

27 11 00 BDF/IDF AMEP Requirements (Revision date: 10/12/11)

1.0 Purpose

- A. These guidelines provide requirements for designers to incorporate into bid documents. They are part of the University Wiring Standard (UWS), version 3.0.

2.0 General Requirements

- A. **Function.** The Building Distribution Frame (BDF) room serves as the primary hub of the communications infrastructure in a building. Intermediate Distribution Frame (IDF) rooms are satellite rooms connected to the BDF via the riser pathway/cablings system. Both room types function as hubs of service zones where all horizontal cabling within the zone terminates. The BDF also serves as the termination point for the building entrance ductbank and cabling system.
- B. **Environment.** BDF/IDFs provide access to cabling cross-connect hardware and active network electronics by technicians supporting voice, data, and video services. These rooms should be designed to provide the proper environment for both technicians and equipment. They should be properly sized, powered, lighted, and cooled. They should also provide appropriate security and environmental protection for equipment.

3.0 Materials and Standards

- A. **Standards.** All work shall be in accordance with the latest edition of all applicable campus, State, and Federal regulations and codes. Special considerations should be made to comply with NEC, NFPA, and North Carolina State Construction Office requirements. All work shall also be in accordance with the latest versions of the BICSI TDMM manual and TIA-569 standard.
- B. **Multi-rack IDF sizing.** IDFs should be sized based on the quantity of equipment racks to be housed. The quantity of racks is based on the number of outlets in the IDF's service zone. The minimum width of the room should be 8'- 0" for rooms equipped with one row of racks. The minimum depth of rooms equipped with two rows of racks should be 12'- 0". The length of the room should be based on quantity and types of racks to be installed. The width of each rack type (including vertical managers) is:
 - 1. "192-outlet rack" and "144-outlet rack" – 3'- 9"
 - 2. "96-outlet rack" and "48-outlet rack" – 3'- 5"
 - 3. "24-outlet rack" – 2'- 10"
 - 4. "BDF rack", "IDF rack", and electronics racks – 2'- 3"

Small IDFs will be provisioned with an "IDF rack" and one 48-outlet rack", or "96-outlet rack". These rooms should allow for one future cross-connect rack and have a minimum length of 12'- 0". Medium IDFs will be provisioned with an "IDF rack", an electronics rack, and either a "144-outlet rack" or "192-outlet rack". These rooms should allow for one future cross-connect rack and have a minimum length of 14'- 0". Large IDFs will be provisioned with an "IDF rack", an electronics rack, a 192-outlet rack, and an additional cross-connect rack. These rooms should allow for one future cross-connect rack and have a minimum length of 18'- 0".

- C. **Multi-rack BDF sizing.** BDFs should be sized as above for racks with an additional 2'- 0" in length to allow space for termination of telephone entrance cabling.

- D. Single rack BDF/IDF sizing. BDF/IDFs serving less than 48 outlets (including 20% growth) may be provisioned with a single rack. The minimum interior dimensions of these rooms should be 3'- 0" x 5'- 6" with the door positioned on one of the long walls.
- E. Surface mounted cabinets. BDF/IDFs serving less than 24 outlets (including 20% growth) may be provisioned with a surface mounted cabinet. Cabinets are 24" W x 25"D. A minimum of 3'- 0" clearance should be maintained in front of the cabinet. In addition, clearance should be maintained so the cabinet can be fully opened about its rear hinge on the side the hinge is installed.
- F. Flush mounted cabinets. IDFs serving less than 12 outlets (including 20% growth) may be provisioned with a set of flush mounted cabinets. A minimum of 3'- 0" should be maintained in front of the cabinets.
- G. Dedicated facility. BDF/IDFs should be used solely for equipment related to voice, data, and video communications functions supported by ComTech. It should not be used to house equipment related to other building systems (i.e. fire alarm, security, building automation, departmental servers, etc.).
- H. Room locations. When possible, the BDF should be located on the lowest floor of a building with IDFs stacked on each floor directly above it. In some larger buildings, multiple stacks of IDFs will be required. One key limiting factor in determining acceptable locations for BDF/IDFs is that data networking technologies require that the length of the horizontal data cable link does not exceed 295 ft. (90m). A good rule of thumb to use in determining acceptable locations is the "250 ft. rule". The pathway run from the outlet box farthest from a BDF/IDF back to where the wireway penetrates the wall of that BDF/IDF should not exceed 250 ft. It is imperative that this calculation includes allowances for all vertical and horizontal components of the run.
- I. Governance. ComTech has final authority over access to and the use of all BDF/IDFs. All BDF/IDFs will be keyed to the campus telecom room key. Keys may be checked out on a daily or long term project basis using current ComTech policies and procedures. Only a very limited number of campus staff outside of ComTech will be issued permanent keys. These will primarily be individuals involved in support of life safety functions/systems.
- J. Access. BDF/IDFs should be located such that they can be accessed by technicians without having to pass through lockable space. Typically, each will be located with a door exiting to a corridor. It is acceptable to locate these rooms with the door directly accessing the exterior of a building. However, efforts must be made to ensure that exterior doors are sealed properly from water, dirt, and heat. Locating doors so that they are to be entered from mechanical, electrical, or other similar spaces is unacceptable.
- K. Architectural requirements. BDF/IDFs can be constructed with materials similar to those used for basic office space construction, and can be matched to nearby spaces.
 - 1. Walls. All four walls of each room should typically be installed to the deck above. Walls will be constructed using 3 5/8" steel studs (25 GA at walls, 20 GA around door) at 16" O.C. with one layer of 5/8" thick type X (ASTM C-36) gypboard each side. 4" rubber cove base should be installed on all walls inside the room.
 - 2. Ceilings. In general, no ceilings should be installed in the rooms, and the walls run to the deck above. Where this is not practical, a gypboard and stud construction ceiling should be installed as high as possible (9'- 0" minimum). In these cases, wireways should

penetrate the walls of the room below the ceiling height. Acoustic tile ceilings should not be installed.

3. Interior doors. Typically, interior BDF/IDF doors should be single 3'- 0" X 7'- 0" wood veneer doors (premium rotary cut birch finish), 5 ply on staved core, 20 minute rated (labeled). Doors are to be provided pre-machined for three hinges and mortise lockset. Door frames will typically be hollow metal frame 16 GA cold rolled steel, with 2" head, 5 3/4" jamb, 4 3/4" throat. Frames are to be 20 minute rated (labeled), welded construction, prepped for three hinges and 4 7/8" ANSI standard strike. The door headers should be reinforced for installation of surface type closers. Doors should swing out, not into the BDF/IDFs. Door and frame color and style should match surrounding doors as closely as possible.
4. Exterior doors. BDF/IDF doors which exit to the exterior of a building should be matched to other exterior utility doors. Typically, these will be 3'- 0" X 7'- 0" hollow metal doors with hollow metal frame of 16 GA cold rolled steel. Doors should swing out, not into the BDF/IDFs.
5. Door hardware. Typical door hardware should include:
 - Five knuckle steel hinges, 4 1/2" X 4 1/2", US26D (dull chromium) finish, with oil impregnated bearings
 - Storeroom/closet function steel mortise lockset, LWM series lever, US26D (dull chromium) finish, always requiring key to open
 - Mortise cylinder, steel, US26D (dull chromium) finish
 - Heavy duty, parallel arm closer, with extra duty arm, aluminum finish, using thru-bolt & machine screw fasteners, aluminum finish,
 - 8" tall (door width less 2") stainless steel kickplate, US32D (satin stainless) finish
 - Silencers for metal frame door, gray finishDoor hardware should match that used for surrounding doors. All lock cores will be installed by the NCSU Facilities Operations.
6. Door seals. In order to protect sensitive network electronics, it is important that moisture and dust be kept out of BDF/IDFs. The bottom of interior doors should be equipped with solid door sweeps, brush door sweeps, or thresholds equipped with vinyl inserts as applicable to prevent water and dust from entering room underneath door. Exterior doors should be equipped with rubber gasketing or perimeter seal on top and side of door to provide a seal from external rain, humidity, and dust.
7. Flooding. A potential source of flooding in the BDF occurs when the telecommunications manhole outside the building is at a higher elevation than the BDF. While installation of water tight sealants inside the conduits can usually mitigate flooding, the BDF finished floor should be located higher than the top of the manhole when feasible.
8. Interior/finishes. The interior of each BDF/IDF should be completely painted with two coats of Glidden 4000 Hi-Hiding white latex paint or equal. Floors should be finished with 12" X 12" vinyl composition tiles, commercial grade, Armstrong Standard Excelon – polar white, or equal.
9. 3/4" thick plywood is to be installed on all walls from 24" to 96" AFF. A section of plywood should also be installed above the door frame. Plywood is to be either fire retardant plywood with label side out or standard plywood painted with fire retardant white paint. If fire retardant paint is used, the contractor shall paint all sides of the plywood.

10. Signage. An NCSU standard, ADA compliant sign denoting room number and "Telecommunications" should be installed on or adjacent each BDF/IDF door.

- L. Mechanical requirements. Each BDF/IDF should be equipped with an HVAC system to keep the room at or below 75° F and 55% relative humidity after all electronic equipment is installed. Cooling will be required 365 days/year. Heating will never be required. For design purposes, the typical heat generation per room will range from 5000 to 7000 BTU/hour. Generally, VAV systems are preferred, but other systems (fan coil, split system, etc.) may be employed as well. All active HVAC systems installed in BDF/IDFs should be able to be controlled separately from the system in the remainder of the building. The system controls (thermostat) should be accessible to personnel inside the room. Wireless remotes for HVAC units should not be used.
- M. Electrical requirements - lighting. Fluorescent lighting fixtures should be installed in each BDF/IDF to provide a minimum of 50 foot-candles measured 3 ft. AFF. Typically, one row of pendant mounted fluorescent light fixtures should be installed between the front of the row of equipment racks and the wall, and one between the rear of the row of equipment racks and the wall. The designer should denote the exact location of fixtures on the drawings to ensure that they do not interfere with the cabling ladder racks and wireway/conduit penetrations. Fixtures should be located as to provide maximum lighting after ladder racks are installed. Fixtures should be installed between 8'- 6" and 10'- 0" AFF. In some locations, wall mounted fixtures may be necessary. These should be installed so that the top of the fixture is just below 6'- 6" AFF.

Typical pendant mounted fixtures are four lamp, 2' X 4' fixtures with acrylic prismatic lens, equipped with electronic ballast and T-8 bulbs. The typical wall mounted fixtures are two-tube fixtures with acrylic prismatic lens, equipped with electronic ballast and T-8 bulbs. All of the fixtures in a room should be controlled from a single pole switch located just inside the door of the room.

- N. Electrical requirements – power. Power requirements. In each multi-rack BDF/IDF, two duplex receptacles each should be located on each wall (except wall with the door). The receptacles should be NEMA 5-20R, quadplex, 20A, 125V with steel cover plate. Receptacles should be wall mounted at 18" AFF. Each room should be provisioned with two separate 20A branch circuits. One duplex outlet on each wall should be wired to the first branch circuit, with the second outlet on that wall wired to the second branch circuit.

In single rack BDF/IDFs, two receptacles should be installed, one on each of the side (short) walls. Both receptacles should be on the same circuit.

In surface mounted cabinet BDF/IDFs, one receptacle should be installed on the wall so that it is accessible from inside the cabinet. It should be mounted at 3'- 6" AFF and centered within the cabinet. The receptacle should be a NEMA 5-20R, duplex 20A, 125V with steel cover plate.

In flush mounted cabinet IDFs, one Structured Media Center (non-surge) duplex receptacle should be installed in the bottom of the lower cabinet.

When possible, all receptacles should be on circuits on emergency generator power. Each receptacle should be clearly labeled with: panel room number, panel number, and circuit number. UPSs and rack mount power strips will be installed by NCSU.

End of Section