

**Part 1            General**

**1.1            RELATED SECTIONS**

- .1        Section 27 05 28 - Pathways for Communications Systems.
- .2        Section 27 10 05 - Structured Cabling for Communications Systems.

**1.2            REFERENCES**

- .1        American National Standards Institute
  - .1        ANSI J-STD-607-A-2002, Joint Standard - Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications.
  - .2        Telecommunications Industries Association (TIA)/Electronic Industries Alliance (EIA)
    - .1        TIA/EIA-606-2002, Administration Standard for the Commercial Telecommunications Infrastructure.
  - .3        U.S. Department of Labor/Occupational Safety and Health Administration (OSHA)
    - .1        Nationally Recognized Testing Laboratory (NRTL).

**1.3            SYSTEM DESCRIPTION**

- .1        Telecommunications grounding and bonding system consist of grounding busbars, bonding backbones, and other bonding conductors.
- .2        Provides ground reference for telecommunications systems within building and bonding to it of telecommunications rooms.
- .3        Metallic pathways, cable shields, conductors, and hardware within telecommunications spaces are bonded to telecommunications grounding and bonding system.

**1.4            QUALITY ASSURANCE**

- .1        Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

**1.5            DELIVERY, STORAGE AND HANDLING**

- .1        Waste Management and Disposal:
  - .1        Dispose of packaging and waste materials in appropriate on-site bins for recycling and disposal in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .2        Indoor Environmental Quality Credit EQ - 4.4 Low - Emitting Materials. Co-ordinate with Section 01 35 21 - LEED Requirements.
  - .3        Adhesives, sealants and sealant primers: Low VOC to meet requirements of LEED Indoor Environmental Quality Credit EQ – 4.1        Low-Emitting Materials: Adhesives and Sealants.

- .1 Low VOC complying with SCAQMD Rule #1168, October 2003,
- .4 Paints and coatings: Low VOC to meet requirements of LEED Indoor Environmental Quality Credit EQ – 4.2: Low-Emitting Materials: Paints and Coatings.
  - .1 Conform with VOC and Chemical component limits of Green Seal's Standard GS-11 January 1993 requirements.
  - .2 VOC content of anti-corrosive coatings must be less than VOC content limits of Green Seal Standard GS-03 May 1997 requirements.
  - .3 Paints and coatings not covered by GS-11 and GS-03 to meet requirements of SCAQMD Rule #1113, November 1996.
- .2 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

## **Part 2 Products**

### **2.1 TELECOMMUNICATIONS MAIN GROUNDING BUSBAR (TMGB)**

- .1 Predrilled copper busbar, listed by NRTL, electrotin plated with holes 8 mm diameter for use with standard-sized lugs to: ANSI J-STD-607-A .
- .2 Dimensions 6 mm thick, 50 mm wide, 200 mm long to: ANSI J-STD-607-A.

### **2.2 BONDING CONDUCTOR FOR TELECOMMUNICATIONS**

- .1 #6 AWG copper conductor, green marked to: ANSI J-STD-607-A.

### **2.3 WARNING LABELS**

- .1 Non-metallic warning labels in English and French to: ANSI J-STD-607-A.
- .2 Identify labels with wording "If this connector is loose or must be removed, please call the building telecommunications manager".

## **Part 3 Execution**

### **3.1 TELECOMMUNICATIONS MAIN GROUNDING BUSBAR (TMGB)**

- .1 Install TMGB in entrance room on insulated supports 50 mm high at location close to electrical power panel if one is installed in same room as indicated.
- .2 Install #6 AWG copper bonding conductor from TMGB to alternating current equipment ground (ACEG) of serving electrical power panel (panelboard).

### **3.2 BONDING CONDUCTORS GENERAL**

- .1 When placed in ferrous metallic conduit or EMT longer than 1 m, bond to each end of conduit or EMT using grounding bushing.

**3.3                    BONDING CONDUCTOR FOR TELECOMMUNICATIONS**

- .1      Install bonding conductor for telecommunications from TMGB to service equipment (power) ground.
- .2      Use exothermic welding, approved 2 hole compression lugs for connection to TMGB.

**3.4                    BONDING TO TMGB**

- .1      Bond metallic raceways in telecommunications entrance room to TMGB using #6 AWG green marked copper conductor.
- .2      For cables within telecommunications entrance room having shield or metallic member, bond shield or metallic member to TMGB using #8 AWG copper conductor.
- .3      Bond equipment cabinet located in telecommunications entrance room to TMGB using #6 AWG green marked copper conductor.

**3.5                    LABELLING**

- .1      Apply warning labels to telecommunications bonding and grounding conductors.
- .2      Apply additional administrative labels to: TIA/EIA-606.

**END OF SECTION**

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**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .2        Section 26 05 31 - Splitters, Junction, Pull Boxes and Cabinets.
- .3        Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

**1.2                SYSTEM DESCRIPTION**

- .1        Empty telecommunications raceways system consists of outlet boxes, cover plates, terminal distribution cabinets, conduits, cabletroughs, pull boxes, sleeves and caps, fish wires, service poles, service fittings, concrete encased ducts.
- .2        Overhead distribution system.

**1.3                WASTE MANAGEMENT AND DISPOSAL**

- .1        Waste Management and Disposal:
  - .1        Dispose of packaging and waste materials in appropriate on-site bins for recycling and disposal in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .2        Indoor Environmental Quality Credit EQ - 4.4 Low - Emitting Materials. Co-ordinate with Section 01 35 21 - LEED Requirements.
  - .3        Adhesives, sealants and sealant primers: Low VOC to meet requirements of LEED Indoor Environmental Quality Credit EQ – 4.1        Low-Emitting Materials: Adhesives and Sealants.
    - .1        Low VOC complying with SCAQMD Rule #1168, October 2003,
  - .4        Paints and coatings: Low VOC to meet requirements of LEED Indoor Environmental Quality Credit EQ – 4.2: Low-Emitting Materials: Paints and Coatings.
    - .1        Conform with VOC and Chemical component limits of Green Seal's Standard GS-11 January 1993 requirements.
    - .2        VOC content of anti-corrosive coatings must be less than VOC content limits of Green Seal Standard GS-03 May 1997 requirements.
    - .3        Paints and coatings not covered by GS-11 and GS-03 to meet requirements of SCAQMD Rule #1113, November 1996.

**Part 2            Products**

**2.1                MATERIAL**

- .1        Conduits: EMT type, in accordance with Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

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- .2 Junction boxes, cabinets type E T: in accordance with Section 26 05 31 - Splitters, Junction, Pull Boxes and Cabinets.
  - .3 Outlet boxes type, conduit boxes size, and fittings: in accordance with Section 26 05 31 - Splitters, Junction, Pull Boxes and Cabinets.
  - .4 Fish wire: polypropylene type.

**Part 3 Execution**

**3.1 INSTALLATION**

- .1 Install empty raceway system, including overhead distribution system, fish wire, terminal cabinets, outlet boxes, floor boxes, pull boxes, cover plates, conduit, sleeves and caps, cabletroughs, service poles, miscellaneous and positioning material to constitute complete system.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED SECTIONS**

- .1        Section 27 05 26 – Grounding and Bonding for Communications Systems.
- .2        Section 27 05 28 – Pathways for Communications Systems.

**1.2            REFERENCES**

- .1        Canadian Standards Association (CSA International)
  - .1        CSA-C22.2 No. 214-02, Communications Cables (Bi-National standard with UL 444).
  - .2        CSA-C22.2 No. 232-M1988(R2004), Optical Fiber Cables.
- .2        Telecommunications Industry Association (TIA)/Electronic Industries Alliance (EIA)
  - .1        TIA/EIA-568-B.1-(2001), Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements.
  - .2        TIA/EIA-568-B.2-(2001), Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted-Pair Cabling Components.
  - .3        TIA/EIA-606-A-(2002), Administration Standard for the Commercial Telecommunications Infrastructure.

**1.3            DEFINITIONS**

- .1        Refer to TIA/EIA-598-C, Annex A for definitions of terms: optical-fiber interconnect, distribution, and breakout cables.

**1.4            SYSTEM DESCRIPTION**

- .1        Structured telecommunications wiring system consist of unshielded-twisted-pair and optical fiber cables, terminations, connectors, cross-connection hardware and related equipment installed inside building for occupant's telecommunications systems, including voice (telephone), data, and image.
- .2        Installed in physical star configuration with separate horizontal and backbone sub-systems.
  - .1        Horizontal cables link work areas to telecommunications rooms located on same floor.

**1.5            SUBMITTALS**

- .1        Provide submittals in accordance with Section 01 33 00 - Submittal Procedures .
- .2        As-built Records and Drawings:
  - .1        Provide Microsoft Excel database reflecting cable installation and cross-connections.
  - .2        Provide electronic drawings in AutoCAD 2000 format depicting all construction.

- .3 Provide two (2) bound complete hard-copy sets of as-built records to the Contract Administrator.
  - .1 Provide and place one hard copy of as-built records for each telecommunications room in plan holder in each telecommunications room.

## **1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Waste Management and Disposal:
  - .1 Dispose of packaging and waste materials in appropriate on-site bins for recycling and disposal in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .2 Indoor Environmental Quality Credit EQ - 4.4 Low - Emitting Materials. Co-ordinate with Section 01 35 21 - LEED Requirements.
  - .3 Adhesives, sealants and sealant primers: Low VOC to meet requirements of LEED Indoor Environmental Quality Credit EQ – 4.1 Low-Emitting Materials: Adhesives and Sealants.
    - .1 Low VOC complying with SCAQMD Rule #1168, October 2003,
  - .4 Paints and coatings: Low VOC to meet requirements of LEED Indoor Environmental Quality Credit EQ – 4.2: Low-Emitting Materials: Paints and Coatings.
    - .1 Conform with VOC and Chemical component limits of Green Seal's Standard GS-11 January 1993 requirements.
    - .2 VOC content of anti-corrosive coatings must be less than VOC content limits of Green Seal Standard GS-03 May 1997 requirements.
    - .3 Paints and coatings not covered by GS-11 and GS-03 to meet requirements of SCAQMD Rule #1113, November 1996.

## **Part 2 Products**

### **2.1 MULTI-PAIR 100 Ω BALANCED TWISTED PAIR CABLE**

- .1 100 ohm, 25 pairs, sheath consists of thermoplastic jacket with underlying metallic shield, Category 3 to: TIA/EIA-568-B.2, flame test classification FT4 or MPG or CMG to: CSA-C22.2 No. 214.

### **2.2 WORK AREA UTP 4-PAIR MODULAR JACK**

- .1 Eight-position modular jack ("RJ-45"), type T568A Category 5e to: TIA/EIA-568-B.2 :
  - .1 In self-contained surface-mount box, 4 jacks per box.
  - .2 Mounted in compatible single gang faceplate, angle entry, 4 jack positions per faceplate.

### **2.3 TERMINATION AND CROSS-CONNECTION HARDWARE FOR UTP**

- .1 IDC Terminal strips, 25 pair, for terminating 25 pair 100 Ω balanced twisted pair cables and supporting cross-connections using jumper wires or compatible plug-ended patch cords: Category 5e to: TIA/EIA-568-B.2.

- .2 Mount or block for housing 12 IDC terminal strips, mounted on cabinet.
  - .1 Distribution rings or channels capable of externally mating with the above mount for managing cross-connection wires.
- .3 Patch panel, 1 rack unit high, 24 ports:
  - .1 Each port equipped with factory installed "RJ-45" jacks, type T568A Category 5e to: TIA/EIA-568-B.2.
  - .2 Horizontal cable-management unit for every 24 ports.

#### **2.4 UTP PATCH CORDS**

- .1 2 metres long, with factory-installed male plug at one end to mate with "RJ-45" jack and with factory-installed male plug at other end to mate with "RJ-45" jack to: TIA/EIA-568-B.2.

#### **2.5 UTP WORK AREA CORDS**

- .1 3 metres long, each end equipped with "RJ-45" plug Category 5e Category 6 to: TIA/EIA-568-B.2.

### **Part 3 Execution**

#### **3.1 INSTALLATION OF TERMINATION AND CROSS-CONNECT HARDWARE**

- .1 Install termination and cross-connect hardware in cabinet as indicated and according to manufacturers' instructions. Identify and label as indicated to: TIA/EIA-606-A.

#### **3.2 INSTALLATION OF HORIZONTAL DISTRIBUTION CABLES**

- .1 Install horizontal cables as indicated in conduits from telecommunication rooms to individual work-area jacks. Identify and label as indicated to: TIA/EIA-606-A.
- .2 Support horizontal cables at intervals not exceeding 1.2 metres.
  - .1 Where raceways are used to distribute cables to each zone, provide supplementary "J" hooks to support cables at intervals not exceeding 1.2 metres.
- .3 Terminate horizontal cables in telecommunications room and at individual work-area jacks.
  - .1 Identify and label as indicated to: TIA/EIA-606-A.
- .4 Coil spare cables and store in ceiling space in zone.
- .5 Harness slack cable in cabinets, racks, and wall-mounted termination and cross-connection hardware.

#### **3.3 IMPLEMENT CROSS-CONNECTIONS**

- .1 Implement cross-connections using patch cords as specified.

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**3.4 FIELD QUALITY CONTROL**

- .1 Test horizontal UTP cables as specified below and correct deficiencies provide record of results as hard copy and electronic record on CD.
  - .1 Perform tests for Permanent Link on installed cables, including spares:
    - .1 Category 5e using certified level IIe tester to: TIA/EIA-568-B.1.
  - .2 Perform tests for Channel on 20 % of cross-connected data horizontal cabling installed from each telecommunications room, including shortest and longest drops from each telecommunications room: should more than 5 % of tested cables fail, test remaining cross-connected data cables.
    - .1 Category 5e using certified level IIe tester to: TIA/EIA-568-B.1.
- .2 Test backbone UTP cables as specified below and correct deficiencies: provide record of results as hard copy and electronic record on CD.
  - .1 Perform Wire Map tests on multi-pair UTP cables to: TIA/EIA-568-B.1.
- .3 Provide record of results as hard copy electronic record on floppy disk CD to: TIA/TSB-140.

**END OF SECTION**