

# TECHNICAL REPORT



---

## Dimensional tolerances of ferrite cores

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

---

ICS 29.100.10

ISBN 978-2-8322-4349-7

**Warning! Make sure that you obtained this publication from an authorized distributor.**

## CONTENTS

|   |    |
|---|----|
| FOREWORD.....   | 3  |
| INTRODUCTION.....   | 5  |
| 1 Scope.....  | 7  |
| 2 Normative references .....  | 7  |
| 3 Terms and definitions .....   | 7  |
| 4 Summary of dimensional tolerances of ferrite cores.....                             | 7  |
| 4.1 General.....  | 7  |
| 4.2 Dimensional tolerances of E-cores.....  | 7  |
| 4.3 Dimensional tolerances of ring cores .....  | 9  |
| 4.4 Dimensional tolerances of ETD/EER-cores .....                                     | 11 |
| 4.5 Dimensional tolerances of planar ER-cores.....                                    | 13 |
| 5 Conclusion .....  | 15 |
| Annex A (informative) Data of dimensional tolerances .....                            | 16 |
| A.1 E-core.....   | 16 |
| A.2 Ring core .....   | 34 |
| A.3 ETD/EER-core .....  | 43 |
| A.4 Planar ER-core .....  | 49 |
| Bibliography.....   | 55 |
| <br>  |    |
| Figure 1 – Cause-and-effect diagram of variations in dimension .....                  | 6  |
| Figure 2 – E-core.....  | 7  |
| Figure 3 – Dimensional tolerances of each part of E-cores.....                        | 9  |
| Figure 4 – Ring core .....  | 10 |
| Figure 5 – Dimensional tolerances of each part of ring cores .....                    | 11 |
| Figure 6 – ETD/EER-core .....   | 11 |
| Figure 7 – Dimensional tolerances of each part of ETD/EER-cores .....                 | 13 |
| Figure 8 – Planar ER-core .....   | 14 |
| Figure 9 – Dimensional tolerances of each part of planar ER-cores .....               | 15 |
| <br>  |    |
| Table 1 – IEC standards of ferrite core dimensions .....                              | 5  |
| Table 2 – Dimensional tolerances recommended for a new design of E-cores.....         | 8  |
| Table 3 – Dimensional tolerances recommended for a new design of ring cores .....     | 10 |
| Table 4 – Dimensional tolerances recommended for a new design of ETD/EER-cores .....  | 12 |
| Table 5 – Dimensional tolerances recommended for a new design of planar ER-cores..... | 14 |
| Table A.1 – Dimensional tolerances of each part ( <i>E-core</i> ).....                | 16 |
| Table A.2 – Dimensional tolerances of each part ( <i>Ring-core</i> ) .....            | 34 |
| Table A.3 – Dimensional tolerances of each part ( <i>ETD/EER-core</i> ) .....         | 43 |
| Table A.4 – Dimensional tolerances of each part ( <i>Planar ER-core</i> ) .....       | 49 |

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## DIMENSIONAL TOLERANCES OF FERRITE CORES

## 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.

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".

IEC TR 63090, which is a Technical Report, has been prepared by IEC technical committee 51: Magnetic components, ferrite and magnetic powder materials.

The text of this technical report is based on the following documents:

|               |                  |
|---------------|------------------|
| Enquiry draft | Report on voting |
| 51/1166/DTR   | 51/1186/RVDTR    |

Full information on the voting for the approval of this technical report 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.

A bilingual version of this publication may be issued at a later date.

**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.**

## INTRODUCTION

This document shows the dimensional tolerances of ferrite cores that are generally used by ferrite core suppliers. As a reference, this is useful for ferrite core suppliers and users when they design ferrite cores and/or the components which use the ferrite cores.

IEC has published international standards regarding ferrite core dimensions and their tolerances, as listed in the Table 1, and core sizes in each core shape were chosen from industrial standards from Europe, Japan and USA. However, there are some cases that lack unity in the dimensional tolerances even if ferrite core dimensions are close.

Because many new sizes are still designed for the E, ETD/EER, planar ER and ring core, this document gives information about the dimensional tolerances for reference dimensions of each core shape.

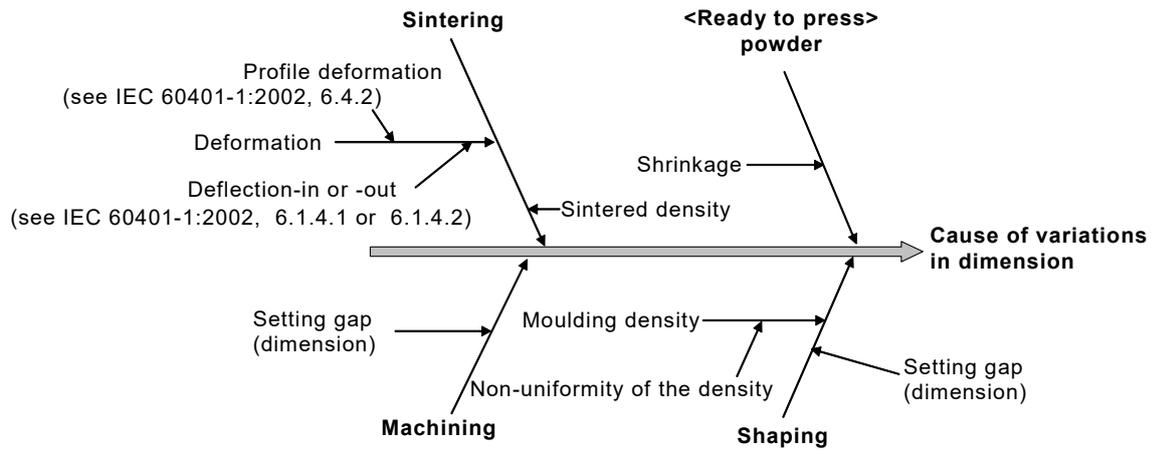
**Table 1 – IEC standards of ferrite core dimensions**

| IEC standard  | Current standard |
|---|------------------|
| IEC 62317-1, <i>Ferrite cores – Dimensions – Part 1: General specification</i>  | ///              |
| IEC 62317-2, <i>Ferrite cores – Dimensions – Part 2: Pot-cores for use in telecommunications, power supply, and filter applications</i> | ///              |
| IEC 62317-3, <i>Ferrite cores – Dimensions – Part 3: Half-pot cores (future standard)</i>   | IEC 62323        |
| IEC 62317-4, <i>Ferrite cores – Dimensions – Part 4: RM-cores and associated parts</i>  | ///              |
| IEC 62317-5, <i>Ferrite cores – Dimensions – Part 5: EP-cores and associated parts for use in inductors and transformers</i>            | ///              |
| IEC 62317-6, <i>Ferrite cores – Dimensions – Part 6: ETD-cores for use in power supplies</i>  | ///              |
| IEC 62317-7, <i>Ferrite cores – Dimensions – Part 7: EER-cores</i>  | ///              |
| IEC 62317-8, <i>Ferrite cores – Dimensions – Part 8: E-cores</i>  | ///              |
| IEC 62317-9, <i>Ferrite cores – Dimensions – Part 9: Planar cores</i>   | ///              |
| IEC 62317-10, <i>Ferrite cores – Dimensions – Part 10: PM cores (future standard)</i>   | IEC 61247        |
| IEC 62317-11, <i>Ferrite cores – Dimensions – Part 11: EC-cores for use in power supply applications</i>                                | ///              |
| IEC 62317-12, <i>Ferrite cores – Dimensions – Part 12: Ring cores</i>   | ///              |
| IEC 62317-13, <i>Ferrite cores – Dimensions – Part 13: PQ-cores for use in power supply applications</i>                                | ///              |
| IEC 62317-14, <i>Ferrite cores – Dimensions – Part 14: EFD-cores for use in power supply applications</i>                               | ///              |

### Cause of variations in dimension

The shrinkage of <Ready to press> powders, the density of mouldings, the deformation of ferrite cores, etc., are considered as causes of variations in dimension.

They are gathered in the following cause-and-effect diagram in Figure 1.



IEC

**Figure 1 – Cause-and-effect diagram of variations in dimension**

**Consideration of the dimensional tolerance**

The dimensional tolerance is considered according to the processing conditions, and the core part is classified into the following three conditions:

- decided according to the mould and sintering, or
- decided according to the press direction, or
- grinding direction.

## **DIMENSIONAL TOLERANCES OF FERRITE CORES**

### **1 Scope**

This document gives guidelines on the dimensional tolerances of ferrite cores. This document is considered as general information useful in the dialogue between ferrite core suppliers and users.

### **2 Normative references**

There are no normative references in this document.