AS/NZS IEC 61000.3.2:2023
IEC 61000-3-2:2018+AMD1:2020 CSV

Australian/New Zealand Standard™

Electromagnetic compatibility (EMC)

Part 3.2: Limits — Limits for harmonic current emissions (equipment input current ≤16 A per phase)

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Part 3.2: Limits — Limits for harmonic current emissions (equipment input current ≤16 A per phase)

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Preface

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-034, Power Quality, to supersede AS/NZS 61000.3.2:2013.

The objective of this document is to specify the limitation of harmonic currents injected into the public supply system.

It specifies limits of harmonic components of the input current which can be produced by equipment tested under specified conditions.

This document is applicable to electrical and electronic equipment having a rated input current up to and including 16 A per phase and intended to be connected to public low-voltage distribution systems.

Arc welding equipment, which is not professional equipment, with a rated input current up to and including 16 A per phase, is included in the scope of this document.

All other arc welding equipment is excluded from the scope of this document; however, the harmonics emission can be evaluated using AS/NZS IEC 61000.3.12:2023 and relevant installation restrictions.

The tests according to this document are type tests.

For systems with nominal voltages less than but not equal to 220 V (line-to-neutral), the limits have not yet been considered.

This document is identical with, and has been reproduced from, IEC 61000-3-2: 2018+AMD1:2020 CSV, *Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)*.

This Standard provides for the use of the following Australian Standards as equivalent to the IEC Standards referenced herein:

IEC Standards	AS Standards and AS/NZS Standards
IEC 60155:1993, *Glow-starters for fluorescent lamps*	AS 60155:2018, *Glow-starters for fluorescent lamps* (IEC 60155:1993 (ED. 4.0), MOD)
IEC 60335-2-24:2010, *Household and similar electrical appliances – Safety – Part 2-24: Particular requirements for refrigerating appliances, ice-cream appliances and ice makers*, IEC 60335-2-24:2010/AMD1:2012 IEC 60335-2-24:2010/AMD2:2017	AS/NZS 60335.2.24:2021, *Household and similar electrical appliances — Safety, Part 2.24: Particular requirements for refrigerating appliances, ice-cream appliances and ice-makers* (IEC 60335-2-24 (ED 8.0) MOD)
IEC 60598-2-17:2017, *Luminaires – Part 2-17: Particular requirements – Luminaires for stage lighting, television and film studios (outdoor and indoor)*	AS/NZS 60598.2.17:2019, *Luminaires, Part 2.17: Particular requirements — Luminaires for stage lighting, television and film studios (outdoor and indoor)* (IEC 60598-2-17:2017 (ED.2.0) MOD).

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(a) In the source text “this part of IEC 61000” should read “this document”.

(b) A full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 61000-3-2 edition 5.1 contains the fifth edition (2018-01) [documents 77A/986/FDIS and 77A/990/RVD] and its amendment 1 (2020-07) [documents 77A/1077/FDIS and 77A/1084/RVD].

This Final version does not show where the technical content is modified by amendment 1. A separate Redline version with all changes highlighted is available in this publication.

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International Standard IEC 61000-3-2 has been prepared by sub-committee 77A: EMC – Low frequency phenomena, of IEC technical committee 77: Electromagnetic compatibility.

It forms part 3-2 of the IEC 61000 series. It has the status of a product family standard.

This fifth edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) an update of the emission limits for lighting equipment with a rated power ≤ 25 W to take into account new types of lighting equipment;
b) the addition of a threshold of 5 W under which no emission limits apply to all lighting equipment;
c) the modification of the requirements applying to the dimmers when operating non-incandescent lamps;
d) the addition of test conditions for digital load side transmission control devices;
e) the removal of the use of reference lamps and reference ballasts for the tests of lighting equipment;
f) the simplification and clarification of the terminology used for lighting equipment;
g) the classification of professional luminaires for stage lighting and studios under Class A;
h) a clarification about the classification of emergency lighting equipment;
i) a clarification for lighting equipment including one control module with an active input power ≤ 2 W;
j) an update of the test conditions for television receivers;
k) an update of the test conditions for induction hobs, taking also into account the other types of cooking appliances;
l) for consistency with IEC 61000-3-12, a change of the scope of IEC 61000-3-2 from equipment with an input current ≤ 16 A to equipment with a rated input current ≤ 16 A.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 61000 series, published under the general title, *Electromagnetic compatibility (EMC)*, can be found on the IEC website.

The committee has decided that the contents of the base publication and its amendment will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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INTRODUCTION

IEC 61000 is published in separate parts, according to the following structure:

Part 1: General

General considerations (introduction, fundamental principles)

Definitions, terminology

Part 2: Environment

Description of the environment

Classification of the environment

Compatibility levels

Part 3: Limits

Emission limits

Immunity limits (in so far as they do not fall under the responsibility of the product committees)

Part 4: Testing and measurement techniques

Measurement techniques

Testing techniques

Part 5: Installation and mitigation guidelines

Installation guidelines

Mitigation methods and devices

Part 6: Generic standards

Part 9: Miscellaneous

Each part is further subdivided into several parts, published either as international standards or as technical specifications or technical reports, some of which have already been published as sections. Others will be published with the part number followed by a dash and a second number identifying the subdivision (example: IEC 61000-6-1).

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ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

1 Scope

This part of IEC 61000 deals with the limitation of harmonic currents injected into the public supply system.

It specifies limits of harmonic components of the input current which can be produced by equipment tested under specified conditions.

This part of IEC 61000 is applicable to electrical and electronic equipment having a rated input current up to and including 16 A per phase, and intended to be connected to public low-voltage distribution systems.

Arc welding equipment, which is not professional equipment, with a rated input current up to and including 16 A per phase, is included in the scope of this document. All other arc welding equipment is excluded from the scope of this document; however, the harmonics emission can be evaluated using IEC 61000-3-12 and relevant installation restrictions.

The tests according to this document are type tests.

For systems with nominal voltages less than but not equal to 220 V (line-to-neutral), the limits have not yet been considered.

NOTE The words apparatus, appliance, device and equipment are used throughout this document. They have the same meaning for the purposes of this document.

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. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-161:1990, *International Electrotechnical Vocabulary (IEV) – Part 161: Electromagnetic compatibility* (available at www.electropedia.org)

IEC 60107-1:1997, Methods *of measurement on receivers for television broadcast transmissions – Part 1: General considerations – Measurements at radio and video frequencies*

IEC 60155:1993, *Glow-starters for fluorescent lamps*

IEC 60268-1:1985*, Sound system equipment – Part 1: General*
IEC 60268-1:1985/AMD1:1988
IEC 60268-1:1985/AMD2:1988

IEC 60268-3:2018, *Sound system equipment – Part 3: Amplifiers*

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IEC 60335-2-2:2019, *Household and similar electrical appliances – Safety – Part 2-2: Particular requirements for vacuum cleaners and water-suction cleaning appliances*

IEC 60335-2-14:2016, *Household and similar electrical appliances – Safety – Part 2-14: Particular requirements for kitchen machines*

IEC 60335-2-24:2010, Household *and similar electrical appliances – Safety – Part 2-24: Particular requirements for refrigerating appliances, ice-cream appliances and ice makers*
IEC 60335-2-24:2010/AMD1:2012
IEC 60335-2-24:2010/AMD2:2017

IEC 60335-2-79:2016, Household *and similar electrical appliances – Safety – Part 2-79: Particular requirements for high pressure cleaners and steam cleaners*

IEC 60598-2-17:2012, *Luminaires – Part 2-17: Particular requirements – Luminaires for stage lighting, television and film studios (outdoor and indoor)*
IEC 60598-2-17:2012/AMD1:2015

IEC 60974-1:2017, *Arc welding equipment – Part 1: Welding power sources*

IEC 61000-4-7:2002, *Electromagnetic compatibility (EMC) – Part 4-7: Testing and measurement techniques – General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto*
IEC 61000-4-7:2002/AMD1:2008

IEC 62756-1:2015, *Digital load side transmission lighting control (DLT) – Part 1: Basic requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-161 and the following apply.

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

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
portable tool
electrical tool which is hand-held during normal operation and used for a short time (a few minutes) only

Note 1 to entry: Hand-held means that no part of the tool, except the power cord, rests on the floor during normal operation.

3.2
lamp
light source provided with at least one cap

Note 1 to entry: For products that have the same physical characteristics as lamps for general lighting but that are built to emit optical radiation mainly in the IR or UV spectrum, the term IR lamp or UV lamp is often used.

[SOURCE: IEC 60050-845:2020, 845-27-008, modified – existing notes 2 and 3 have been removed, the term “electric” has been removed from the term and the definition]

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3.3
integrated lamp
electric lamp which cannot be dismantled without being permanently damaged, incorporating lighting control gear, and all additional elements necessary for starting and stable operation of the light source, designed for direct connection to the supply voltage

[SOURCE: IEC 60050-845:2020, 845-27-009]

3.4
luminaire
apparatus which distributes, filters or transforms the light transmitted from at least one source of optical radiation and which includes, except the sources themselves, all the parts necessary for fixing and protecting the sources (IEV 845-21-032) and, where necessary, circuit auxiliaries together with the means for connecting them to the power supply

[SOURCE: IEC 60050-845: 845-30-001:2020, modified – existing note has been removed]

3.5
input current
current directly supplied to an equipment or a part of equipment by the AC distribution system

3.6
void

3.7
active input power
mean value of the instantaneous power, taken over 10 (50 Hz systems) or 12 (60 Hz systems) fundamental periods and measured in accordance with IEC 61000-4-7:2002 and IEC 61000-4-7:2002/AMD1:2008 at the input supply terminals of the equipment under test

3.8
balanced three-phase equipment
equipment having rated line current modules which differ by no more than 20 %

3.9
professional equipment
equipment for use in trades, professions or industries and which is not intended for sale to the general public, as designated by the manufacturer

[SOURCE: IEC 60050-161:1990, 161-05-05, modified – the existing Note has been replaced by the text added at the end of the definition]

3.10
total harmonic current
THC
total RMS value of the harmonic current components of orders 2 to 40, expressed as:

$$THC = \sqrt{\sum_{h=2}^{40} I_h^2}$$

Note 1 to entry: This note applies to the French language only.

3.11
total harmonic distortion
THD
ratio of the RMS value of the sum of the harmonic components (in this context, harmonic current components I_h of orders 2 to 40) to the RMS value of the fundamental component, expressed as:

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$$THD = \sqrt{\sum_{h=2}^{40}\left(\frac{I_h}{I_1}\right)^2}$$

Note 1 to entry: This note applies to the French language only.

3.12
partial odd harmonic current
POHC
total RMS value of the odd harmonic current components of orders 21 to 39, expressed as:

$$POHC = \sqrt{\sum_{h=21,23}^{39} I_h^2}$$

Note 1 to entry: Details for the calculation of the $POHC$ are given in Annex C.

Note 2 to entry: This note applies to the French language only.

3.13
lighting equipment
equipment with a primary function of generating and/or regulating and/or distributing the radiation emitted by a light source

Note 1 to entry: See also 5.2.

3.14
stand-by mode
non-operational, low power consumption mode (usually indicated in some way on the equipment) that can persist for an indefinite time

3.15
repeatability
<results of measurements> closeness of the agreement between the results of measurements of harmonic currents on the same equipment under test, carried out with the same test system, at the same location, under identical test conditions

3.16
reproducibility
<results of measurements> closeness of the agreement between the results of measurements of harmonic currents on the same equipment under test, carried out with different test systems under conditions of measurement intended to be the same in each case

Note 1 to entry: The test system and test conditions are assumed to fulfil all normative requirements in the applicable standards.

3.17
variability
<results of measurements> closeness of the agreement between the results of measurements of harmonic currents on different samples of the same type of equipment under test, having no intentional differences, carried out with different test systems under conditions of measurement intended to be the same in each case

Note 1 to entry: The test system and test conditions are assumed to fulfil all normative requirements in the applicable standards.

Note 2 to entry: In the context of this document, the meaning of the terms can be summarized as follows:

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