

*(NOTE TO DESIGNER: These Specifications are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer.)*

SECTION 27 11 00  
COMMUNICATIONS EQUIPMENT ROOM FITTINGS

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Equipment room fittings for ER/MDF and TR/IDF facilities.

1.2 RELATED SECTIONS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section 27 05 00 – Communications Common Work Results
- C. University of Houston Information Technology Telecommunications Infrastructure Standards (latest edition).

1.3 SUMMARY

- A. This Section specifies the requirements for the Communications Equipment Room Fittings for University of Houston *[Project Name and Description.]*
- B. Communications Equipment Room Fittings
  1. The communications service entrance pathway will consist of a minimum of four (4) 4" conduits from the Building Entrance Point to the ER/MDF.
  2. Space for new outside plant copper and fiber optic cable and terminating hardware mounted in contractor provided 19" racks will be provided in the ER/MDF.
  3. ER and TR facilities shall include the following:
    - a. ER/MDF Room: Shall not be less than the following size depending on the total building area being served. Note: Special purpose rooms, such as laboratories, computer rooms and certain instructional spaces, may have higher than average density of communications outlets. The size of the ER/TR serving these rooms shall increase accordingly, as determined by ITNO.
      - 1) <10,000 sq. ft.: 8' X 10'
      - 2) <20,000 sq. ft.: 10' X 15'
      - 3) <30,000 sq. ft.: 15' X 15'
      - 4) <40,000 sq. ft.: 17' X 17'
      - 5) <50,000 sq. ft.: 19' X 19'
    - b. TR/IDF Room: Shall not be less than the following size depending on the total building area being served.
      - 1) <5,000 sq. ft.: 4.5' X 4.5'
      - 2) >5,000 < 8000 sq. ft.: 10' X 7'
      - 3) <8,000 sq. ft.: 10' X 9'
      - 4) <10,000 sq. ft.: 10' X 11'
    - c. 24/7 environmental controls - 18 °C to 24 °C (64 °F to 75 °F). The humidity range should be 30% to 55% relative humidity.
    - d. Ceiling height a minimum of 9 ft 6 inches (9' 6") above finished floor (AFF)
    - e. No false ceilings or water pipe within the room's interior or running horizontally on the floor above.
    - f. Light fixture height a minimum of 8.5 ft AFF, with a minimum equivalent of 500 lux (50 foot candles) measured 3' AFF, with 30% emergency light fixtures, if available. Fluorescent lighting is

- prohibited.
- g. Dedicated Telecom Room power panels fed from UPS distribution, if available.
  - h. Convenience electrical outlets shall be installed on a side wall to allow for power cables to be run along relay racks, minimizing possibility of tripping hazards.
  - i. A minimum of one (1) duplex convenience outlet shall be placed at 6 foot intervals around perimeter walls immediately to the left and right of the door for general purpose use. Duplex utility outlets shall be placed at a 18 inches AFF.
  - j. At a minimum, one 240 volt 30 AMP dedicated circuit with a NEMA L6-30R receptacle and one 240 volt 20 AMP dedicated circuit with a NEMA L6-20R receptacle shall be installed at a height of seven (7) feet AFF. Both conduit and outlets shall be connected to the outside of the basket tray facing rear of the relay racks.
  - k. At a minimum, there shall be four (4) 120 volt 20 AMP dedicated outlets with each pair on a dedicated circuit with emergency generator back-up. These outlets are to be located at a height of seven (7) feet AFF and both conduit and outlets shall be connected to the outside of the basket tray facing the rear of the equipment racks. Final design and layout approval on the number, type and location of the outlets shall be provided by ITNO.
  - l. At a minimum, there shall be one (1) 20-amp 120-volt single phase circuit per rack. All telecommunication circuits shall be clearly labeled on circuit breaker panels with the circuit identification number located on the faceplate of the outlet in the telecommunications room.
  - m.  $\frac{3}{4}$  "void-free" AC-grade marine plywood on all walls, 8 ft high, painted with at least two coats of light colored fire retardant paint. Fire Marshall to inspect and approve before painting. Paint should be equivalent to: Flame Control Coatings, LLC. Flame Control NO. 20-20A. Fire Hazard Classification, ASTM E-84 (NFPA 255) Class "A".
  - n. A Telecommunications Main Grounding Bus Bar (TMGB) in the MER and Telecommunications Grounding Bus Bar (TGB) in the TR and a Bonding Conductor for Telecommunications (BCT) that bonds the TMGB to the electrical power ground compliant with ANSI J STD-607 A Standards
  - o. Equipment racks and overhead runway (ladder rack) system as shown in T-drawings.
  - p. 4" riser sleeves between stacked ER/TRs as shown in T-drawings.
  - q. Building Entrance stub-ups as shown in T-drawings.
  - r. Cage covered fire suppression elements
  - s. A floor rating greater than 50 lbf/ft<sup>2</sup> distributed loading
  - t. Fully-opening, secured, lockable, solid-core doors that are at least 3 ft wide and 6.7 ft [80 in]) tall and open outwards from the room.
  - u. Door locking mechanisms shall be cored with a campus-standard BEST system to accept the Telecommunication Room standard keying of 3IL119 as provided by the University of Houston Lock Shop. Keys for ER's will be available from ITNO Project Managers as needed.
  - v. Rooms shall not provide for pass-through or over-head conduits serving plumbing, HVAC or electrical services, except for sprinkler systems.
  - w. No panels for electrical or other services shall be contained in a TR/ER.
  - x. Rooms shall be located to maintain compliance with TIA/EIA distance limitations and stacked vertically whenever possible.
  - y. Conduits entering room shall be located within 4" of wall and conduit outer diameter and stubbed 2" into room.
  - z. An additional two conduits, sleeved cores or cable tray, over and above the current requirements shall be included for future growth.
  - aa. Appropriately sized UPS shall be installed in every Telecommunication Room and in Equipment Rooms having rack-mounted equipment/hardware. ITNO will determine appropriate UPS devices.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Equipment Racks – Heavy duty aluminum 7' floor mounted racks with cable management channels on

both sides and mounting rails for 19" equipment are required.

1. Chatsworth Products Inc.
  - a. Relay Rack - 55053-703
  - b. Grounding Bar – 13622-012
- B. Vertical Cable Management
  1. Chatsworth Products Inc.
    - a. Combination Cabling Section - 30162-703
  2. Uniprise
    - a. 6 in. Wide 7FT Double Sided Black W/ Doors - VCM-DS-84-6B 760072785
    - b. 8 in. Wide 7FT Double Sided Black W/ Doors - VCM-DS-84-8B 760089359
    - c. 10 in. Wide 7FT Double Sided Black W/ Doors - VCM-DS-84-10B 760089367
    - d. 12 in. Wide 7FT Double Sided Black W/ Doors - VCM-DS-84-12B 760089375
- C. Horizontal Cable Management
  1. Panduit Products
    - a. 1U - NCMHF1
    - b. 2U - NCMHF2
- D. Basket Cable Tray
  1. Cablofil
    - a. 12" x 2" – CF54 /300 EZ
    - b. 12" X 4" – CF105 / 300 EZ

## 2.1 RELAY RACKS

- A. Equipment racks shall be capable of accepting 19" equipment, self-supporting and manufactured from high-strength aluminum with two top brackets included for additional strength.
- B. Finish color shall be black. Mounting holes shall be drilled and tapped each side at 5/8"-5/8"-1/2" patterns compatible with EIA 1-1/4"-5/8" alternating patterns.
- C. The rack shall include base flanges with mounting holes drilled through for securing the rack to the floor. Each mounting hole must be at least 5/8" in diameter.
- D. Where the rack is to be mounted to VCT flooring or bare concrete, an insulating pad must be used, and care must be taken that anchors, used to secure the rack to the floor, do not come in contact with any reinforcing steel embedded in the concrete slab.
- E. In the Telecommunications and Equipment Rooms a minimum of six (6) rack mount spaces are reserved at the top of each rack for fiber enclosures.

## 2.3 CABLE MANAGEMENT

- A. Vertical cable management shall be double-sided and narrow or wide depending upon application requirements. Each manager section shall have a black finish. Lockable latching sections and protective edge guards shall be included.
- B. Horizontal cable management shall be capable of attachment to a 19" rack, maximum 6" deep and maximum 2.8" high. Each manager shall have a black finish.

## 2.4 CABLE RUNWAY

- A. Subject to compliance with these specifications, cable runway shall be as manufactured by Chatsworth Products, Inc. Cable runway (ladder rack) is required within the ER/TR's to provide a suitable pathway to route all cabling into and out of termination equipment, mounted in equipment racks or on backboards attached to walls, and pathway spaces beyond the ER/TR.
- B. Runway: Provide UL classified cable runway and components. Such products are to be UL classified as to

its suitability as an equipment-grounding conductor. Cable runway and components are to have rounded edges and smooth surfaces in compliance with applicable standards, and with the following additional construction features:

1. Dimension: The cross sectional area of the side rail shall be greater than 0.20 square inches. The height of the side rail must remain at 1-1/2 inches.
  2. Material and Finish: All cable runway and components shall be made of tubular steel and finished with flat black powder coat paint or gold chem film over zinc plating.
  3. Construction: Cable runway is a prefabricated metal structure consisting of two longitudinal side rails connected by individual transverse members. Cable runway shall be constructed of 1-1/2" x 3/8" x .065" rectangular steel tubing. Cross members shall be a single continuous rectangular tube 1/2" x 1" x .065" with radiused corners. Cross members shall be welded to stringers at 9" intervals with ends finished to protect installers and cables.
  4. Cable runway width shall be 12 inches except as otherwise shown on the Telecommunications Drawings.
  5. Cross members shall be spaced every 9 inches at a minimum.
- C. UL Classified Runway Butt-Splice Kit: Consists of 4 splice plates, U-shaped. Overall, 5" by 5/8" by 11/16" thick. Provided with 7/16" by 3/8" cutout for insertion of trimmed head bolt. Bolt measures 3/8" diameter by 2-1/2" long provided with hex nut and lock washer.
- D. UL Classified Runway Junction Splice Kit: L-shaped splice angles. Overall, 2" x 2" by 1-1/2", 3/16" thick. Secured to cable runway by 3/8" diameter by 1-1/2" hex bolts, nuts and lock washers.
- E. UL Classified 90 Degree Runway Splice Kit: Outside Clamp - Overall, 5-3/4" x 3/4" by 5/8", minimum 0.10 thick. Provided with 7/16" by 7/16" cutout for insertion of trimmed head bolt. Bolt measures 3/8" diameter by 3-1/4" long. Provided with hex nut and lock washer. Inside Edge Clamp - Overall, 2-9/16" x 15/16" x 5/8", minimum 0.10 thick. Provided with 7/16" x 7/16" cutout for insertion of trimmed head bolt.
- F. UL Classified 45 Degree Runway Splice Kit: Outside Clamp - Overall, 4-7/16" x 5/8" x 3/4", minimum 0.10" thick. Provided with 7/16" x 7/16" cutout for insertion of trimmed head bolt. Bolt measures 3/8" diameter by 2-11/16" long provided with hex nut and lock washer. Inside Edge Clamp - Overall, 2-9/16" x 15/16" x 5/8" minimum 0.10" thick. Provided with 7/16" x 7/16" cutout for insertion of trimmed head bolts.

## PART 3 - EXECUTION

### 3.1 GENERAL

#### A. ER / TR

1. Cabling within Racks and Enclosures: provide adequate length of cabling. Train conductors to termination terminal points that follow manufactures installation procedures for maintaining cable performance specifications. Provide lacing/mounting bars to restrain cables, to prevent straining connections, and to stop bending cables to smaller radii than minimums recommended by manufacturer.
2. Equipment Racks: Provide 19" wide x 7'-0" tall racks with number of vertical rack sections as required to allow space for termination of all fiber and data/voice cabling plus mounting space for multi-port concentrators (Hub/Switches) required to cross-connect all data jacks.
3. Locate/space racks and enclosures according to EIA/TIA guidelines for front and around access.
4. Vertical wire management: double-sided vertical rack cabling sections. Reference T. Drawings
5. Entrance: Arrange and coordinate locations of distribution frames, patch panels, cross-connections in communication rooms and racks to optimize space requirements of any service provider requirements, telephone system and LAN equipment.
6. Provide cable runway in equipment room above all racks and up to runway/conduits/sleeve's entering room from corridors to form a complete runway system connecting all hardware installations. Attach grounding lugs to each rack/cable raceway, conduit, etc. Refer to 'T' drawings

for details.

7. Install trays overhead along the equipment rows, leading to the cross-connects. Coordinate tray locations with lighting, air-handling systems, and fire extinguishing systems so that fully loaded trays will not obstruct or impede their operation. In the United States, NEC Article 392 provides requirements for cable trays.
8. Provide horizontal cable runways. Equip each 19" rack with overhead ladder style cable runway installed between the wall and horizontal/equipment racks. Refer to COMMUNICATIONS "T" drawings for proposed locations and sizing of each runway. Securely attach to wall studs with support brackets (and racks if applicable), in accordance with manufacturer written instructions.
9. Provide ground lug for each 19" rack. Racks shall be grounded to wall mounted ground bus bar using #6 AWG stranded, green jacketed, insulated copper conductor. Furnish all required bonding material and hardware, and bond to building grounding electrode subsystem TMGB in ER. If crimp connectors are used to bond the #6 AWG wire, follow NEC bonding procedures/specifications.
10. An inert dielectric material shall separate dissimilar metals apt to corrode through electrolysis under the environmental operating conditions specified.

END OF SECTION