

Part 1 General**1.1 RELATED SECTIONS**

- .1 Division 01 - General Requirements.
- .2 Section 26 05 00 - Common Work Results for Electrical.
- .3 Section 26 05 28 - Grounding - Secondary.

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 consisting of grounding bus bars, bonding backbones, and other bonding conductors.
- .2 Provides ground reference for telecommunications systems within building and bonding to ground of equipment in telecommunications rooms.
- .3 Metallic pathways, cable shields, conductors, and hardware within telecommunications spaces are bonded to telecommunications grounding and bonding system.

Part 2 Products**2.1 TELECOMMUNICATIONS GROUNDING BUSBARS (TGB)**

- .1 Predrilled copper bus bar, listed by NRTL with holes 8 mm (1/3") diameter for use with standard-sized lugs to: ANSI J-STD-607-A.
- .2 Dimensions 6 mm thick, 50 mm wide, 600 mm long to: ANSI J-STD-607-A.

2.2 BONDING CONDUCTOR FOR TELECOMMUNICATIONS

- .1 Copper conductor, green insulated, size as indicated to: ANSI J-STD-607-A.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 BONDING CONDUCTORS GENERAL

- .1 When placed in ferrous metallic conduit or EMT, bond one end of conduit or EMT using grounding bushing.

3.3 BONDING CONDUCTOR FOR TELECOMMUNICATIONS

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

3.4 BONDING TO TMGB

- .1 Bond metallic communications raceways terminated at the telephone backboard to TMGB using #6 AWG green insulated copper conductor.
- .2 For communications cables near telephone backboard having shield or metallic member, bond shield or metallic member to TMGB.
- .3 Bond equipment racks and cabinets near telephone backboard to TMGB using #6 AWG green insulated copper conductor.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Division 01 - General Requirements.
- .2 Section 26 05 00 - Common Work Results for Electrical.
- .3 Section 26 05 32 - Outlet Boxes, Conduit Boxes and Fittings.
- .4 Section 26 05 34 - Conduits, Conduit Fastenings and Conduit fittings.
- .5 Section 27 05 28 - Pathways for Communications Systems.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International):
 - .1 C22.1-18, Canadian Electrical Code, Safety Standard for Electrical Installations.
 - .2 CSA-C22.2 No. 214-08, Communications Cables.
- .2 American National Standards Institute (ANSI)/ Telecommunications Industry Association (TIA):
 - .1 ANSI/TIA-568-C.1-(February 2009), Commercial Building Telecommunications Cabling Standard.
 - .2 ANSI/TIA-568-C.3-(June 2008), Optical Fiber Cabling Components Standard.
 - .3 TIA-568-B.10-(April 2008), Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted-Pair Cabling Components.
 - .4 TIA-606-A-1(January 2009), Administration Standard for the Commercial Telecommunications Infrastructure.

1.3 SYSTEM DESCRIPTION

- .1 Structured telecommunications wiring system consisting 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 data (computer).

1.4 SUBMITTALS

- .1 Submit Shop Drawings in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Submit Guarantee Letter from Manufacturer.

- .3 Submit Cable Test Results.
- .4 As-built Records and Drawings:
 - .1 Provide As-Built drawings in accordance with Division 01 requirements.
 - .2 Provide and place one hard copy of as-built records in telecommunications room.

1.5 GUARANTEE

- .1 Entire system "End to End", shall be verified and guaranteed for a period of 25 years from date of acceptance. Guarantee shall be single source for all components "End to End" including patch cords.

Part 2 Products

2.1 GENERAL

- .1 Conduit: to Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.
 - .1 Data to be white in colour (confirm with Owner prior to submitting shop drawings).
 - .2 Access points to be yellow in colour (confirm with Owner prior to submitting shop drawings).
- .2 Outlet boxes, conduit boxes and fittings: to Section 26 05 32 - Outlet Boxes, Conduit Boxes and Fittings.
- .3 All "Permanent Link" components shall be from the same manufacturer.

2.2 DATA CABLES

- .1 Horizontal distribution cables - copper.
 - .1 Four (4) unshielded twisted pairs formed into a cable core, with overall polyvinyl chloride jacket, Category 6 listed, white (standard data).
 - .2 Conductors: 23 AWG copper with polyolefin PFE insulation.
 - .3 Non-parallel twists.
 - .4 Cables shall extend 300 mm beyond box at outlet, and minimum 3 m beyond termination point at terminal or branch panel.
 - .5 Certification/Listings:
 - .1 CSA certified as CMR (FT4) per CSA standard C22.2 and UL standard 444.

- .6 Acceptable manufacturers: not applicable.

2.3 PATCH PANEL

- .1 UTP patch panels for copper.
 - .1 Category 6 rated.
 - .2 24-port, keystone style, blank panel.
 - .3 1.6 mm steel, black finish.
 - .4 Complete with keystone UTP jack modules as required at patch panel for all data drops. UTP jack module color to match system cabling color.
 - .5 Acceptable manufacturers: not applicable.

2.4 PATCH CORDS/LINE CORD

- .1 Patch/Line cords - copper
 - .1 Four (4) unshielded twisted pair.
 - .2 Conductors, 24 AWG with overall polyvinyl chloride (PVC) jacket, category 6 rated.
 - .3 UL listed.
 - .4 Modular 8 - pin plug.
 - .5 Provide one (1) 3 m patch cord per data and one (1) 600 mm patch cord for data at head end.
 - .6 Color: to match system cabling colour at rack, (Data). Grey at wall (data).
 - .7 Acceptable manufacturers: not applicable.

2.5 DATA OUTLETS

- .1 Data outlets - copper:
 - .1 Eight (8) conductor jacks as indicated.
 - .2 Fully compliant with all requirements for Category 6.
 - .3 White, 4 port angled entry faceplate with lamicoid identification label and white or yellow keystone modules.
 - .4 Suitable for flush mounting as indicated.
 - .5 Acceptable Products: not applicable.
 - .6 Provide blank keystone modules for all unused ports.

2.6 EQUIPMENT RACK (DATA)

- .1 Wall mounted, single unit, 559 mm.
- .2 Fully welded rack including assembled overhead and vertical cable management channels.

- .3 Rack: 4 mm welded steel uprights, black finish.
- .4 Base: 9 mm steel, black finish.
- .5 Bond rack to ground bus.
- .6 Accessories Requirements:
 - .1 Rack;
 - .2 Vertical cable manager (1) per side;
 - .3 Horizontal cable managers: front and rear (2 RU);
 - .4 Power strip bracket;
 - .5 Power strip: c/w 10 x 5-20R receptacles;
 - .6 UPS: 120V 60Hz, 3 KVA, rack mountable.
 - .7 Acceptable Manufacturers: not applicable.

2.7 FIBRE OPTIC CABLE

- .1 Multimode laser optimized OM4, 50/125.
- .2 Indoor.
- .3 12 strands.
- .4 Armoured.
- .5 LC type connectors, with maximum of 0.75 dB loss per connector (EIA/TIA 568 Standard).
- .6 Acceptable manufacturers: not applicable.

2.8 FIBRE OPTIC PATCH PANEL/CORDS

- .1 Rack mounted.
- .2 Capable of terminating 12 fibre pairs fitted with LC connectors.
- .3 Accessories/Requirements:
 - .1 Enclosure;
 - .2 Adapter Strip;
 - .3 Reverse polarity patch cord.
- .4 Acceptable manufacturers: not applicable.

Part 3 Execution**3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 The network shall be designed and installed using industry standard equipment, and procedures. The contractor assumes responsibility for ensuring the electrical and mechanical integrity of all parts of the network. Any parts of the network not operating properly shall be made operational prior to system acceptance.
- .2 Installation shall be performed, using accepted practices, by personnel with the following capabilities and experience:
 - .1 Communication installation experience with UTP.
 - .2 Knowledge of applicable building code, regulations, and CSA telecommunication standards, in particular, CSA T-530, CSA T-529, CSA T-528 and CSA T-527.
- .3 All wiring shall be adequately supported and run perpendicular to building lines. Where conduit or a cable conveyance system is not used, wiring shall be supported every 1.5 m maximum by cable hook. Cabling shall be bundled using Velcro ties every 1.5 m maximum throughout building.
- .4 Appropriate care and installation techniques shall be used to ensure that the manufactures specifications for minimum bend radius, maximum tensile rating and vertical rise are not exceeded.
- .5 No splices are allowed in UTP cables.
- .6 Three (3) meters of cable slack, coiled, shall be provided at the field outlet end of each cable to allow for future rearrangement/re-termination of the workspace. Velcro ties as required.
- .7 All cables not meeting the Manufacturer's and the Owner's requirements shall be replaced with no additional cost to the owner or penalty to the scheduled project completion.

- .8 All of the necessary wiring harnesses, connectors, patch panels, adapters, shelves, etc. required for the installation shall be provided by the contractor.
- .9 Any additional materials deemed necessary for cable management (i.e. distribution rings, Velcro ties, cable hooks, etc.) shall be provided by the contractor. Plastic tie-wraps are not permitted. Supply and install required vertical and horizontal cable managers within the data racks and chimneys up to the ceilings as required.
- .10 Each faceplate shall have an appropriate icon to illustrate it is data.
- .11 Patch panels and the faceplates shall be clearly labeled. The numbering scheme will be determined prior to the beginning of the installation.
- .12 Each cable shall be permanently imprinted with a typewritten identification adhesive label. Identification tags must be installed within 600 mm of each end of the cable. The numbering scheme will be determined prior to the beginning of the installation.
- .13 The maximum allowable cable length is 90 m from the mechanical termination of the media at the horizontal cross-connect in the telecommunication closet to the telecommunications outlet/connector in the work area.
- .14 Each workstation shall be terminated with quantity of data outlets as per drawings. Blank inserts shall be provided for unused ports.

3.3 SYSTEM VERIFICATION

- .1 Prior to system acceptance, the contractor shall provide a certificate of proof of performance verifying that all work described in this document and any future revisions has been completed and that the complete network functions as intended.
- .2 Each MDVO faceplate shall be clearly labeled with the cable number or drop number as agreed upon prior to installation and as indicated in the label section with the owner.

- .3 Every pair of data station wires shall be tested from the patch panel to the wall jack to ensure the pair polarity is maintained and that the pair plan is followed throughout the installation. The testing should also ensure that no shorts or opens exist within a given pair and that there are no shorts, miswires or reversals between the pairs. The testing shall be conducted using a microtest penta scanner. All tests must meet CSA T-529 M95 ANSI/EIA/IA-568A (10.0) parameters. The length of each cable shall be documented.
- .4 Testing will be performed in conformance with CSA T529 EIA/TIA 568A. All tests results are to be provided to the owner in hard copy and in electronic format.
- .5 Fiber testing shall be done in accordance with ANSI/TIA/EIA-568A. All results shall be tabulated in an organized fashion and returned to the owner at the completion of the job, signed by the installer completing the work. The test results become the property of the owner upon system acceptance.

3.4 CABLE TESTS

- .1 Cabling, terminations and testing shall be performed by an end to end "Certified System Vendor", or "Factory Authorized Contractor", and shall be "IBDN Certified". Provide test results and certification.
- .2 All tests shall be completed with a level III tester.
- .3 Cables failing test shall be replaced by electrical contractor, at contractor's expense.
- .4 Test results shall be submitted on compact discs.

3.5 INSTALLATION OF EQUIPMENT CABLES

- .1 Install equipment cables from equipment patch panel as indicated.
 - .1 Identify and label as indicated to: TIA-606-A.

3.6 IMPLEMENT CROSS-CONNECTIONS

- .1 Implement cross-connections using patch cords as specified (data).

END OF SECTION

