Terms and nomenclature for cores made of magnetically soft ferrites – Part 1: Terms used for physical irregularities and reference of dimensions
Figure 57 – U-core ................................................................................................................ 27
Figure 58 – UR-core ............................................................................................................. 27
Figure 59 – Balun-core ....................................................................................................... 27
Figure 60 – Multi hole bead ............................................................................................... 27
Figure A.1 – E-core ............................................................................................................. 33
Figure A.2 – RM-core ........................................................................................................ 33

Table 1 – Ring-core dimension designations ..................................................................... 23
Table 2 – Other ferrite shape dimension designations ...................................................... 24
INTERNATIONAL ELECTROTECHNICAL COMMISSION

TERMS AND NOMENCLATURE FOR CORES MADE
OF MAGNETICALLY SOFT FERRITES –

Part 1: Terms used for physical irregularities
and reference of dimensions

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.

3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.

4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.

5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.

6) All users should ensure that they have the latest edition of this publication.

7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.

8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.

9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

DISCLAIMER
This Redline version is not an official Standard and is intended to provide the user with an indication of what changes have been made to the previous version. Only the IEC International Standard provided in this package is to be considered the official Standard.

This Redline version provides you with a quick and easy way to compare all the changes between this standard and its previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.
International Standard IEC 60401-1 has been prepared by IEC technical committee 51: Magnetic components, ferrite and magnetic powder materials.


This edition includes the following significant technical changes with respect to the previous editions of IEC 60401-1 and IEC 60401-2:

a) added the surface irregularity term “pores” in 4.3.1.6;
b) added the surface irregularity term “scratch” in 4.3.6.3;
c) removed the surface irregularity term “crater” in 4.1.5 of IEC 60401-1: 2002;
d) removed the bulk irregularity terms “superpores” in 5.1, “inclusions” in 5.2, “internal stratification” in 5.3 and “internal crack” in 5.4 of IEC 60401-1: 2002;
e) removed the contents related to “yoke ring cores” in 7.1.3 and 7.4 of IEC 60401-1:2002;
f) replaced the surface irregularity term “stratification” with “lamination” in 4.3.4.7;
g) replaced the location related terms “upper surface of back” with “bottom surface” and “lower surface of back” with “back surface” in Figure A.1;
h) changed Clause 7 of IEC 60401-1:2002 into Annex A.

The text of this International Standard is based on the following documents:

<table>
<thead>
<tr>
<th>CDV</th>
<th>Report on voting</th>
</tr>
</thead>
<tbody>
<tr>
<td>51/1313/CDV</td>
<td>51/1332/RVC</td>
</tr>
</tbody>
</table>

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.

A list of all parts in the IEC 60401 series, published under the general title Terms and nomenclature for cores made of magnetically soft ferrites can be found on the IEC website.

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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.
1 Scope

This part of IEC 60401 provides a nomenclature of the most frequent surface, bulk and shape irregularities relevant to cores made of soft ferrites (magnetic oxides). Most irregularities are graphically exemplified as visual aids. A general recommendation is also given in Annex A for a consistent scheme for specifying the exact location of the irregularity, combining a general name for the location with more detailed qualifiers of the specified location. This document can also be useful as a terminology reference when preparing technical documentation, irregularity inspection specifications, etc.

This document also presents a method for defining the designation nomenclature for the major physical attributes of soft ferrite core shapes. The purpose of this document is to facilitate uniform usage of dimensional characters by manufacturers, specifiers, and users when describing core dimensions on drawings, in tables, and on catalogue specification sheets.

2 Normative references

There are no normative references in this document.
INTERNATIONAL STANDARD

Terms and nomenclature for cores made of magnetically soft ferrites – Part 1: Terms used for physical irregularities and reference of dimensions
Figure 15 – Lamination ......................................................................................................... 13
Figure 16 – Crazing ............................................................................................................... 13
Figure 17 – Difference in colour tones .................................................................................. 14
Figure 18 – Discoloration ...................................................................................................... 14
Figure 19 – Stain .................................................................................................................... 14
Figure 20 – Crystallite ........................................................................................................... 14
Figure 21 – Roughness .......................................................................................................... 15
Figure 22 – Short-ground surface ....................................................................................... 15
Figure 23 – Scratch ............................................................................................................... 15
Figure 24 – Convexity ............................................................................................................ 16
Figure 25 – Concavity ............................................................................................................ 16
Figure 26 – Warping .............................................................................................................. 16
Figure 27 – Deflection-out .................................................................................................... 17
Figure 28 – Deflection-in ....................................................................................................... 17
Figure 29 – Transverse deflection ....................................................................................... 17
Figure 30 – Undulation .......................................................................................................... 18
Figure 31 – Non-parallelism ................................................................................................. 18
Figure 32 – Non-perpendicularity ....................................................................................... 18
Figure 33 – Non-coplanarity ................................................................................................. 18
Figure 34 – Non-circularity ................................................................................................. 19
Figure 35 – Ovality ................................................................................................................ 19
Figure 36 – Non-concentricity of co-planar circles ................................................................. 19
Figure 37 – Non-concentricity of circles lying on two planes .................................................. 20
Figure 38 – Steplike ground surface .................................................................................... 20
Figure 39 – Uneven grinding slant ....................................................................................... 20
Figure 40 – Un-matching ..................................................................................................... 21
Figure 41 – Profile deformation ............................................................................................ 21
Figure 42 – Ring-cores .......................................................................................................... 22
Figure 43 – E-core ................................................................................................................ 22
Figure 44 – ETD- or EER-core .............................................................................................. 23
Figure 45 – EC-core .............................................................................................................. 23
Figure 46 – Planar E-core ..................................................................................................... 23
Figure 47 – Planar EL-core .................................................................................................... 23
Figure 48 – Planar ER-core ................................................................................................... 23
Figure 49 – Plate-core mating planar cores ........................................................................... 23
Figure 50 – EFD-core .......................................................................................................... 24
Figure 51 – Drum-core ......................................................................................................... 24
Figure 52 – EP-core .............................................................................................................. 24
Figure 53 – PQ-core .............................................................................................................. 24
Figure 54 – Pot-core and half pot-core for inductive proximity switches .................................. 24
Figure 55 – PM-core ............................................................................................................. 24
Figure 56 – RM-core ............................................................................................................ 25
Figure 57 – U-core .............................................................................................................. 25
Figure 58 – UR-core ............................................................................................................. 25
Figure 59 – Balun-core ......................................................................................................... 25
Figure 60 – Multi hole bead ............................................................................................... 25
Figure A.1 – E-core ............................................................................................................. 28
Figure A.2 – RM-core ......................................................................................................... 28

Table 1 – Ring-core dimension designations ........................................................................ 21
Table 2 – Other ferrite shape dimension designations ....................................................... 22
INTERNATIONAL ELECTROTECHNICAL COMMISSION

TERMS AND NOMENCLATURE FOR CORES MADE OF MAGNETICALLY SOFT FERRITES –

Part 1: Terms used for physical irregularities and reference of dimensions

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.

3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.

4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.

5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.

6) All users should ensure that they have the latest edition of this publication.

7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.

8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.

9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60401-1 has been prepared by IEC technical committee 51: Magnetic components, ferrite and magnetic powder materials.


This edition includes the following significant technical changes with respect to the previous editions of IEC 60401-1 and IEC 60401-2:

a) added the surface irregularity term “pores” in 4.3.1.6;

b) added the surface irregularity term “scratch” in 4.3.6.3;

c) removed the surface irregularity term “crater” in 4.1.5 of IEC 60401-1: 2002;
d) removed the bulk irregularity terms “superpores” in 5.1, “inclusions” in 5.2, “internal stratification” in 5.3 and “internal crack” in 5.4 of IEC 60401-1: 2002;

e) removed the contents related to “yoke ring cores” in 7.1.3 and 7.4 of IEC 60401-1:2002;

f) replaced the surface irregularity term “stratification” with “lamination” in 4.3.4.7;

g) replaced the location related terms “upper surface of back” with “bottom surface” and “lower surface of back” with “back surface” in Figure A.1;

h) changed Clause 7 of IEC 60401-1:2002 into Annex A.

The text of this International Standard is based on the following documents:

<table>
<thead>
<tr>
<th>CDV</th>
<th>Report on voting</th>
</tr>
</thead>
<tbody>
<tr>
<td>51/1313/CDV</td>
<td>51/1332/RVC</td>
</tr>
</tbody>
</table>

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.

A list of all parts in the IEC 60401 series, published under the general title *Terms and nomenclature for cores made of magnetically soft ferrites* can be found on the IEC website.

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.
1 Scope

This part of IEC 60401 provides a nomenclature of the most frequent surface, bulk and shape irregularities relevant to cores made of soft ferrites (magnetic oxides). Most irregularities are graphically exemplified as visual aids. A general recommendation is also given in Annex A for a consistent scheme for specifying the exact location of the irregularity, combining a general name for the location with more detailed qualifiers of the specified location. This document can also be useful as a terminology reference when preparing technical documentation, irregularity inspection specifications, etc.

This document also presents a method for defining the designation nomenclature for the major physical attributes of soft ferrite core shapes. The purpose of this document is to facilitate uniform usage of dimensional characters by manufacturers, specifiers, and users when describing core dimensions on drawings, in tables, and on catalogue specification sheets.

2 Normative references

There are no normative references in this document.