SLOVENSKI STANDARD
SIST EN IEC 61000-3-2:2019/oprA2:2023

01-april-2023

Elektromagnetna združljivost (EMC) - 3-2. del: Mejne vrednosti - Mejne vrednosti za oddajanje harmonskih tokov (vhodni tok opreme do vključno 16 A na fazo) - Dopolnilo A2

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

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

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

Ta slovenski standard je istoveten z: **EN IEC 61000-3-2:2019/prA2:2023**

ICS:

33.100.10 Emisija Emission

SIST EN IEC 61000-3-2:2019/oprA2:2023 en

77A/1161/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:	
IEC 61000-3-2/AMD2 ED5	
DATE OF CIRCULATION:	CLOSING DATE FOR VOTING:
2023-02-24	**2023-05-19**
SUPERSEDES DOCUMENTS:	
77A/1148/RR	

IEC SC 77A : EMC - LOW FREQUENCY PHENOMENA	
SECRETARIAT:	SECRETARY:
France	Mr Cédric LAVENU
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: ☐
	Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED:	
☒ EMC ☐ ENVIRONMENT	☐ QUALITY ASSURANCE ☐ SAFETY
☒ SUBMITTED FOR CENELEC PARALLEL VOTING	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING
Attention IEC-CENELEC parallel voting The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of

- any relevant patent rights of which they are aware and to provide supporting documentation,
- any relevant “in some countries” clauses to be included should this proposal proceed. Recipients are reminded that the enquiry stage is the final stage for submitting "in some countries" clauses. See AC/22/2007.

TITLE:

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

PROPOSED STABILITY DATE: 2026

NOTE FROM TC/SC OFFICERS:

INTRODUCTION

(For information of the NC's only, not to be part of the standard)

Amendment 2 to IEC 61000-3-2 Ed. 5.1 (= IEC 61000-3-2:2018 plus IEC 61000-3-2/AMD1:2021) is based on 77A/1098/Q, 77A/1106/DISH, 77A/1123A/RQ, 77A/1149/CD, 77A/1150/CD, 77A/1151/CD, 77A/1152/CD, the observations to these CD's and discussions in SC77A / WG1 during the meetings October 2021, May 2022 and November 2022.

At CD stage the amendment has been split into 4 different fragments:

Fragment 1	Lighting equipment
Fragment 2	Test conditions
Fragment 3	Repeatability and measurement uncertainty
Fragment 4	Miscellaneous

As the number of comments on the 4 different CDs was not very high, SC77A WG1 during its meeting November 2022 in San Diego decided to combine the 4 fragments already at CDV stage.

The CDV contains the following main changes in comparison with IEC 61000-3-2 ED 5.1:

- Inclusion of Interpretation Sheet IEC 61000-3-2/AMD1/ISH1 ED5
- New terms and definitions reflecting the actual luminaires on the market
- Adapted test conditions for actual luminaires on the market
- Consolidate the test conditions for video-cassette recorders
- Revision of test conditions for washing machines
- Clarification of references in clause B.17
- Adding IEC Guide 115 to the normative references
- Better specification for repeatability
- New specification for measurement uncertainty and decision rule
- Adding IEC TR 61000-1-6:2012/COR1:2014 to the bibliography
- New definition for an independent function
- New definitions for symmetrical control, asymmetrical control and phase control
- Clarification that special test conditions in Annex B have precedence over the general test conditions in clause 6.3.1
- Clarification for the calculation of THC, THD or POHC (The disregarding of currents less than 0,6 % of input current or less than 5 mA applies only to individual harmonics.)
- Clarification for the application of class D limits
- Clarification for the requirements on the test voltage in A.2, bullet d)
- Addition of an informative Annex D "Symmetry of mains current waveforms"

TEXT OF THE AMENDMENT PROPOSAL

1 Scope

Delete the fifth paragraph.

Replace the last paragraph with the following text:

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

2 Normative references

Modify the reference to IEC 60598-2-17:

IEC 60598-2-17:2017, *Luminaires – Part 2-17: Particular requirements – Luminaires for stage lighting, television and film studios (outdoor and indoor)*

Add the following new reference:

IEC Guide 115 “Application of uncertainty of measurement to conformity assessment activities in the electrotechnical sector”

Update the following references to read:

IEC 60335-2-14:2016, *Household and similar electrical appliances – Safety – Part 2-14: Particular requirements for kitchen machines*
IEC 60335-2-14:2016/AMD1:2019

IEC 60335-2-24:2020, Household *and similar electrical appliances – Safety – Part 2-24: Particular requirements for refrigerating appliances, ice-cream appliances and ice makers*

IEC 60335-2-79:2021, Household *and similar electrical appliances – Safety – Part 2-79: Particular requirements for high pressure cleaners and steam cleaners*

IEC 60598-2-17:2017, *Luminaires – Part 2-17: Particular requirements – Luminaires for stage lighting, television and film studios (outdoor and indoor)*

IEC 60974-1:2021, *Arc welding equipment – Part 1: Welding power sources*

3 Terms and definitions

Replace the first paragraph with the following text:

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

Add the following new terms and definitions:

3.x1
independent functions
functions which do not intentionally interact with each other

3.x2
symmetrical control (single phase)
control of the mains current conduction designed to operate in an identical manner on the positive and negative half cycles of an alternating supply voltage.

Note 1 to entry: The identical pattern can appear across one or more periods of the fundamental frequency (see Annex D for examples).

3.x3
asymmetrical control (single phase)

control of the mains current conduction which is not symmetrical control

3.x4
integrated luminaire
luminaire which cannot be dismantled, without being permanently damaged, to remove the contained mains-connected devices individually

3.x5
non-integrated luminaire
luminaire which can be dismantled, without being permanently damaged, to remove the contained mains-connected devices

Note 1 to entry: Separate lighting control gear or integrated lamps are examples of mains-connected devices

Secretariat note: The definitions of the new terms 3.x4 and 3.x5 reflect the actual luminaires on the market and are similar to the definition of an integrated lamp.

3.x6
separate lighting control gear (SLCG)
lighting control gear that is designed to be directly connected to mains and can be placed on the market as a separate product or as a replaceable part of a non-integrated luminaire

Note 1 to entry: Separate lighting control gear can be a built-in control gear or an independent control gear as defined in IEC 61347-1.

Secretariat note: The terms "separate lighting control gear" and "independent lighting control gear" are already used in the current version, but they are not defined. The 3.x6 term and definition merge the missing definitions and include the replaceable control gear which is applied in non-integrated luminaires.

3.26
professional luminaire for stage lighting and studios
Modify the reference to IEC 60598-2-17:

luminaire (outdoor or indoor) for stage lighting or for television, film or photographic studios within the scope of IEC 60598-2-17:2017 and which is professional equipment

5.2 Description of lighting equipment

Replace the text of the first dash with the following text:
– integrated lamps, integrated luminaires, non-integrated luminaires, separate lighting control gear;

Delete the text of the third dash:

Secretariat note: This adapted description of lighting equipment reflects the actual lighting equipment on the market that is within the scope of IEC 61000-3-2.

6.3.1 Test configuration

Replace the second paragraph with the following text:

Specific test conditions for the measurement of harmonic currents associated with some types of equipment are given in Annex B, which take precedence over the general test conditions given below.

6.3.2 Measurement procedure

Replace the first paragraph with the following text:

The tests shall be conducted according to the general requirements given in 6.3.3 and Annex B, as applicable. Further recommendations are given in 6.3.3 and 6.3.4.

6.3.3 General requirements

Change the headline to read:

6.3.3 General requirements and recommendations

6.3.3.1 Repeatability

Change the complete text of clause 6.3.3.1 into the following:

The repeatability (see 3.15) of the average value for the individual harmonic currents of an order ≤ 11 over the entire test observation period should be better than (5 % of the applicable limit + 1mA), when the following conditions are met:

- the same equipment under test (EUT) (not another of the same type, but the exact same specimen);
- the same test system;
- the same location;
- identical test conditions;
- identical climatic conditions, if relevant.

The repeatability of the average value of individual harmonic currents of an order > 11 under the same conditions should be better than (10 % of the applicable limit + 1 mA).

This repeatability recommendation can serve the purpose of assisting in the determination of the necessary test observation period when this period is not fixed by Table 4 nor Annex B. However, in no case does this recommendation serve as a pass/fail criterion for the assessment of compliance with the requirements of this document.

For the avoidance of doubt, in cases where all relevant limits are met, the test results shall be accepted as demonstrating compliance, even if the repeatability values exceed the recommended values in this clause.

6.3.3.4 Application of limits

Replace the third paragraph with the following text:

Harmonic currents less than 0,6 % of the average input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded. This exclusion applies only to the comparison of individual harmonic currents against limits.

6.5 Multifunction equipment

Delete Note 1 and remove the number from Note 2.

Replace the third paragraph with the following text:

For equipment for which it is not obvious how to operate each function alone, instructions may be provided for testing purposes explaining how the function can be operated alone. These instructions may specify internal changes in the equipment, exclusively for the purpose of operating independent functions alone during the test. The equipment shall be tested accordingly. The test report shall contain a detailed description of how the separate testing of independent functions has been achieved and how the tests have been performed.

7.4.3 Rated power ≥ 5 W and ≤ 25 W

Add the following text and the note at the end of the second dash:

If the waveform includes a noise-like component that makes it difficult to determine the phase angles with some instruments intended to comply with IEC 61000-4-7, an oscilloscope or any other time-domain measurement may be used, if it meets the same bandwidth limitation requirement. This can, for example, be achieved by filtering and/or data acquisition combined with FFT/IFFT operations.

NOTE Background information can be found in IEC 61000-3-2/AMD1/ISH1 ED5.

7.5 Limits for Class D equipment

Replace the first paragraph with the following text:

The harmonics of the input current shall not exceed the values derived from column 2 of Table 3 according to the power value determined in 6.3.2, or the values specified in column 3 of Table 3, whichever are lower.

8 Compliance with this document

Revise clause 8 as follows:

Move the existing text under a new sub-clause 8.1:

8.1 Use of test methods

Add a new subclause 8.2:

8.2 Decision rules and measurement uncertainty

8.2.1 Measurements with an instrument according to IEC 61000-4-7, class I

The following decision rule applies: The measurement results shall be compared directly with the limits. Further calculation of a measurement uncertainty is not required. The test methods specified in this document minimize the number of major sources of uncertainty.

NOTE 1 This decision rule is an application of the so called “accuracy method”, described in IEC Guide 115 “Application of uncertainty of measurement to conformity assessment activities in the electrotechnical sector” as follows:

Quote

4.4.3 *Procedure 2, see Figure 2, is used when ISO/IEC 17025, 5.4.6.2, Note 2, applies.*
Procedure 2 is the traditional method used under the CB Scheme and has been referred to as the “accuracy method”. The test performed is routine. Sources of uncertainty are minimized so that the uncertainty of the measurement need not be calculated to determine conformance with the limit. Variability in test parameters is within acceptable limits. Test parameters such as power source voltage, ambient temperature and ambient humidity are maintained within the defined acceptable limits for the test. Personnel training and laboratory procedures minimize uncertainty of measurement due to human factors. Instrumentation used has an uncertainty within prescribed limits.

Unquote

The reference in Guide 115 to ISO/IEC 17025, 5.4.6.2, Note 2 applies to the version from 2005. In ISO/IEC 17025 from 2017 the same text is now in 7.6.3:

7.6.3 *A laboratory performing testing shall evaluate measurement uncertainty. Where the test method precludes rigorous evaluation of measurement uncertainty, an estimation shall be made based on an understanding of the theoretical principles or practical experience of the performance of the method.*

NOTE 1 from ISO-17025:2017: In those cases where a well-recognized test method specifies limits to the values of the major sources of measurement uncertainty and specifies the form of presentation of the calculated results, the laboratory is considered to have satisfied 7.6.3 by following the test method and reporting instructions.

NOTE 2 The reference in IEC Guide 115 to CTL OD 5014 “IEC system of conformity assessment schemes for electrotechnical equipment and components” is replaced and superseded by the reference to IEC 61000-4-7 in this clause.

8.2.2 Measurements with an instrument according to IEC 61000-4-7, class II

A decision rule based on Procedure 1 of IEC Guide 115, Section 4.4.2, shall be applied and a detailed analysis of the measurement uncertainty shall be performed.

NOTE 1 Guidance for the calculation of the measurement uncertainty can be found in IEC 61000-1-6.

A.1 Test circuit

Replace the entire sub-clause with the following text:

The harmonic currents of the EUT shall be measured in accordance with the circuits given in the following figures:

– Figure A.1 for single-phase equipment;

– Figure A.2 for three-phase equipment.

Measurement equipment complying with IEC 61000-4-7:2002 and IEC 61000-4-7:2002/AMD1:2008 shall be used.

A.2 Supply source

Replace the first sentence of the text under bullet d) with the following text:

The peak value of the test voltage shall be between 1,40 times and 1,42 times (inclusive) its RMS value and shall be reached between 87° and 93°(inclusive) after the zero crossing of the test voltage.

Annex B (normative) **- Type test conditions**

Change the title to read:

Annex B (normative) **- Special test conditions**

B.4 Video-cassette recorders

Replace the title and content with the following text:

B.4 Video-cassette recorders and similar equipment

Measurements on video-cassette recorders and other similar equipment using tape support shall be made in the playback mode with the standard tape speed.

B.5.3 Luminaires

Replace the existing text with the following text:

B.5.3.1 General

Luminaires containing only passive devices that produce no harmonic currents comply with the requirements of this document without testing.

NOTE Examples of passive devices are lamp holders and electromechanical switches.

If the luminaire is equipped with a glow starter, a starter in accordance with IEC 60155:1993 shall be used.

B.5.3.2 Non-integrated luminaires

Non-integrated luminaires allowing the removal and separate verification of contained mains-connected devices comply with the requirements of this document if their mains-connected devices comply with the requirements of this document.

NOTE Examples of mains-connected devices are integrated lamps and separate lighting control gear (SLCG).

B.5.3.3 Integrated luminaires

Integrated luminaires shall be tested as manufactured. If these luminaires additionally incorporate further independent functions that do not intentionally interact with the lighting function and that belong to Class A or Class D, as specified in 5.1, they may be tested with each independent function operated alone, if this can be achieved without modifying the luminaire. For luminaires for which it is not obvious how to operate each independent function alone without modifying the luminaire, an instruction may be provided for testing purposes of how each independent function can be operated alone. This instruction may specify changes in the luminaire. The luminaire shall be tested accordingly.

The luminaire thus tested complies with the requirements of this document when each independent function complies with the requirements for the relevant class of equipment belonging to the function. If no instruction for testing purposes is provided or if it is not possible to test the luminaire with each function operated alone, or if further functions belonging to Class A or Class D intentionally interact with the lighting function, the luminaire complies with this document if it meets the limits for Class C equipment with all functions operating simultaneously.

NOTE 1 For example, a function can be operated alone by setting the others into an off or standby mode, if provided.

NOTE 2 An example of an independent function is a surveillance camera, which is also active when the light is switched off.

NOTE 3 An example of a function that intentionally interacts with the lighting function is a motion detector that controls the light output of the luminaire.

B.5.4 Lighting control gear

Replace the existing title and text with the following title and text:

B.5.5 Separate lighting control gear (SLCG)

SLCG shall be tested with light sources specified in their instructions for use, or with artificial loads having electrical characteristics close to those of those light sources.

If the SLCG is designed for more than one type of light source or if the SLCG is designed to additionally power auxiliary loads (e.g. a sensor or a camera), the instructions for the use of the SLCG shall specify for which load characteristics (light sources, auxiliary loads) the SLCG fulfils the relevant harmonic requirements and the SLCG shall be tested for each corresponding load characteristic and shall comply in each case.

B.8 Washing machines

Replace the entire sub-clause with the following text:

The washing machine shall be tested during a complete laundry program incorporating the normal wash-cycle, filled with (50 ± 5) % of the rated washing load in kg. The load shall be made of double hemmed, pre-washed cotton cloths, size approximately 70 cm × 70 cm, dry weight from 140 g/m^2 to 175 g/m^2. The cloths shall be loaded into the washing machine in a way to avoid an unrealistic unbalance of the weight.

NOTE Loading the cloths one-by-one is one way to achieve this.

The temperature of the fill water shall be

- (65 ± 5) °C for washing machines without heating elements and intended for connection to a hot water supply;
- from 10 °C to 25 °C for other washing machines.