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Standards

Irish Standard  
I.S. EN IEC 61631:2020

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

**I.S. EN IEC 61631:2020**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

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## National Foreword

I.S. EN IEC 61631:2020 is the adopted Irish version of the European Document EN IEC 61631:2020, Test method for the mechanical strength of cores made of magnetic oxides

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EUROPEAN STANDARD

**EN IEC 61631**

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2020

ICS 29.100.10

Supersedes EN 61631:2001 and all of its amendments  
and corrigenda (if any)

English Version

**Test method for the mechanical strength of cores made of  
magnetic oxides  
(IEC 61631:2020)**

Méthode d'essai pour la résistance mécanique des noyaux  
en oxydes magnétiques  
(IEC 61631:2020)

Prüfverfahren zur Bestimmung der mechanischen Festigkeit  
von magnetischen Oxidkernen  
(IEC 61631:2020)

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European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

## **EN IEC 61631:2020 (E)**

### **European foreword**

The text of document 51/1312/CDV, future edition 2 of IEC 61631, prepared by IEC/TC 51 "Magnetic components, ferrite and magnetic powder materials" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61631:2020.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2021-03-11
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-06-11

This document supersedes EN 61631:2001 and all of its amendments and corrigenda (if any).

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The text of the International Standard IEC 61631:2020 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 63093-6	NOTE	Harmonized as EN IEC 63093-6
IEC 63093-8	NOTE	Harmonized as EN IEC 63093-8
IEC 63093-12	NOTE	Harmonized as EN IEC 63093-12

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
ISO 7500-2	-	Metallic materials - Verification of static uniaxial testing machines – Part 2: Tension creep testing machines - Verification of the applied force	EN ISO 7500-2	-

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**IEC 61631**

Edition 2.0 2020-05

# **INTERNATIONAL STANDARD**

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





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**IEC Glossary - [std.iec.ch/glossary](http://std.iec.ch/glossary)**

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.



**IEC 61631**

Edition 2.0 2020-05

# **INTERNATIONAL STANDARD**

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

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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ICS 29.100.10

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

## FOREWORD

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

## 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 stated in the test report for 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 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 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.

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

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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>

#### 3.1

##### **mechanical strength**

maximum recorded force at the instant of fracture of a magnetic oxide core when it is loaded with the bending stress

### 4 Apparatus

#### 4.1 Test core support and loading wedge

Test cores shall be supported on free moving roller bars or on a flat support depending on their size (see 6.2). The loading wedge, the roller bars and the stretch bar or the flat support shall be made of hardened steel with a hardness of 40 HRC (HRC is Rockwell hardness) to 60 HRC. The loading wedge and the roller bars shall have a radius of 2 mm. The radius of the contact part of the stretching rod head and the measured core is 2 mm. The loading wedge and the stretch bar shall be connected to a device for measuring and recording the load applied.



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