

The requirements below apply to all telecommunications spaces.

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#### **A. Location**

There must be at least one telecommunications equipment room (T-E-R) in a single-story building. For multi-story buildings, one T-E-R on the first floor (or basement) is required and at least one smaller telecommunications room (TR) is required on each floor above. T-E-Rs and TRs must be designed so that they are within 295 "cable feet" (90 meters) of every telecommunications outlet (TO) on that floor. If this is not possible then more than one TR per floor is required. (295 cable feet includes cable lengths through vertical walls, conduits, cable trays and other pathways between the patch panels in the TR and the TO.)

The best location for T-E-Rs or TRs is the building core. The rooms should be vertically aligned or stacked. They must be accessible either from the building exterior, public hallway or other common areas. They must not be located inside office spaces, class rooms or auditoria.

T-E-Rs and TRs must be dedicated to telecommunications. They may not contain electrical and mechanical equipment; fire alarm panels, slop sinks for janitors, etc. Equipment not related to the T-E-R and TR such as piping, duct work, building column and distribution of building power must not be located in or pass through the T-E-R or TRs.

#### **B. Size**

The size of the telecommunications spaces depends on the function and total area served. (Please refer to the sizing method for each specific type of telecommunications space in items K and L.)

#### **C. Doors**

The doors to the telecommunications rooms must open 180 degrees outward unless restricted by building code. They must be a minimum of 36" wide and 80" high with no door sills. For security reasons, doors must be equipped with locks. Whenever possible a telecommunications room should be accessible with card access. Telecommunications rooms must not have windows.

#### **D. Floors**

Carpet is not permitted in any telecommunications spaces. Floors-- also walls and ceilings-- should be treated and sealed to eliminate dust. Static-controlled vinyl tiles are the preferred floor cover.

The rating for distributed floor loading for telecommunications room must be greater than 100 lbs/sq. ft. Concentrated loading must be greater than 2000 lbs in areas that will support telecommunications equipment.

#### **E. Walls**

All walls must be lined with ¾" void free A-C grade (or better) plywood. The plywood must be fire retardant or treated with at least two coats of fire retardant paint on all sides. Use light colored paint to aid with lighting in the rooms. The bottom of the plywood should be mounted 6" above finished floor (AFF). No electrical conduits, junction boxes or any other equipment may be mounted on or across any backboard.

#### **F. Ceiling**

Drop ceiling or suspended ceiling is not permitted in all telecommunications spaces. The minimum acceptable ceiling height is 8.5'. It should be unobstructed to provide space over the equipment

racks for suspended cable trays or horizontal ladder racks. Sprinkler heads must be provided with cages to prevent accidental operations. Drainage troughs must be provided under the sprinkler pipes to prevent leakage onto the equipment. They must be as high as possible to avoid accidental operation from cable pulling activities.

### **G. Electrical Power**

Tarrant County requires that two L5-30R, 120V 30 dedicated twist lock circuits be installed in each telecommunication space. One of these receptacles should be connected to the emergency power system if available. A minimum of two duplex convenience outlets should also be installed in the telecommunications spaces, located in a readily accessible location and not within the door swing.

### **H. Lighting**

Lighting must have uniform intensity of 50 foot candles when measured 3 feet from the finished floor. Indirect lighting is not permitted. Lighting fixtures must be on separate electrical circuits separate from the circuit that feeds the electrical outlets in the room. Do not place light fixture above equipment racks, cabinets, frames or other freestanding equipment to avoid blocking of light.

### **I. Environmental Control**

The temperature inside telecommunications rooms must be maintained between 64 °F-75 °F and relative humidity between 30%-55%. There must be at least one air exchange per hour in the rooms to maintain positive pressure inside the rooms.

### **J. Grounding**

Per NEC and ANSI/EIA/TIA- 607 requirements, the telecommunications grounding and bonding infrastructure shall be designed and routed through each telecommunications space. Each telecommunications room shall be equipped with a Telecommunications Grounding Busbar (TGB) bonded directly to the Telecommunications Bonding Backbone (TBB). The busbars shall be a minimum of 6" in length, 2" in width and 1/4 thick. They shall be drilled and tapped to accommodate standard NEMA compliant grounding hardware. The TBB shall be a minimum of #6 AWG stranded copper grounding conductor and should be in conduits. All TBBs must be tied to the telecommunications main grounding busbar (TMGB) located in the equipment room (or main telecommunications room). The TMGB must be bonded to the building system ground with a minimum of 3/0 AWG stranded copper bonding conductor (BC). The ohmic resistance to ground from any point in the telecommunications grounding system must not be more than 3 ohms.

### **K. Telecommunications Equipment Room (T-E-R)**

A telecommunications equipment room (T-E-R) is where the entrance conduits terminate. It is usually located on the ground floor but may also be located in the basement. A T-E-R typically functions as the main cross-connect (MCC). It is the main telecommunications serving point for the building. It will contain telecommunications equipment, much of it mounted on 19" racks. Cables will be spliced and terminated on the walls. It is important that the entrance conduits stub up in the T-E-R as close to a corner as possible. Typical T-E-R dimensions are 12' x 12'-1/2' (minimum) for a building serving fewer than 200 work areas --a typical work area (WA) is 10'x10' or 100 sq. ft. A larger building will require a larger T-E-R.

### **L. Telecommunications Rooms (TRs)**

TRs are smaller than T-E-Rs. They are the cabling hubs for floors within a building. They also contain network electronics, typically mounted in 19" racks.

- A TR serving 50 WAs or 5000 sq. ft. must be at least 10'x 8' in size. (A typical WA is 10'X10' or 100 sq. ft.)

- A TR serving an area larger than 5000 sq. ft. and less than or equal to 8000 sq. ft. must be at least 10'x 9'.
- A TR serving an area larger than 8000 sq. ft. and less than or equal to 10,000 sq. ft. must be at least 10'x 11'.
- For a building where useable floor area served is much less than 5000 sq. ft., a small 8'x 6' TR is adequate.
- A minimum of four 4-inch vertical riser conduits or sleeves are required between TRs. They must be installed as close to a corner in the TR as much as possible.

#### **4. Horizontal Pathways**

The Horizontal Pathway System is the pathway through which cables are pulled from the T-E-R or TR to the outlets on that floor. Outlets must be connected to a TR on the same floor. Wiring pathways shall be at least 12 inches from unshielded power lines of <480 volts and at least 5" from fluorescent lighting fixtures.

##### **Cable Trays**

It is important that the path for the cable tray is clear of obstructions, such as HVAC ducts, large pipes and structural beams within the building. Where fire or smoke barriers are penetrated by the cable tray, they shall be fire stopped to maintain the rating of the barrier. Alternatively, conduit sleeves may be used through the penetrations. They must be fire stopped as well. The number of sleeves required depends on the number of cables and size of tray. Use 50% fill ratio to determine the number of sleeves. Two additional spare sleeves should be installed to accommodate future cable placement.

Place cable trays above drop ceilings in corridors. Do not place them above offices or inaccessible spaces. There must be at least 4 inches of vertical space between the suspended ceiling tile and the bottom of the cable tray; 12 inches of vertical clearance from the top of the cable tray to the true ceiling; and 2' total side clearance (meaning, if the cable tray is wall mounted and there is no clearance on one side, then minimum clearance on the other side should be 2').

It is desirable that the cable tray originates from the TR. If it does not originate from the TR then 4" conduits may be used to connect the TR to the cable tray. The number of 4" conduits required depends on the number of cables and size of tray. Use 50% fill ratio to determine the number of 4" conduits. Two additional spare conduits should be installed to accommodate future cable placement.

Access ceiling panels must be installed at 5-foot interval if cable tray is passing through a hard-lid ceiling. The panels should be within 2 feet from the cable tray. They shall not be mounted directly underneath the cable tray.

All metallic cable trays must be grounded but should not be used as grounding conductor for equipment.

##### **C. Perimeter Raceway System**

In a perimeter raceway, power and telecommunications cables must be in separate compartments and must comply with applicable electric codes. When metallic barrier is provided, it must be bonded to ground. The barrier must run continuously throughout the length of the raceway.

A double-gang pull box must be placed in the wall at 10-foot interval along the length of the raceway. Each box must have a 1-1/4 conduit to the cable tray.

##### **D. Riser Conduits**

A minimum of four 4-inch vertical riser conduits are required between TRs.

## **5. Telecommunications Outlets**

### **A. Standard Wall Outlets**

It is mounted flush in the wall at same height as the convenience electrical outlet-- 18" AFF.

Indicate TO locations on the prints with half-shaded triangles. Use appropriate symbols to differentiate TOs that have additional interface such as video or that support special devices like a wireless access point. It must be designated with appropriate subscript on the drawings.

### **B. Floor-mounted Outlets**

Enclosures for floor mounted TOs must have 1-1/4" knock-outs to accept the station conduits and must accommodate standard TO faceplates.

## **6. Power over Ethernet (PoE)**

### **A. Ethernet Switches**

The standard Ethernet switches, used by the County, support IEEE 802.3af compliant end devices. Each port will support 15.4W maximum power.

## **7. Miscellaneous**

### **A. Audio-visual, Intercom and Paging Systems**

Audio-visual (AV) systems, intercoms and similar in-house paging devices are the responsibility of the architect. They may not be located in any TR

### **B. Payphones**

A cable will be pulled to the location of any planned payphone, however they will not be terminated on the payphone end.

### **C. Elevator Phones**

Elevator phones are cabled to elevator equipment room. Phones are provided by Facilities Management. There must be at least one TO in the elevator equipment room that is cabled to the nearest TR. There must be adequate number of jacks on the TO to accommodate all elevators in the building

## **8. References**

Telecommunications Distribution Method Manual (TDMM) 10th Edition by Building Industry Consulting Services Incorporated (BICSI)

ANSI/EIA/TIA 568-B-- Commercial Building Telecommunications Cabling Standard

ANSI/EIA/TIA 569-- Commercial Building Standards for Telecommunications Pathways and Spaces

ANSI/EIA/TIA 606-Administration Standard for the Telecommunications Infrastructure of Commercial Buildings

ANSI/EIA/TIA 607-Commercial Building Grounding and Bonding Requirements for Telecommunications

NFPA 70--National Electric Code (NEC)