



NSAI
Standards

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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NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

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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

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EUROPEAN STANDARD

EN 60556:2006/A1

NORME EUROPÉENNE

EUROPÄISCHE NORM

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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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

EN 60556:2006/A1:2016

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- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2019-05-05

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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

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

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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
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

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



Reference number
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INTERNATIONAL STANDARD

IEC 60556

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International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch



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CONTENTS

FOREWORD.....	5
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	7
4 Saturation magnetization M_S	7
4.1 General	7
4.2 Object	8
4.3 Theory.....	8
4.4 Test sample	9
4.5 Measuring apparatus for the vibrating coil method (VCM).....	9
4.6 Measuring apparatus for the vibrating sample method (VSM)	12
4.7 Calibration.....	15
4.8 Measuring procedure.....	16
4.9 Calculation	17
4.10 Accuracy	17
4.11 Data presentation	18
5 Magnetization (at specified field strength) M_H	18
5.1 General	18
5.2 Object	18
5.3 Theory.....	18
5.4 Test specimen	20
5.5 Measuring apparatus	21
5.6 Calibration.....	23
5.7 Measuring procedure.....	24
5.8 Calculation	24
5.9 Accuracy	24
5.10 Data presentation	24
6 Gyromagnetic resonance linewidth ΔH and effective Landé factor g_{eff} (general)	25
6.1 General	25
6.2 Object	25
6.3 Theory.....	25
6.4 Test specimens and cavities.....	26
6.5 Measuring apparatus	29
6.6 Measuring procedure.....	29
6.7 Calculation	31
6.8 Accuracy	31
6.9 Data presentation	31
7 Gyromagnetic resonance linewidth ΔH_{10} and effective Landé factor g_{10} (at 10 GHz)	31
7.1 General	31
7.2 Object	31
7.3 Theory.....	31

7.4	Test specimen and cavity	32
7.5	Measuring apparatus	33
7.6	Measuring procedure	33
7.7	Calculation	34
7.8	Accuracy	34
7.9	Data presentation	35
8	Spin-wave resonance linewidth ΔH_k	35
8.1	General	35
8.2	Object	35
8.3	Theory	35
8.4	Test specimen and cavity	38
8.5	Measuring apparatus	39
8.6	Calibration	39
8.7	Measuring procedure	39
8.8	Calculation	40
8.9	Accuracy	40
8.10	Data presentation	40
9	Effective linewidth ΔH_{eff}	40
9.1	General	40
9.2	Object	40
9.3	Theory	41
9.4	Test specimen and cavity	43
9.5	Measuring apparatus	43
9.6	Calibration	44
9.7	Apparatus adjustment	44
9.8	Measuring procedure	45
9.9	Calculation	46
9.10	Accuracy	46
9.11	Data presentation	46
10	Complex permittivity ϵ_r	47
10.1	General	47
10.2	Object	47
10.3	Theory	47
10.4	Test specimen and cavity	50
10.5	Measuring apparatus	50
10.6	Measurement procedure	51
10.7	Calculation	51
10.8	Accuracy	52
10.9	Data presentation	52
11	Apparent density ρ_{app}	52
11.1	General	52
11.2	Apparent density (by mensuration)	52
11.3	Apparent density (by water densitometry)	54
	Bibliography	56

Figure 1 – Vibrating coil method – Sample and coils arrangement	9
Figure 2 – Magnetic field configuration	10
Figure 3 – Measuring apparatus (VCM).....	12
Figure 4 – Vibrating sample method – Sample and coil arrangement	13
Figure 5 – Measuring apparatus (VSM).....	14
Figure 6 – Hysteresis curves for a magnetic material: $B(H)$ curve, $M(H)$ curve	19
Figure 7 – Test sample with compensation unit.....	20
Figure 8 – Test specimen.....	21
Figure 9 – Measuring circuit for determining magnetization (at specified field strength) M_H	22
Figure 10 – Miller integrator	23
Figure 11 – Cavity for measurement of gyromagnetic resonance linewidth and effective Landé factor	27
Figure 12 – Stripline resonator for measurement of gyromagnetic resonance linewidth and effective Landé factor at low frequency	28
Figure 13 – Schematic diagram of the equipment required for measurement of gyromagnetic resonance linewidth and effective Landé factor	30
Figure 14 – Schematic diagram of the equipment required for measurement of gyromagnetic resonance linewidth and effective Landé factor at 10 GHz	34
Figure 15 – Subsidiary absorption and saturation of the normal resonance	36
Figure 16 – Pulse deterioration at onset of subsidiary resonance.....	36
Figure 17 – Measured critical r.f. field strength as a function of pulse duration t_d	37
Figure 18 – Typical TE_{104} cavity for the measurement of spin-wave resonance linewidth at about 9,3 GHz.....	38
Figure 19 – Block diagram of spin-wave resonance linewidth test equipment.....	39
Figure 20 – Sectional view of the cavity with specimen	42
Figure 21 – Dimensions of a cavity designed for resonance at a frequency of 9,1 GHz	42
Figure 22 – Schematic diagram of equipment for measuring effective linewidth ΔH_{eff}	44
Figure 23 – Determination of Q_0	46
Figure 24 – Ideal resonant cavity with specimen, used for theoretical calculation (sectional view).....	48
Figure 25 – Dimensions of the resonant cavity with specimen.....	50
Figure 26 – Schematic diagram of equipment required for the measurement of complex dielectric constant.....	51

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

FOREWORD

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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.

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