

Australian/New Zealand Standard™

**Electromagnetic compatibility (EMC)**

**Part 3.6: Limits—Assessment of  
emission limits for distorting loads  
in MV and HV power systems  
(IEC 61000-3-6:1996, MOD)**



**S t a n d a r d s** Australia



**STANDARDS**  
NEW ZEALAND  
Pāpārahau Aotearoa

## **AS/NZS 61000.3.6:2001**

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# Australian/New Zealand Standard™

## Electromagnetic compatibility (EMC)

### Part 3.6: Limits—Assessment of emission limits for distorting loads in MV and HV power systems (IEC 61000-3-6:1996, MOD)

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## PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-034, Power Quality.

It is one of a series of parts which will replace the AS 2279 series on disturbances in mains supply networks by adopting relevant IEC Standards in the IEC 61000, *Electromagnetic compatibility (EMC)*—Part 3: *Limits* series.

The objective of this series of Standards is to provide manufacturers and suppliers of electricity and users of electrical equipment intended for connection to an electrical network, with limits for voltage disturbances and flicker produced by that equipment and the methods for ascertaining compliance to them in order to maintain electromagnetic compatibility within the electrical network.

This Standard is a modified adoption of the IEC technical report, type 3 IEC 61000-3-6, *Electromagnetic compatibility (EMC)*—Part 3: *Limits*—Section 6: *Assessment of emission limits for distorting loads in MV and HV power systems—Basic EMC publication*.

The IEC use the term technical report, type 3 to indicate that the technical committee responsible for writing the document has collected data of a different kind from that which is normally published as an International Standard. For example, this may be state-of-the-art technical data or it may be the presentation of alternative methods of calculation with illustrative examples.

This Australian Standard is structured so that all requirements are in the main Sections of the Standard and all recommendations and illustrative examples are in the Appendices of the Standard.

The term ‘informative’ has been used in this Standard to define the application of the appendix to which it applies. An ‘informative’ appendix is only for information and guidance.

This Standard is Part 3.6 of a series which, when complete, will consist of the following:

### AS/NZS

#### 61000 Electromagnetic compatibility (EMC)

- Part 1.1 General—Application and interpretation of fundamental definitions and terms
- Part 2.3 Environment—Description of the environment—Radiated and non-network-frequency-related conducted phenomena
- Part 2.5 Environment—Classification of electromagnetic environments
- Part 3.2 Limits—Limits for harmonic current emissions (equipment input current less than or equal to 16 A per phase)
- Part 3.3 Limits—Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current less than or equal to 16 A
- 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
- Part 3.5 Limits—Limitation of voltage fluctuations and flicker in low-voltage power supply systems for equipment with rated current greater than 16 A
- Part 3.6 Limits—Assessment of emission limits for distorting loads in MV and HV power systems (this Standard)
- Part 3.7 Limits—Assessment of emission limits for fluctuating loads in MV and HV power systems
- Part 4.1 Testing and measurement techniques—Overview of immunity tests

- Part 4.3 Testing and measurement techniques—Radiated, radio-frequency electromagnetic field immunity test
- Part 4.5 Testing and measurement techniques—Surge immunity test
- Part 4.6 Testing and measurement techniques—Immunity to conducted disturbances, induced by radio-frequency fields
- Part 4.7 Testing and measurement techniques—General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto
- Part 4.16 Testing and measurement techniques—Test for immunity to conducted, common mode disturbances in the frequency range 0 Hz to 150 Hz.

Where approval is required, this Standard should be read in conjunction with the regulations, service rules, electricity code and installation rules of the electricity distributor approving the connection.

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## STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

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**1 Scope**

This Standard outlines principles which are intended to be used as the basis for determining the requirements for connecting large distorting loads (producing harmonics and/or interharmonics) to public power systems. The primary objective is to provide guidance for engineering practices which will ensure adequate service quality for all connected consumers.

Since the guidelines outlined in this Standard are necessarily based on certain simplifying assumptions, there is no guarantee that this approach will always provide the optimum solution for all harmonic problems. The recommended approach should be used with flexibility and judgement as far as engineering is concerned, when applying the given assessment procedures in full or in part.

The final decision regarding the connection of distorting installations will always rest with the utility.

Problems related to harmonics fall into two basic categories:

- The harmonic currents are injected into the supply network by converters and other harmonic sources. Both harmonic currents and resulting voltages can be considered as conducted phenomena. The objective of this Standard is to limit actual harmonic voltages on supply systems to levels (compatibility levels) that will not result in adverse effects on sensitive equipment. Since the harmonic voltages result from harmonic currents and impedances, this involves limiting the harmonic currents injected into the system.
- The harmonic currents in the range 50 Hz to 5 kHz may induce interference into communication systems. This phenomenon is more pronounced at higher order harmonic frequencies because of increased coupling between the circuits and because of the higher sensitivity of the communication circuits in the audible range.

This Standard primarily focuses on controlling or limiting harmonic voltages and their effects, but a clause is included to address communication interference.

Appendices A, B, C, D, E, F, G, H, I, J and K are for information only.

## NOTES

- 1 The load is to be understood as the complete consumer's installation.
- 2 This Standard uses the following terms for system voltage:
  - low voltage (LV) refers to  $U_n \leq 1 \text{ kV}$ ;
  - medium voltage (MV) refers to  $1 \text{ kV} < U_n \leq 35 \text{ kV}$ ;
  - high voltage (HV) refers to  $35 \text{ kV} < U_n \leq 230 \text{ kV}$ ;
  - extra high voltage (EHV) refers to  $230 \text{ kV} < U_n$ .