

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



BASIC EMC PUBLICATION  
PUBLICATION FONDAMENTALE EN CEM

**Electromagnetic compatibility (EMC) –  
Part 4-9: Testing and measurement techniques – Impulse magnetic field  
immunity test**

**Compatibilité électromagnétique (CEM) –  
Partie 4-9: Techniques d'essai et de mesure – Essai d'immunité au champ  
magnétique impulsionnel**



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IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
Fax: +41 22 919 03 00  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

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## CONTENTS

FOREWORD.....	5
INTRODUCTION.....	7
1 Scope and object.....	8
2 Normative references.....	8
3 Terms, definitions and abbreviated terms .....	9
3.1 Terms and definitions .....	9
3.2 Abbreviated terms .....	10
4 General .....	11
5 Test levels.....	11
6 Test instrumentation .....	12
6.1 General.....	12
6.2 Combination wave generator .....	12
6.2.1 General .....	12
6.2.2 Performance characteristics of the generator .....	13
6.2.3 Calibration of the generator .....	13
6.3 Induction coil.....	14
6.3.1 Field distribution .....	14
6.3.2 Characteristics of the standard induction coils of 1 m × 1 m and 1 m × 2,6 m .....	14
6.4 Calibration of the test system .....	14
7 Test setup .....	15
7.1 Test equipment .....	15
7.2 Verification of the test instrumentation .....	16
7.3 Test setup for impulse magnetic field applied to a table-top EUT .....	16
7.4 Test setup for impulse magnetic field applied to a floor standing EUT.....	17
7.5 Test setup for impulse magnetic field applied in-situ .....	18
8 Test procedure .....	19
8.1 General.....	19
8.2 Laboratory reference conditions .....	19
8.2.1 Climatic conditions .....	19
8.2.2 Electromagnetic conditions.....	19
8.3 Execution of the test .....	19
9 Evaluation of test results.....	20
10 Test report.....	20
Annex A (informative) Characteristics of non standard induction coils .....	22
A.1 General.....	22
A.2 Determination of the coil factor .....	22
A.2.1 General .....	22
A.2.2 Coil factor measurement .....	22
A.2.3 Coil factor calculation.....	23
A.3 Magnetic field measurement.....	23
A.4 Verification of non standard induction coils .....	24
Annex B (informative) Information on the field distribution of standard induction coils .....	25
B.1 General.....	25
B.2 1 m × 1 m induction coil.....	25

B.3	1 m × 2,6 m induction coil with reference ground plane .....	26
B.4	1 m × 2,6 m induction coil without reference ground plane.....	28
Annex C (informative)	Selection of the test levels .....	29
Annex D (informative)	Measurement uncertainty (MU) considerations .....	31
D.1	General.....	31
D.2	Legend .....	31
D.3	Uncertainty contributors to the surge current and to the surge magnetic field measurement uncertainty .....	32
D.4	Uncertainty of surge current and surge magnetic field calibration .....	32
D.4.1	General .....	32
D.4.2	Front time of the surge current .....	32
D.4.3	Peak of the surge current and magnetic field .....	34
D.4.4	Duration of the current impulse.....	35
D.4.5	Further MU contributions to time measurements .....	36
D.4.6	Rise time distortion due to the limited bandwidth of the measuring system.....	36
D.4.7	Impulse peak and width distortion due to the limited bandwidth of the measuring system.....	37
D.5	Application of uncertainties in the surge generator compliance criterion .....	38
Annex E (informative)	Mathematical modelling of surge current waveforms .....	39
E.1	General.....	39
E.2	Normalized time domain current surge (8/20 μs) .....	39
Annex F (informative)	Characteristics using two standard induction coils.....	42
F.1	General.....	42
F.2	Particular requirements for calibration .....	42
F.3	Field distribution of the double induction coil arrangement .....	43
Annex G (informative)	3D numerical simulations.....	45
G.1	General.....	45
G.2	Simulations .....	45
G.3	Comments .....	45
Bibliography	.....	53
Figure 1	– Simplified circuit diagram of the combination wave generator .....	12
Figure 2	– Waveform of short-circuit current (8/20 μs) at the output of the generator with the 18 μF capacitor in series .....	13
Figure 3	– Example of a current measurement of standard induction coils.....	14
Figure 4	– Example of test setup for table-top equipment showing the vertical orthogonal plane.....	17
Figure 5	– Example of test setup for floor standing equipment showing the horizontal orthogonal plane.....	17
Figure 6	– Example of test setup for floor standing equipment showing the vertical orthogonal plane.....	18
Figure 7	– Example of test setup using the proximity method .....	18
Figure A.1	– Rectangular induction coil with sides $a + b$ and $c$ .....	23
Figure A.2	– Example of verification setup for non standard induction coils .....	24
Figure B.1	– +3 dB isoline for the magnetic field strength (magnitude) in the $x$ - $y$ plane for the 1 m × 1 m induction coil .....	25

Figure B.2 – +3 dB and –3 dB isolines for the magnetic field strength (magnitude) in the  $x$ - $z$  plane for the 1 m × 1 m induction coil .....26

Figure B.3 – +3 dB isoline for the magnetic field strength (magnitude) in the  $x$ - $z$  plane for the 1 m × 2,6 m induction coil with reference ground plane .....27

Figure B.4 – +3 dB and -3 dB isolines for the magnetic field strength (magnitude) in the  $x$ - $y$  plane for the 1 m × 2,6 m induction coil with reference ground plane.....27

Figure B.5 – +3 dB isoline for the magnetic field strength (magnitude) in the  $x$ - $y$  plane for the 1 m × 2,6 m induction coil without reference ground plane .....28

Figure B.6 – +3 dB and –3 dB isolines for the magnetic field strength (magnitude) in the  $x$ - $z$  plane for the 1 m × 2,6 m induction coil without reference ground plane .....28

Figure E.1 – Normalized current surge (8/20  $\mu$ s): Width time response  $T_W$  .....40

Figure E.2 – Normalized current surge (8/20  $\mu$ s): Rise time response  $T_r$  .....40

Figure E.3 – Current surge (8/20  $\mu$ s): Spectral response with  $\Delta f = 10$  kHz .....41

Figure F.1 – Example of a test system using double standard induction coils .....42

Figure F.2 – +3dB isoline for the magnetic field strength (magnitude) in the  $x$ - $y$  plane for the double induction coil arrangement (0,8 m spaced) .....44

Figure F.3 – +3 dB and –3 dB isolines for the magnetic field strength (magnitude) in the  $x$ - $z$  plane for the double induction coil arrangement (0,8 m spaced) .....44

Figure G.1 – Current and H-field in the centre of the 1 m × 1 m induction coil.....46

Figure G.2 –  $H_x$ -field along the side of 1 m × 1 m induction coil in A/m .....46

Figure G.3 –  $H_x$ -field in direction  $x$  perpendicular to the plane of the 1 m × 1 m induction coil .....47

Figure G.4 –  $H_x$ -field along the side in dB for the 1 m × 1 m induction coil .....47

Figure G.5 –  $H_x$ -field along the diagonal in dB for the 1 m × 1 m induction coil .....48

Figure G.6 –  $H_x$ -field plot on  $y$ - $z$  plane for the 1 m × 1 m induction coil .....48

Figure G.7 –  $H_x$ -field plot on  $x$ - $y$  plane for the 1 m × 1 m induction coil .....49

Figure G.8 –  $H_x$ -field along the vertical middle line in dB for the 1 m × 2,6 m induction coil...49

Figure G.9 –  $H_x$ -field 2D plot on  $y$ - $z$  plane for the 1 m × 2,6 m induction coil .....50

Figure G.10 –  $H_x$ -field 2D plot on  $x$ - $y$  plane at  $z = 0,5$  m for the 1 m × 2,6 m induction coil ....50

Figure G.11 – Helmholtz setup:  $H_x$ -field and 2D plot for two 1 m × 1 m induction coils, 0,6 m spaced .....51

Figure G.12 – Helmholtz setup:  $H_x$ -field and 2D plot for two 1 m × 1 m induction coils, 0,8 m spaced .....52

Table 1 – Test levels..... 11

Table 2 – Definitions of the waveform parameters 8/20  $\mu$ s ..... 13

Table 3 – Specifications of the waveform time parameters of the test system ..... 15

Table 4 – Specifications of the waveform peak current of the test system..... 15

Table D.1 – Example of uncertainty budget for surge current front time ( $T_f$ ).....33

Table D.2 – Example of uncertainty budget for the peak of surge current ( $I_p$ ).....34

Table D.3 – Example of uncertainty budget for current impulse width ( $T_d$ ).....35

Table D.4 –  $\alpha$  factor (see equation (D.10)) of different unidirectional impulse responses corresponding to the same bandwidth of system  $B$  .....37

Table D.5 –  $\beta$  factor (equation (D.14)) of the standard current surge waveform.....38

Table F.1 – Specifications of the waveform peak current of this test system .....43

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTROMAGNETIC COMPATIBILITY (EMC) –****Part 4-9: Testing and measurement techniques –  
Impulse magnetic field immunity test**

## FOREWORD

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International Standard IEC 61000-4-9 has been prepared by subcommittee 77B: High frequency phenomena, of IEC technical committee 77: Electromagnetic compatibility.

It forms Part 4-9 of the IEC 61000 series. It has the status of a basic EMC publication in accordance with IEC Guide 107.

This second edition cancels and replaces the first edition published in 1993 and Amendment 1:2000. This edition constitutes a technical revision.

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

- a) new Annex B on induction coil field distribution;
- b) new Annex D on measurement uncertainty;
- c) new Annex E on mathematical modeling of surge waveform;

- d) new Annex F on characteristics using two standard induction coils;
- e) new Annex G on 3D numerical simulations;
- f) coil factor calculation and calibration using current measurement have been addressed in this edition.

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

CDV	Report on voting
77B/728/CDV	77B/745A/RVC

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 website under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
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- amended.

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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 (insofar as they do not fall under the responsibility of the 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 several parts, published either as international standards or as technical specifications or technical reports, some of which have already been published as sections. Others will be published with the part number followed by a dash and a second number identifying the subdivision (example: IEC 61000-6-1).

This part is an international standard which gives immunity requirements and test procedures related to "pulse magnetic field".

## **ELECTROMAGNETIC COMPATIBILITY (EMC) –**

### **Part 4-9: Testing and measurement techniques – Impulse magnetic field immunity test**

#### **1 Scope and object**

This part of IEC 61000 specifies the immunity requirements, test methods, and range of recommended test levels for equipment subjected to impulse magnetic disturbances mainly encountered in:

- industrial installations,
- power plants,
- railway installations,
- medium voltage and high voltage sub-stations.

The applicability of this standard to equipment installed in different locations is determined by the presence of the phenomenon, as specified in Clause 4.

This standard does not consider disturbances due to capacitive or inductive coupling in cables or other parts of the field installation. Other IEC standards dealing with conducted disturbances cover these aspects.

The object of this standard is to establish a common reference for evaluating the immunity of electrical and electronic equipment when subjected to impulse magnetic fields. The test method documented in this part of IEC 61000 describes a consistent method to assess the immunity of an equipment or system against a defined phenomenon.

NOTE As described in IEC Guide 107, this is a basic EMC publication for use by product committees of the IEC. As also stated in Guide 107, the IEC product committees are responsible for determining whether this immunity test standard is applied or not, and if applied, they are responsible for determining the appropriate test levels and performance criteria. TC 77 and its sub-committees are prepared to co-operate with product committees in the evaluation of the value of particular immunity test levels for their products.

This standard defines:

- a range of test levels;
- test equipment;
- test setups;
- test procedures.

The task of the described laboratory test is to find the reaction of the equipment under test (EUT) under specified operational conditions to impulse magnetic fields caused by switching and lightning effects.

#### **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 (all parts), *International Electrotechnical Vocabulary (IEV)* (available at [www.electropedia.org](http://www.electropedia.org))