

SECTION 27 11 00 -- COMMUNICATIONS EQUIPMENT ROOM FITTINGS

1.1 GENERAL

- A. This Section defines the general design requirements for a uniform Communications Room Infrastructure that shall be followed for all OFCC Technology construction projects.
 - 1. Communications Rooms consist of:
 - a. Entrance Facility (EF)
 - b. Main Equipment Room (MER)
 - c. Telecommunication Rooms (TR)
 - d. Telecommunications Enclosure (TE)

1.2 SECTION INCLUDES

- A. Main Equipment Room (MER)
- B. Telecommunication Rooms (TR)
- C. Telecommunications Enclosure (TE)
- D. Equipment Backboards
- E. Equipment Racks and Cabinets
- F. Cable Ladder and Cable Tray

1.3 QUALITY ASSURANCE

- A. All equipment shall be UL listed.
- B. All equipment and Installation Practices shall comply with the latest ANSI/NFPA-70 National Electric Code.
- C. All equipment Installation Practices shall comply with the Local Electric Code.
- D. All equipment shall comply with the latest ANSI-J-STD-607 Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications Standard.
- E. All equipment and Installation Practices shall comply with the latest BICSI Telecommunications Distribution Methods Manual (TDMM).
- F. All equipment Racks and Cabinets shall comply with the latest ANSI/EIA-310 Cabinets, Racks, Panels and Associated Equipment Standard.

1.4 TELECOMMUNICATIONS ROOM SIZING

- A. TR Sizing Requirements
 - TR Sizing
 - | | |
|---|--|
| If the Serving Area is... | Then the Interior Dimensions of the Room Shall Be... |
| <5,000 FT ² | 10ft x 8ft |
| >5,000 FT ² --8,000 FT ² | 10ft x 9ft |
| >8,000 ft ² --10,000 ft ² | 10FT x 11ft |
 - Minimum of 1 TR per Floor
 - Multiple rooms are required if the cable length between the HC (FD) and the telecommunications outlet location, including slack, exceeds 300 ft. If the usable

floor space to be served exceeds 10,000 ft², consider additional TRs.

1.5 MAIN EQUIPMENT ROOM (MER) GENERAL

- A. Each Building shall be equipped with a MER.
- B. Location of MER to be determined with the goal of minimizing backbone cabling runs, providing accessibility to cabling pathways, serving as a TR for a large quantity of local outlets, and being able to incorporate incoming service entrance conduits.
- C. Extend Service Entrance Conduits from the Entrance Facility (EF) to the MER
 - 1. Note – To control costs, consider incorporating the EF into the MER overall space.
 - 2. Note – Service Providers will typically provide the Entrance Facility equipment in new construction. The EF will be existing in renovation projects and should be incorporated into the design.
- D. The MER shall be adequately sized to house the core networking, telephony, security, and distributed services equipment, along with provisions for local TR functionality, with sufficient clearances around racks and cabinets to meet BICSI standards, and floor space for 20% future growth.
- E. Orientation and configuration of room shall accommodate required airflow and cooling requirements as dictated by rack/cabinet design.
- F. Room shall include sufficient horizontal and vertical cable management systems (cable tray, ladder rack, fiber duct, etc.).
- G. Provide fixed cabling pathways (cable tray or conduit) from the MER to the EF and each TR/TE. Cabling pathways to be sized based upon the cable requirements and a 50% utilization factor for the completed design.

1.6 TELECOMMUNICATION ROOM (TR)/(TE) GENERAL

- A. Provide TR/TE as required to serve local outlets and maintain no more than 90m maximum cable lengths to all Category rated cabled outlets. TR/TE locations should be chosen to minimize total number of spaces required.
- B. The preference is to utilize full TR spaces with building walls and a secure door. Where space is not available, a TE may be utilized within a shared space such as a storage room or mechanical space. Careful consideration must be given to security, cooling, power, and accessibility to cabling pathways when utilizing TE for cabling connectivity.
- C. BICSI standards suggest providing a minimum of at least 1 TR per floor, with stacking preferred in multi-story buildings.
- D. The TR/TE shall be adequately sized to house the local cabling termination, security, network and telephony equipment, with sufficient clearances around racks and cabinets to meet BICSI standards.
- E. Orientation and configuration of room shall accommodate required airflow and cooling requirements as dictated by rack/cabinet design.
- F. Room shall include sufficient horizontal and vertical cable management systems (cable tray, ladder rack, fiber duct, etc.).
- G. Provide fixed cabling pathways (cable tray or conduit) to the MER and to adjacent TR/TE spaces within the same floor. Cabling pathways to be sized based upon the cable requirements and a 50% utilization factor for the completed design.

1.7 MER AND TR REQUIREMENTS

- A. Discuss design requirements and space allocation during initial programming meetings with Architect and Owner.
- B. All Telecommunications Rooms are to be open to the deck above.

- C. The MER and TR shall be rectangular in shape and shall avoid curved surface or non- perpendicular angled walls. Walls shall be constructed to be continuous up to the deck.
- D. Consolidate multiple floors and serving areas into a single TR whenever possible. For example, a centrally located TR on the 2nd floor could also serve the 1st and 3rd floor.
- E. The MER and TR shall have floor finishes that are statically neutral (such as polished concrete)
- F. The MER and TR shall have at least one lockable door that opens outward and has minimum dimensions of 3 feet (0.91 m) wide by 6.7 feet (2.0 m) tall.
- G. Provide each MER and TR with an HVAC system that maintains continuous environmental control 24 hours per day, 365 days per year. Mechanical system shall provide slight positive pressure to room to avoid collection of duct/debris from building spaces surrounding the TR/MER. Maintain temperature between 64° F (18° C) to 75° F (24° C). Maintain relative humidity between 30% and 55% -- non-condensing.
- H. Arrange lighting to provide adequate illumination levels in vertical footcandles on the front and rear of the rack mounted equipment. Avoid lighting designs that place fixtures directly over the racks/cabinets. Provide a minimum of 500 lux (50-foot candles of uniform lighting when measured at 3 feet AFF with vertical footcandles no less than 40% of the horizontal. Provide 10% minimum uplighting in the space.
- I. Provide Telecommunications Grounding Systems
- J. ***Provide the following minimum clearances:***
 - 1. ***Minimum of 40 in. (1 m) between equipment racks and the front of cross-connect fields.***
 - 2. ***Allow a minimum of 6 in. (150 mm) from the wall for wall-mounted equipment.***
 - 3. ***Minimum of a 40 in. (1 m) aisle in front of and behind all equipment racks and cabinets.***
 - 4. ***Minimum of 36 in. (0.91 m) floor area depth for equipment racks and cabinets.***
- K. Provide sufficient Generator Electrical circuits to service the associated UPS units.
- L. Power all active devices from UPS units, which are connected to the Building generator.
- M. Use light colored walls to enhance lighting.
- N. MER and TR spaces to be free from water piping (with the exception of sprinkler branches feeding heads within the room). This includes no water, drain, storm, sanitary, waste, condensate, steam, sprinkler mains, etc.

1.8 EQUIPMENT BACKBOARDS

- A. Cover at least two (2) walls with AC grade or better, void free ¾ in. (19 mm) plywood at least 8 feet (2.4 m) high.
- B. Place the grade C surface towards the wall and coat the plywood with two coats of fire- retardant white paint or provide FT plywood with paint not covering the FT label.

1.9 EQUIPMENT RACKS

- A. Utilize a combination of server grade cabinets, deep equipment cabinets, 4-post racks and 2-post relay racks as required to support the telecommunications equipment.
- B. Equipment racks and cabinets shall have full height vertical cable organizers on both the left and right sides.
- C. Equipment racks and cabinets shall be provided with rear vertical cable organizers on both the left and right sides.
- D. Consider the use of horizontal cable manager panels to organize and route associated patch cabling.

- E. 4-post Equipment racks are the preferred enclosure for equipment that is deep, heavy, or requires additional security.
- F. Equipment racks and cabinets are to be configured with appropriate ventilation options to accomplish the designed cooling configuration for the space.
- G. All equipment racks and cabinets shall be UL listed, and where required, seismically braced.
- H. All racks/cabinets shall be provided with labeling including name of MER/TR, Room number, and an identifier to indicate position within room.

1.10 CABLE LADDER AND CABLE TRAY

- A. Utilize overhead cable management systems in the MER and each TR. Cable management system can consist of any combination of ladder rack, wire mesh cable tray per fiber duct.
- B. Overhead cable management shall include wall mounted and over racks/cabinets.
- C. ***All locations where cabling transitions out to wall mounted or rack mounted equipment, provide waterfall support structure to assure proper cable bend radius.***

1.11 GENERAL

- A. All racks/cabinets, patch panels, cables, jacks, system components, etc. shall be labeled according to ANSI/EIA/TIA-606 specifications and in coordination with the District/Architect.
- B. Coordinate the location of lighting equipment so that fully loaded cable trays and ladder do not impede or obstruct the lighting.
- C. Coordinate the location of the HVAC equipment to avoid the following:
 - 1. No water piping or drip pans located over racks/cabinets or active electronics that are wall mounted.
 - 2. No mechanical equipment which requires servicing located over racks/cabinets where access to equipment would be compromised.

END OF SECTION