

Standards

ANSI/TIA/EIA-606

Administration Standard for the Telecommunications Infrastructure of Commercial Buildings

Distributed by **NDS INFORMATION- TELECOM SYSTEM**



Head Office

7/131 Thai Ha – Dong Da – Hanoi – Vietnam

Tel: +84.4.5376480

Fax: +84.4.5376481

Email: info@nds.com.vn

Web: www.nds.com.vn

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ADMINISTRATION CONCEPTS

This section deals with the elements of a telecommunications system as they relate to the administration of that system including the pathways, spaces, grounding and bonding.

Identifiers

Definition: An identifier is used in labeling telecommunications infrastructure components such as cable, racks, telecommunications rooms, equipment rooms, pathways and telecommunications outlets.

It is a unique set of number, letters or a combination of both that are not repeated within the administration of the system.

Identifiers are inserted into the administrative database and onto a label which is affixed to the component.

Shall be:

- marked at the element to be administered
- unique eg: no cable identifier should be the same as a pathway identifier.

Identifiers may be encoded or un-encoded. An un-encoded identifier contains information specific only to the element identified, eg: C-001 could be a cable designated as 001. But a piece of termination hardware may be identified as 4A-B12 which would be termination hardware in closet 4A, on column (possibly a rack) B, Patch Panel 12.

Labelling

Definition: Labeling is the marking of an element of a telecommunications infrastructure with the appropriate identifier and other relevant information.

Labeling may occur in two ways. Labels may be securely attached to the element, or, the element itself may be marked directly.

Labeling shall be:

- affixed to the element to be administered or
- marked directly on the element being administered.

See section 8.2 of the original standards documentation for labeling requirements.

Records

Definition: A record is a grouping of information about a specific element of a telecommunications system. The record will also contain the linkages to other elements of the telecommunications system.

The record will be contained in a database which may be searched and sorted according to the requirements of the users.

There is information which is required and information which is optional.

Table 1 is an example of a cable record.

Cable records may contain information about termination positions, the pathway it is located in, and the space it is located. For example, the cable record shown in Table 1 has it in pathway CP12, terminating in closet 4C, on rack B12, position 001.

There are 4 categories of information referred to in the standard, they are:

- Required Information
- Required Linkages

- Optional Information
- Other Linkages

As a minimum requirement, all records shall contain the Required Information and Required Linkages.

The "comments" section is not a required part of the standard, but are included for clarity. It is used within this document to help the reader understand the example being shown.

Table 1: An example of a Cable Record

| | Sample Data | | Comment |
|-----------------------------|----------------------|--------------|---|
| Required Information | | | |
| Cable Identifier | C0001 | | |
| Cable Type | 4 pr UTP Category 5e | | description of cable |
| Unterminated Pair/Cond | 0 | | list of unterminated pairs or conductors |
| Damaged Pair/Cond | 0 | | list of damaged pairs or conductors |
| Available Pair/Cond | 0 | | list of available pairs or conductors |
| Required Linkages | | | |
| | End 1 | End 2 | |
| Pr 1-4, Term pos record | J0005 | 4C-B12-001 | the element each end of the cable is connected to |
| Splice Record | n/a | | |
| Pathway Record | CP-12 | | the pathway the cable is located in |
| Grounding Record | n/a | | |
| Optional Information | | | |
| Cable Length | 75 meters | | |
| UPC | n/a | | |
| Ownership | Smith | | |

| | | |
|----------------------|-------|--|
| Other Information | | |
| Other Linkages | | |
| Equipment Records | PC120 | the equipment the cable terminates at (desk top) |
| Other Linked Records | | |

Linkages

- are the connections between records and identifiers.
- occur when an identifier from one record "points" to another record

For example a cable identifier may show where each end of that cable terminates.

User Code

Definition: In administration of a telecommunications system, a user code is a unique way of identifying a particular user location.

The code may be an extension number, office or work area number, or other numbering scheme designed by the owner, installer or engineer.

This user code is input into the telecommunications data base for later use.

The user code provides the administrator with easy to understand code that will point to a specific office, account, telephone number or person. For example, an outlet labeled O-112 may be located in Office 230. In this case the location of Office 230 is much more readily understood than O-112. This aids in moves, adds and changes.

PRESENTATION OF INFORMATION

A typical administration system includes:

- Labels
- Records
- Reports
- Drawings
- Work orders.

Reports

Reports detail information about the telecommunications infrastructure records. The information may be all of the information about the record, or it may be selected information. The way in which the information is extracted will depend on its input into the cable database. For example, a report may detail the cable id, the pathway it is located in and its cable type. This information may then be sorted however the user wants.

DRAWINGS

Drawings are used to illustrate different stages of telecommunications infrastructure planning and installation. Annex C of the original standards documentation provides symbols that may be used in drawings.

Conceptual Drawings

Conceptual drawings are used to convey the proposed design intent. They do not include the elements and identifiers and do not necessarily have to become part of the administration documentation.

Installation Drawings

Installation drawings are more detailed than the conceptual drawings and are used to document the telecommunications infrastructure to be installed. They should include the infrastructure elements and may also describe the installation methods. It is not necessary to provide identifiers on these drawings.

Record Drawings

Record drawings document the installed telecommunications infrastructure including:

- Floor plans
- Elevation
- Detail drawings

Record drawings are site specific and will have identifiers assigned to key elements. There may be separate drawings for other portions of the infrastructure such as pathways and spaces depending on how complex the installation is.

WORK ORDERS

Work orders document the operations needed to implement changes affecting the telecommunications infrastructure such as:

- moving a patch cord
- installing a conduit
- relocating an outlet box.

and involve either individually or in combination:

- spaces
- pathways
- cables
- splices
- terminations
- grounding

Personnel responsible for the work and for the documentation should also be listed.

The original standards documents contain several examples of the various types of reports available.

PATHWAY & SPACE ADMINISTRATION

Pathways are the components of a telecommunications system that route media from one point to another. Spaces are the areas of a telecommunications system where equipment is located.

Pathway and space administration relates directly to the pathways and spaces identified in ANSI/TIA/EIA 569.

When joining two or more pathways of different types or sizes, each segment shall be administered as a separate pathway.

IDENTIFIERS

Pathway Identifiers

Shall:

- be unique and assigned to each pathway which serves as a link to the pathway record.
- be marked on each pathway or on the pathway labels.
- be assigned to each section of a partitioned pathway such as a duct bank.

Pathway Labeling

Pathways shall be:

- labeled at all endpoints located in telecommunications rooms, equipment rooms or entrance facilities.
- labeled at regular intervals in a closed loop environment.
- labeled at the each end point where there are intermediate points with 3 or more pathway endpoints such as pull boxes and joined tray segments. The main pathway should be assigned an identifier such as 1A400 and its 3 partitions assigned 1A400-a, 1A400-b and 1A400-c.

Space Identifiers and Labeling

A unique identifier shall be assigned to each space.

All spaces shall be labeled. Labels should be placed at the entry to the space, eg: on the door of the telecommunications room.

RECORDS

Pathway Records

Contain pathway:

- identifier
- type
- fill
- loading

Link to:

- Cable records
- Space records, both ends
- Space record access
- Other pathway records

- Grounding records

Space Records

Shall show space:

- identifier
- type

Shall show linkages to:

- Pathway records
- Cable records
- Grounding records

REPORTS

Pathway Reports

Summary reports should show at a minimum:

- types
- present fill
- present load

And may also show:

- contents of pathway
- other interlinked records.

Space Reports

Summary space reports should show:

- All spaces
- Type of space
- Location

And may also show:

- Additional space information
- Other interlinked records.

The original standards documentation contain several examples of what a good report should look like.

DRAWINGS

Shall:

- be maintained for the pathway and spaces elements
- show location of pathways
- size of pathways
- location of telecommunications outlet boxes

Should show details for:

- plan and elevation views of all telecommunications rooms, equipment rooms and entrance facilities.

- routing
- bend radii
- pull boxes
- wall penetrations
- fire-stopping

WORK ORDERS

Shall:

- be kept on file when they involve changes to pathways and spaces

Pathway work orders, or pathway portions of work orders shall show:

- the pathway identifier
- the pathway type
- associated space records

Space work orders, or space portion of a work order shall show:

- the space identifier
- space type

After the work order has been completed, it will be used to update the database.

WIRING SYSTEM ADMINISTRATION

Shall have:

- changes to the wiring system updated into the database system
- spliced cables treated as a single cable

Hardware containing multiple termination positions may be administered as a single termination point, eg: 8 pin modular connector.

Refer to Annex B of the original standards documentation for addition administrative information.

IDENTIFIERS

Cable identifiers

- each cable shall have a unique identifier
- the identifier shall be marked directly on the cable or the labels affixed to the cable.

Cable labeling shall have:

- horizontal and backbone cables labeled at each end
- the pathway linkage field refer to all pathway segments used when cable is routed through multiple pathways,

Cable labeling should:

- have the cables labeled at each end with labels
- be located at strategic locations such as conduit ends, backbone splice points, manholes and pull boxes.

- have cables of differing conductor counts that are spliced together administered as separate cables.
- have spliced segments labeled with a single cable identifier, provided the largest pair count cable is maintained from end to end and indicated as such on the cable labels.

TERMINATION HARDWARE IDENTIFIERS and LABELING

A unique identifier shall be:

- assigned to each termination hardware unit
- marked on each termination hardware or its label.

Termination Position Identifiers and Labeling

A unique identifier shall be:

- assigned to each termination position
- marked on each termination position label
- marked on each termination position shall with the termination position identifier except where high termination densities make labeling impractical. In these instances identifiers shall be assigned to the termination hardware and the termination position

Splice Closure Identifiers and Labeling

A unique identifier shall be:

- assigned to each splice closure
- marked on each splice closure or its label.

RECORDS

General

Good administration will provide as much data as possible with respect to the installation including component manufacturer, transmission rate, category etc.

Cable Records

For each cable the following information shall be recorded:

- the cable identifier
- cable type
- unterminated
- damaged
- available pairs/conduors

Linkages to the following shall be maintained for every pair/conductor in the cable:

- termination position records
- splice records
- pathway records
- grounding records

The cable type field shall include:

- the manufacturer and manufacturer's designation
- the month and year of installation or acceptance may be recorded as optional information.

The termination position linkage field details the termination positions of every pair/conductor or set of pairs/conductors of the cable. Each pair/conductor or set of pairs/conductors has a link to two termination position records.

Termination Hardware Records

The termination hardware records shall:

- show identifier and type
- show damaged position numbers for each element of termination hardware
- identify each termination position of the hardware
- show links to records for position, spaces and grounding

User Code

Shall be assigned to a termination position record for a telecommunications outlet connector. This user code may be a:

- telephone number
- circuit numberuser name
- or some other reference specified by the user or installer.

Splice Records

Splice records shall:

- show splice identifier and type
- maintain linkages to cable and space records

LINKAGE ADMINISTRATION

Splices With One Cable

A linkage is established from the cable record to the splice record through the splice linkage field.

Splices With Separate Cable Identifiers

A pair/conductor-level linkage is established from the cable records to the splice record through the termination position field.

REPORTS

Cable Summary Report

A cable summary report is recommended and at a minimum it should show:

- cable type
- terminating positions.

Information from the cable records or other interlinked records may also be useful.

End-to-End Circuit Report

The end-to-end circuit report shows the connectivity from end to end. At a minimum, the report should detail:

- a user code
- associated termination positions
- cables connecting the work area to the other end of each circuit.

Information from termination position or other interlinked records may also be useful.

Cross-connect Report

Each termination space containing cross-connects should have a report available showing the cross-connections in that space. Information from the termination position records or other interlinked records may also be useful.

Drawings

Record drawings shall be maintained. These drawings shall show:

- the location of all cable terminations
- the location of all backbone cables
- the identifier for each represented termination and cable shall appear on the drawing
- the location of all telecommunications outlets on the floor plans

Drawings should show:

- the routing of all cables
- plan and elevation views of all backbone cabling as installed and routed through telecommunications:
 - pathways
 - closets
 - equipment rooms
 - equipment facilities
- the locations of all splices

Annex C of the original standards documentation provides symbols that may be used in drawings.

Work Orders

Work orders shall:

- be maintained and kept on file for all repairs or changes
- be updated when the work order affects the records.

The wiring portion of the work order shall include:

- cable identifiers
- cable types
- termination identifiers
- termination types
- splice identifiers
- splice types when relevant.

This information is then used to update the administration records.

GROUNDING AND BONDING ADMINISTRATION

When changes are made to grounding and bonding elements, the affected labels, records, reports, and drawings shall be updated.

IDENTIFIERS

Grounding and Bonding Identifiers

The Telecommunications Main Grounding Busbar shall be marked "TMGB".

A unique identifier shall be assigned to each telecommunications backbone bonding conductor attached to the TMGB.

A unique identifier shall be assigned to each Telecommunications Grounding Busbar (TGB). These identifiers shall use the prefix "TGB".

All bonding conductors extended to equipment from any TGB in the building should have unique identifiers.

Grounding and Bonding Labeling

The conductor connecting the TMGB to the building ground shall be labeled at each end. Labels shall be affixed on the conductor in a visible location and as close as possible to the bonding point at each end of the conductor.

The TMGB shall be labeled as "TMBG".

Each telecommunications backbone bonding conductor attached to the TMGB shall be marked or labeled. Labels or markings shall be located on conductors and as close as practicable to the TMGB. Labels or markings shall also be attached to the other end of these backbone bonding conductors where they are bonded to the TGBs.

Each TGB shall be marked or labeled.

It is recommended that all bonding conductors extended to equipment from any TGB in the building be labeled. Labels should be located on the conductors as close as practicable to the busbar.

RECORDS

Three record types are required to administer the grounding/bonding elements of the telecommunications infrastructure:

- the TMGB record
- backbone bonding conductor records
- TGB records

TMGB Record

The TMGB Record shall show:

- TMBG identifier
- busbar type
- grounding conductor identifier
- resistance to earth
- the date that measurement was taken

Linkages to bonding conductor records and the space record shall be maintained.

Backbone Bonding Conductor

The bonding conductor identifier shall show:

- bonding conductor identifier
- conductor type
- busbar identifier

Linkages to busbar and pathway records shall be maintained.

TGB Records

The TGB record shall show:

- the busbar identifier
- busbar type

The bonding conductor record and the space record shall be maintained.

Pathway Records for Grounding

Pathway administration is accomplished by using the corresponding pathway type record in section 5 of the original standards documentation.

REPORTS

A telecommunications grounding and bonding summary report should be available listing at a minimum:

- TMGB and other grounding busbars, together with their attached backbone bonding conductors.

Information from the grounding/bonding records and other interlinked records may be useful.

DRAWINGS

Record drawings for telecommunications grounding and bonding infrastructure elements shall:

- be maintained
- show the location of the grounding electrode
- the routing of the grounding electrode conductor from the grounding electrode to the TMGB
- all grounding busbars attached to the backbone bonding conductors.

Drawings showing the routing of all bonding conductors may also be useful.

Annex C of the original standards documentation provides symbols that may be used in drawings.

Drawings should show:

- plan and elevation views of all bonding conductors as installed in and routed through telecommunications pathways
- closets
- equipment rooms
- entrance facilities

WORK ORDERS

Work orders shall:

- be maintained

- be kept on file for all grounding/bonding repairs or changes.

Records affected by the work order shall

- be updated
- have the grounding/bonding portion of the work order include backbone bonding conductor and busbar identifiers and types.

After the work order has been implemented, this information is used to update the administration records.

LABELING AND COLOR CODING

Labels

The rules for labeling are tied to ANSI/TIA/EIA 568 B and for that reason the original standards documents should be referenced while reviewing this part of the standard.

Labels are divided into three categories based on their method of attachment:

- adhesive
- insert
- other

Adhesive Labels

Adhesive labels shall meet:

- the legibility, defacement, and adhesion requirements specified in UL 969 (Ref D-16)
- the general exposure requirements in UL 969 for indoor use
- the exposure requirements listed in UL 969 for indoor and outdoor use.

Labels should be selected based on:

- the material they will be adhered to
- the environment they will be in

Cable labels should:

- be made from a durable material, such as vinyl
- be suitable for wrapping and bending
- have a white printing area
- have a clear tail that will wrap around the cable and over the printed area

Insert Labels

Insert labels shall:

- meet the legibility, defacement, and general exposure requirements specified in UL 969
- meet the exposure requirements listed in UL 969 for indoor and outdoor use
- be held in place under the normal operating conditions to which the labeled infrastructure element is subjected.

Other Labels

- are considered the same as insert labels for purposes of this standard.

Labeling should:

- be consistent across an installation
- be easy to see
- when attached to removable covers, have the covers associated with its corresponding base unit. An alternate solution is to label pull boxes, handholes, and splice boxes on clearly visible exterior surfaces close to their covers
- reflect particular applications: for example, non-conductive labels for certain cables

Bar Coding

Bar codes shall:

- be Code 39 conforming to USS-39 or
- be Code 128 (Ref D-17) conforming to USS-128 (Ref D-17)
- have a ratio within 2.5:1 to 3.0:1 for Code 39 bar codes
- have a minimum quiet zone of 6.35 mm (0.25 in) on each side of the bar code if a wand scanner is used
- use the same x-bar dimension for all bar codes on any one label
- have human-readable identifiers present for each bar code on a label.

COLOR CODING of TERMINATION FIELDS

General

Color coding as specified in this standard is based on the hierarchical star configuration for backbone cabling as specified in ANSI/EIA/TIA-568.

Color Coding Rules

Color coding shall:

- use the pantone number or its equivalent
- label each end of the cable with the same color label
- label cross-connections between termination fields (groups of termination labels) of two different colors

Colors

| Colour (Pantone #) | Identification |
|--------------------|---|
| Orange (150C) | Demarcation point-Central Office terminations |
| Green (353C) | Network Connections (customer side of demarc point) |
| Purple (264C) | Common Equipment (PBXs, computers, LANs) |
| White | First Level Backbone |
| Gray (422C) | Second Level Backbone |
| Blue (291C) | Station Termination (req'd at TR and ER only) |
| Brown (465C) | Interbuilding Backbone Cables |
| Yellow (101C) | Auxilliary Circuits (alarms, security) |
| Red (184C) | Key Telephone Systems |

Note: Colors shown above are not the Pantone equivalents.

Differentiation of Termination Fields by Performance Category

Where cables of two different performance categories are used, their labeling should indicate the difference.