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Test method for the mechanical strength of cores made of magnetic oxides

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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**TEST METHOD FOR THE MECHANICAL STRENGTH
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- 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.
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This redline version of the official IEC Standard allows the user to identify the changes made to the 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 61631 has been prepared by IEC technical committee 51: Magnetic components, ferrite and magnetic powder materials.

This second edition cancels and replaces the first edition published in 2001. This edition constitutes a technical revision.

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

- a) the phrase: "This document is also applicable to the mechanical strength measurement of magnetic powder cores" has been added in the scope;
- b) IEC 61246 has been replaced by IEC 63093-8; EN 1002-2 has been replaced by ISO 7500-1; ISO 4677-1 and ISO 4677-2 have been withdrawn;
- c) dimensions D and F in Figure A.1 and Table A.1 have been changed to be consistent with Figure 1 of IEC 63093-8:2018;
- d) addition of the content of ring-cores test;
- e) addition of Annex B;
- f) the location of the jig is amended in Figure 3;
- g) in Figure 5, the roller bars are moved to the edge of the I-core, aligned with the core.

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

CDV	Report on voting
51/1312/CDV	51/1333/RVC

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,
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- 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.

INTRODUCTION

The method specified in this document is intended to be used for obtaining agreements between parties for material development, quality checking, characterization and data acquisition purposes. The method places closely defined restrictions on the arrangement of the test-piece and the function of the test apparatus, including the test-jigs, in order to minimize the errors that can arise as a consequence of the test method.

All other factors are ~~required to be~~ stated in the test report ~~in order to be allowed for~~ ~~in the~~ comparison of the behavior of the magnetic oxide cores. It is not possible to rigorously standardize particular surface finishes, since it is difficult to control all the mechanical factors. But, ~~it is absolutely essential to mention~~ the state of the surface in the report ~~should be mentioned~~, as surface defects can have a large effect on mechanical strength in certain types of tests (see Clause 6). The extrapolation of mechanical strength data to other geometries, multi-axial stressing, other rates of stressing or other environmental conditions, should be viewed with caution. The origin of a fracture in a mechanical test piece can be a valuable guide to the nature and position of strength-limiting defects (such as pores, large grains and impurity concentration).

The results of strength tests are influenced by a combination of the following factors: the microstructure of the material, the surface finishing procedure applied to the test cores, the size and shape of the test cores, the mechanical parameters of the testing apparatus, the rate of load application and the relative humidity of the ambient atmosphere. Because of the ceramic nature of magnetic oxide cores, a considerable range of results is usually obtained from a number of nominally identical test cores. Thus test results ~~need to be~~ ~~are~~ interpreted with caution.

TEST METHOD FOR THE MECHANICAL STRENGTH OF CORES MADE OF MAGNETIC OXIDES

1 Scope

This document specifies a test method for the mechanical strength of cores made of magnetic oxides. This test method is suitable for most of the E-cores, ETD-cores, I-cores and ring-cores but other core types such as U-cores could be tested according to a derived method agreed by the parties concerned. This document is also applicable to the mechanical strength measurement of magnetic powder cores.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

~~IEC 61246:1994, Magnetic oxide cores (E-cores) of rectangular cross-section and associated parts – Dimensions~~

~~EN 10002-2:1992, Tensile testing of metallic materials – Part 2: Verification of the force measuring system of the tensile testing machine~~

~~ISO 4677-1:1985, Atmospheres for conditioning and testing – Determination of relative humidity – Part 1: Aspirated psychrometer method~~

~~ISO 4677-2:1985, Atmospheres for conditioning and testing – Determination of relative humidity – Part 2: Whirling psychrometer method~~

ISO 7500-2, Metallic materials – Verification of static uniaxial testing machines – Part 2: Tension creep testing machines – Verification of the applied force

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