

Electromagnetic compatibility (EMC) —

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

ICS 33.100.10

National foreword

This British Standard is the UK implementation of EN 61000-3-2:2006+A2:2009. It is identical to IEC 61000-3-2:2005 incorporating amendments 1:2008 and 2:2009. It supersedes BS EN 61000-3-2:2006 which will be withdrawn on 1 July 2012.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment 1 is indicated by **A1** **A1**.

The UK participation in its preparation was entrusted by Technical Committee GEL/210, EMC, to Subcommittee GEL/210/8, Low frequency standards.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

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English version

**Electromagnetic compatibility (EMC)
Part 3-2: Limits -
Limits for harmonic current emissions
(equipment input current ≤ 16 A per phase)
(IEC 61000-3-2:2005)**

Compatibilité électromagnétique (CEM)
Partie 3-2: Limites -
Limites pour les émissions
de courant harmonique (courant appelé
par les appareils ≤ 16 A par phase)
(CEI 61000-3-2:2005)

Elektromagnetische Verträglichkeit (EMV)
Teil 3-2: Grenzwerte -
Grenzwerte für Oberschwingungsströme
(Geräte-Eingangsstrom ≤ 16 A je Leiter)
(IEC 61000-3-2:2005)

This European Standard was approved by CENELEC on 2006-02-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 77A/503/FDIS, future edition 3 of IEC 61000-3-2, prepared by SC 77A, Low frequency phenomena, of IEC TC 77, Electromagnetic compatibility, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61000-3-2 on 2006-02-01.

This European Standard supersedes EN 61000-3-2:2000 + A2:2005.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
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- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2009-02-01

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directives 89/336/EEC and 1999/5/EC. See Annex ZZ.

Annexes ZA and ZZ have been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61000-3-2:2005 was approved by CENELEC as a European Standard without any modification.

Foreword to amendment A1

The text of document 77A/625/FDIS, future amendment 1 to IEC 61000-3-2:2005, prepared by SC 77A, Low frequency phenomena, of IEC TC 77, Electromagnetic compatibility, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A1 to EN 61000-3-2:2006 on 2009-07-01.

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- latest date by which the national standards conflicting
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Endorsement notice

The text of amendment 1:2008 to the International Standard IEC 61000-3-2:2005 was approved by CENELEC as an amendment to the European Standard without any modification.

Foreword to amendment A2

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- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2012-07-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of amendment 2:2009 to the International Standard IEC 61000-3-2:2005 was approved by CENELEC as an amendment to the European Standard without any modification.

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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 levels
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 sections which are to be published either as international standards, technical specifications, or as technical reports.

These standards and reports will be published in chronological order and numbered accordingly (for example, 61000-6-1).

This part is an international standard which gives emission limits for harmonic currents from equipment having an input current up to and including 16 A per phase.

This part is a Product Family Standard.

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 may be produced by equipment tested under specified conditions.

Harmonic components are measured according to Annexes A and B.

This part of IEC 61000 is applicable to electrical and electronic equipment having an 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 input current up to and including 16 A per phase, is included in this standard.

Arc welding equipment intended for professional use, as specified in IEC 60974-1, is excluded from this standard and may be subject to installation restrictions as indicated in IEC 61000-3-4 or IEC 61000-3-12.

The tests according to this standard are type tests. Test conditions for particular equipment are given in Annex C.

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

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

2 Normative references

The following referenced documents are indispensable for the application 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(131), *International Electrotechnical Vocabulary (IEV) – Chapter 131: Electric and magnetic circuits*

IEC 60050(161), *International Electrotechnical Vocabulary (IEV) – Chapter 161: Electro-magnetic compatibility*

 Text deleted 

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

IEC 60155, *Glow-starters for fluorescent lamps*

IEC 60268-1:1985, *Sound system equipment – Part 1: General*

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

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

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

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

IEC 61000-2-2, *Electromagnetic compatibility (EMC) – Part 2: Environment – Section 2: Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems*

IEC/TS 61000-3-4, *Electromagnetic compatibility (EMC) – Part 3-4: Limits – Limitation of emission of harmonic currents in low-voltage power supply systems for equipment with rated current greater than 16 A*

IEC 61000-3-12, *Electromagnetic compatibility (EMC) – Part 3-12: Limits – Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current >16 A and ≤75 A per phase*

IEC 61000-4-7, *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*

Recommendation ITU-R BT.471-1, *Nomenclature and description of colour bar signals*

3 Definitions

For the purpose of this part of IEC 61000, the following definitions apply, as well as the definitions of IEC 60050(161).

3.1

portable tool

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

3.2

lamp

a source for producing light

3.3

self-ballasted lamp

a unit which cannot be dismantled without being permanently damaged, provided with a lamp cap and incorporating a light source and any additional element necessary for starting and stable operation of the light source

3.4

luminaire

an apparatus (other than a lamp) which distributes, filters or transforms the light transmitted from one or more lamps and which includes all the parts necessary for supporting, protecting the lamps, and, where necessary, circuit auxiliaries, together with the means for connecting them to the supply

 Subclause deleted 

3.6

ballast

a device connected between the supply and one or more discharge lamps which serves mainly to limit the current of the lamp(s) to the required value. It may include means for transforming the supply voltage and/or frequency, correcting the power factor and, either alone or in combination with a starting device, provide the necessary conditions for starting the lamp(s)

3.7

step-down converter for lighting equipment

a unit inserted between the supply and one or more tungsten halogen or other filament lamps which serves to supply the lamp(s) with its (their) rated voltage, generally at high frequency. The unit may consist of one or more separate components. It may include means for dimming, correcting the power factor and suppressing radio interference

 Subclause deleted 

3.9

reference lamp

a lamp selected for testing ballasts which, when associated with a reference ballast, has electrical characteristics that are close to the objective values given in the relevant lamp specification

3.10

reference ballast

a special inductive-type ballast designed for the purpose of providing comparison standards for use in testing ballasts and for the selection of reference lamps. It is essentially characterized by a stable voltage-to-current ratio, which is relatively uninfluenced by variations in current, temperature, and the magnetic surroundings

3.11

input current

current directly supplied to an equipment or a part of equipment by the a.c. distribution system

3.12

circuit power factor

the circuit power factor is the ratio of the measured active input power to the product of the supply voltage (r.m.s.) and the supply current (r.m.s.)

3.13

active power

the mean value, taken over one period, of the instantaneous power

[IEV 131-03-18]

NOTE The active input power is the active power measured at the input supply terminals of the equipment under test.

3.14

balanced three-phase equipment

equipment having rated line current modules which differ by no more than 20 %

3.15

professional equipment

equipment for use in trades, professions, or industries and which is not intended for sale to the general public. The designation shall be specified by the manufacturer

A2 3.16

total harmonic

3.16.1

total harmonic current

total r.m.s. value of the harmonic current components of orders 2 to 40

$$\text{total harmonic current} = \sqrt{\sum_{n=2}^{40} I_n^2}$$

3.16.2

total harmonic distortion

THD

ratio of the r.m.s. value of the sum of the harmonic components (in this context harmonic current components I_h of orders 2 to 40) to the r.m.s. value of the fundamental component

$$THD = \sqrt{\sum_{h=2}^{40} \left(\frac{I_h}{I_1} \right)^2} \quad \text{A2}$$

3.17

built-in dimmer

dimmer, including the user control, which is entirely contained within the enclosure of a luminaire

3.18

partial odd harmonic current

total r.m.s. value of the odd harmonic current components of orders 21 to 39

$$\text{partial odd harmonic current} = \sqrt{\sum_{n=21,23}^{39} I_n^2}$$

3.19

lighting equipment

equipment with a primary function of generating and/or regulating and/or distributing optical radiation by means of incandescent lamps, discharge lamps or LED's

Included are:

- lamps and luminaires;
- the lighting part of multi-function equipment where one of the primary functions of this is illumination;
- independent ballasts for discharge lamps and independent incandescent lamp transformers;
- ultraviolet (UV) and infrared (IR) radiation equipment;
- illuminated advertising signs;
- dimmers for lamps other than incandescent.

Excluded are:

- lighting devices built in equipment with another primary purpose such as photocopiers, overhead projectors and slide projectors or employed for scale illuminating or indication purposes;
- dimmers for incandescent lamps.