

## **Section D7000 Information Technology - General**

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### **D7000 - Introduction**

This section outlines general standards and requirements for Information Technology systems in all campus projects. The OIT standards include the following sections:

- D7000: General Information Technology (IT) Requirements
- D7010: IT Pathways
- D7020: IT Cabling
- D7030: IT Equipment Rooms
- D7040: IT Contractor Requirements
- D7050: IT System Testing & Labeling
- D7060: IT CAD Requirements
- D7070: Audiovisual Systems
- D7080: Distributed Communications and Monitoring Systems
- D7090: Wireless Communication

### **D7000.10 – Conformance, Codes and Industry Best Practices**

1. References to regulations, codes, and standards mean the latest edition, amendment and revisions to the regulations, codes and standards in effect on the date of the Contract Documents.
2. All work and materials shall conform to and be installed, inspected, and tested in accordance with the governing rules and regulations of federal, state, and local government agencies.
3. Installations, materials, equipment and workmanship shall conform to the specifications and drawings and all applicable provisions of the most recent versions of the following regulations, codes, and standards including all applicable addenda:
  - a. NFPA 70 / NEC
  - b. NESC (National Electrical Safety Code)
  - c. NFPA 101 Life Safety Code
  - d. ASTM Standards

- e. IEEE Standards
  - f. NEMA Standards
  - g. ANSI – American National Standards Institute
  - h. TIA – Telecommunications Industry Association Cabling Standards including, but not limited to, 455 Series, 472 Series, 492 Series, 526 Series, 568, 569, 598, 604 Series, 606, 607, 758,
  - i. ICEA
  - j. FCC Code of Federal Regulations (CFR)
  - k. TIA - TSB Field-Testing Length, Loss and Polarity of Optical Fiber Cabling Systems
  - l. Applicable State of Colorado codes including UFBC and Department of Labor Rules and Regulations
  - m. Applicable Municipal codes
  - n. Applicable codes and regulations of other authorities having lawful jurisdiction pertaining to the work required
  - o. Americans with Disabilities Act (ADA)
  - p. BICSI - Telecommunications Distribution Methods Manual (TDMM), Information Technology Systems Installation Methods Manual (ITSIMM), and Outside Plant Reference Manual (OSPDRM).
  - q. UL Standards
4. All modifications required by the referenced codes, rules, regulations, and authorities shall be made by the Contractor without additional charge to UCB.
  5. Report immediately to UCB OIT personnel and/or the Consultant, in writing, any part of the telecommunication system design which does not conform to the requirements of these codes or regulations, or otherwise be held responsible to provide and install material which will comply with these codes and regulations.
  6. Applicable codes and ordinances and local interpretations take precedence when they conflict with or are more stringent than the telecommunications design. Drawings and specifications take precedence where this design is more stringent than codes and ordinances.
  7. All materials, appliances, equipment, and devices shall conform to the applicable standards of Underwriters Laboratories (UL), and shall be listed by UL if a UL listing category has been established. Furnish products that have been tested and qualified to meet the rating criteria by UL or other testing firm acceptable to authority having jurisdiction.
  8. Equipment and materials shall be of the quality and manufacture indicated. The equipment specified is based on the acceptable manufactures listed. Where “approved equal” is stated, equipment shall be equivalent in every way to that of the equipment specified and subject to approval of UCB based on submittals provided.

**D7000.11 – IT Scope Of Work**

1. Work includes, but is not limited to, the following:
  - a. Placement of, and additions to, Main Distribution Frame and Intermediate Distribution Frame (MDF/IDF) hardware, including equipment racks, cable routing hardware, copper, and fiber cable termination equipment, patch cords, and grounding and bonding.

- b. Placement of, and additions to, hardware for audiovisual (A/V) systems for classrooms and lecture halls, including components, equipment racks, cable routing hardware, copper, and fiber cable termination equipment, patch cords, and grounding and bonding.
    - c. Placement of, and additions to, interior telecommunications pathways including conduit, cable-tray, pull-boxes, metallic surface-mount raceway systems, and j-hooks, as approved by OIT on a case-by-case basis. Standard practice is all pathways are to be installed by the Electrical Contractor and exceptions will be included and detailed on the prints, in the OIT scope of work and/or in COB/RFI/ASI submittals.
    - d. Placement of, and additions to, exterior telecommunications pathways including trenching/backfill, conduit system, pull-boxes, handholes, manholes and cable routing hardware.
    - e. Installation and termination of backbone cabling, including copper cabling, and singlemode and multimode fiber optic cabling.
    - f. Installation and termination of horizontal cabling, including copper cabling, and multimode fiber optic cabling.
    - g. Testing, identification, and administration for the above telecommunications systems.
    - h. Removal of existing horizontal cabling, terminations, and outlets in coordination with electrical contractor for removal of associated cable pathways.
  2. All work shall be conducted in coordination with UCB OIT and other building trades.
  3. The work covered by this Section consists of furnishing all materials, accessories, connectors, supports, electrical protection, equipment, tools, setup, preparation, labor, supervision, incidentals, transportation, storage, and related items and appurtenances, and performing all operations necessary to complete the telecommunications work as indicated in the project drawings and specified herein. It is the intent and purpose of this specification to have, upon completion of the project, a “turn-key” telecommunications system designed, built, coordinated and integrated with the existing telecommunications system and complete and operable in all respects. Completely install, connect, and test all systems, equipment, devices, etc., shown or noted or required to final connections and leave ready for satisfactory operation. Provide any minor items omitted from the design, but obviously necessary to accomplish the above intent.
  4. All telecommunications designs for UCB buildings on and off campus must be approved by the OIT department for standards and design structure. Any design outside of these OIT standards must be approved and include a written agreement for the design from the OIT Infrastructure Engineering Department.
  5. Minimum composition requirements and/or installation methods for the following materials and work are included in this section:
    - a. Cables
    - b. Factory Assembled Products
    - c. Compatibility of Related Equipment
    - d. Special Tools and Kits
    - e. Firestops and Penetration Seals
    - f. Anchoring and Supports
    - g. Grounding and Bonding
    - h. Cutting and Patching
    - i. Concealment

- j. Equipment Modification
6. Examine MDFs and IDF's and verify conditions are as shown on project drawings. Provide notification in writing of conditions deviating from drawings or detrimental to proper completion of the work.
7. Beginning of installation in the MDFs and IDF's indicates Contractor acceptance of existing conditions.

**D7000.12 – IT Drawings and Specifications**

1. It is the intention of these specifications and related project drawings to call for finished work, tested and ready for operation in complete accordance with all applicable codes, regulations, standards, and ordinances.
2. These specifications and the project drawings are complimentary, and what is called for in either of these shall be binding as though called for by both. Should any conflict arise between the drawings and specifications, such conflict shall be brought to the attention of the Consultant and the OIT CM for resolution. If the Contractor fails to contact the Consultant and OIT CM in writing of any conflict between the specifications and the project drawings, the Contractor shall be subject to re-work the area of conflict at the Contractor's cost.
3. Omissions from the specifications and/or project drawings or the incorrect description of details of work which are evidently necessary to carry out the intent of the specifications and project drawings, or which are customarily performed, shall not relieve the Contractor from performing such omitted or incorrectly described detail of the work. All work shall be performed as verified in field measurements, field construction criteria, material catalog numbers and similar data checked and coordinated with each shop drawing by the Contractor.
4. The telecommunications and technology project drawings are diagrammatic and indicate general design, layout, and arrangement of equipment and various systems. Being diagrammatic, the drawings may not necessarily show all details such as pull-boxes, conduit runs or sizes, etc., necessary for a complete and operable system. Unless detailed dimensioned drawings are included, exact locations are subject to approval of UCB.
5. Do not scale project drawings for dimensions. Take all dimensions and measurements from the site and actual equipment to be furnished. All dimensions, measurements, and the location and existence of underground equipment must be verified in the field since actual locations, distance, and elevations will be governed by actual field conditions. Contractor shall be responsible for all measurements taken from the field.

**D7000.13 – IT Equipment and Materials**

1. All telecommunications cabling inside the building shall be UL listed and marked type CM, CMR, or CMP and shall be installed in accordance with NEC articles 300, 800 and 820.
2. All fiber optic cable inside the building shall be UL listed and marked type OFN, OFNR, or OFNP and shall be installed in accordance with NEC articles 300 and 770.
3. Manufacturers of equipment assemblies that include components made by others shall assume complete responsibility for the final assembled unit.
  - a. All components of an assembled unit need not be products of the same manufacturer.
  - b. Constituent parts, which are alike, shall be the product of a single manufacturer.
  - c. Components shall be compatible with each other and with the total assembly for intended service.

- d. Contractor shall guarantee performance of assemblies of components and shall repair or replace elements of the assemblies as required to deliver the specified performance of the complete assembly.
4. Equipment and materials installed shall be compatible in all respects with other items being furnished and with existing items so that a complete and fully operational system will result. Elevator lobby phones required by code shall be an Area of Refuge Analog Station (AOR) phone supplied by OIT and installed by the project contractors. On concrete walls the Surface Mounted AOR box will be used. The standard installation shall be the Flush Mounted AOR box with the IT conduit piped directly to the AOR boxes and installed per the Talkaphone ([talkaphone.com/products/aor-cse-fm](http://talkaphone.com/products/aor-cse-fm) and [talkaphone.com/products/aor-cse-sm](http://talkaphone.com/products/aor-cse-sm)) Datasheet size to ADA and code requirements. A standard Data circuit shall be installed from the MDF/IDF into the AOR box with a surface box within the AOR. OIT will program the phone as a ring-down phone and add AudioCodes Media packs as required.

**D7000.14 – Special Tools and Kits**

1. Furnish any special installation equipment, tools, or kits necessary to properly complete the telecommunications system installation. This may include, but is not limited to, tools for pulling, splicing, terminating, and testing the cables, communication devices, stands for cable reels, cable wenchers, assembly and adjustment devices, etc.
2. OIT Standing Order contractors shall provide a complete list of all tools and kits annually, at the beginning of each contract year.

**PART 3 - EXECUTION****D7000.20 Examination of Project Site**

1. Prior to any project work, examine the project site carefully, including all project drawings showing existing systems and equipment. The Contractor shall be fully informed of, and shall identify, all utility, state, and local requirements that will affect the telecommunications work at the project site.
2. Examine areas and conditions under which the specified work is to be done. Provide written notification to the OIT CM of conditions detrimental to proper completion of the work.
3. Verify field measurements and conditions are as shown on project drawings. Provide written notification to the OIT CM of conditions deviating from drawings.
4. Beginning of telecommunications work indicates Contractor acceptance of existing conditions.
5. Determine if the installation of the proposed systems will affect the operation or code compliance of existing systems. With UCB approval, relocate, modify, or otherwise revise existing telecommunications systems as required to maintain operational integrity and code compliance.
6. Become familiar with the local conditions under which the work is to be performed and correlate the on-site observations with the requirements of the specifications and project drawings. No allowance will be made for claims of concealed conditions which the Contractor, in exercise or reasonable diligence in examination of the site, observed or should have observed.
7. Before ordering any materials or doing any project work, verify all measurements and be responsible for correctness of same. No extra charge or compensation will be allowed for duplicate work or material required because of unverified differences between actual dimensions and the measurements indicated on the project drawings. Any discrepancies found shall be submitted in writing to the Consultant and the OIT CM for consideration before proceeding with the project work.

8. The approximate locations of existing and new telecommunications outlets, cabling and equipment will be indicated on the project drawings; however, the drawings are not intended to give complete and accurate information. Field verify existing outlets and cabling prior to submitting a quote. Determine the exact locations after thoroughly examining the general building plans and by actual measurements before and during construction, subject to the approval of UCB OIT and the Consultant.
9. Before construction work commences, visit the site and identify the exact routing for all cable pathways and equipment placement. Verify all dimensions, locating the work and its relation to existing work, all existing conditions and their relation to the work and all man made obstructions and conditions, etc. affecting the completion and proper execution of the work as indicated in the project drawings and specifications.
10. Post and comply with: **OIT CONSTRUCTION INSPECTION REPORT – LOW-VOLTAGE / COMMUNICATIONS** attached to UCB standard **D7040**.

#### **D7000.21 General Installation Requirements**

1. All equipment locations shall be coordinated with UCB, other trades and existing conditions to eliminate interference with required clearances for equipment maintenance and inspections.
2. Coordinate work with UCB, other trades and existing conditions to determine exact routing of cable, cable tray, hangers, conduit, etc., before fabrication and installation.
3. The exact core locations shall be identified and coordinated with UCB Facilities Management, EH&S, and the UCB Asbestos Management plan as necessary. X-rays may be required prior to core drilling in some surfaces, abide by UCB standard B1013. Identify and abide by all UCB core drilling requirements.
4. Install telecommunications cabling and equipment to facilitate maintenance and repair or replacement of equipment components. Provide easy, safe and code mandated clearances at equipment racks and enclosures, and other equipment requiring maintenance and operation. Coordinate with UCB exact location and mounting height of all equipment in finished areas, such as equipment racks, termination equipment, communication and electrical devices. As much as practical, connect equipment for ease of disconnecting, with a minimum of interference with other installations.
5. Coordinate ordering and installation of all materials and equipment with long lead times or having major impact on work by other trades so as not to delay the job or impact the schedule.
6. Set all equipment to accurate line and grade, level all equipment and align all equipment components. All work shall be installed level and plumb, parallel and perpendicular to other building systems and components.
7. Provide all scaffolding, rigging, hoisting, lifts, and services necessary for delivery, installation, and erection of materials, equipment, and apparatus furnished into the premises. These items shall be removed from premises when no longer required. Use of University owned supplies and equipment is prohibited.
8. Coordinate all work in existing spaces with the building proctor.

#### **D7000.22 Workmanship**

1. All labor shall be thoroughly competent and skilled, and all work shall be executed in strict accordance with the best practice of the trades.
2. Good workmanship and appearance shall be considered of equal importance with telecommunications operation. Lack of quality workmanship shall be considered sufficient reason for rejection of a system in

part or in its entirety. Carefully lay out all work in advance and install in a neat and workmanlike manner in accordance with recognized good practices and standards. Provide workmen who are skilled in their craft and a competent Project Manager who will be on the job at all times.

#### **D7000.23 Structural Penetrations in Existing Buildings**

1. Provide all cutting, patching and core drilling, etc., as necessary for telecommunications work in accordance with UCB standard **B1013**. Locate holes and outlets to be drilled, coordinate with work of other trades, and obtain approval of UCB prior to cutting or core drilling.
2. Cut and drill from both sides of walls and/or floors to eliminate splaying.
3. Patch adjacent existing work disturbed by installation of new work, including insulation, walls and wall covering, ceiling and floor covering and other finished surfaces. Patch openings and damaged areas equal to existing surface finish.
4. Cut openings in prefabricated construction units in accordance with manufacturer's instructions.
5. Openings for electrical work shall be carefully caulked or grouted as required. Spare conduits shall be tightly capped.
6. All cutting in the building construction made necessary to admit work, repair defective materials, defective workmanship, or by neglect of the Contractor to properly anticipate his requirements, shall be done in accordance with these specifications with no additional cost to UCB. Patching shall be complete in every detail. Actual work involved in these repairs shall be done by skilled craftsmen in the trades involved.
7. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.
8. Clean up and vacuum all spaces after cutting and patching to remove all debris from the work.

#### **D7000.24 Concealment**

1. Use existing conduit and cable trays and conceal all project work above ceilings and in walls, below slabs, and elsewhere throughout building where possible and practicable. If concealment is impossible or impracticable, notify the OIT CM and the Consultant before starting that part of the work, and install only after approval is given by OIT.

#### **D7000.25 Equipment Modification**

1. Where existing equipment is to be modified, furnish materials and labor as necessary to modify or add to the equipment. Modifications shall be done neatly with factory parts and assemblies approved for the application. Modification shall in no way jeopardize the compliance of existing equipment with any governing codes and regulations.

#### **D7000.26 Firestops and Penetration Seals**

1. Refer to Appendix **D7000.261** for UCB Firestop Materials.
2. All new and existing penetrations through fire-rated walls, floors, ceilings, etc. shall be sealed to prevent the spread of smoke, fire, toxic gas, or water through the penetration either before, during, or after a fire. The fire rating of penetration seal shall be at least that of the wall, floor, or ceiling into which it is

- installed, so the original fire rating is maintained. The installation shall provide an air and watertight seal. This includes all existing telecommunications cables and pathways to remain within the project area.
3. All new and existing conduit and sleeve openings used for the project shall be waterproofed or fireproofed upon cable placement through such passageways in compliance with Colorado Building and Fire Codes and UCB standard **D4010**.
  4. Firestop systems shall be installed where required by building code and in accordance with the UL listing and manufacturer's guidelines.
  5. Each installed firestop shall be labeled for identification in accordance with UCB standard **D4010**.
  6. Patch all openings remaining around and inside all new and existing conduit sleeves and cable penetrations to maintain the integrity of any fire-rated wall, floor, ceiling, etc.
  7. Manufacturer's installation standards shall be closely followed (minimum depth of material, use of ceramic fiber, procedures, etc.).
  8. Cable Trays: All new cable tray pathways shall not penetrate fire-rated walls. Cable tray shall stop within 6 inches of the wall and a fire-rated assembly shall be used for the wall penetration, such as EZ path product or equivalent approved by OIT.
  9. Seal all foundation penetrating conduits and all service entrance conduits and sleeves to eliminate the intrusion of moisture and gases into the building. This requirement also includes spare conduits.
  10. Spare conduits shall be plugged with expandable plugs.
  11. All service entrance conduits through the building shall be sealed or resealed upon cable placement.
  12. Entrance conduits with cables in them shall be permanently sealed by firmly packing the void around the cable with oakum and capping with a hydraulic cement or waterproof duct seal.
  13. Coordinate all penetrations with pertinent trades, including but not limited to Structure and Architecture.

## Appendices

### **D7000.261 – UCB Firestop Materials**

#### Pre-Approved Equipment Schedule

Line	Description	Manufacturer	Part Number
1	One EZ-Path Series 33 System	STI	EZDP33FWS
2	Two EZ-Path Series 33 System	STI	EZDP233GK
3	Three EZ-Path Series 33 System	STI	EZDP333GK
4	Four EZ-Path Series 33 System	STI	EZDP433GK
5	EZ-Path Series 44+ Fire-Rated Pathway Device	STI	EZD44S2
6	EZ-Path Series 44+ Wall Bracket (1–5 Pathways)	STI	EZP544W
7	EZ-Path 4" Radius Control Module	STI	EZRCM44S
8	EZ-Path 3" Radius Control Module	STI	RCM33
9	EZ-Path Series 44+ Modular Grid Single Bank (4 Devices)	STI	EZDG444S2