

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

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**Calculation of the effective parameters of magnetic piece parts**

**Calcul des paramètres effectifs des pièces magnétiques**





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INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**CALCULATION OF THE EFFECTIVE PARAMETERS  
OF MAGNETIC PIECE PARTS**

## FOREWORD

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International Standard IEC 60205 has been prepared by IEC technical committee 51: Magnetic components, ferrite and magnetic powder materials.

This fourth edition cancels and replaces the third edition published in 2006 and Amendment 1:2009. This edition constitutes a technical revision.

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

- a) addition, in 5.1, of the drawing of a core of rectangular cross-section with chamfer;
- b) addition, in 5.1.3, of the equation of a core of rectangular cross-section with chamfer;
- c) equations in 5.1.4, 5.6, 5.7, 5.8, 5.9, 5.11, 5.12, 5.14 are amended or replaced;
- d) drawings RM6-S and RM6-R in 5.7 are amended;
- e) addition of EC-cores, see 5.15.

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

FDIS	Report on voting
51/1149/FDIS	51/1156/RVD

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

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

The contents of the corrigendum of July 2018 have been included in this copy.

## INTRODUCTION

The purpose of this revision is to provide formulae by which everybody can reach the same effective parameter values. Firstly, it is necessary to have a sufficient number of significant figures when figures are rounded off in the process of calculation. Additionally, some of the calculation formulae have been changed to get closer to the actual shape.

In this revision, the basic idea of calculation has not been changed. Recently, analysis of the magnetic field in the core has been considerably improved, so that, based on these ideas, development of new approaches and formulae can be expected.

Furthermore, the new “EC-cores” have been added.

The parameters in the existing IEC standards will be revised with the outcome from the formulae of this document.

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## CALCULATION OF THE EFFECTIVE PARAMETERS OF MAGNETIC PIECE PARTS

### 1 Scope

This document specifies uniform rules for the calculation of the effective parameters of closed circuits of ferromagnetic material.

### 2 Normative references

There are no normative references in this document.

### 3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

### 4 Basic rules applicable to this standard

**4.1** All results shall be expressed in units based on millimetres, shall be accurate to three significant figures, but to derive  $l_e$ ,  $A_e$  and  $\mu_e$  the values of  $C_1$  and  $C_2$  shall be calculated to five significant figures. All angles are in radians.

NOTE The purpose of specifying this degree of accuracy is only to ensure that parameters calculated at different establishments are identical and it is not intended to imply that the parameters are capable of being determined to this accuracy.

**4.2**  $A_{\min}$  is the nominal value of the smallest cross-section.  $A_g$  is the geometrical cross-section of a ring core with rectangular shape. All the dimensions used to calculate  $A_{\min}$  shall be the mean values between the tolerance limits quoted on the appropriate piece part drawing. All results shall be expressed in units based on millimetres, and shall be accurate to three significant figures.

The minimum physical cross-section area  $A_{\min}$  is given as:  $A_{\min} = \min(A_i)$

NOTE  $A_g$  can be used for the measurement of the saturation flux density  $B_{\max}$  on ring cores with rectangular cross-section.

**4.3** Calculations are only applicable to the component parts of a closed magnetic circuit.

**4.4** All dimensions used for the purpose of calculations shall be the mean value within the tolerance limits quoted on the appropriate piece part drawing.

**4.5** All irregularities in the outline of the core, such as small cut-outs, notches, chamfers, etc. shall be ignored unless otherwise described.