Australian/New Zealand Standard™

Electromagnetic compatibility (EMC)

Part 2.7: Environment—Low frequency magnetic fields in various environments

STANDARDS Australia

STANDARDS NEW ZEALAND PAEREWA AOTEAROA

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee EL-034, Power Quality. It was approved on behalf of the Council of Standards Australia on 3 June 2009 and on behalf of the Council of Standards New Zealand on 19 June 2009.
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The following are represented on Committee EL-034:

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Consumers' Federation of Australia
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We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia or Standards New Zealand at the address shown on the back cover.

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PREFACE

This Technical Report was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-034, Power Quality. This document is informative and of a more descriptive nature than a normative Standard.

The objective of this Technical Report is to provide users of electromagnetic emissions Standards with reference values on low-frequency magnetic fields produced by some electrical equipment (particularly video display units) in various environments such as industrial, commercial office, residential and hospital.

This Technical Report is identical with, and has been reproduced from IEC/TR 61000-2-7, Ed 1.0 (1998), *Electromagnetic compatibility (EMC)—Part 2: Environment—Section 7: Low frequency magnetic fields in various environments*.

The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a technical report when it has collected data of a different kind from that which is normally published as an International Standard, for example 'state of the art'.

As this Technical Report is reproduced from an International Technical Report, the following applies:

(a) Its number does not appear on each page of text and its identity is shown only on the cover and title page.

(b) A full point should be substituted for a comma when referring to a decimal marker.

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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 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 6: Generic standards

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 of type 3.

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard

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1 Scope

Interest in magnetic fields has been stimulated in recent years by concern over the physiological effects they may have on humans and animals and the deleterious effects they have on the performance of some electrical equipment, particularly video display units. Investigations have yielded results which are presented in this report as reference values.

Note 1 – The European Union EMC Directive has prompted magnetic field measurements, particularly in respect of the commercial office environments associated with supply authority substations and electrical distribution systems within buildings. Supply authorities have sponsored most of the work and the results are generally within the frequency range of 50 Hz to 2 kHz, and presented as r.m.s. values. There is, however, a need to have some knowledge about d.c. fields and the fields up to 150 kHz as they may interfere with some types of equipment.

Note 2 – Most of the magnetic field data in this report is associated with sinusoidal current sources and r.m.s. values may be assumed unless otherwise stated.

Power supply systems operating at voltages less than or equal to 1 000 V are designated low-voltage, those above 1 000 V and up to 35 kV are designated medium-voltage, and those in excess of 35 kV are designated high-voltage.

2 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this technical report. At the time of publication, the edition indicated was valid. All normative documents are subject to revision, and parties to agreements based on this technical report are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60050(161):1990, *International Electrotechnical Vocabulary (IEV) – Chapter 161: Electromagnetic compatibility.*

3 Units

Magnetic field values in this report are either expressed in field strengths of amperes per metre, A/m, or in flux densities of microtesla, μT. Where the older flux density unit of milligauss, mG, has appeared in reference documents it has been converted to μT by the following relationship:

$$1\ \mu T = 10\ mG \approx 0{,}796\ A/m$$

The following units are applied in the present report:

Magnetic field strength: H in A/m

Magnetic flux density: $B = \mu \times H$ in T (Tesla)

whereby the permeability $\mu = \mu_r \times \mu_0$ and $\mu_0 = 1{,}256 \cdot 10^{-6}$ (Wb/Am)

in air the relative permeability $\mu_r = 1$ and B (μT) = 1,256 H (A/m)

NOTE – 1 T = 1 Wb/m^2 = 10^4 G and $B = 1{,}256 \cdot 10^{-9}$ G (in air)