



ANSI/TIA-568-B.1-4-2003  
Approved: February 26, 2003

# TIA STANDARD

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## Commercial Building Telecommunications Cabling Standard

### Part 1: General Requirements

### Addendum 4 – Recognition of Category 6 and 850 nm Laser-Optimized 50/125 $\mu\text{m}$ Multimode Optical Fiber Cabling

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## TIA-568-B.1-4

(Addendum No. 4 to TIA/EIA-568-B.1)

FEBRUARY 2003

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# Recognition of Category 6 and 850 nm Laser-Optimized 50/125 $\mu\text{m}$ Multimode Optical Fiber Cabling

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# 1 INTRODUCTION

The purpose of this addendum is to recognize balanced twisted pair category 6 cabling and 850 nm laser-optimized 50/125  $\mu\text{m}$  multimode optical fiber cable by revising sub-clauses 4.4, 4.5, 5.3 and 11.2.2 of TIA/EIA-568-B.1. These revisions are identified in the following text with additions shown in ***bold italics*** and deletions shown as ~~strikeout~~.

## 2 CLAUSE REVISIONS

### 4.4 Recognized cables

Two types of cables are recognized and recommended for use in the horizontal cabling system. These cables are:

- a) four-pair 100-ohm ***category 3 (ANSI/TIA/EIA-568-B.2), category 5e (ANSI/TIA/EIA-568-B.2) or category 6 (ANSI/TIA/EIA-568-B.2-1)*** unshielded twisted-pair (UTP) or screened twisted-pair (ScTP) cables (ANSI/TIA/EIA-568-B.2)
- b) two or more optical fiber multimode cable, either 62.5/125  $\mu\text{m}$  or 50/125  $\mu\text{m}$  (ANSI/TIA/EIA-568-B.3 ***or ANSI/TIA/EIA-568-B.3-1***)

At this time, 150-ohm shielded twisted-pair (STP-A) cable is a recognized media type (ANSI/TIA/EIA-568-B.2). It is not, however, recommended for new cabling installations and is expected to be removed from the next revision of this Standard.

Recognized cables, associated connecting hardware, jumpers, patch cords, equipment cords, and work area cords shall meet all applicable requirements specified in ANSI/TIA/EIA-568-B.2, ***ANSI/TIA/EIA-568-B.2-1,*** ~~and~~ ANSI/TIA/EIA-568-B.3 ***and ANSI/TIA/EIA-568-B.3-1.***

When bundled and hybrid cables are used for horizontal cabling, each cable type shall be recognized and meet the transmission and color-code specifications for that cable type given in ANSI/TIA/EIA-568-B.2, ***ANSI/TIA/EIA-568-B.2-1,*** ~~and~~ ANSI/TIA/EIA-568-B.3 ***and ANSI/TIA/EIA-568-B.3-1.*** Additionally, bundled or hybrid copper cables shall meet the bundled or hybrid cable requirements in ANSI/TIA-568-B.2. These requirements apply to hybrid cables and bundled cables assembled prior to installation, sometimes referred to as loomed, speed-wrap, or whip cable constructions.

#### NOTES

1 – Annex C provides a brief description of a number of other horizontal cables that have been used in telecommunications. These cables, as well as others, may be effective for specific applications. Although these cables are not part of the requirements of this Standard, they may be used in addition to the minimum requirements of this Standard.

2 – Hybrid cables consisting of optical fiber and copper conductors are sometimes referred to as composite cables.

#### 4.5 Choosing types of cabling

This Standard recognizes the importance of both voice and data telecommunications in a commercial building. A minimum of two telecommunications outlet/connectors shall be provided for each individual work area as shown in figure 4-1. One telecommunications outlet/connector may be associated with voice and the other with data. Consideration should be given to installing additional outlets/connectors based on present and projected needs.

The two telecommunications outlet/connectors shall be configured as:

- a) One telecommunications outlet/connector shall be supported by a four-pair 100-ohm cable, category 3 or higher (category 5e **or category 6** recommended) as specified in ANSI/TIA/EIA-568-B.2 **and ANSI/TIA/EIA-568-B.2-1**.
- b) The other/second telecommunications outlet/connector(s) shall be supported by a minimum of one of the following horizontal media. This media choice should be based on present and projected needs.
  - 1) Four-pair 100-ohm **cable, either category 5e or category 6**, cable as specified in ANSI/TIA/EIA-568-B.2 **and ANSI/TIA/EIA-568-B.2-1**.
  - 2) Two-fiber multimode optical fiber cable, either 62.5/125  $\mu\text{m}$  or 50/125  $\mu\text{m}$  as specified in ANSI/TIA/EIA-568-B.3 **and ANSI/TIA/EIA-568-B.3-1**

ANSI/TIA/EIA-568-B.2, **ANSI/TIA/EIA-568-B.2-1** and ANSI/TIA/EIA-568-B.3 requirements on compatible connectors shall be met. See subclause 6.2 for work area outlet/connector specifications.

#### 5.3 Recognized cables

Due to the wide range of services and site sizes where backbone cabling will be used, more than one transmission medium is recognized. This Standard specifies transmission media, which shall be used individually or in combination in the backbone cabling. The recognized media are:

- a) 100-ohm **category 3, category 5e or category 6** twisted-pair cable (ANSI/TIA/EIA-568-B.2 **and ANSI/TIA/EIA-568-B.2-1**)
- b) multimode optical fiber cable, either 62.5/125 mm or 50/125 mm (ANSI/TIA/EIA-568-B.3 **and ANSI/TIA/EIA-568-B.3-1**)
- c) singlemode optical fiber cable (ANSI/TIA/EIA-568-B.3)

Recognized cables, associated connecting hardware, jumpers, patch cords, equipment cords, and work area cords shall meet all applicable requirements specified in ANSI/TIA/EIA-568-B.2, **ANSI/TIA/EIA-568-B.2-1**, ~~and~~ ANSI/TIA/EIA-568-B.3, **and ANSI/TIA/EIA-568-B.3-1**.

#### NOTES

1 – Crosstalk between individual, unshielded twisted-pairs may affect the transmission performance of multipair copper cables. Annex B provides some shared sheath guidelines for multipair cables.

2 – Annex C provides a brief description of a number of other backbone cables that have been used in telecommunications. These cables, as well as others, may be effective for specific applications. Although these cables are not part of the requirements of this Standard, they may be used in addition to the minimum requirements of this Standard.

3 – See subclause 5.5 for backbone cabling distance limitations.

### 5.5.1 Intra and interbuilding distances

The maximum supportable distances are application and media dependent. The maximum backbone distances specified in figure 5-2 are guidelines based on voice transmission for balanced twisted-pair cabling (maximum 800 m [2624 ft]) and the applications listed in annex E for optical fiber cabling. The distances given are for the total backbone channel length, including backbone cable, patch cords or jumpers, and equipment cable.

To minimize cabling distances, it is often advantageous to locate the main cross-connect near the center of a site. Cabling installations that exceed these distance limits may be divided into areas, each of which can be supported by backbone cabling within the scope of this Standard. Interconnections between the individual areas, which are outside the scope of this Standard, may be accomplished by employing equipment and technologies normally used for wide area applications.

The length of category 3 multipair balanced 100-ohm backbone cabling, that supports applications up to 16 MHz, should be limited to a total of 90 m (295 ft).

The length of category 5e multipair balanced 100-ohm backbone cabling, that supports data applications up to 100 MHz, should be limited to a total distance of 90 m (295 ft).

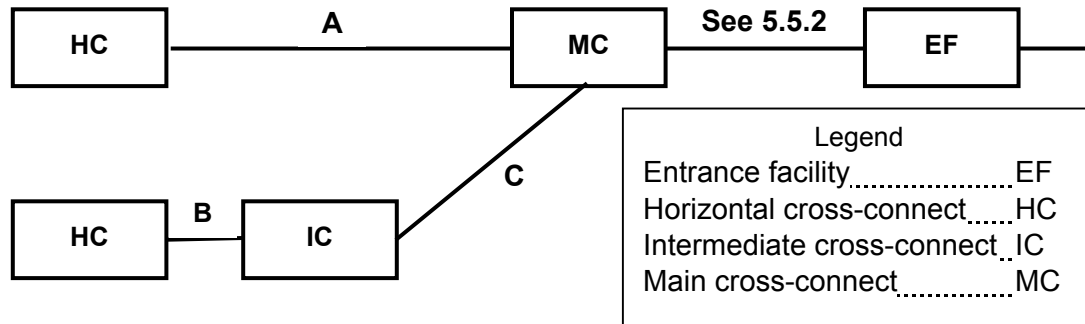
***The length of category 6 multipair balanced 100-ohm backbone cabling, that supports data applications up to 250 MHz, should be limited to a total distance of 90 m (295 ft).***

The 90 m (295 ft) distance allows for an additional 5 m (16 ft) at each end for equipment cables (cords) connecting to the backbone.

#### NOTES

1 – The 90 m (295 ft) distance limitation assumes uninterrupted cabling runs between cross-connects that serve equipment (i.e., no intermediate cross-connect).

2 – Users of this document are advised to consult the specific standards associated with the planned service, or equipment manufacturers and systems integrators to determine the suitability of the cabling described herein for specific applications.



Media Type	A	B	C
100-ohm twisted-pair	800 m (2624 ft) maximum see 5.5.1	300 m (984 ft) maximum see 5.5.1	500 m (1640 ft) see 5.5.1
62.5/125 μm optical fiber	2000 m (6560 ft) maximum	300 m (984 ft) maximum	1700 m (5575 ft)
50/125 μm optical fiber	2000 m (6560 ft) maximum	300 m (984 ft) maximum	1700 m (5575 ft)
Singlemode optical fiber	3000 m (9840 ft) maximum	300 m (984 ft) maximum	2700 m (8855 ft)

NOTES:

- 1 – While it is recognized that the capabilities of singlemode fiber may allow for backbone link distances of up to 60 km (37 miles), this distance is generally considered to extend outside the scope of this Standard.
- 2 – Specific applications may exist, or become available in the future, that do not operate over the maximum distances specified. For example, to support access providers, it may be necessary to insert repeaters or regenerators (outside the scope of this Standard) along the backbone cabling.
- 3 – It is recommended that users selecting multimode fiber use either 62.5/125 μm or 50/125 μm fiber cable for new installation and additions. The user should consider both multimode and singlemode fiber cable to support backbone cabling systems.

**Figure-1 Backbone distances**

When the horizontal cross-connect (HC) to intermediate cross-connect (IC) distance is less than maximum, the intermediate cross-connect (IC) to main cross-connect (MC) distance can be increased accordingly. However, the total distance from the horizontal cross-connect (HC) to the main cross-connect (MC) shall not exceed the maximum specified in figure 5-2, column A.

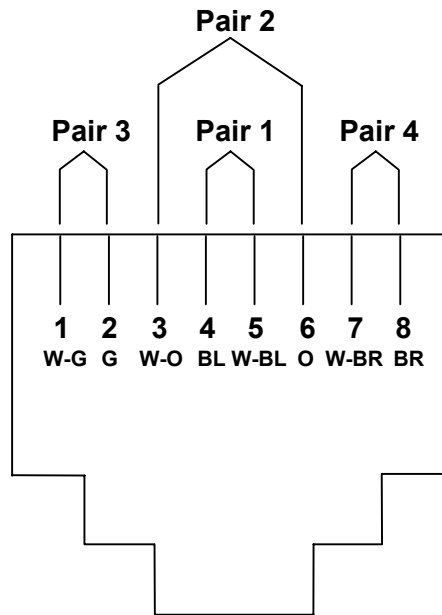
**6.2.1 100-Ohm balanced twisted-pair telecommunications outlet/connector**

Each 4-pair cable shall be terminated in an eight-position modular jack at the work area. The 100-ohm UTP and ScTP telecommunications outlet/connector shall meet the modular interface requirements specified in IEC 60603-7. In addition, the telecommunications outlet/connector for 100-ohm UTP and ScTP cable shall meet the requirements of ANSI/TIA/EIA-568-B.2 (*for category 3 & 5e*), *ANSI/TIA/EIA-*

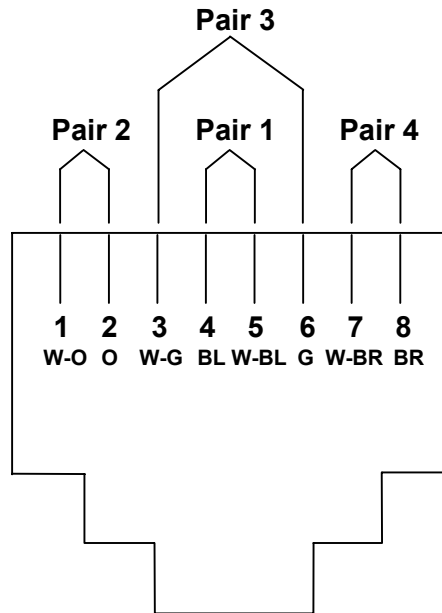
**568-B.2-1 (for category 6)**, and the terminal marking and mounting requirements specified in ANSI/TIA/EIA-570-A.

Pin/pair assignments shall be as shown in figure 6-1 or, optionally, per figure 6-2 if necessary to accommodate certain 8-pin cabling systems. The colors shown are associated with the horizontal distribution cable. These illustrations depict the front view of the telecommunications outlet/connector.

NOTE - US Federal Government publication NCS, FTR 1090-1997 recognizes designation T568A only.



**Figure-2 Eight-position jack pin/pair assignments (T568A)**



**Figure-3 Optional eight-position jack pin/pair assignment (T568B)**

### 6.3 Work area cords

The maximum horizontal cable length is specified in subclause 4.3 and is based on a maximum length of 5 m (16 ft) of work area cord. Patch cords used in the work area shall meet or exceed the performance requirements in ANSI/TIA/EIA-568-B.2 (*for category 3 & 5e*), **ANSI/TIA/EIA-568-B.2-1** (*for category 6*), and ANSI/TIA/EIA-568-B.3 **or ANSI/TIA/EIA-568-B.3-1**.

Work area cabling may vary in form depending on the application. A cord with identical connectors on both ends is commonly used. When application specific adaptations are needed at the work area, they shall be external to the telecommunications outlet/connector (see subclause 4.2). Some of the most commonly encountered adaptations at the work area are:

- a) a special cable or adapter is required when the equipment connector is different from the telecommunications outlet/connector.
- b) a "Y" adapter is required when two services run on a single cable.
- c) passive adapters that may be needed when the cable type in the horizontal cabling is different from the cable type required by the equipment.
- d) active adapters that may be needed when connecting devices that use different signaling schemes.
- e) pair transposition adapters that may be necessary for compatibility.
- f) termination resistors required for ISDN terminals.

NOTE – When used, cabling adapters in the work area may have detrimental effects on the transmission performance of the telecommunications cabling system. Therefore, it is important that their compatibility with premises cabling, equipment and applications be considered before they are connected to the telecommunications network

### 11.2.2 Applicability

The transmission requirements specified herein are applicable to unshielded twisted-pair (UTP) and screened twisted-pair (ScTP) cabling links consisting of cables and connecting hardware specified in this Standard. This subclause relates to performance with respect to 100-ohm 4-pair UTP and ScTP cabling only. Compliance with this specification does not imply compatibility with cables having nominal impedance values other than 100-ohm. ***Category 6 channels and permanent links shall meet or exceed the performance requirements of ANSI/TIA/EIA-568-B.2-1.***





