



## AT&T Practice

# Raised Access Floor Design Standards for ANS Equipment Locations

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## **1. About This Document**

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This document describes the standards for the design and installation of a RAF System. The information is organized as follows:

- Section 1 provides general information concerning AT&T Raised Access Floor Systems.
- Section 2 provides references to construction technologies not covered by this document.
- Section 3 provides a summary of installation and materials requirements.
- Section 4 describes design requirements.
- Section 5 summarizes the design criteria for a complete RAF System.
- Section 6 describes Cutting and Drilling of Removable Floor Tile
- Section 7 provides a form for installation certification.

### **1.1 Purpose**

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This document is intended to describe AT&T Raised Access Floor Systems. It provides summaries of the system components, design criteria and requirements. Issues addressed in this document include seismic and load capacity calculations, equipment configurations, floor anchoring, fire and electrical static resistance, and grounding.

### **1.2 Related Documentation**

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The following AT&T Practices are referenced in this document.

760-200-020 Telephone Buildings - Design Loads

760-200-026 Seismic Zone Classification

760-200-120 Appendix 1 Procurement Requirements for Raised Access Floor (RAF) Systems

760-250-150 Building Planning for Electronic Data Processing Systems

760-400-105 Design Strategy for the AT&T Enhanced Network Services Facility Program

760-610-305 Fire Safety Interior Finishes, Furnishings, and Decorations

760-630-410 Fire Stopping Considerations for Floor and Wall Penetrations and Protection of Cable Runs

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801-900-160 AT&T Network Equipment Development Standards  
(Generic) Requirements (MLID 9069)

803-501-100 Grounding & Electrical Protection for AT&T  
Telecommunication Buildings and Equipment

### **1.3 Reason for Reissue**

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This document is reissued to reflect changes in the Raised Access Flooring System design. This system improves upon previous releases, still addressing NEDS and seismic considerations, while also considering ease of installation issues. How to Obtain a Copy of This Document

External AT&T suppliers may obtain a copy of this document by accessing AT&T's Supplier Information web site (InfoSwap) at <https://www.infoswap.att.com/>. This site requires an id and password that can be obtained through AT&T Supplier Management.

Internal AT&T customers may obtain an electronic copy of this document in Portable Document Format (PDF) by accessing the ANS Online Document Management System (ODMS) at <http://www.qms.att.com/odms/>.

Any questions on the application of this document should be referred to the SME.

### **1.4 How to Comment on This Document**

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To report errors or suggest changes to this document, contact the document owner. The name of the document owner can be obtained from ODMS (same link as above).

## **2. General**

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### **2.1 Application**

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This section describes the AT&T Raised Access Floor (RAF) System. These standards apply to new raised floor installations and shall serve as a guide for additions adjacent to existing raised floor areas.

This system was developed with AT&T for use within the central office. Seismic and load capacity calculations, equipment configurations, floor anchoring, fire and electrical static resistance, grounding, quality and reliability issues are all addressed.

AT&T's Infrastructure Design Standards Manager shall be contacted for resolutions regarding project layout, materials, equipment, and occupancies issues.

### **2.2 References**

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For construction terminology defined or not defined herein, and/or as made reference to in other standards, refer to AT&T Practice 760-200-120, Appendix 1, "Procurement Requirements for Raised Access Floor (RAF) Systems," and the appropriate nationally recognized construction industry associations and societies. For design, testing, and installation methods and standards for the RAF System, refer to the manufacturer.

## **3. Summary**

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### **3.1 Availability**

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The AT&T Raised Access Floor (RAF) System shall replace the use of commercially available and previously accepted computer floor systems within AT&T NSD space. Areas of installation shall include all administrative supportive areas (i.e., MMOC, NOC, TCC), network equipment areas (i.e., DAC, 4ESS, 5ESS), Point of Presence (POP) locations, Web Hosting, and rental/vacant spaces that eventually will handle network equipment.

### 3.2 Application

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Where special conditions, situations, or the budget may place restrictions on the complete RAF System usage (i.e., administrative areas), the RAF stringers and gravity-held floor panels shall be the minimum components installed as replacement components of the standard manufactured computer floor. In this situation, future network deployment affords AT&T the ability of material redemption and/or supplementation to a complete RAF System. It shall also be noted that the RAF System's standard seismic pedestal shall be strongly considered for use.

In areas where communication or data equipment is not planned and the building structure cannot be modified to house such equipment, the manufacturer's standard flooring system for the site's seismic zone may be substituted.

Carpet tiles with AT&T's Environmental Design Standards Manager's approval may be used outside of network equipment areas (i.e., administrative space). Refer to paragraph 5.6.

The geographical seismic area or zone per the locally adopted building code or, AT&T Practice 760-200-026, "Seismic Zone Classifications", determines the type of RAF System used. This document is based on the latest Uniform Building Code (UBC) issue, establishing AT&T's seismic construction classification.

Floor systems in seismic zones 3 and 4 include solid aluminum panels to be used where equipment is to be installed. Coordinate the aluminum panel layout with the equipment layout. Provide equipment mounting panels for equipment indicated as new on the COLD drawings and a site stock of 10 panels for future equipment. As the site stock is depleted, replace the site stock to maintain 10 equipment mounting panels.

Only at the AT&T Representative's discretion shall RAF material from within company stock be reused, provided that this material was properly removed, stored, and retains all applicable identifying certification.

The RAF System, similar to commercial computer raised floor systems, can be erected on a portion of or on an entire building floor in new and existing facilities that may have already established raised floor systems. Stairs, ramps, and railings can be eliminated where the use of a depressed floor slab for raised floor areas can be economically incorporated within the new construction. Where a depressed floor slab results in a slab below grade, insure that adequate waterproofing is provided to prevent intrusion of water into the floor plenum.

## **4. Design Requirements**

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### **4.1 General**

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The RAF System is AT&T's standard for all installations. By design the system withstands stress from overturning moments, shear loads, and compressive loads induced by the floor's response to earthquake loading. Raised floor design loads are generally specified for uniform and concentrated loading. Typical uniform floor loading for telephone buildings are listed in AT&T Practice 760-200-020, "Design Loads for Telephone Buildings". The Architect/Engineer of Record shall verify concentrated floor loading and transient floor loads per location.

Unlike previously accepted flooring systems, electronic data processing and network equipment shall not be secured directly through the raised floor to the sub-floor.

A one-inch gap shall be provided between the RAF and any vertical portion of the building structure (walls, columns, cable racks, conduits, etc.) to allow movement of the RAF without damage to the RAF or the building structure. The gap shall be covered by a metal angle attached to the building structure or other fill material as defined in the manufacturer's installation instructions.

### **4.2 Grounding**

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The building engineer for AT&T Network equipment areas must provide electrical grounding of the RAF System that connects the raised floor system, including the perimeter angle, to the building ground. Grounding is discussed in AT&T Practice 803-501-100 Chapter 11, "Grounding & Electrical Protection for AT&T Telecommunication Buildings and Equipment." For Data Center Facilities, refer to AT&T 760-400-105 Section 7.12 for additional information.

### **4.3 Use of Plenum Space**

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Underfloor supply air signifies increased regulations on the total floor cavity environment and equipment cabling. The Central Office underfloor environment is not typically used for supply air and is usually classified as "Dead Space," not a crawl space or a confined space. If the cavity is planned for supply air, ensure that the planners of electrical and signal systems understand the applicable regulations.

All subfloor cable penetrations shall be fire rated per AT&T Practice 760-630-410, "Fire Stopping Considerations for Floor and Wall Penetrations and Protection of Cable Runs".

Existing subfloor finishes shall be removed, sealed, and/or encapsulated (i.e., vinyl-asbestos floor tile) prior to drilling and mechanically anchoring the raised floor pedestals. This will prevent excessive dust from developing within the work area while ensuring proper set of pedestal bases. Well adhered VCT may remain in place. Mastic or any type of adhesive is prohibited for pedestal anchoring or temporary placement.

Exception: The pedestals supporting only cut, non-load bearing perimeter tiles may be anchored with adhesive. Pedestals supporting only ramps may be anchored with adhesive.

When the subfloor is subject to potential water leakage (i.e., when water or other liquid is piped through this area), the subfloor surface will be waterproofed to prevent leakage into lower areas within the facility. Floor drains, drip pans, and water detection alarms will be also installed.

The RAF System installation is based on a 2 foot by 2 foot grid pattern as coordinated with network equipment arrangements. All floor panels in the maintenance aisles shall be completely removable using the manufacturer's appropriate panel lifting device. In so doing, total access to the cable pathways is rendered without disturbing the access floor's supportive substructure. Refer to the Central Office Layout Designers (COLD) drawings for the floor's "reference or starting point" and equipment layouts.

Unlike commercially available raised floor systems, greater accessibility is provided with the deletion of field-applied diagonal seismic bracing on the pedestals. Routing of cable paths shall be designated under equipment lineups, and the open aisles shall generally be designated as maintenance or service aisles.

In non-telecommunication facilities, the higher initial cost of raised floor systems as compared with conventional construction, must be evaluated. Alternative solutions such as under carpet flat conductor power and communication wiring, power poles, or wall mounted raceways should be considered.

## **4.4 Planning and Scheduling**

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Coordinate with the work schedule of other trades. All overhead work should be completed before the RAF is installed. If overhead work is required after the RAF is installed, the floor must have adequate protection to prevent permanent damage to the RAF.

A dry accessible area must be provided to receive and unload the materials. A free path must be provided from the receiving area to the installation area.

The installation area must be closed to the weather. The temperature must be maintained between 55°F and 90°F, and relative humidity not to exceed 70% during and after the installation. The installation area must not have water leaks from the weather or HVAC/Plumbing.

The installation area should be free of other trades and their materials.

The sub-floor surface must be free of moisture, dust, dirt and other debris. If any attachment is to be made with adhesive, test the compatibility of the sealer and the adhesive.

The sub-floor must be concrete. Floor tiles containing asbestos must be removed prior to drilling for anchor installation. Well-adhered floor tiles not containing asbestos may remain in place. Pedestal adhesive may not be used where floor tiles are installed.

## **5. The RAF System**

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### **5.1 General**

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This section summarizes the design criteria of a complete, portable, RAF System which incorporates modular formed steel and aluminum panels on an elevated, mechanically anchored seismic pedestal system and supports screwed box stringers with optional metal railings, ramps, and stairs assemblies, thus creating a floor system with an accessible, non-confining underfloor cavity for telecommunication network and facility support services. Refer to the attached "System Details" in AT&T Practice 760-200-120, Appendix 1, "Procurement Requirements for Raised Access Floor (RAF) Systems," for component illustrations.

Refer to the FRD for design requirements of the raised floor system.

## 5.2 Pedestals

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The RAF System's supporting columns that create the underfloor cavity are available in several seismic models designed for the seismic zone of the installation. The company standard is the 24-inch assembly. If a greater height is required, contact the RAF manufacturer for the proper pedestal selection. A waiver from Standards is required for flooring heights in excess of 30".

Final adjustment is provided within each pedestal head assembly for overall floor leveling and alignment to adjoining floor surfaces. The length of the exposed adjustment threaded rod shall not exceed the manufacturer's recommendations.

The vertical centerline of each pedestal shall be set at the intersections of the AT&T Central Office Layout Designer's (COLD) twenty-four (24) inch square grid layout, as dimensioned from the reference or starting point for equipment placement. Any additional pedestals at cutouts, cut panels at columns or along the perimeter, or per floor loading requirements shall be placed to maintain structural integrity.

Additional Seismic bracing is not required.

Perimeter Pedestal units supporting cut floor panels and cantilevering box stringers need only one (1) anchor, provided that each unit is placed within twelve (12) inches from the perimeter.

## 5.3 Pedestal Anchors

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For approved anchor manufacturers, refer to AT&T Practice 760-200-120, Appendix 1, "Procurement Requirements for Raised Access Floor (RAF) Systems". All anchor types shall be approved for use within the jurisdiction holding code enforcement, for example; International Conference of Building Officials (ICBO) Evaluation Report, Southern Building Code Congress International, Inc. (SBCCI), City of Los Angeles (COLA) Research, etc.

Pedestal type 1 anchor is a concrete screw type, 3/8 inch diameter with an embedded drilled hole depth of 3.0 inches or an approved equal pending site particulars.

Pedestal types 2 & 3 anchors are the heavy-duty expansion/sleeve type with torque value of sixty foot-pounds (60 ft-lb.) and an embedment depth of 80 millimeters (mm) minimum, set within a drilled hole depth of 100 mm maximum.

Where the anchors are to be installed in lightweight concrete, thin slabs, damaged slabs or other substandard condition, a structural engineer shall select an anchoring system to provide a holding capacity equivalent to the specified anchoring system.

#### **5.4 Box Stringers**

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The modular steel stringers shall be positioned and mechanically fastened to the pedestal head assemblies

Stringers for the Maxcess system are constructed of boxed cross-sectional galvanized steel with an approximate overall dimension of two (2) feet. Each stringer is mechanically fastened to the pedestal heads using two (2) 0.250/20 by 2.0 inch plated screws that are accessible from above and provide a positive electrical contact.

Stringers for the Tate system are similar, except that each is approximately four (4) feet in length and are installed in a basket weave pattern.

#### **5.5 Floor Panels**

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All panels, except where type 3 pedestals are used and equipment mounting panels are required, shall bear a model identification and a reference number denoting the panel's concentrated load capacity of 1,250 pounds per the Ceiling and Interior Systems Contractors Association (CISCA) standard. The standard commercial floor panels of 24 inches square utilize an all-steel, unitized, welded panel construction with a uniform bottom pan pattern of formed modular pockets to resist deflection. The installed panels shall not extend below the support stringer's bottom edge.

Equipment mounting panels for seismic zones 3 & 4 shall be a T6 Aluminum plate, 1-1/4" thick around its perimeter (refer to manufacturer specs for details). Maxcess model 11605 Equipment Panel.

#### **5.6 Panel Covering**

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Exposed panel covering for use within network equipment areas shall be fabricated in one piece to cover each panel face. Panel color and trim shall be per the AT&T/Manufacturer Agreement as in effect or per the Architect's sample.

Carpeting shall not be used in Central Office (CO) equipment areas, computer rooms, or administrative areas containing equipment that is electrically connected to the CO or computer equipment such as the Maintenance Operations Center (MOC) of the 4ESS office.

Provided that this panel covering meets AT&T's Environment and Safety Engineering Center-Corporate Fire Protection Organization requirements as specified in AT&T Practice 760-610-305, "Fire Safety Interior Finishes, Furnishings and Decorations," carpet tiles with low-static electricity properties and low-lint dispersion may be used in administrative office areas or in computer terminal rooms where service characteristics of the carpeting will not have any detrimental effect on equipment operation. This carpeting shall be applied to the panel over the HPL, which allows for removal when the panel may be deployed within network areas.

### **5.7 Cable Location Stickers**

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To limit the number of floor panels removed in performing work, all sub-floor and through the wall cable penetrations below the RAF System shall receive a "CABLE PENETRATION BELOW" identification sticker. These self-adhesive, orange color stickers with black lettering shall be applied directly to the floor panel above the occurrence or above the base molding on the wall where a through the wall penetration occurs below.

To order:

Ideal Jacobs Printing Inc.  
22 East Willow Street  
Milburn, New Jersey 07041  
(973) 275-5100

### **5.8 Accessories**

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Stairs, ramps, hand, and guard railings can be supplied by the floor manufacturer or an outside vendor provided their design criteria are acceptable to the Architect/Engineer of Record.

The portable floor panel lifting device that is compatible with panel covering shall be kept on a wall mounted holder. Mount the lifter's bracket that includes panel removal and replacement instructions and the lifter, adjacent to each entry/exit door or on a column enclosure opposite of or closest to each point of entry within the area as required by AT&T and/or the code authority holding jurisdiction.

## **5.9 Framework Anchoring Details**

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To anchor equipment framework to a raised floor, the vendor must first know the earthquake zone of the installation. Zones 0 –2B have the frames bolted to the raised floor through a u-channel across the bottom of the floor tile. Zones 3 & 4 have ½-inch diameter bolts, nuts and washers extending through the solid aluminum raised floor panel. Standard hold-down parts are used on top of the floor for all zones. Anchors and hold down material to be engineered for proper seismic zone.

### **5.9.1 Seismic Zones 0 – 2B**

To fasten network and unequal flange duct framework to a raised floor, place under the panel a 1-5/8" x 1-5/8" u-channel with continuous slot down and use clips covering the free ends of the u-channel where the threaded rod goes through to prevent it from spreading when compressed. Use hold down plate engineered for that frame, and use threaded rod, nut, washer, insulating bushing and hold down washer in the base of frame, and clip, washer, lockwasher, and nut on bottom of u-channel. The u-channels should be mounted perpendicular to the front of the bay and not extend more than four inches past the edge of the stringers blocking access. End caps must be used on the u-channel to prevent injury. Torque the nut to 30 foot pounds. Do not over tighten as the tile will deform and become uneven with its surrounding tiles. If the floor tile is not bolted to the pedestals, the u-channel must extend under the stringers in front and behind the equipment frame.

### **5.9.2 Seismic Zones 3 & 4**

In seismic zones 2B and higher the equipment frames are bolted directly to the solid aluminum program floor panel. U-channel is not used in higher earthquake zones. Anchor the cabinet at all four corners. Do not over tighten threaded rods as floor tile will deform and make floor uneven.

### **5.9.3 Leveling of equipment**

The raised floor is laser leveled at time of the floor installation so no leveling blocks or shims should be necessary to level the frames. This is especially important in seismic zones 2B and higher as leveling blocks would cause a rocking motion from the frames during an earthquake. If a vendor finds the floor is not level they should contact the AT&T representative to ensure the floor is level before starting the installation.

## **6. Cutting and Drilling of Removable Floor Tile**

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Mark the removable floor tile for cable penetration using template supplied by the network equipment frame vendor, floor plan drawing, or by placing frames in the proper footprint and marking the tile from the base of the frame or cabinet. Mark the tile for the frame anchoring holes in the same manner. Remove the tile, cut cable access holes, and drill the anchoring holes through the tile in an area away from the equipment to make sure the equipment area is not contaminated with metal shavings. If the floor plan identifies a future frame on the same tile as the one you are adding a frame, it is necessary to drill and cut the tile, as it cannot be removed later.

## **7. AT&T Installation Certification Forms**

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### **7.1 See the following attachments.**

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Complete the form at final acceptance and place a signed copy in the project file, in the Maintenance Instructions and send a copy to the Element Manager.

**AT&T INSTALLATION CERTIFICATION FORM  
FOR MAXCESS RAF SYSTEM**

AT&T 760-200-110 Appendix 1, Issue 6

Date: \_\_\_\_\_  
To: Maxcess Technologies, Inc.  
235 Deming Way  
Summerville, SC 29483  
843-821-1200

AT&T Contract No. 2001101.2.C  
PO Number: \_\_\_\_\_  
Job Number: \_\_\_\_\_  
Project Name: \_\_\_\_\_

Attention: Mr. Juan House

From: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Project Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

For: Material only: \_\_\_\_\_ Material and Services: \_\_\_\_\_  
Seismic Classification: \_\_\_\_\_ Floor Height: \_\_\_\_\_  
Project Square Footage: \_\_\_\_\_ Panel capacity: \_\_\_\_\_

Sir,

This letter serves as our certification that the SAF System as installed at said location is in accordance with your directives and quality requirements which are pursuant to AT&T Contract 2001101.2.C.

Additionally, the final installation was and accepted by:

\_\_\_\_\_  
(AT&T Representative) (Date)

Thank You,

\_\_\_\_\_  
(Maxcess Authorized Installer) (Date)

copy to:

W. H. Henderson - AT&T Design Standards  
Room No. 11042A  
1200 Peachtree Road  
Atlanta, Georgia 30309  
Phone: 404-810-7249

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**AT&T INSTALLATION CERTIFICATION FORM  
FOR TATE RAF SYSTEM**

AT&T 760-200-110 Appendix 1, Issue 6

Date: \_\_\_\_\_  
To: Tate Access Floors, Inc.  
7510 Montevideo Road  
Jessup, Maryland 20794  
800-242-4304

AT&T Contract No. CH923022AO  
PO Number: \_\_\_\_\_  
Job Number: \_\_\_\_\_  
Project Name: \_\_\_\_\_

Attention: Mr. Roger Picker, VP

From: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Project Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

For: Material only: \_\_\_\_\_ Material and Services: \_\_\_\_\_  
Seismic Classification: \_\_\_\_\_ Floor Height: \_\_\_\_\_  
Project Square Footage: \_\_\_\_\_ Panel capacity: \_\_\_\_\_

Sir,

This letter serves as our certification that the SAF System as installed at said location is in accordance with your directives and quality requirements which are pursuant to AT&T Contract CH923022AO.

Additionally, the final installation was and accepted by:

\_\_\_\_\_  
(AT&T Representative) (Date)

Thank You,

\_\_\_\_\_  
(Tate Authorized Installer) (Date)

copy to:

W. H. Henderson - AT&T Design Standards  
Room No. 11042A  
1200 Peachtree Road  
Atlanta, Georgia 30309  
Phone: 404-810-7249

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