

INTERNATIONAL STANDARD



**Electromagnetic compatibility (EMC) –
Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker
in public low-voltage supply systems, for equipment with rated current ≤ 16 A
per phase and not subject to conditional connection**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Electromagnetic compatibility (EMC) –

Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection

Compatibilité électromagnétique (CEM) –

Partie 3-3: Limites – Limitation des variations de tension, des fluctuations de tension et du papillotement dans les réseaux publics d'alimentation basse tension, pour les matériels ayant un courant assigné ≤ 16 A par phase et non soumis à un raccordement conditionnel

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	8
4 Assessment of voltage changes, voltage fluctuations and flicker	10
4.1 Assessment of a relative voltage change, $d(t)$	10
4.2 Assessment of the short-term flicker value, P_{st}	10
4.2.1 General	10
4.2.2 Flickermeter	11
4.2.3 Simulation method	11
4.2.4 Analytical method	11
4.2.5 Use of $P_{st} = 1$ curve	12
4.3 Assessment of long-term flicker value, P_{lt}	12
5 Limits	12
6 Test conditions	13
6.1 General	13
6.2 Measurement uncertainty	14
6.3 Test supply voltage	14
6.4 Reference impedance.....	14
6.5 Observation period	14
6.6 General test conditions.....	15
Annex A (normative) Application of limits and type test conditions for specific equipment.....	19
Annex B (normative) Test conditions and procedures for measuring d_{max} voltage changes caused by manual switching	27
Annex C (informative) Determination of steady state voltage and voltage change characteristics, as defined in IEC 61000-4-15:2010	28
Annex D (informative) Input relative voltage fluctuation $\Delta V/V$ for $P_{st} = 1,0$ at output [IEC/TR 61000-3-7:2008]	33
Bibliography.....	34
Figure 1 – Reference network for single-phase and three-phase supplies derived from a three-phase, four-wire supply.....	16
Figure 2 – Curve for $P_{st} = 1$ for rectangular equidistant voltage changes	17
Figure 3 – Shape factors F for double-step and ramp-voltage characteristics	17
Figure 4 – Shape factors F for rectangular and triangular voltage characteristics	18
Figure 5 – Shape factor F for motor-start voltage characteristics having various front times.....	18
Figure C.1 – Evaluation of $U_{hp}(t)$	32
Table 1 – Assessment method	11
Table A.1 – Test conditions for hotplates	19
Table A.2 – Electrode parameters	24
Table A.3 – Frequency factor R related to repetition rate " r ".....	25

Table C.1 – Test specification for $d_C - d_{\max} - t_d(t) > 3,3 \%$ (from Table 12 of IEC 61000-4-15: 2010).....	31
Table C.2 – Test specification for $d_C - d_{\max} - t_d(t) > 3,3 \%$ (from Table 13 of IEC 61000-4-15: 2010).....	31
Table D.1 – Input relative voltage fluctuation $\Delta V/V$ for $P_{St} = 1,0$ at output	33

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTROMAGNETIC COMPATIBILITY (EMC) –**Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection**

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

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

This third edition cancels and replaces the second edition published in 2008. This edition constitutes a technical revision.

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

- a) This edition takes account of the changes made in IEC 61000-4-15:2010.

The text of this standard is based on the following documents:

FDIS	Report on voting
77A/809/FDIS	77A/816/RVD

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

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 this publication 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.

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 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.

ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection

1 Scope

This part of IEC 61000 is concerned with the limitation of voltage fluctuations and flicker impressed on the public low-voltage system.

It specifies limits of voltage changes which may be produced by an equipment tested under specified conditions and gives guidance on methods of assessment.

This part of IEC 61000 is applicable to electrical and electronic equipment having an input current equal to or less than 16 A per phase, intended to be connected to public low-voltage distribution systems of between 220 V and 250 V line to neutral at 50 Hz, and not subject to conditional connection.

Equipment which does not comply with the limits of this part of IEC 61000 when tested with the reference impedance Z_{ref} of 6.4, and which therefore cannot be declared compliant with this part, may be retested or evaluated to show conformity with IEC 61000-3-11. Part 3-11 is applicable to equipment with rated input current ≤ 75 A per phase and subject to conditional connection.

The tests according to this part are type tests. Particular test conditions are given in Annex A and the test circuit is shown in Figure 1.

NOTE 1 The limits in this standard relate to the voltage changes experienced by consumers connected at the interface between the public supply low-voltage network and the equipment user's installation. Consequently, if the actual impedance of the supply at the supply terminals of equipment connected within the equipment user's installation exceeds the test impedance, it is possible that supply disturbance exceeding the limits could occur.

NOTE 2 The limits in this standard are based mainly on the subjective severity of flicker imposed on the light from 230 V 60 W coiled-coil filament lamps by fluctuations of the supply voltage. For systems with nominal voltage less than 220 V line to neutral and/or frequency of 60 Hz, the limits and reference circuit values are under consideration.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC/TR 60725, *Consideration of reference impedances and public supply impedances for use in determining disturbance characteristics of electrical equipment having a rated current ≤ 75 A per phase*

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

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

IEC 61000-3-11, *Electromagnetic compatibility (EMC) – Part 3-11: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems – Equipment with rated current ≤ 75 A and subject to conditional connection*

IEC 61000-4-15:2010, *Electromagnetic compatibility (EMC) – Part 4-15: Testing and measurement techniques – Flickermeter – Functional and design specifications*

SOMMAIRE

AVANT-PROPOS	38
INTRODUCTION.....	40
1 Domaine d'application	41
2 Références normatives.....	41
3 Termes et définitions	42
4 Détermination des variations de tension, des fluctuations de tension et du papillotement (flicker)	44
4.1 Détermination en valeur relative d'une variation de tension, $d(t)$	44
4.2 Evaluation de la valeur du papillotement de courte durée, P_{st}	45
4.2.1 Généralités.....	45
4.2.2 Flickermètre	45
4.2.3 Méthodes de simulation	45
4.2.4 Méthode analytique	45
4.2.5 Utilisation de la courbe $P_{st} = 1$	46
4.3 Evaluation de la valeur du papillotement de longue durée, P_{lt}	46
5 Limites	46
6 Conditions d'essai	47
6.1 Généralités.....	47
6.2 Incertitude de mesure.....	48
6.3 Tension d'alimentation d'essai.....	49
6.4 Impédance de référence.....	49
6.5 Période d'observation.....	49
6.6 Conditions générales d'essai.....	49
Annexe A (normative) Application des limites et conditions d'essai type pour équipements particuliers	54
Annexe B (normative) Conditions et procédures pour la mesure des variations de tension d_{max} dues à une commutation manuelle	62
Annexe C (informative) Détermination de la tension permanente et des caractéristiques de variation de tension, telles que définies dans la CEI 61000-4-15:2010	63
Annexe D (informative) Variations relatives de tension $\Delta V/V$ en entrée correspondant à un niveau $P_{st} = 1,0$ en sortie [CEI/TR 61000-3-7:2008]	68
Bibliographie.....	69
 Figure 1 – Réseau de référence pour alimentations monophasées et triphasées dérivées d'une alimentation triphasée, quatre conducteurs	51
Figure 2 – Courbe pour $P_{st}=1$ des variations de tension rectangulaires équidistantes	52
Figure 3 – Facteurs de forme F pour des caractéristiques de tension en double échelon et en rampe	52
Figure 4 – Facteurs de forme F pour des caractéristiques rectangulaires et triangulaires.....	53
Figure 5 – Facteurs de forme F des caractéristiques de tension de démarrage de moteurs pour différents temps de front.....	53
Figure C.1 – Évaluation de $U_{hp}(t)$	67
 Tableau 1 – Méthodes d'évaluation	45

Tableau A.1 – Conditions d'essai pour les plaques chauffantes	54
Tableau A.2 – Paramètres de l'électrode.....	59
Tableau A.3 – Facteur de fréquence R lié aux taux de répétition « r »	61
Tableau C.1 – Spécifications d'essais pour $d_C - d_{\max} - {}^t d(t) > 3,3 \%$ (extrait du Tableau 12 de la CEI 61000-4-15:2010).....	66
Tableau C.2 – Spécifications d'essais pour $d_C - d_{\max} - {}^t d(t) > 3,3 \%$ (extrait du Tableau 13 de la CEI 61000-4-15:2010).....	66
Tableau D.1 – Variations relatives de tension $\Delta V/V$ en entrée correspondant à un niveau $P_{St} = 1,0$ en sortie	68

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

COMPATIBILITÉ ÉLECTROMAGNÉTIQUE (CEM) –

Partie 3-3: Limites – Limitation des variations de tension, des fluctuations de tension et du papillotement dans les réseaux publics d'alimentation basse tension, pour les matériels ayant un courant assigné ≤ 16 A par phase et non soumis à un raccordement conditionnel

AVANT-PROPOS

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La Norme internationale CEI 61000-3-3 a été établie par le sous-comité 77A: CEM – Phénomènes basse fréquence, du comité d'études 77 de la CEI: Compatibilité électromagnétique.

La présente norme constitue la partie 3-3 de la série de normes CEI 61000. Elle a le statut d'une norme de famille de produit.

Cette troisième édition annule et remplace la seconde édition parue en 2008. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

a) Cette édition prend en compte les changements effectués dans la CEI 61000-4-15:2010.

Le texte de cette norme est issu des documents suivants:

FDIS	Rapport de vote
77A/809/FDIS	77A/816/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette norme.

Cette publication a été rédigée selon les Directives ISO/CEI, Partie 2.

Une liste de toutes les parties de la série CEI 61000, publiées sous le titre général *Compatibilité électromagnétique (CEM)*, peut être consultée sur le site web de la CEI.

Le comité a décidé que le contenu de cette publication ne sera pas modifié avant la date de stabilité indiquée sur le site web de la CEI sous "<http://webstore.iec.ch>" dans les données relatives à la publication recherchée. A cette date, la publication sera

- reconduite,
- supprimée,
- remplacée par une édition révisée, ou
- amendée.

INTRODUCTION

La CEI 61000 est publiée sous forme de plusieurs parties conformément à la structure suivante:

Partie 1: Généralités

- Considérations générales (introduction, principes fondamentaux)

- Définitions, terminologie

Partie 2: Environnement

- Description de l'environnement

- Classification de l'environnement

- Niveaux de compatibilité

Partie 3: Limites

- Limites d'émission

- Limites d'immunité (dans la mesure où elles ne relèvent pas des comités de produit)

Partie 4: Techniques d'essai et de mesure

- Techniques de mesure

- Techniques d'essai

Partie 5: Guides d'installation et d'atténuation

- Guides d'installation

- Méthodes et dispositifs d'atténuation

Partie 9: Divers

Chaque partie est à son tour subdivisée en sections qui seront publiées soit comme Normes internationales, soit comme Rapports techniques.

Ces normes et rapports seront publiés chronologiquement et numérotés en conséquence.

COMPATIBILITÉ ÉLECTROMAGNÉTIQUE (CEM) –

Partie 3-3: Limites – Limitation des variations de tension, des fluctuations de tension et du papillotement dans les réseaux publics d'alimentation basse tension, pour les matériels ayant un courant assigné ≤ 16 A par phase et non soumis à un raccordement conditionnel

1 Domaine d'application

La présente partie de la CEI 61000 traite des limitations des fluctuations de tension et du papillotement (flicker) appliquées sur le réseau de distribution public basse tension.

Elle spécifie les limites des variations de tension pouvant être produites par un équipement essayé dans des conditions spécifiées et formule des recommandations pour les méthodes d'évaluation.

La présente partie de la CEI 61000 s'applique aux matériels électriques et électroniques ayant un courant appelé inférieur ou égal à 16 A par phase et destinés à être raccordés à des réseaux publics de distribution basse tension présentant une tension nominale phase-neutre comprise entre 220 V et 250 V à 50 Hz et non soumis à un raccordement conditionnel.

Les matériels qui ne sont pas conformes aux limites indiquées dans cette partie de la CEI 61000 lorsqu'ils sont soumis à essai sur l'impédance de référence Z_{ref} de 6.4, et qui de ce fait ne peuvent être déclarés conformes à cette partie, peuvent être à nouveau soumis à essai ou évalués pour démontrer la conformité aux exigences de la CEI 61000-3-11, qui s'appliquent aux matériels ayant un courant appelé assigné ≤ 75 A par phase et soumis à un raccordement conditionnel.

Les essais effectués selon la présente partie sont des essais types. Les conditions d'essai pour des équipements particuliers sont données en Annexe A, et les circuits d'essai sont indiqués en Figure 1.

NOTE 1 Les limites mentionnées dans la présente norme concernent les variations de tension rencontrées par les consommateurs connectés au point de raccordement entre le réseau public d'alimentation basse tension et les matériels de l'installation de l'utilisateur. Par conséquent, il est possible que des perturbations dépassant les limites aient lieu si l'impédance d'alimentation aux bornes d'alimentation de l'appareil connecté à l'intérieur de l'installation de l'utilisateur est supérieure à l'impédance d'essai.

NOTE 2 Les limites de la présente norme sont principalement fondées sur la sévérité subjective du papillotement provenant de la lumière émise par une lampe à filament bi-spiralé de 230 V 60 W soumise à des fluctuations de la tension d'alimentation. Pour les réseaux dont la tension nominale phase-neutre est inférieure à 220 V et/ou la fréquence est de 60 Hz, les limites et les valeurs de référence du circuit sont à l'étude.

2 Références normatives

Les documents suivants sont cités en référence de manière normative, en intégralité ou en partie, dans le présent document et sont indispensables pour son application. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

CEI/TR 60725, *Etude des impédances de référence et des impédances des réseaux publics d'alimentation aux fins de la détermination des caractéristiques de perturbation des équipements électriques utilisant un courant nominal ≤ 75 A par phase*

CEI 60974-1, *Matériel de soudage à l'arc – Partie 1: Sources de courant de soudage*

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

CEI 61000-3-11, *Compatibilité électromagnétique (CEM) – Partie 3-11: Limites – Limitation des variations de tension, des fluctuations de tension et du papillotement dans les réseaux publics d'alimentation basse tension – Equipements ayant un courant appelé ≤ 75 A et soumis à un raccordement conditionnel*

CEI 61000-4-15:2010, *Compatibilité électromagnétique (CEM) – Partie 4-15: Techniques d'essai et de mesure – Flickermètre – Spécifications fonctionnelles et de conception*

REDLINE VERSION



**Electromagnetic compatibility (EMC) –
Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker
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CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	8
4 Assessment of voltage changes, voltage fluctuations and flicker	10
4.1 Assessment of a relative voltage change, " e " $d(t)$	10
4.2 Assessment of the short-term flicker value, P_{st}	11
4.2.1 General	11
4.2.2 Flickermeter	12
4.2.3 Simulation method	12
4.2.4 Analytical method	12
4.2.5 Use of $P_{st} = 1$ curve	13
4.3 Assessment of long-term flicker value, P_{lt}	13
5 Limits	13
6 Test conditions	14
6.1 General	14
6.2 Measurement accuracy uncertainty	15
6.3 Test supply voltage	15
6.4 Reference impedance.....	15
6.5 Observation period	16
6.6 General test conditions.....	16
Annex A (normative) Application of limits and type test conditions for specific equipment.....	23
Annex B (normative) Test conditions and procedures for measuring d_{max} voltage changes caused by manual switching	31
Annex C (informative) Determination of steady state voltage and voltage change characteristics, as defined in IEC 61000-4-15:2010	32
Annex D (informative) Input relative voltage fluctuation $\Delta V/V$ for $P_{st} = 1,0$ at output [IEC/TR 61000-3-7:2008]	37
Bibliography.....	38
Figure 1 – Reference network for single-phase and three-phase supplies derived from a three-phase, four-wire supply.....	18
Figure 2 – Histogram evaluation of $U(t)$.....	
Figure 3 – Relative voltage change characteristic	
Figure 4 2 – Curve for $P_{st} = 1$ for rectangular equidistant voltage changes	19
Figure 5 3 – Shape factors F for double-step and ramp-voltage characteristics	20
Figure 6 4 – Shape factors F for rectangular and triangular voltage characteristics	21

Figure 7 5 – Shape factor F for motor-start voltage characteristics having various front times.....	22
Figure C.1 – Evaluation of $U_{hp}(t)$	36
Table 1 – Assessment method	12
Table A.1 – Test conditions for hotplates	23
Table A.4 2 – Electrode parameters	28
Table A.2 3 – Frequency factor R related to repetition rate " r "	30
Table C.1 – Test specification for $d_C - d_{max} - t_{d(t)} > 3,3$ % (from Table 12 of IEC 61000-4-15:2010).....	35
Table C.2 – Test specification for $d_C - d_{max} - t_{d(t)} > 3,3$ % (from Table 13 of IEC 61000-4-15:2010).....	35
Table D.1 – Input relative voltage fluctuation $\Delta V/V$ for $P_{st} = 1,0$ at output	37

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTROMAGNETIC COMPATIBILITY (EMC) –**Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection**

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 redline version of the official IEC Standard allows the user to identify the changes made to the previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

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

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

This third edition cancels and replaces the second edition published in 2008. This edition constitutes a technical revision.

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

- a) This edition takes account of the changes made in IEC 61000-4-15:2010.

The text of this standard is based on the following documents:

FDIS	Report on voting
77A/809/FDIS	77A/816/RVD

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

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 this publication 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.

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 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 part is a Product Family Standard.~~

~~The limits in this standard relate to the voltage changes experienced by consumers connected at the interface between the public supply low voltage network and the equipment user's installation. Consequently, if the actual impedance of the supply at the supply terminals of equipment connected within the equipment user's installation exceeds the test impedance, it is possible that supply disturbance exceeding the limits may occur.~~

ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection

1 Scope

This part of IEC 61000 is concerned with the limitation of voltage fluctuations and flicker impressed on the public low-voltage system.

It specifies limits of voltage changes which may be produced by an equipment tested under specified conditions and gives guidance on methods of assessment.

This part of IEC 61000 is applicable to electrical and electronic equipment having an input current equal to or less than 16 A per phase, intended to be connected to public low-voltage distribution systems of between 220 V and 250 V line to neutral at 50 Hz, and not subject to conditional connection.

Equipment which does not comply with the limits of this part of IEC 61000 when tested with the reference impedance Z_{ref} of 6.4, and which therefore cannot be declared compliant with this part, may be retested or evaluated to show conformity with IEC 61000-3-11. Part 3-11 is applicable to equipment with rated input current ≤ 75 A per phase and subject to conditional connection.

The tests according to this part are type tests. Particular test conditions are given in Annex A and the test circuit is shown in Figure 1.

NOTE 1 The limits in this standard relate to the voltage changes experienced by consumers connected at the interface between the public supply low-voltage network and the equipment user's installation. Consequently, if the actual impedance of the supply at the supply terminals of equipment connected within the equipment user's installation exceeds the test impedance, it is possible that supply disturbance exceeding the limits could occur.

NOTE 2 The limits in this standard are based mainly on the subjective severity of flicker imposed on the light from 230 V 60 W coiled-coil filament lamps by fluctuations of the supply voltage. For systems with nominal voltage less than 220 V line to neutral and/or frequency of 60 Hz, the limits and reference circuit values are under consideration.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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) – Chapter 161: Electromagnetic compatibility~~

IEC/TR 60725, *Consideration of reference impedances and public supply impedances for use in determining disturbance characteristics of electrical equipment having a rated current ≤ 75 A per phase*

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

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

IEC 61000-3-11, *Electromagnetic compatibility (EMC) – Part 3-11: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems – Equipment with rated current ≤ 75 A and subject to conditional connection*

IEC 61000-4-15:2010, *Electromagnetic compatibility (EMC) – Part 4-15: Testing and measurement techniques – Flickermeter – Functional and design specifications*