

AS/NZS 1020:2023



Australian/New Zealand Standard™

The control of static electricity in non-hazardous areas



AS/NZS 1020:2023

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Australian/New Zealand Standard™

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Preface

This Standard was prepared by the joint Standards Australia/Standards New Zealand Committee EL-025, Control of Undesirable Static Charges, to supersede AS/NZS 1020:1995, *The control of undesirable static charges*.

The objective of this document is to set out requirements and recommendations for controlling static electricity (static) that is incidentally generated by processes or activities in non-hazardous areas. Depending on circumstances, static can present risks, hazards, damage, static shock or inconvenience.

This document updates requirements for new technology and new equipment that have been introduced since the previous edition was published.

The major changes in this edition are as follows:

- (a) Change of terminology in the title to be “static electricity”.
- (b) Removal of aspects related to hazardous areas. This document now only includes aspects relevant to non-hazardous areas.
- (c) Identification of details for using an electrical installation’s Protective Earth (PE) network or Functional Earth (FE) for mitigating static electricity.
- (d) Introduction of a Static Control Assessment and a Static Control Plan.

The term “informative” is used in Standards to define the application of the appendices to which they apply. An “informative” appendix is only for information and guidance.

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The control of static electricity in non-hazardous areas

1 Scope

This document sets out a methodology for addressing the risks associated with static as follows:

- (a) Assessment of the risk.
- (b) Determination of suitable controls.
- (c) Specification and implementation of controls.
- (d) Maintenance and repair.

This document includes the following:

- (i) Consideration of the generation of static and the problems it presents in a specific environment.
- (ii) A description of methods and equipment for measuring electric potential, charge, capacitance, and resistance parameters associated with static.

This document does not consider the following:

- (A) Methods for lightning protection, see AS 1768.
- (B) The control of static electricity for the purpose of preventing ignition of an explosive atmosphere. Refer to SA TS 60079.32.1.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document.

NOTE Documents referenced for informative purposes are listed in the Bibliography.

AS/NZS 3000, *Electrical installations — Buildings, structures and premises (known as the SAA Wiring Rules)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

IEC Electropedia: available at <https://www.electropedia.org/>

ISO Online browsing platform: available at <https://www.iso.org/obp/>

3.1

antistatic

conductive or dissipative

Note 1 to entry: Used to describe a material that is incapable of retaining a significant electrostatic charge when in contact with earth. In this context the word is commonly used to describe a type of footwear and antistatic additives (ASAs) for use with liquids.

Note 2 to entry: Preferred term is *conductive* (3.4) or *dissipative* (3.6) depending on which is correct.

[SOURCE: IEC TS 60079-32-1:2013, 3.1]

3.2

bonding

process of connecting two or more conducting objects together by means of a *conductor* (3.5)

Note 1 to entry: See also notes to [definition 3.4](#).

3.3

competent person

person, who has acquired, through education, training, qualification or experience or a combination of these, the knowledge and skill enabling that person to perform the required task correctly

Note 1 to entry: See [Clause 4.4](#) for competency required when working with static electricity.

3.4

conductive

having a resistivity or resistance below the *dissipative range* (3.6)

Note 1 to entry: Conductive materials or objects are neither dissipative nor insulating and are incapable of retaining a significant electrostatic charge when in contact with earth.

Note 2 to entry: Product standards and other standards covering electrostatic properties often include specific definitions of “conductive” which apply only to items covered by those standards and may be different to the definitions given here. For example, refer to ISO 8031 and ISO 8330 for hose and hose assemblies.

[SOURCE: IEC TS 60079-32-1:2013, 3.2, modified]

3.4.1

conductive flooring

flooring having a resistance range of 0 to 100 kΩ

3.4.2

conductive footwear

footwear ensuring that a person standing on a conductive floor has a resistance to earth low enough to ensure dissipation of electrostatic charges even in particularly hazardous situations (for example when handling sensitive explosives) but not high enough to prevent a hazardous electrical shock at voltages less than 500 V

Note 1 to entry: Refer to IEC 61340-4-3 and IEC 61340-4-5.

[SOURCE: IEC TS 60079-32-1:2013, 3.3]

3.5

conductor

conductive object

[SOURCE: IEC TS 60079-32-1:2013]

3.6

dissipative

electrostatic dissipative

having an intermediate resistivity or resistance that lies between the conductive and insulating ranges

Note 1 to entry: Dissipative materials or objects are neither conductive nor insulating but, like conductive items, safely limit contact charging and/or dissipate even the maximum charging currents associated with their designed application when in contact with earth.

Note 2 to entry: Product standards often include specific definitions of “dissipative” which apply only to items covered by those standards and may be different to the definitions given here.

[SOURCE: IEC TS 60079-32-1:2013, 3.7]

3.6.1

dissipative clothing

clothing that meets the material and design requirements specified in EN 1149-5

[SOURCE: IEC TS 60079-32-1:2017, 3.8]

3.6.2

dissipative footwear

footwear ensuring that a person standing on a conductive or dissipative floor has a resistance to earth low enough to ensure dissipation of electrostatic charges but high enough to prevent a hazardous electrical shock at voltages less than 500 V

Note 1 to entry: Refer to IEC 61340-4-3 and IEC 61340-4-5.

Note 2 to entry: Antistatic footwear as described in ISO 20345 may fulfil this function

[SOURCE: IEC TS 60079-32-1:2013, 3.9]

3.7

earthing grounding

specific form of bonding by means of which one or more conducting objects are connected to the general mass of earth by a conductor

Note 1 to entry: “Bonded” or “earthed” means respectively that a bonding or earthing conductor has been deliberately applied, or that an electrically conducting path having a resistance sufficiently low for this purpose (usually not exceeding 1 MΩ) is always present. This resistance includes the combined resistances of every component in the earthing system, for example person plus floor plus connection between floor and earth.

Note 2 to entry: Australia, New Zealand, and many other countries use the term ‘earthing’, which is aligned with the IEC terminology. Alternatively, the term ‘grounding’ is commonly used in the United States.

3.8

electrostatic discharge

charge on a liquid or on a solid (that) creates a hazard only if it is discharged to another body, or, more usually, to earth

Note 1 to entry: See SA TS 60079.32.1 for information about sparks, corona, brush discharges, propagating brush discharges, lightning like discharges and cone discharges.

[SOURCE: IEC TS 60079-32-1:2013, A.3.1]

3.9

electrostatic shock static shock

pathophysiological effect resulting from an electric current caused by an electrostatic discharge passing through human or animal body

3.10

functional earthing FE

earthing arrangement provided to ensure correct operation of electrical equipment or to permit reliable and proper functioning of electrical installations

Note 1 to entry: ‘Clean’ (low noise) earths provided for electrical equipment may be considered as FE.

Note 2 to entry: FE precedes the term of anything that has a functional earth function other than a static earth.

[SOURCE: AS/NZS 3000:2018, 1.4.66 modified, note 2 to entry added]

3.10.1

protective earthing conductor

protective earth

earthing conductor, other than a main earthing conductor, intended to carry earth fault currents and connecting any portion of the earthing system to the portion of the electrical installation or electrical equipment required to be earthed, or to any other portion of the earthing system

[SOURCE: AS/NZS 3000:2018, 1.4.100, modified]

3.10.2

static earthing

SE

earthing arrangement provided to ensure dissipation of generated electrostatic charge

Note 1 to entry: SE precedes the term of anything that has a static earthing function.

3.11

insulating

having a resistivity or resistance that is higher than the *dissipative* ([3.6](#)) range

Note 1 to entry: Insulating materials or objects are neither conductive nor dissipative. Electrostatic charges can accumulate on them and do not readily dissipate even when they are in contact with earth.

Note 2 to entry: Product standards and other standards covering electrostatic properties often include specific definitions of “insulating” which apply only to items covered by those standards and may be different to the definitions given here. For example, refer to ISO 8031 and ISO 8330 for hose and hose assemblies.

Note 3 to entry: The adjective “non-conductive” has often been used as a synonym for insulating. It is avoided in this document as it could be taken to mean either “insulating” or “insulating or dissipative” and this may lead to confusion.

[SOURCE: IEC TS 60079-32-1:2013, 3.15]

3.12

ionisation

charge neutralisation

method of making the air locally ion-rich so that charges on insulating solid materials can be neutralised

Note 1 to entry: Can be used for neutralising charge on insulating plastic sheets or films.

3.13

may

indicates the existence of an option

3.14

non-hazardous area

Note 1 to entry: area in which an explosive atmosphere is not expected to be present in quantities such that special precautions for the construction, installation and use of equipment are required

Note 2 to entry: A hazardous area is typically classified into Zones 0, 1 or 2 for flammable vapours or gases, or Zones 20, 21 or 22 for combustible dusts.

[SOURCE: IEC 60050-426-03-02:2020, modified — Note to entry added]

3.15

resistance

surface resistance ([3.15.1](#)), *surface resistivity* ([3.15.2](#)) or *volume resistivity* ([3.15.3](#))

3.15.1

surface resistance

resistance expressed in ohms between two electrodes in contact with the surface to be measured

Note 1 to entry: One common configuration (for example in IEC 60079-0 and IEC 60167) uses parallel electrodes, 100 mm long and 10 mm apart)

Note 2 to entry: The surface resistance is dependent upon the electrode configuration. The surface resistance measured with the example electrode configuration is 10 times lower than the surface resistivity.

Note 3 to entry: Soft conductive rubber strip electrodes are preferred over silver paint electrodes.

[SOURCE: IEC TS 60079-32-1:2013, 3.21]

3.15.2

surface resistivity

resistance across opposite side of a surface of unit length and unit width commonly expressed in ohms (or ohms/square)

Note 1 to entry: This configuration is used in ASTM D257 and BS 7506-2.

[SOURCE: IEC TS 60079-32-1:2013, 3.22]

3.15.3

volume resistivity

resistance of a body of unit length and unit cross-sectional area expressed in ohm metres

[SOURCE: IEC TS 60079-32-1:2013, 3.23]

3.16

shall

indicates that a statement is mandatory

3.17

should

indicates a recommendation

3.18

static electricity

static

electrical charging of materials by such processes as physical contact, separation, electrostatic induction and by deposition of charged particles

Note 1 to entry: Static electricity is often referred to as simply “static”.

3.19

static maintenance program

regular inspection, maintenance and repair of static electricity controls and equipment

4 Static electricity

4.1 General

4.1.1 Overview

Regardless of the generation method, static is the result of an imbalance of electric charge. The imbalance occurs when one entity loses electrons and becomes positively charged while the other gains electrons and therefore becomes negatively charged.