READ THIS FIRST

Notice to the Design Engineer, please refer to the Port of Seattle, Facilities and Infrastructure standards for reference before editing this specification.

This Project Spec Document may need additional modifications to suit your project. It is recommended that you proofread each section, paying attention to any “Notes” boxes such as this one--you should remove these “Notes” sections as you go. Also, do a search for all bracket characters “ [ ] “ as they are used to show you areas containing options or project specific details (you can use Microsoft Word’s Find feature {Ctrl-F} to jump to an open bracket “ [ “ character quickly). Again, these bracket characters should be removed.

It is important that every paragraph be numbered to allow for easy referencing. If you use the document’s built in styles and formatting your outline should be fine (turn on the formatting toolbar by going to View > Toolbars > Formatting). Most paragraphs will use the style “Numbered Material” and can be promoted (Shift) or demoted (Shift-Tab).

You should not have to manually enter extra spaces, carriage returns or outline characters such as A, B, C, or 1.01, 1.02; the formatting will do this for you. The entire document is 11 pt. Arial. If you paste items in, you may need to reapply the “Numbered Material” format.

1. GENERAL
   1. SUMMARY OF WORK
      1. The extent and location of “Grounding and Bonding for Communication Systems” Work is shown in the Contract Documents. This section includes grounding and bonding of communications systems and equipment. Grounding and bonding requirements specified in this section may be supplemented by special requirements of systems described in other Sections.
   2. GOVERNING CODES, STANDARDS AND REFERENCES
      1. ANSI/BICSI N3-20 (American National Standards Institute/Building Industry Consulting Services International) - Planning and Installation Methods for Bonding and Grounding of Telecommunication and ICT Systems and Infrastructure
      2. ANSI/TIA-607 (American National Standards Institute/Telecommunication Industry Association) - Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises
      3. ASTM B8 (American Society for Testing and Materials) - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
      4. NFPA 70 (National Fire Protection Association) - National Electrical Code (NEC)
      5. NFPA 780 (National Fire Protection Association) - Standard for the Installation of Lightning Protection Systems
      6. UL (Underwriters Laboratories)
      7. UL 467 (Underwriters Laboratories) - Grounding and Bonding Equipment
   3. SUBMITTALS
      1. Submit materials data in accordance with of Section 01 33 00 - Submittals. Furnish manufacturers’ technical literature, standard details, product specifications, calibration reports, and installation instructions for all products.
      2. Submittals shall include the following:
         1. Product Data: For each type of product indicated.
         2. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
            1. Grounding: Indicate locations of grounding bus bars.
            2. Grounding and Bonding System line diagram.
         3. Field quality control reports.
         4. As-Built Data: Plans showing dimensioned as-built locations of grounding features.
   4. QUALITY ASSURANCE
      1. Installer Qualifications: All installation of the Telecommunication Ground Systems shall be done by a licensed electrician.
      2. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
   5. PROJECT CONDITIONS
      1. Environmental Limitations: Do not deliver or install equipment frames and cable trays until spaces are enclosed and weather tight, wet work in spaces is complete and dry.
   6. COORDINATION
      1. Coordinate layout and installation of communications pathways with the other trades installing equipment in the ceiling.
      2. Coordinate grounding and bonding of communications systems with the electrical installer.
      3. Coordinate the labeling scheme for the communications systems with the Owner.
2. PRODUCTS

A. If only one product is acceptable (single or sole source product), obtain an approved Competition Waiver and submit to the CPO Construction, Contract Administrator. The language shall read as: “Manufacturer Name, Product # XXXXX, No Equal.” Refer to CPO-6 Competition Waiver Policy for more information.

B. If a Competition Waiver is not approved or more than one product is acceptable, this section must list a minimum of 2 products plus the language “Or Approved Equal,” along with salient characteristics. Refer to CPO Construction’s Salient Characteristics Guidelines for more information.

* 1. MANUFACTURERS
     1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
        1. Chatsworth Products, Inc. (CPI)
        2. Harger Lightning & Grounding
        3. Commscope
        4. Or Approved Equal
  2. GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS
     1. Grounding Electrode System
        1. Comply with requirements of Section 26 05 26 – Grounding and Bonding for Electrical Systems.
     2. Primary Bonding Busbar
        1. The PBB (Primary Bonding Busbar) must be a predrilled copper busbar with holes for use with standard- sized lugs, have minimum dimensions of 6.3 mm (0.25 in) thick by 101 mm (4 in) wide, and length per contract drawings. It must be listed by an NRTL.
        2. Hole patterns on the busbars shall accommodate two-hole lugs per the of ANSI/BICSI N3-20 and ANSI/TIA-607 standards.
        3. Accessories:
           1. Insulators to electrically isolate busbars from the mounting surfaces.
           2. Mounting hardware shall be stainless steel hardware to fasten the two-hole ground lugs to the Busbar.
     3. Secondary Bonding Busbar
        1. The SBB (Secondary Bonding Busbar) must be a predrilled copper busbar with holes for use with standard- sized lugs, have a minimum dimension of 6.3 mm (0.25 in) thick by 51 mm (2 in) wide, and length per contract drawings. It must be listed by an NRTL.
        2. Hole patterns on the busbars shall accommodate two-hole lugs per the ANSI/BICSI N3-20 and ANSI/TIA-607 standards.
        3. Accessories:
           1. Insulators shall electrically isolate Busbars from the wall, or other mounting surfaces, thereby controlling the current path.
           2. Mounting hardware 316 stainless steel hardware to fasten the two-hole ground lugs to the Busbar.
     4. Grounding Conductors
        1. Comply with requirements of Section 26 05 26 – Grounding and Bonding for Electrical Systems.
     5. Bonding Accessories
        1. Two Mounting Hole Ground Terminal Block for Racks and Cabinets
           1. Ground terminal block shall be made of electroplated tin aluminum extrusion.
           2. Ground terminal block shall accept conductors ranging from #14 AWG through 2/0.
           3. The conductors shall be held in place by two stainless steel set screws.
           4. Ground terminal block shall have two 1/4” (6.4 mm) holes spaced on 5/8” (15.8 mm) centers.
           5. Ground terminal block shall be UL Listed as a wire connector.
        2. Compression Lugs
           1. Compression lugs shall be manufactured from electroplated tinned copper.
           2. Compression lugs shall have two holes spaced on [5/8”] (15.8 mm) [1”] (25.4 mm) centers.
           3. Compression lugs shall be sized to fit a specific size conductor, sizes #6 AWG to 4/0, as stated below.
           4. Compression lugs shall be UL Listed as wire connectors.
        3. Antioxidant Joint Compound
           1. Oxide inhibiting joint compound for copper-to-copper, aluminum-to- aluminum or aluminum-to-copper connections.
        4. C-Type, Compression Taps
           1. Compression taps shall be manufactured from copper alloy.

Remove below paragraph if no raised floor in project.

* + - 1. Pedestal Clamp With Grounding Connector
         1. Pedestal clamp shall be made from [electroplated tinned copper][ bronze]. Installation hardware will be stainless steel.
         2. Pedestal clamps shall be sized to fit #6 AWG or #2/0 AWG.
         3. Pedestal clamp installation hardware shall be sized to attach to round and/or square raised access floor pedestals.
         4. Pedestal clamp shall provide straight (in-line) or cross (intersection) support for up to two conductors.
      2. Pipe Clamp With Grounding Connector
         1. Pipe clamp shall be made from electroplated tinned bronze. Installation hardware will be stainless steel.
         2. Pipe clamp shall be sized to fit up to two conductors ranging in size from #6 AWG to 250KCMIL; conductors must be the same size.
         3. Pipe clamp installation hardware shall be sized to attach to pipes, sizes 1” to 6” (0.75” to 6.63” in diameter).
      3. Equipment Ground Jumper Kit
         1. Kit includes one 24”L insulated ground jumper with a straight two hole compression lug on one end and an L-shaped two hole compression lug on the other end, two plated installation screws, an abrasive pad and a 0.5oz tube of antioxidant joint compound.
         2. Ground conductor is an insulated green/yellow stripe #6 AWG wire
         3. Lugs are made from electroplated tinned copper and have two mounting holes spaces 0.5” to 0.625” apart that accept 1/4” screws.
         4. Jumper will be made with UL Listed components.

1. EXECUTION
   1. GENERAL
      1. All installation of the Communication Ground Systems shall be done by a licensed electrician. This includes but not limited to:
         1. PBB (Primary Bus Bar) and SBB (Secondary Bus Bar)
         2. All communications grounding and bonding conductors.
         3. Bonding to all non-active (non-current carrying) communications metal support structures, rack, runway, etc. within each Communication Room or Space.
      2. The PBB/SBB is not to be used as an ac equipment ground.
      3. The TBB should not be placed in ferrous metallic conduit. If it is necessary to place grounding and bonding conductors in conduit that exceeds 1m (3’) in length, the conductors shall be bonded to each end of the conduit using a grounding bushing or a # 6 AWG conductor, minimum.
      4. Provide grounding connections as specified in Section 26 05 26 – Grounding and Bonding for Electrical Systems.
   2. INSTALLATION
      1. Outdoor grounding and bonding connections.
         1. Provide outdoor grounding and bonding connections as specified in Section 26 05 26 – Grounding and Bonding for Electrical Systems.
      2. Wall-Mount Bus Bars
         1. Attach bus bars to the wall with appropriate hardware according to the manufacturer’s installation instructions.
         2. Conductor connections to the PBB or SBB shall be made with two-hole bolt-on compression lugs sized to fit the busbar and the conductors.
         3. Each lug shall be attached with stainless steel hardware after preparing the bond according to manufacturer recommendations and treating the bonding surface on the busbar with antioxidant to help prevent corrosion at the bond.
         4. The wall-mount busbar shall be bonded to ground as part of the overall Telecommunications Bonding and Grounding System.
      3. Grounding Conductors
         1. Telecommunications grounding connectors shall have a minimum size of #6 AWG.
         2. All Telecommunication grounding conductors shall be sized so that no more than 40V can be present along its entire length.
      4. Rack and Cabinet Mount Bus Bars and Ground Bars
         1. Provide bus bar as shown in the Contract Documents.
         2. Bond the rack-mount bus bar or ground bar to the room’s PBB or SBB.
      5. Ground Terminal Block
         1. Provide as needed to bond rack and cabinet to the PBB or SBB.
      6. Bonding Conductor
         1. Where building steel is available within the room, the PBB/SBB shall be bonded to the nearest structural steel column.
         2. Where building steel is not available withing the room, a bonding conductor can be routed between PBB and the nearest effectively grounded AC electrical branch circuit panel board, provided a low ground impedance of the panel board has been verified with a ground impedance tester.
         3. The size of any bonding conductors shall follow the recommended sizes shown on the drawings.
         4. Comply with requirements in Section 26 05 26 – Grounding and Bonding for Electrical Systems.
   3. IDENTIFICATION
      1. Identify system components, wiring, and cabling complying with ANSI/TIA-606-A. Comply with requirements in Section 27 05 53 – Identification and Labeling.
      2. Provide nonmetallic pre-printed labels, white background with black printing that can be permanently mounted to the busbar.
      3. The bonding conductors for telecommunications, TBB conductor, and each grounding equalizer shall be green or marked with a distinctive green color.
         1. All cabling used to bond grounds are to be tagged with labels with the point of origin and destination i.e. going to/coming from, with printed labels.
2. MEASUREMENT AND PAYMENT
   1. GENERAL
      1. No separate measurement or payment will be made for the Work required by this section. The cost for this portion of the Work will be considered incidental to, and included in the payments made for the applicable bid items in the [Schedule of Unit Prices] [Lump Sum price bid for the Project].

End of Section

Revision History:

10/11/2018 New Section

10/14/2021 Revised for clarity