Irish Standard
I.S. EN 60556:2006&A1:2016

Gyromagnetic materials intended for application at microwave frequencies - Measuring methods for properties

I.S. EN 60556:2006&A1:2016

Incorporating amendments/corrigenda/National Annexes issued since publication:

EN 60556:2006/A1:2016

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I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

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This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

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National Foreword

I.S. EN 60556:2006&A1:2016 is the adopted Irish version of the European Document EN 60556:2006, Gyromagnetic materials intended for application at microwave frequencies - Measuring methods for properties

This document does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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In line with international standards practice the decimal point is shown as a comma (,) throughout this document.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60556:2006/A1

June 2016

ICS 29.100.10

English Version

Gyromagnetic materials intended for application at microwave frequencies - Measuring methods for properties (IEC 60556:2006/A1:2016)

Matériaux gyromagnétiques destinés à des applications hyperfréquences - Méthodes de mesure des propriétés (IEC 60556:2006/A1:2016)

Gyromagnetische Materialien für Mikrowellenanwendungen - Messverfahren zur Ermittlung der Eigenschaften (IEC 60556:2006/A1:2016)

This amendment A1 modifies the European Standard EN 60556:2006; it was approved by CENELEC on 2016-05-05. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment the status of a national standard without any alteration.

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This amendment exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 60556:2006/A1:2016 E

European foreword

The text of document 51/1064/CDV, future IEC 60556:2006/A1, prepared by IEC/TC 51 "Magnetic components and ferrite materials" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60556:2006/A1:2016.

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) 2017-02-05
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2019-05-05

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The text of the International Standard IEC 60556:2006/A1:2016 was approved by CENELEC as a European Standard without any modification.

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60556

June 2006

ICS 29.100.10

English version

Gyromagnetic materials intended for application at microwave frequencies - Measuring methods for properties

(IEC 60556:2006)

Materiaux gyromagnétiques destinés aux applications hyperfréquences - Méthodes de mesure des caractéristiques (CEI 60556:2006)

Gyromagnetische Materialien für Mikrowellenanwendungen - Messverfahren zur Ermittlung der Eigenschaften (IEC 60556:2006)

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CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Ref. No. EN 60556:2006 E

Foreword

The text of document 51/850/FDIS, future edition 2 of IEC 60556, prepared by IEC TC 51, Magnetic components and ferrite materials, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60556 on 2006-05-01.

This Standard is to be used in conjunction with IEC 60392.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2007-02-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2009-05-01

Annex ZA has been added by CENELEC.

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Endorsement notice

The text of the International Standard IEC 60556:2006 was approved by CENELEC as a European Standard without any modification.

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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 When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60050-221	-[1)]	International electrotechnical vocabulary - Chapter 221: Magnetic materials and components	-	-
IEC 60205	2006	Calculation of the effective parameters of magnetic piece parts	EN 60205	2006
IEC 60392	1972	Guide for the drafting of specifications for microwave ferrites	-	-

[1)] Undated reference.

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INTERNATIONAL STANDARD

IEC 60556

Second edition
2006-04

Gyromagnetic materials intended for application at microwave frequencies – Measuring methods for properties

Reference number
IEC 60556:2006(E)

Publication numbering

As from 1 January 1997 all IEC publications are issued with a designation in the 60000 series. For example, IEC 34-1 is now referred to as IEC 60034-1.

Consolidated editions

The IEC is now publishing consolidated versions of its publications. For example, edition numbers 1.0, 1.1 and 1.2 refer, respectively, to the base publication, the base publication incorporating amendment 1 and the base publication incorporating amendments 1 and 2.

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INTERNATIONAL STANDARD

IEC 60556

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2006-04

Gyromagnetic materials intended for application at microwave frequencies – Measuring methods for properties

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International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE XA

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

GYROMAGNETIC MATERIALS INTENDED FOR APPLICATION AT MICROWAVE FREQUENCIES – MEASURING METHODS FOR PROPERTIES

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.
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International Standard IEC 60556 has been prepared by IEC technical committee 51: Magnetic components and ferrite materials.

This second edition cancels and replaces the first edition, published in 1982, its amendment 1 (1997) and amendment 2 (2004). This edition constitutes a technical revision.

This second edition is a consolidation of the first edition and its amendments 1 and 2. It includes editorial improvements as well as improvements to the figures.

This standard is to be read in conjunction with IEC 60392.

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

FDIS	Report on voting
51/850/FDIS	51/859/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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

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

GYROMAGNETIC MATERIALS INTENDED FOR APPLICATION AT MICROWAVE FREQUENCIES – MEASURING METHODS FOR PROPERTIES

1 Scope

This International Standard describes methods of measuring the properties used to specify polycrystalline microwave ferrites in accordance with IEC 60392 and for general use in ferrite technology. These measuring methods are intended for the investigation of materials, generally referred to as ferrites, for application at microwave frequencies.

Single crystals and thin films generally fall outside the scope of this standard.

NOTE 1 For the purposes of this standard, the words “ferrite” and “microwave” are used in a broad sense:

– by “ferrites” is meant not only magneto-dielectric chemical components having a spinel crystal structure, but also materials with garnet and hexagonal structures;

– the “microwave” region is taken to include wavelengths approximately between 1 m and 1 mm, the main interest being concentrated on the region 0,3 m to 10 mm.

NOTE 2 Examples of components employing microwave ferrites are non-reciprocal devices such as circulators, isolators and non-reciprocal phase-shifters. These constitute the major field of application, but the materials may be used in reciprocal devices as well, for example, modulators and (reciprocal) phase-shifters. Other applications include gyromagnetic filters, limiters and more sophisticated devices, such as parametric amplifiers.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendment) applies.

IEC 60050-221, *International Electrotechnical Vocabulary (IEV) – Part 221: Magnetic materials components*

IEC 60205:2006, *Calculation of the effective parameters of magnetic piece parts*

IEC 60392:1972, *Guide for the drafting of specifications for microwave ferrites*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-221 apply.

4 Saturation magnetization M_s

4.1 General

Saturation magnetization is a characteristic parameter of ferrite materials. It is widely used in theoretical calculations, for instance in computation of tensor permeability components (see IEC 60050-221). In a variety of microwave applications, saturation magnetization determines the lower frequency limit of the device, mainly due to the occurrence of so-called low-field loss when the material is unsaturated.