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TIA STANDARD

Commercial Building Telecommunications Cabling Standard

Part 1: General Requirements

Addendum 2 – Grounding and Bonding Specifications for Screened Balanced Twisted- Pair Horizontal Cabling

TIA-568-B.1-2

(Addendum No. 2 to TIA/EIA-568-B.1)

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GROUNDING AND BONDING SPECIFICATIONS
FOR
SCREENED BALANCED TWISTED-PAIR HORIZONTAL CABLING

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FOREWORD

(This foreword is not part of the Standard)

In 2000, the Telecommunications Industry Association (TIA) recognized the need for additional grounding and bonding requirements for termination of screened balanced twisted-pair horizontal cables to the building grounding and bonding system specified in TIA/EIA-J-STD-607-A. The project was assigned to TR-42.1 under Engineering Committee TR-42.

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This Standard has been prepared by the TR-42.1 Sub-Committee and approved by the Technical Committee TR-42.

There is one annex in this Standard. Annex A is normative and considered a mandatory part of this Standard.

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1 INTRODUCTION

This Standard specifies additional components and requirements for screened balanced twisted-pair horizontal cabling.

2 PURPOSE AND SCOPE

This Standard specifies additional requirements for grounding (earthing) and bonding of installed screened balanced twisted-pair horizontal cables and connecting hardware used within a commercial building environment.

3 NORMATIVE REFERENCES

The following standards contain requirements that, through reference in this text, constitute provisions of this Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision; parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated. ANSI and TIA maintain registers of currently valid national standards published by them.

ANSI/TIA/EIA-568-B.1, *Commercial Building Telecommunications Standard Part 1: General Requirements*, 2001

ANSI/TIA/EIA-568-B.2, *Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components*, 2001

ANSI/TIA/EIA-569-A, *Commercial Building Standard for Telecommunications Pathways and Spaces*, 1998

ANSI/TIA/EIA-606-A, *Administration Standard for the Telecommunications Infrastructure of Commercial Buildings*, 2002

ANSI/TIA/EIA-J-STD-607-A, *Commercial Building Grounding (Earthing) & Bonding Requirements for Telecommunications standard*, 2002

4 DEFINITIONS, ACRONYMS & ABBREVIATIONS

4.1 Definitions

The generic definitions in this section have been formulated for use by the entire family of telecommunications infrastructure standards. As such, the definitions do not contain mandatory requirements of the Standard. Specific requirements are found in the normative sections of this Standard.

bonding: The permanent joining of metallic parts to form an electrically conductive path that will ensure electrical continuity and the capacity to conduct safely any current likely to be imposed.

bonding conductor: A conductor that interconnects the screened balanced twisted-pair horizontal cabling infrastructure to the telecommunications grounding busbar.

earthing: See **grounding**.

effectively grounded: For a definition see the NEC.

ground: A conducting connection, whether intentional or accidental, between an electrical circuit (e.g., telecommunications) or equipment and the earth, or to some conducting body that serves in place of earth.

grounding: The act of creating a conducting connection, whether intentional or accidental, between an electrical circuit (e.g., telecommunications) or equipment and the earth, or to some conducting body that serves in place of earth.

telecommunications grounding busbar: A common point of connection for telecommunications system and equipment bonding to ground, and located in the telecommunications room or equipment room.

4.2 Acronyms and abbreviations

EMC	Electromagnetic compatibility
NRTL	Nationally recognized testing laboratory
TGB	Telecommunications grounding busbar
TO	Telecommunications outlet

5 GROUNDING CONSIDERATIONS

5.1 Corrections and revisions to ANSI/TIA/EIA-568-B.1

The purpose of this clause is to revise clause 4.6 of ANSI/TIA/EIA-568-B.1. These revisions are identified in the following text with additions shown in bold italics and deletions shown as strikeout.

4.6 Grounding considerations

Grounding systems are an integral part of the signal or telecommunications cabling system that they support. In addition to helping protect personnel and equipment from hazardous voltages, a proper grounding system may **improve the EMC performance of the** ~~reduce electromagnetic interference (EMI) to and from the telecommunications~~ cabling system. Improper grounding can produce induced voltages and those voltages can disrupt other telecommunications circuits.

Grounding and bonding shall meet the requirements and practices of applicable authorities or codes. In addition, telecommunications grounding/bonding shall conform to **ANSI/TIA/EIA-J-STD-607-A** ~~ANSI/TIA/EIA-607~~ requirements.

The **screen shield** of ScTP cables shall be bonded ~~through a conducting path~~ to the telecommunications grounding busbar (TGB) in the telecommunications room (see ~~subclause 4.2.5~~). Grounding **of equipment** at the work area is usually accomplished through the **ground conductor of the** equipment power connection. **If present, screen shield connections to** at the work area **equipment shall be** ~~are~~ accomplished through **the screen of an ScTP work area patch cord extending from the TO to the equipment.** At the work area end of the horizontal cabling, the voltage measured between the **screen shield** and the ground wire of the electrical outlet used to **provide** ~~supply power to the workstation~~ **equipment** shall not exceed 1.0 V ~~rms~~ **RMS and shall not exceed 1.0 V dc.** The cause of any higher voltage should be removed before using the cable.

The screen of ScTP connecting hardware shall be bonded to the TGB in the telecommunications room according to the requirements given in normative annex A of this Standard.

The horizontal cable screen shall be bonded via a screen termination to the connecting hardware screen termination. The connecting hardware screen termination is controlled by component specifications and shall be verified to ensure that all applicable requirements are met.

ANNEX A (NORMATIVE) GROUNDING (EARTHING) AND BONDING OF SCREENED BALANCED TWISTED-PAIR HORIZONTAL CABLING

A.1 General

The basic components and requirements for grounding (earthing) and bonding specified herein shall be followed for every area of a building wherein screened balanced twisted-pair horizontal cabling is installed. The grounding (earthing) and bonding infrastructure for installed screened balanced twisted-pair horizontal cables are also specified herein. The grounding (earthing) and bonding infrastructure for installed screened backbone cables is specified in ANSI/TIA/EIA-J-STD-607-A. In all cases, applicable electrical code requirements shall be satisfied.

A.2 Overview of the horizontal cabling grounding (earthing) and bonding infrastructure

The screened balanced twisted-pair horizontal cable grounding (earthing) and bonding infrastructure includes four major components as described in A.3:

- a) Connecting hardware screen termination conductor
- b) Bonding conductor
- c) Connecting hardware screen termination
- d) Telecommunications grounding busbar (TGB)

These screened balanced twisted-pair horizontal cabling grounding (earthing) and bonding components are intended to work in conjunction with telecommunications pathways and spaces (ANSI/EIA/TIA-569-A) and administration (ANSI/TIA/EIA-606-A), including:

- a) Telecommunications equipment room
- b) Telecommunications room (TR)
- c) Telecommunications labeling and record keeping

A.3 Screened balanced twisted-pair horizontal cabling grounding (earthing) and bonding infrastructure components

This clause describes the characteristics of the major components of the horizontal cabling grounding (earthing) and bonding infrastructure.

A.3.1 Connecting hardware screen termination conductor

The screen of all installed screened balanced twisted-pair horizontal cable shall be fitted at each end with screened connecting hardware. The connecting hardware screen termination conductor (see figure A.1) shall enable connections between the cable screen extending from one side of the connecting hardware to the cable screen extending from the other side of the connecting hardware. All connecting hardware and cable used in screened balanced twisted-pair horizontal cabling shall comply with annex K of ANSI/TIA/EIA-568-B.2. Individual connecting hardware screen termination conductors may be interconnected in a common connecting hardware screen termination conductor. Connections from the common connecting hardware screen termination conductor to individual screen termination conductors shall be made in parallel. Series connections shall not be used.

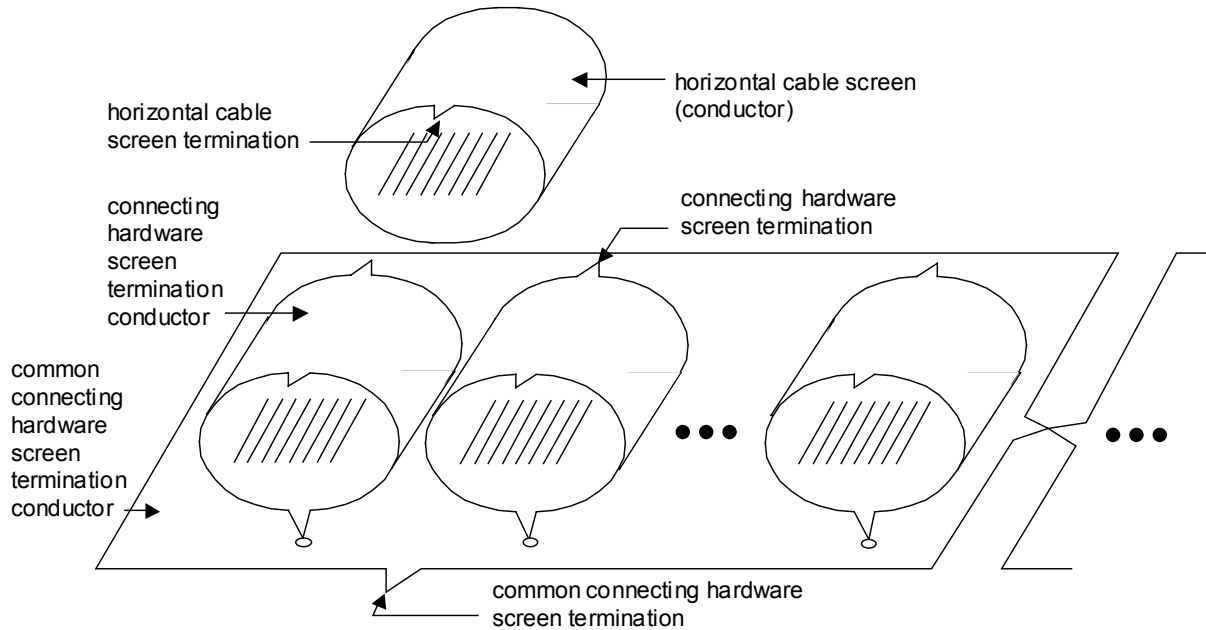


Figure A.1 – Connecting hardware screen termination conductor

A.3.1.1 Connecting hardware screen termination location and TGB considerations

The TGB may be bonded to metallic structures supporting screened connecting hardware where connecting hardware screen termination conductors are interconnected and electrically bonded.

A.3.2 Bonding conductors and connecting hardware screen terminations

The bonding conductor interconnects telecommunications connecting hardware screen terminations, metallic structures supporting telecommunications connecting hardware (e.g. patch panels) and metallic raceways for telecommunications cabling with the TGB. The bonding conductor circuit originates at the TGB, extends through the telecommunications room's pathways, and connects to each individual or common connecting hardware screen termination.

The bonding conductor shall be a copper conductor. Individual connecting hardware screen terminations may be bonded directly to a common connecting hardware screen termination conductor or through bonding conductor. The minimum bonding conductor size for connections from the TGB to the metallic structures shall be 4 mm (No. 6 AWG). The minimum bonding conductor size for connections from the metallic structures to the common connecting hardware screen terminations shall be 1.6 mm (No. 14 AWG). The bonding conductor may be insulated.

All grounding (earthing) and bonding conductors and connecting hardware shall be listed for this purpose by a nationally recognized testing laboratory (NRTL).

NOTE - Conductors are listed for the application/space in which they are intended to be used (e.g. riser systems or plenum spaces.)

Metallic cable screens shall not be used as bonding conductors.

A.3.2.1 Bonding conductor labeling

Each bonding conductor should be labeled. Labels should be located on conductors as close as practicable to their point of termination in a readable position. Labels should be nonmetallic and include the information depicted in figure A.2. Refer to ANSI/TIA/EIA-606-A for additional labeling requirements.

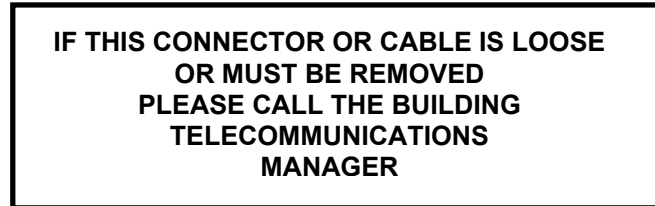


Figure A.2 - Bonding conductor label

A.3.2.2 Bonding conductor color-code

Each bonding conductor should be marked with a distinctive green color. Additional identification may be applied to distinguish telecommunications grounding conductors from other grounding conductors.

A.3.2.3 Bonding conductor installation considerations

Bonding conductors should not be placed in ferrous metallic conduit. If it is necessary to place bonding conductors in ferrous metallic conduit that exceeds 1 m (3 ft) in length, the conductors shall be bonded to each end in accordance with the requirements of ANSI/TIA/EIA-J-STD-607-A.

Bonding conductors shall be installed and protected from physical and mechanical damage. Bonding conductors should be installed without splices.

A.3.3 Telecommunications grounding busbar (TGB)

The TGB is the grounding (earthing) connection point for screened balanced twisted-pair horizontal cabling in the area served by that telecommunications room or equipment room and serves other grounding functions. The TGB shall conform to the requirements provided in ANSI/TIA/EIA-J-STD-607-A.

A.3.3.1 Connections to the TGB

Connections of bonding conductors from metallic raceways for telecommunications cabling and metallic structures supporting telecommunications connecting hardware to the TGB shall utilize listed connecting hardware.

A.4 Telecommunications room and equipment room

Each individual and common connecting hardware screen termination conductor in a telecommunications room or equipment room shall be effectively grounded to the TGB with a bonding conductor.

A.5 Consolidation point

If present, consolidation point connections in a screened balanced twisted-pair horizontal cabling channel shall utilize ScTP connecting hardware that complies with all applicable requirements of annex K of ANSI/TIA/EIA-568-B.2.

A.5.1 Consolidation point screen termination interconnection

Individual connecting hardware screen termination conductors may be interconnected in a common connecting hardware screen termination conductor. Connections from the common connecting hardware screen termination conductor to individual screen termination conductors

shall be made in parallel. Series connections shall not be used.

A.6 Work area

The screen shall be continuous between the TR (or equipment room) and the TO in the work area. TO connections shall utilize ScTP connecting hardware that complies with annex K of ANSI/TIA/EIA-568-B.2. Individual connecting hardware screen termination conductors may be interconnected in a common connecting hardware screen termination conductor. Connections from the common connecting hardware screen termination conductor to individual screen termination conductors shall be made in parallel. Series connections shall not be used.

Except when required by code, the connecting hardware screen termination conductor should not be bonded to ground in the work area by any means other than through the screen of an ScTP work area cord extending from the telecommunications outlet/connecting hardware to equipment.

A.6.1 Ground wire resistance

The resistance between the green wire ground at the electrical outlet in the work area and the screen termination conductor at the telecommunications outlet/connecting hardware should not exceed 21Ω . 21Ω is the effective maximum DC loop resistance of a permanent link. The cause of any higher resistance should be rectified before connecting a screened balanced twisted-pair horizontal link or channel to network equipment.

