriate size bolt, 1/4 inch x 20 minimum), making sure that bolt does not extend into wire management part of tray.

F. Grounding of Equipment Frame:

1. Install Panduit Telecommunications Rack Grounding Kit from equipment frame to grounded cable tray, TMGB, or TGB.

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