(NOTE TO DESIGNER: These Specifications are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer.)

SECTION 28 05 26
GROUNDING AND BONDING FOR ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Grounding electrodes and conductors.

B. Equipment grounding conductors.

C. Bonding.

D. Communication system grounding.

E. Electrical equipment and raceway grounding and bonding.

F. Control equipment grounding.

1.2 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.

1.3 RELATED SECTIONS

A. Refer to Section 28 05 00 for detailed information on scope of work.

B. Refer to Section 28 05 53 for all labeling requirements.

C. University of Houston Campus Design Guideline and Standards Security System Standards (latest edition)

1.4 DEFINITIONS

A. MER - Main Equipment Room: The main room, which typically contains the PBX, MDF and main Data Communications equipment.

B. ER - Equipment Room: Any additional room containing switches, hubs, patch panels and cross-connects away from a central location to serve areas out of distance from the MER.

C. 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.

D. MDF - Main Distribution Frame: A termination frame for unshielded twisted pair cable, usually providing a connection field for PBX telephone ports and feeder/riser cables to TR's. The MDF is normally located in the MER.

E. 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 MER.

F. TMGB - Telecommunications Main Grounding Busbar: The dedicated extension of the building grounding electrode system for the telecommunications infrastructure.

G. TGB - Telecommunications Grounding Busbar: The grounding connection point for telecommunications systems and equipment in the area served by an ER.

H. TBB - Telecommunications Bonding Backbone: A bonding conductor that provides direct connection between the TGB's and TMGB.

1.5 REFERENCES

A. Follow Section 01423

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
4. 467 Grounding and Bonding Equipment

E. National Fire Protection Association (NFPA):
1. 780 Lightning Protection Code
2. 70 National Electrical Code (NEC)
   a. NEC Article No. 250 - Grounding

F. American National Standards Institute/Telecommunications Industry Association/Electronic Industries Alliance (ANSI/TIA/EIA):
1. J-STD-607-A 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

H. Local, county, state and federal regulations and codes in effect as of date of “notice to proceed” shall be complied with.

PART 2 - PRODUCTS

2.1 GROUNDING BUSBARS

A. Telecommunications Main Grounding Busbar (TMGB)
1. Chatsworth #10622-012 ground busbar with Chatsworth #10622-000 busbar insulators or equivalent.

B. Telecommunications Grounding Busbar (TGB)
1. Chatsworth #10622-012 ground busbar with Chatsworth #10622-000 busbar insulators or equivalent.

2.2 GROUNDING JOINTS AND SPLICES

A. Grounding conductor joints/splices shall be mechanical type, copper alloy, with a minimum of two bolts and a separate section for each conductor equal to Burndy “QPX”, OZ/Gedney “XTP” or “PMX” or Penn-Union “VX” or copper compression type with two (2) indents equal to Burndy, T&B or Blackburn.

B. Grounding conductor terminations (lugs) shall be single barrel, mechanical screw type, copper alloy with machined contact surfaces equal to OZ type "SL", T&B, or Burndy or copper compression type with two (2) indents equal to Burndy, T&B or Blackburn.

2.3 BONDING CONDUCTORS

A. Cable Tray Bonding Conductor
   1. Green #8 AWG insulated bonding jumper (12" max) with appropriate lugs or manufactured braided copper grounding jumper equal to B-Line #CAM-GJ, T&B #BD12, OZ/Gedney type "FB" or 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, as 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. Table 1
         1) Sizing of the TBB
         2) TBB length (ft) TBB Size (AWG)
            (a) Less than 13 6
            (b) 14-20 4
            (c) 21-26 3
            (d) 27-33 2
            (e) 34-41 1
            (f) 42-52 1/0
            (g) 53-66 2/0
      b. 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 "MDF".
   2. TMGB shall be installed so that the BC for telecommunications is as short and straight as possible.
   3. Conductor shall be installed in continuous 3/4" conduit.

B. Installation of the TGB
   1. Install the TGB at the bottom of plywood backboard near the copper riser terminations in each "IDF".
   2. TGB shall be installed 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 2.03.D for conductor size) from the TMGB to each TGB.

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 (2) indents.
   2. Install manufactured insulating cover or heavy tape insulation over joints/splices.

E. Grounding of Cable Tray

1. Install Green #8 AWG bonding jumper (12" max) with appropriate lugs at each cable tray joint or install manufactured braided copper grounding jumper equal to B-Line #CAM-GJ, T&B #BD12, OZ/Gedney type "FB" or Mono-Systems.
2. Install Green #8 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, ¼" x 20 min.), making sure that bolt does not extend into wire management part of tray.

F. Grounding of Equipment Frame
1. Install Panduit or equivalent Telecommunications Rack Grounding Kit from equipment frame to grounded cable tray, TMGB, or TGB.

END OF SECTION