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Electromagnetic compatibility (EMC) - Part 3: Limits - Section 5: Limitation of voltage fluctuations and flicker in low-voltage power supply systems for equipment with rated current greater than 16 A

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Electromagnetic compatibility (EMC) –

Part 3:
Limits – Section 5: Limitation of voltage fluctuations and flicker in low-voltage power supply systems for equipment with rated current greater than 16 A

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 3: Limits –
Section 5: Limitation of voltage fluctuations and flicker in low-voltage power supply systems for equipment with rated current greater than 16 A

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international cooperation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. 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. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of the IEC on technical matters, prepared by technical committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
3) They have the form of recommendations for international use published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.

The main task of IEC technical committees is to prepare International Standards. In exceptional circumstances, a technical committee may propose the publication of a technical report of one of the following types:

- type 1, when the required support cannot be obtained for the publication of an International Standard, despite repeated efforts;
- type 2, when the subject is still under technical development or where for any other reason there is the future but not immediate possibility of an agreement on an International Standard;
- type 3, when a technical committee has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

Technical reports of types 1 and 2 are subject to review within three years of publication to decide whether they can be transformed into International Standards. Technical reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

IEC 1000-3-5, which is a technical report of type 2, has been prepared by sub-committee 77A: Low frequency phenomena of IEC technical committee 77: Electromagnetic compatibility.

The text of this technical report is based on the following documents:

Committee draft	Report on voting
77A(SEC)72	77A(SEC)80

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This document is issued in the type 2 Technical Report series of publications (according to G.4.2.2 of part 1 of the IEC/ISO Directives) as a "prospective standard for provisional application" in the field of electromagnetic compatibility because there is an urgent requirement for guidance on how standards in this field should be used to meet an identified need.

This document is not to be regarded as an "International Standard". It is proposed for provisional application so that information and experience of its use in practice may be gathered. Comments on the content of this document should be sent to the IEC Central Office.

A review of this type 2 Technical Report will be carried out not later than three years after its publication, with the options of either extension for a further three years or conversion to an International Standard or withdrawal.

Annexes A, B, C and D are for information only.

INTRODUCTION

IEC 1000 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 responsibility of 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 9: Miscellaneous

Each part is further subdivided into sections which are to be published either as International Standards or as Technical Reports.

These standards and reports will be published in chronological order and numbered accordingly.

This section is a technical report.

ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 3: Limits –
Section 5: Limitation of voltage fluctuations and flicker in low-voltage power supply systems for equipment with rated current greater than 16 A

1 Scope

This section of IEC 1000-3 is concerned with the emission of disturbances due to voltage fluctuations and flicker.

The recommendations in this Technical Report are applicable to electrical and electronic equipment intended to be connected to a public low-voltage a.c. distribution system, where the equipment has a rated input current exceeding 16 A per phase, or has a lower rated current, but requires the special consent of the supply authority.

The recommendations that specify the information required to enable a supply authority, manufacturer, or consumer to assess equipment and appropriate questionnaires are included as annexes A and B.

Guidance is also given on emission values of voltage fluctuations produced by equipment which has been type tested to the specified conditions given in IEC 1000-3-3.

NOTE 1 – The limits recommended in this report are mainly based on the subjective severity of the flicker of the light output from 230 V/60 W coiled-coil filament lamps as a result of fluctuation of the supply voltage. For systems with nominal voltages less than 220 V, line-to-neutral, limits, and reference circuit values have not yet been considered.

The authorization to connect equipment to the supply depends on the levels of disturbance caused by the equipment and the load flow conditions in the network.

NOTE 2 – For equipment requiring authorization, only general recommendations for the assessment of disturbances can be given. There is no guarantee that the connection of equipment complying with the recommendations in clause 3 will be allowed in all cases, as system loading must not exceed plant ratings (transformers, cables, etc.).

The methods of assessment may be applied also to private consumer installations.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this section of IEC 1000-3. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based upon this section of IEC 1000-3 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of the IEC and the ISO maintain registers of currently valid International Standards.

IEC 50(161): 1990, *International Electrotechnical Vocabulary (IEV) – Chapter 161: Electromagnetic compatibility*

IEC 555-2: 1982, *Disturbances in supply systems caused by household appliances and similar electrical equipment – Part 2: Harmonics*

IEC 1000-3-3: 1994, *Electromagnetic compatibility – Part 3: Limits – Section 3: Limitation of voltage fluctuations and flicker in low-voltage power supply systems for equipment with rated current ≤ 16 A*

3 Definitions

Definitions are given in IEC 555-2, IEC 1000-3-3 and IEC 50(161).

4 Equipment assessment

4.1 *General*

Methods of flicker assessment for different types of voltage fluctuations are described in IEC 1000-3-3.

It is recommended that the supply quality parameters are measured before and after the connection of a new load which is critical in any respect. The assessment method and data used should be verified.

The equipment shall comply with the limits for all relevant phase-to-neutral voltages.

4.2 *Information from the consumer*

When a consumer enquires about connection of a major load to a low-voltage public supply network he shall, on request, provide information to enable assessment of the possible disturbances caused by the load. This may be done by completing the questionnaire contained in annex A.

4.3 *Information from the electricity supplier*

The electricity supplier may, on request and if appropriate, complete the questionnaire contained in annex B.

4.4 *Information from the manufacturer*

If the equipment complies with the requirements given in IEC 1000-3-3, this should be declared, and no further action is necessary.

If the equipment has an input current up to and including 75 A and does not comply with IEC 1000-3-3, the manufacturer shall calculate and declare the maximum permissible system impedance in accordance with 4.6.2. This declaration is given in order to facilitate the decision of the electricity supplier as to whether or not the equipment may be connected to the supply system at a particular location. In order to proceed, the tests of 4.5 are carried out.

If the equipment has a rated input current exceeding 75 A, the procedure in 4.7 shall be followed.

NOTE – A diagramatic representation of the procedure is given in annex D.