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Calculation of the effective parameters of magnetic piece parts

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Calculation of the effective parameters of magnetic piece parts

FOREWORD

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

This fifth edition cancels and replaces the fourth edition published in 2016. This edition constitutes a technical revision.

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

a) addition, in 5.2, of the drawing and the formulae of pair of URS-cores of rectangular-circular section;
b) using, in 5.9, 5.10, 5.11 and 5.13, the conventional calculation formula that includes "B_1-D" is limited for the x-x cores (x is EL, ER, PQ or E) and addition new formulae for x-PLT cores that replaces "B_1-D" with "(B_1-D+B_2)/2";

c) addition, in 5.9, 5.10, 5.11 and 5.13, of formulae of l_1 and l_3 for x-PLT cores (x is EL, ER, PQ or E) which is different from the l_1 and l_3 of x-x cores;

d) addition of formula A_{min} in each subclause from 5.2.1 to 5.14.

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

Draft	Report on voting
51/1592/FDIS	51/1607/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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

– reconfirmed,

– withdrawn, or

– revised.

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 terminology databases for use in standardization at the following addresses:

– IEC Electropedia: available at https://www.electropedia.org/
– ISO Online browsing platform: available at https://www.iso.org/obp

4 Basic rules applicable to this standard

4.1 All results shall be expressed in units based on millimetres. It is recommended that the intermediate calculation values used to derive l_e, A_e, V_e, C_1 and C_2 have at least 10 decimal places. Finally calculated l_e, A_e, V_e and A_{min} shall be rounded to three significant figures, and C_1 and C_2 shall be rounded 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.

NOTE A_g is used for the measurement of the saturation flux density B_s 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 in this document.

4.6 When the calculation involves the sharp corner of a piece part, then the mean length of flux path for that corner shall be taken as the mean circular path joining the centres of area of the two adjacent uniform sections, and the cross-sectional area associated with that length shall be taken as the average area of the two adjacent uniform sections.