

THOMAS JEFFERSON UNIVERSITY HOSPITAL
STANDARD OPERATING PROCEDURE FOR THE
BUILD OUT OF TELECOMMUNICATIONS ROOMS
AND ASSOCIATED SPACES



PREPARED BY BALA CONSULTING ENGINEERS, INC

FOR

THOMAS JEFFERSON UNIVERSITY HOSPITAL



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University Hospitals

THOMAS JEFFERSON UNIVERSITY HOSPITALS

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Document Intent

This document is intended to provide Thomas Jefferson University Hospital Information Technology department with a standard document for which they can present to other TJU internal departments, engineers or architects to provide a basic understanding of their construction requirements.

ARCHITECTURAL DESIGN COMPONENTS

A. General Placement and Sizing Considerations

1. Telecommunications Rooms (IDF and MDF) Placement

- a. IDF and MDF should be placed as close to core of building as possible.
- b. IDF and MDF rooms should have minimum of two (2) of the architectural walls available for cable entry points from the IDF / MDF to the open office work stations.
- c. IDF and MDF rooms should be vertically aligned in multistory buildings.
- d. Place a minimum of one (1) IDF on each floor with designated voice and data work stations. There shall be (1) MDF per building. At times this may co inhabit within the IDF.
- e. IDF and MDF room space should not be co-mingled with any other critical systems spaces other than what is required to achieve the required Mechanical, Electrical Plumbing, Fire Protection and Security for the IDF or MDF space.
- f. IDF and MDF rooms should not be located in close proximity to water closets or wet areas. IDF and MDF rooms should be placed as far away from wet areas as possible.
- g. IDF and MDF rooms should not be placed above or below any space that could have possible water infiltration. Any direct exposure to moisture may adversely affect the operation of equipment, cabling, and systems within the TR space.

2. IDF and MDF Room Dimensions

- a. IDF Dimensions – Telecommunications rooms need to be sized in accordance with the intended room use, network gear and cabling requirements.
- b. MDF Dimensions – Telecommunications rooms need to be sized in accordance with the intended room use, network gear and cabling requirements.

B. Floor Coverings and Finish Considerations

1. IDF and MDF Floor Coverings

- a. Anti Static VCT floor covering should be installed in all MDF and IDF floors where raised floor or access floors are not available.
2. IDF and MDF Ceilings
 - a. Drop ceilings should be utilized in the MDF and IDF rooms.
 - b. Ceiling should be installed at ten (10) to twelve (12) feet above the finished floor.
3. IDF and MDF Room Wall Finishes
 - a. ¼" AC grade plywood on three of the longest continuous walls. This will need to have further coordinated with potential existing services and architectural features.
 - b. Plywood shall be painted twice with two (2) coats of ~~BLACK~~ ^{WHITE} fire retardant paint on all sides and leading edges. (NOTE: Caution must be exercised when using any paint. Ensure that VOC emission compliance is adhered to. Plywood should not contain urea-formaldehyde).
 - c. Plywood shall be installed Four (4) feet wide by eight (8) feet high for the entire length of all walls that are to have plywood coverings.
 - d. Wall, floor, and ceiling finishes should be light in color. The color black is not recommended.
 - e. When wall fields are anticipated to be supporting a large amount of cables, it is recommended that the plywood be attached to studs affixed to the architectural wall. Constructing the wall in this manner will create a pathway that can be utilized between studs and behind the plywood.

C. Door Sizing and Placement

1. IDF and MDF Door Sizing
 - a. IDF door sizes should be minimum 3'-0" wide and 6'-6" high for standard IDF and MDF rooms. When possible over sized 42" wide doors should be utilized.
 - b. For the larger MDF rooms, or IDFs that house free standing cabinets doorways should be minimum of 6'-0" wide and 7'-6" high.
2. IDF and MDF Door Placement
 - a. Doors should be oriented to afford the door to swing at least 180 degrees from closed position to the open position. If possible and permitted by code, doors should be installed to swing out of the space. This placement will allow more usable wall and floor space in the room.

- b. Doors should be placed facing towards the most accessible common corridor. Placing doors into adjacent spaces that are not considered public spaces is not recommended.

3. Miscellaneous IDF and MDF Requirements

- a. Each door should be equipped for access control magnetic locking hardware or preferred access controlled entry device. It is recommended that a proximity or access control device be placed at each IDF and MDF door to manage and monitor entry into and out of the IDF and MDF space.
- b. Environmental Monitoring – All MDF Rooms must be equipped with a Netbotz unit to provide monitoring of air temperature, humidity, water, and camera security.
- c. Door sills are not recommended.
- d. With larger IDF and MDF rooms that require double doors (6'-0") removable center posts are permitted.
- e. Access to the IDF and MDF should be limited to only the personnel responsible for the maintenance and operation of the cabling and network equipment and equipment within the space. The IDF and MDF rooms should not provide access into or out of any secondary rooms.

D. MDF and IDF Fire Rating Considerations

1. Fire rating considerations

- a. IDF and MDF walls should be built and installed with all architectural and architectural support elements routed from solid floor to solid deck, with a minimum of 1 hour fire rating.
- b. IDF and MDF walls should be made of appropriate GWB finished wall coverings, for aesthetics, and to maintain designated min. 1 hour fire ratings.
- c. MDF spaces that house layer 3 active core electronic infrastructure, walls should provide a 2 hour fire rating.

MECHANICAL DESIGN COMPONENTS

A. Cooling and Relative Humidity

1. IDF and MDF Cooling Requirements

- a. For rooms that house active networking components, the temperature range should be maintained at a range of 64 and 75 degrees F.

- b. For rooms that do not house active networking components but do house low voltage Telecommunications infrastructure, the temperature range should be between 50 and 95 degrees F.
2. IDF and MDF Relative Humidity (RH) Requirements
- a. For rooms that house active networking components, the RH should be between the ranges of 30-55% RH
 - b. For rooms that do not house active networking components the RH should be between the ranges of 30-55% RH
3. IDF and MDF General Mechanical Design Components
- a. Air handling and air distribution units must not be placed above the ceiling of IDF and MDF spaces. These units should be placed in adjacent non critical spaces, or planning must be made to place units in a suitable location that will not impact the IDF and MDF space for service requirements, maintenance, and accidental discharge or failure of units.
 - b. IDF and MDF spaces should maintain positive air pressure.
 - c. IDF and MDF spaces should be designed for a minimum of one air change per hour.
 - d. IDF and MDF mechanical air handling and distribution units should be placed on back up power generation, or have the means to operate over an Uninterruptible Power Supply system if the IDF or MDF space is deemed mission critical.
 - e. Air flow distribution with in the IDF and MDF should be accomplished via the use or supply and return ducts. Grill locations should be coordinated with the telecommunications design team.
 - f. Air flow in the TR spaced should be static and have positive pressure to enable the IDF or MDF space to maintain healthy mechanical environments.
4. Sizing of Units
- a. IDF and MDF rooms can have various equipment requirements and HVAC unit sizing should be based upon the telecommunications department day one and anticipated heat loads.

ELECTRICAL DESIGN COMPONENTS

A. Power Requirements and Power Distribution

1. Uninterruptable Power Supply (UPS)

- a. All network gear housed within the MDF and IDFs shall be supported by UPS units. Typically these units are housed within cabinets or two post racks. The size of the UPS is dependent upon the equipment it is intended to support. Space for these units, as well as the power and cooling required to support them needs to be considered prior to final mechanical and electrical engineering.
2. Circuit Requirements and plug configurations
 - a. Plug configurations and outlet amperage will need to be defined on a case by case basis.
 - b. Branch circuits from the local panel should be routed in EMT conduit from the panel to the receptacle location.
 - c. Locate receptacles dedicated for rack mounted layer 2 or 3 networking gear as close as possible to the device being connected making certain to avoid any tripping hazards. This can be accommodated by placing the receptacles within cabinets, on an adjoining wall or onto an overhead cable tray raceway system. If a raised floor is present, this space can be used to convey the branch circuits to the required location.
 - d. Convenience receptacles should be placed along perimeter walls.
3. Power Distribution in the TR space
 - a. Provide a dedicated electrical panel for the networking equipment located in the IDF or MDF. This panel is not intended for non-networking equipment (lights, fans, HVAC, convenience outlets).
4. Lighting Requirements in TR Spaces
 - a. Lighting should be placed minimum 8'-0" AFF
 - b. Lighting fixtures should be arranged so that light paths are directed to the front and rear of the racks and cabinets.
 - c. Lighting should be arranged so that light paths are directed towards major wall fields and wall mounted active networking equipment
 - d. Lighting should be allocated for 50 LUX (500 Foot candles) measured at 3'-0" AFF.
5. Telecommunication Cable Pathways
 - a. 4" conduit sleeves shall be required for MDF and IDF rooms. Quantity is to be determined by the cabling requirements.

TR/H
NETWORKS
SPEC

PLUMBING AND FIRE PROTECTION DESIGN COMPONENTS

A. Plumbing

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1. Avoid having any plumbing pipes route through telecommunications spaces.
2. Existing plumbing pipes should be removed and reinstalled to avoid telecommunications spaces.

B. Fire Protection

1. Housekeeping

- a. Materials, solvents and trash should not be stored within IDF and MDF rooms.
- b. Fire retardant paint should be used on all plywood surfaces and cut edges.

2. Fire Stop Solutions

- a. All solutions shall return the original fire rated integrity to the penetrated architectural structure or assembly.
- b. All fire stop solutions must be tested and classified with ASTM E814 (UL 1479).
- c. Mechanical firestop systems that are 100% protected whether empty or full should be utilized.
- d. Mechanical firestop systems should be re-enterable.
- e. Detailed documentation of all firestop solutions used should be documented and turned over to the Client as part of close out procedures.

C. Detection

1. Smoke Detectors
2. Heat Detectors

D. Suppression

1. Dry-pipe Double Interlock

- a. Whenever possible avoid routing piping through any telecommunication space. If piping must be routed within the space, drip pans and leak detection systems should be used. Check valves should not be located within the IDF and MDF spaces.
- b. Sprinkler heads should be oriented logically to effectively extinguish potential fire hazards.
- c. Sprinkler heads should be installed with cages to protect the fuse pin trigger device against discharge by accidental contact.

BONDING, GROUNDING AND EARTHING

A. Bonding and Grounding

1. Requirements

- a. All racks, cabinets and cable trays shall be bonded to an approved ground.
- b. Cold water pipes are not an acceptable ground.

2. Telecommunications Main Grounding Busbar

- a. The TMGB is a copper bar that is intended to provide a grounding “backbone” used for bonding the telecommunication equipment through out the building.
- b. A TMGB should be present in each building where low voltage telecommunications cable plant and associated active networking equipment is being utilized. Furnished and installed by the telecommunications contractor.
- c. The TMGB shall be bonded to the electrical service at the electrical service entrance facility, to building steel, to a local electrical panel and all TGBs by the electrical contractor.
- d. Size all bonding conductors in accordance with the National Electrical Code.

3. Telecommunications Grounding Busbar

- a. The TGB is a copper bar that is located in the immediate vicinity of telecommunications equipment that is intended to provide a ground from the TMGB. Furnished and installed by the telecommunications contractor.
- b. The TGB should be bonded to the TMGB, to a local electrical panel ground, and to building steel by the electrical contractor.
- c. Each IDF and MDF will have at least one Telecommunications Grounding Busbar (TGB).
- d. All racks, cabinets, metallic cable trays should be bonded to the TGB by the telecommunications contractor.
- e. Size all bonding conductors in accordance with the National Electrical Code.

