

## SECTION 27 11 00

## COMMUNICATIONS EQUIPMENT ROOM FITTINGS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. This Section includes basic communications room requirements. Refer to "T" series drawings for specific communication room requirements.
- B. The design of communications rooms depend on the size of the building, floor space served, occupant needs, services deployed and future growth.

## 1.2 SCOPE OF WORK

- A. Provide all labor, materials, tools and equipment required for the complete and proper communications equipment room fittings installation.
- B. In order to conform to the overall project event schedule, the contractor shall survey and coordinate the communications equipment room fittings installation with other applicable trades.
- C. In addition to the details specified within this Section, the contractor shall notify the ITS Representative of any additional items deemed necessary to guarantee a fully functional system. The contractor shall furnish and install all necessary items for a fully functional system at no additional charge.

## 1.3 DEFINITIONS

- A. **communications room:** A generic term for an equipment room or telecommunications room.
- B. **entrance room:** A space in which the joining of campus and building telecommunications backbone facilities takes place.
- C. **equipment room:** An environmentally controlled centralized space for telecommunications equipment that usually houses a main or intermediate cross-connect and security equipment.
- D. **telecommunications room:** An environmentally enclosed architectural space designed to contain telecommunications equipment, cable terminations, or cross-connect cabling and security equipment.

## 1.4 RELATED DOCUMENTS

- A. Drawings, Contract Forms, Conditions of the Contract, including Construction Manager/General Contractor (CM/GC) Agreement, Exhibits and other Specification Sections that apply to this section.
- B. Codes and standards
  - 1. The publications listed below form a part of this specification. The publications are referred to in the text by their basic designation only.
  - 2. Specific reference to codes, rules, regulations, standards, manufacturer's instructions, or requirements of regulatory agencies shall mean the latest printed edition of each in effect at the date of contract unless the document is shown dated.
    - a) ANSI-J-STD-607-A, Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications

- b) ANSI/NFPA 70, National Electrical Code
- c) ANSI/TIA/EIA-606-A, Administration Standard for Commercial Telecommunications Infrastructure
- d) NECA/BICSI-568, Installing Commercial Building Telecommunications Cabling
- e) ANSI/NECA/BICSI-607, Telecommunications Bonding and Grounding Planning and Installation Methods for Commercial Buildings
- f) TIA-569-B, Commercial Building Standard for Telecommunications Pathways and Spaces
- g) Local, county, state and federal regulations and codes in effect as of the date of installation.
- h) Equipment of foreign manufacture shall meet U.S. codes and standards. Submittals shall indicate any product of foreign manufacture and the country of origin.

#### 1.5 COMMUNICATIONS ROOM REQUIREMENTS

- A. There shall be as few communications rooms as necessary within a building.
- B. The length of horizontal cable from each communications room shall be a maximum of 295 electrical cable feet (physical cable length is shorter due to the pair-twist within the cable). Notify Design Engineer of any outlets where a cable run of less than 295 feet is not possible.
- C. The equipment room and telecommunications room designs, including location should be developed in accordance with the security plan of the building.
- D. Each building shall contain an equipment room (gateway). The equipment room serves the building and contains the main cross-connect for optical fiber and copper twisted-pair as well as electronics (e.g., Ethernet router, switches). The equipment room may contain the entrance facility (e.g., entrance conduits, splice cases, protectors). The equipment room may also serve as a telecommunications room (containing a horizontal cross-connect). In addition to its communications function, the equipment room may also serve audio/video and security equipment.
- E. Each building may contain one or more telecommunications rooms. Telecommunications rooms contain the horizontal cross-connect for optical fiber and copper twisted-pair as well as electronics (e.g., Ethernet switches). In addition to its communications function, the equipment room may also serve security equipment.
- F. Function
  - 1. Communications rooms provide an environmentally suitable and secure area for communications and security equipment, including: cross-connects, interconnects, backbone terminations, horizontal cable terminations and electronic equipment. They may also be used to house audio/video equipment and terminations.
  - 2. Communications rooms shall house only equipment directly related to the telecommunications systems, including audio/video and security systems and, as required, the room's environmental support systems.
  - 3. An equipment room may include the functions of a telecommunications room, entrance room, or both.

## G. Location

1. Communications rooms shall be located as close as practicable to the center of the area being served.
2. Communications rooms shall be located so they are not restricted by building components that limit expansion (e.g., elevators, core, outside walls, fixed building walls).
3. Communications rooms shall be located so as not to be a flood threat. For example, locations that are below or adjacent to areas of potential water hazard (e.g., restrooms and kitchens) shall be avoided. Additionally, areas having floor drains shall be avoided.
4. Communications rooms shall be located away from sources of electromagnetic interference (e.g., electrical power supply transformers, motors, generators, x-ray/MRI equipment radio or radar transmitters).
5. Equipment rooms shall be located as close as practicable to the electrical entrance.
6. Equipment rooms shall be located to allow delivery of large equipment.

## H. Access

1. Communications rooms shall be located in an accessible area (e.g., hallway).
2. Communications rooms shall be keyed to the university's standard for telecom rooms.
3. Communications rooms shall be fitted with card reader access control. The card read shall control a fail secure electrified lock with integral request to exit switch in the handle.

## I. Size

1. Communications rooms shall accommodate 3-feet of work space between electrical components (e.g., back of a switch to the front of the security equipment; front of rack to telephone terminations).
2. Communications rooms shall accommodate 12 in wide vertical wire management between and at the ends of the equipment racks.
3. Communications rooms shall accommodate three (3) 4RU horizontal wire management per equipment rack.
4. Communications rooms shall accommodate rack mounted angled patch panels for three telecommunications receptacles (i.e., RJ-45) for every 100 square feet of floor area served by the communications room.
5. Communications rooms shall accommodate separate rack mounted angled patch panels for a wireless access point receptacle (i.e., RJ-45) located at every building column that is served by the communications room.
6. Communications rooms shall accommodate separate rack mounted angled patch panels, as necessary, for two elevator receptacles (i.e., RJ-45) per elevator controller, for two security receptacles (i.e., RJ-45) per security controller, and for two building automation system receptacles (i.e., RJ-45) per machine room controller that is served by the communications room.
7. Each telecommunications room shall accommodate wall terminated (e.g., 110 termination blocks) category 3 twisted-pair backbone cabling for a minimum of

- one pair per 100 square feet served (rounded up to the nearest 100-pair complement).
8. Equipment rooms shall accommodate wall terminated (e.g., 110 termination blocks) category 3 twisted-pair backbone cabling for a minimum of backbone twisted-pairs serving each telecommunications room.
  9. Communications rooms shall accommodate separate rack mounted angled patch panels and wall terminated (e.g., 110 termination blocks) twisted-pair cross-over cabling (category 3) sized at 4-pair per 200 square feet (one RJ-45-port per 200 square feet) served by the communications room.
  10. Communications rooms shall accommodate sufficient 188B2 cross-connect wire management for wall mounted terminations (e.g., between backbone 110 terminations and cross-over 110 terminations).
  11. Each telecommunications room shall accommodate two (2) rack mounted, 4RU high fiber distribution patch panels for optical fiber building backbone cabling (i.e., OS2 single-mode, OM4 multimode).
  12. Equipment rooms shall accommodate two (2) rack mounted, 4RU high fiber distribution patch panel per telecommunication room served plus two 4RU fiber distribution patch panel for building entrance (i.e., OS2 single-mode, OM1 multimode).
  13. Each telecommunications room shall accommodate a minimum of 6-feet wide by 8-feet high wall space for security equipment.
  14. Equipment rooms shall accommodate a minimum of 8-feet wide by 8-feet high wall space for security equipment.
  15. Each telecommunications room shall accommodate a minimum of one wall mounted rack for audio/video equipment.
  16. Equipment rooms shall accommodate a minimum of two wall mounted racks for audio/video equipment.
- J. Interior provisioning
1. Equipment not related to the support of the communications room (e.g., piping, ductwork, pneumatic tubing) shall not be installed in, pass through, or enter a communications room. With exception of piping for fire sprinklers, all pipes shall be routed around communications rooms.
  2. Communications rooms shall have void-free  $\frac{3}{4}$ " AC grade, fire-resistant plywood backboards shall be installed (smooth side to the room interior) on the perimeter walls over the gypsum board mounted 12" AFF. All seams shall be sealed.
  3. Plywood backboards within communications rooms shall be painted with a white, fire-retardant paint with exception of the written area on the plywood indicating that it is fire-retardant.
  4. Communications room walls shall extend from floor slab to ceiling deck with no drop ceilings. The minimum walls height shall be 10'-0".
  5. Communications room floors shall be sealed and tiled with anti-static tile.

6. Equipment rooms shall have a minimum 6'W X 6'-8"H door (double door) without a door threshold and without windows. The door should open towards the outside of the room. Hinges shall be pinned with anti-pry guards.
  7. Telecommunications rooms shall have a minimum 3'W X 6'-8"H door without a door threshold and without windows. The door should open towards the outside of the room. Hinges shall be pinned with anti-pry guards.
  8. A slot or slots shall be installed to accommodate cable runway entry from a corridor and a UL approved fire rated assembly. The formed slot shall not have burrs or sharp edges.
  9. Floor sleeves or slots should be located adjacent to the door. Sleeves and slots shall extend 1-3 inches AFF and be firestopped at all times except during cable installation.
  10. Communications rooms shall be located on floor areas designed with a minimum floor loading of 50 lbf/ft<sup>2</sup>.
- K. Fire protection
1. Each communications room shall be equipped with fire detection, fire-extinguishing system and prevention devices. The fire detection devices shall be installed to the building fire alarm system. A minimum of one smoke detector shall be installed in each communications room.
  2. It's preferable that the fire sprinkler system for the communications rooms be a dry, pre-action system. Wire cages shall be installed on all sprinkler heads within the room. The location of the sprinkler heads shall be positioned so that it is not over equipment. Where sprinkler heads are positioned over equipment, drainage troughs shall be installed to protect electronic equipment from leakage.
- L. Electrical
1. Communications rooms shall contain their own power panel for circuits specific to the equipment within that room.
  2. Communications room lighting circuits shall be fed from a power panel other than from within the communications room.
  3. Communications room lighting shall be an integrated switch/sensor control that is located at the entrance of the room. Additional sensors may be required to sense that the room is occupied.
  4. Communications room illumination shall be uniform throughout the room at a minimum of 500 lux (50 foot candles) measure 3' AFF in all aisles between cabinets and racks. Luminaires shall be installed at a minimum height of 9'-0" AFF and in the middle of all aisles between cabinets and racks.
  5. Communications rooms shall have emergency lighting and signs installed such that the absence of primary lighting will not hamper emergency exit.
  6. Communications rooms shall have a wall phone location near the entry door. The wall phone location shall consist of an 4-11/16" x 4-11/16" x 2-1/8" electrical box with a single gang mud-ring (flush with face of plywood) and a 1" (minimum) conduit stubbed to the ladder rack.
  7. Electrical feeders/branch circuits shall not be placed or run through any communications room, except as required to service those rooms.

8. Each equipment rack within a communications room shall have one dedicated 20A 120V NEMA 5-20R duplex outlet mounted 6" AFF, placed to the rear of the vertical management, facing to the rear.
  9. Each equipment rack within a communications room shall have one dedicated 30A 208V NEMA L6-30R outlet mounted 6" to 12" AFF, placed to the rear of the vertical management, facing to the rear.
  10. The first equipment rack in each communications room shall have one additional 30A 208V NEMA L6-30R outlet on the building's emergency power to support the gateway/router and facility network equipment.
  11. Security equipment shall have two dedicated 20A 120V NEMA 5-20R duplex outlets on the building's emergency power mounted 6" AFF. All power circuits specific to security equipment shall also be on the building's emergency power; additional circuits may be necessary – coordinate with security system designer and ITS as necessary.
  12. The perimeter of the communications room shall have convenience 20A 120V NEMA 5-20R duplex outlets mounted 6" AFF at 6 feet intervals around perimeter walls.
  13. Bonding and grounding shall meet the requirements of ANSI-J-607-A and NECA/BICSI-607.
- M. Temperature and humidity
1. HVAC shall be included to maintain the equipment within the room. The HVAC shall be continuous (24 hours per day and 365 days per year). Where a standby (emergency) power source is available, the HVAC system serving the room should be connected to the standby (emergency) supply.
  2. Temperature: 60-degrees to 78-degrees Fahrenheit
  3. Humidity (non-condensing): 30-percent to 50-percent
  4. Sensors shall be installed in communications rooms to monitor temperature and humidity.
  5. A positive pressure shall be maintained with a minimum of one air change per hour.
  6. The room shall be protected from contaminants and pollutants that could affect electronic equipment.
- N. A shallow room shall be provided for cable pass-through between floors when a telecommunications room is not necessary (e.g., a room not being needed due to cable length limitations). This shallow room should be a minimum of 24 inches deep by 4 feet wide with sleeves and a 36" doorway, plywood back-board and cable ladder.

## PART 2 - PRODUCTS

- A. General
1. Refer to other Division 27 specifications for product and additional information.
- B. Plywood backboard
1. Shall be 4 x 8 x 3/4" A/C, fire rated plywood.
  2. Shall be painted – white, acrylic, interior, fire-retardant paint..

## PART 3 - EXECUTION

- A. Notify Design Engineer and ITS Representative in writing as soon as possible of any discrepancies between communications room design (on drawings) and these specifications.
- B. Backboards
  - 1. Linear wall space used for anchoring equipment shall be lined for the full closet width with fire treated BCX grade exterior plywood 3/4" and 8' high.
  - 2. Plywood for mounting termination equipment on shall be installed vertically side by side 12" above finished floor. Mounting of plywood shall be sufficient enough to support the equipment.
  - 3. Plywood for supporting riser cables shall be installed vertically resting directly on the finished floor. Anchoring and mounting techniques of plywood used to support backbone riser cables shall be sufficient to support a minimum of 1500 pounds of weight.
  - 4. In no cases shall the heads of mounting screws protrude past the face of the plywood.

**END OF SECTION**

Initial Publication	30-Sep-11
Update #1	23-Nov-11