磁性材料及元件领域的国际标准和标准化

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提 纲

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- IEC与TC51
- IEC/TC51标准现状
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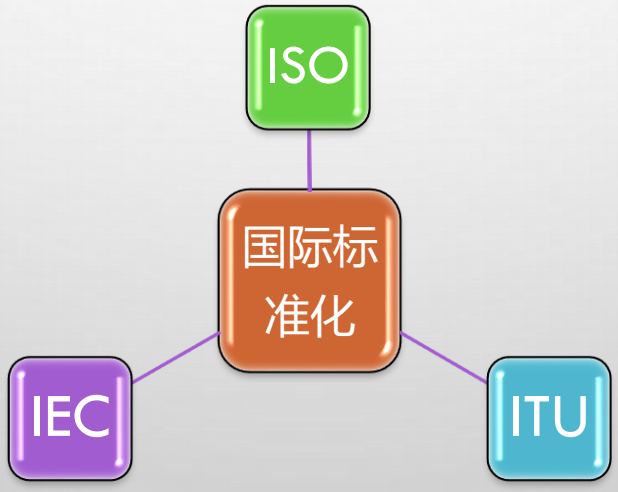
标准概念

- 标准：为在一定范围内获得最佳秩序，经协商一致制定并由公认机构批准，被共同使用的和重复使用的一种规范性文件（摘自 GB/T20000.1-2014)。
- 标准化：制定、发布和实施标准的过程。
- 常用标准包括国际标准、国家标准、行业标准、地方标准、团体标准和企业标准。
- 标准应具有科学性、规范性、时效性，技术上先进、经济上合理。

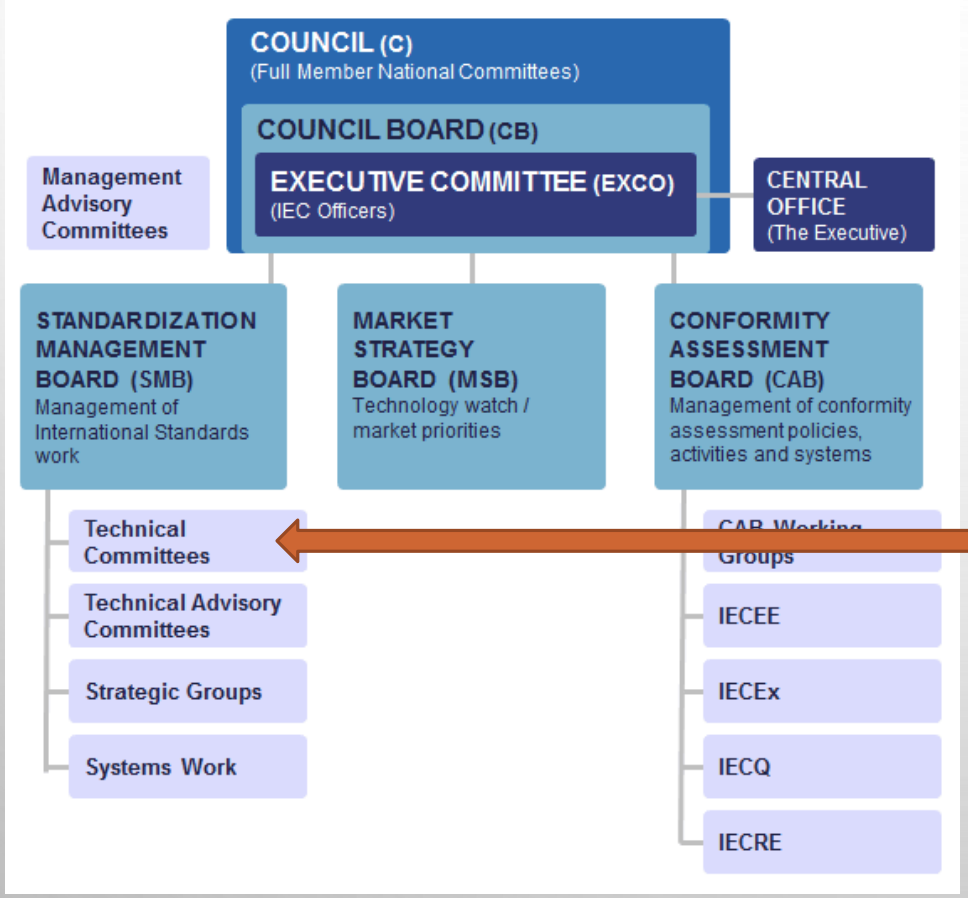
IEC与TC51

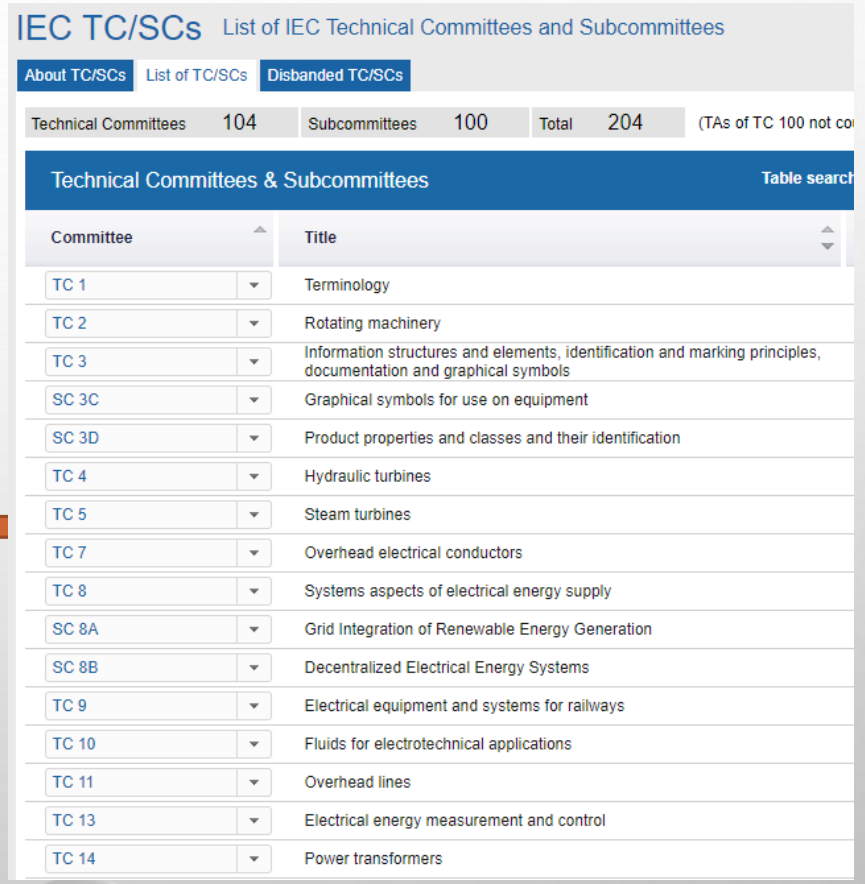
- IEC（INTERNATIONAL ELECTROTECHNICAL COMMISSION，国际电工委员会）成立于1906年，总部位于瑞士日内瓦。
- IEC负责电气和电子工程领域的国际标准化工作，其它领域由ISO（国际标准化组织）、ITU（国际电信联盟）负责。



- IEC现有62个正式成员国，36个非正式成员国，覆盖全球97%的人口。中国为正式成员国。
- 正式成员分为有投票权的积极成员（P成员）和无投票权的观察成员（O成员）。
- 各成员国设立NC（NATIONAL COMMISSION，国家委员会），并以此身份参加IEC的工作和活动。

- IEC通过TC（TECHNICAL COMMITTEE，技术委员会）和SC（SUB-COMMITTEE，分技术委员会）开展各特定专业领域的标准化工作。





IEC TC/SCs List of IEC Technical Committees and Subcommittees

About TC/SCs | List of TC/SCs | Disbanded TC/SCs

Technical Committees 104 | Subcommittees 100 | Total 204 (TAs of TC 100 not co

Technical Committees & Subcommittees — Table search

Committee	Title
TC 1	Terminology
TC 2	Rotating machinery
TC 3	Information structures and elements, identification and marking principles, documentation and graphical symbols
SC 3C	Graphical symbols for use on equipment
SC 3D	Product properties and classes and their identification
TC 4	Hydraulic turbines
TC 5	Steam turbines
TC 7	Overhead electrical conductors
TC 8	Systems aspects of electrical energy supply
SC 8A	Grid Integration of Renewable Energy Generation
SC 8B	Decentralized Electrical Energy Systems
TC 9	Electrical equipment and systems for railways
TC 10	Fluids for electrotechnical applications
TC 11	Overhead lines
TC 13	Electrical energy measurement and control
TC 14	Power transformers

- IEC/TC51成立于1961年2月，全名为“IEC TECHNICAL COMMITTEE 51： MAGNETIC COMPONENTS, FERRITE AND MAGNETIC POWDER MATERIALS “（IEC 51技术委员会:磁性元件、铁氧体和磁粉材料）。
- TC51主要负责磁性元件、铁氧体和磁粉心材料及相关测量、试验方法的标准制定工作。
- TC51涉及的主要应用领域为通信、计算机、汽车、音视频、照明、太阳能和风力发电系统、焊接、感应加热、功率调节（UPS）和RFID等。
- TC 51主席国为美国，秘书国为日本。现有P成员9个，O成员16个。中国为P成员。

- TC 51下设三个WG（WORKING GROUPS，工作组）：

  WG 1 — FERRITE AND POWDER CORES 铁氧体和磁粉心

  WG 9 — INDUCTIVE COMPONENTS 感性元件

  WG 10 — MAGNETIC MATERIALS AND COMPONENTS FOR EMC APPLICATIONS 用于EMC的磁性材料和元件

- 另设有两个MT（ MAINTENANCE TEAMS，维护组），分别有关E型磁心尺寸和旋磁材料测量方法。

- 与TC 51关联的TC和SC：

  SC 46F — 射频及微波无源元件

  TC 68 — 磁合金和钢铁

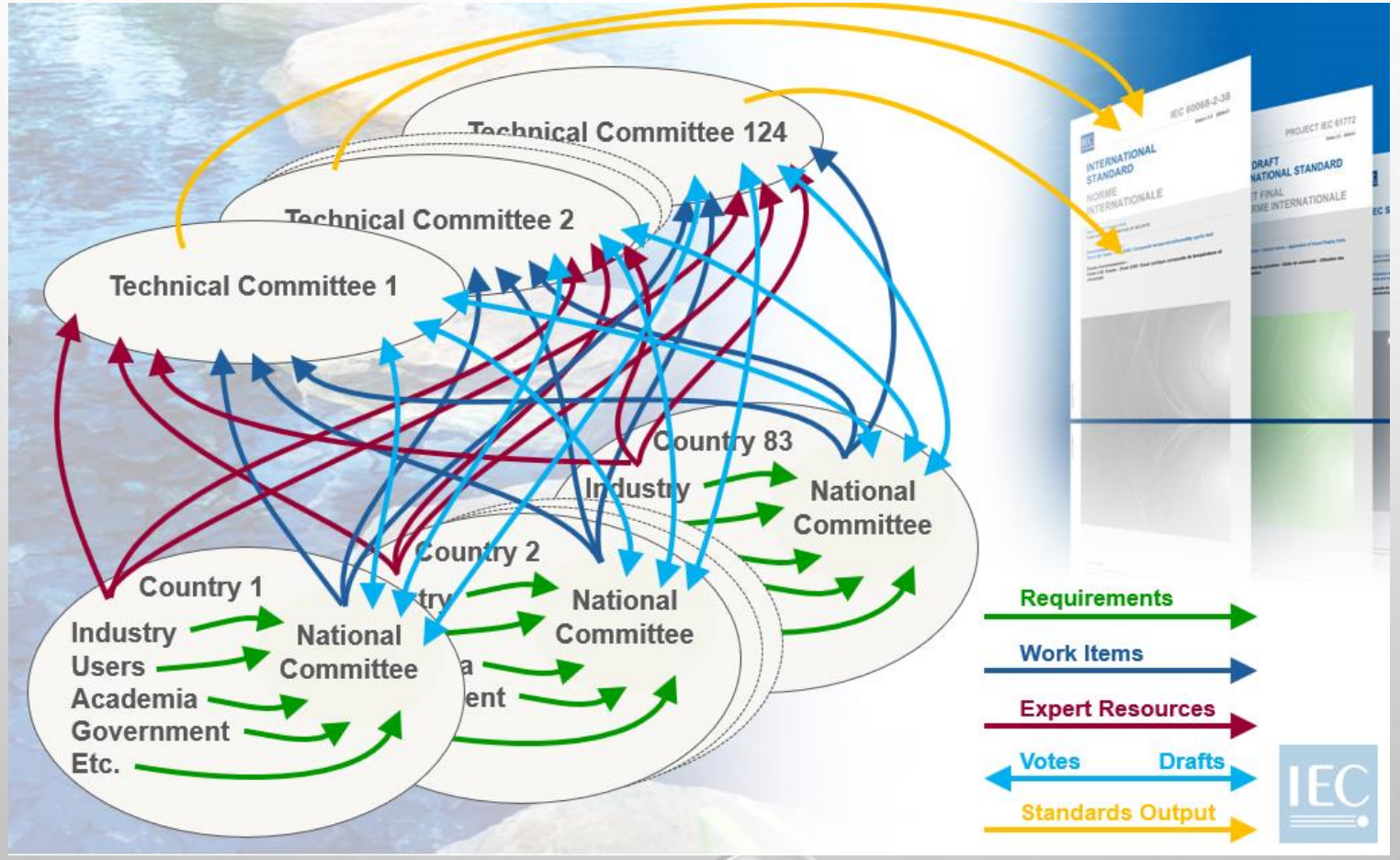
  TC 91 — 电子组装技术

  TC 96 — 变压器、电抗器、电源及其组件

- 这些关联TC和SC均不同程度涉及磁性材料及元件，但相比之下，TC 51和TC68是专司磁性材料及元件标准的TC，具有更高的专业度。

IEC/TC51标准现状

- 国际标准工作流程



- 国际标准制定流程

项目阶段	处理的相关文件	
	名 称	缩 写
预备阶段	预备工作项目(Preliminary work item)	PWI
提案阶段	新工作项目提案 (Proposal to start a new project)	NP
准备阶段	工作草案 (Working draft)	WD
委员会阶段	委员会草案 (Committee draft)	CD
询问阶段	询问草案 (Committee draft for vote)	CDV
批准阶段	最终国际标准草案 (Final draft of international standard)	FDIS
出版阶段	国际标准 (International standard)	IS

- TC51现行出版物有76项，其中标准74项（2项由中国起草），技术规范（TS）和技术报告（TR）各1项；制定过程中标准10项（7项由中国起草）。
- 按标准类型可分为基础标准（术语定义、分类等）、产品标准和方法标准（测量、认证）三类。
- 按标准涉及的材料品种可分为软磁铁氧体、旋磁铁氧体、软磁合金三类标准。
- 按标准涉及的产品状态可分为材料、元件二类标准。
- 按标准年份可分为近五年制、修订的新标准和标龄为5年以上的老标准。
- TC51主要出版物一览表：IEC TC51现行出版物汇总表 180802.DOC

- TC51相关IEC标准的主要特点：

—— 具有较完善的术语定义（如关于铁氧体磁心的IEC 60401系列和关于噪声抑制片的IEC 62333-1等）；

—— 对各种形状铁氧体磁心的尺寸和表面缺陷极限做了较全面的规定（如IEC 62317系列、IEC 60424系列及整合后的IEC 63093系列）；

—— 对采用铁心片的各种通讯和电子设备用变压器和电感器的外形尺寸做了较全面的规定（如IEC 60852系列）；

—— 对部分磁性元件的测量方法做了较全面的规定（如关于软磁磁心电气性能测量的IEC 62044系列及机械强度测量的IEC 61631、关于高频电感器电特性测量的IEC 62024系列和非电特性测量的IEC 62025系列）；

—— 未对各类磁性材料和元件的电气性能具体规格作出规定，因为这应由制造商和客户协商决定；

—— 现行标准尚未包括金属磁粉心相关标准，但制定过程中已有2项（IEC 63182-1 ED1 *MAGNETIC POWDER CORES - GUIDELINES ON DIMENSIONS AND THE LIMITS OF SURFACE IRREGULARITIES – PART 1: GENERAL SPECIFICATION* 和 IEC63182-2 ED1 - *PART 2: RING-CORES* ，均由中国起草）；

—— 现行标准尚未包括硬（永）磁材料及元件相关标准，这可能是TC51未来将要开发的部分。

标准例解读

- 国际标准的结构

主要部分	必备/可选/条件性要素
Title 标准名称	必备
Foreword 前言	必备
Introduction 引言	可选/条件性
Scope 范围	必备
Normative references 规范性引用文件	必备
Terms and definitions 术语和定义	必备
Symbols and abbreviated terms 符号和缩略语	条件性
Technical content 技术内容	必备
Annex 附录	可选
Bibliography 参考文献	条件性

IEC

IEC 63093-7

Edition 1.0 2018-03

标准编号

INTERNATIONAL STANDARD

Ferrite cores – Guidelines on dimensions and the limits of surface irregularities –
Part 7: EER-cores

标准名称

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.100.10

ISBN 978-2-8322-5485-1

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FERRITE CORES – GUIDELINES ON DIMENSIONS AND THE LIMITS OF SURFACE IRREGULARITIES –

Part 7: EER-cores

FOREWORD 前言

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 63093-7 has been prepared by IEC technical committee 51: Magnetic components, ferrite and magnetic powder materials.

This first edition cancels and replaces the first edition of IEC 62317-7 published in 2005. This edition constitutes a technical revision. This edition includes the following significant technical changes with respect to IEC 62317-7:

a) IEC 63093-7 integrates IEC 62317-7 and IEC 60424-3;
b) IEC 60424-3:2015, Table 2, has been included in Annex C as Table C.1.

不同版本的主要内容变化

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

FDIS	Report on voting
51/1217/FDIS	51/1226/RVD

文件依据

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.

A list of all parts in the IEC 63093 series, published under the general title *Ferrite cores – Guidelines on dimensions and the limits of surface irregularities* can be found on the IEC website.

系列标准关系

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.

FERRITE CORES – GUIDELINES ON DIMENSIONS AND THE LIMITS OF SURFACE IRREGULARITIES –

Part 7: EER-cores

1 Scope 范围

This part of IEC 63093 specifies the dimensions that are of importance for mechanical interchangeability for a preferred range of EER-cores made of ferrite, the essential dimensions of coil formers to be used with them as well the effective parameter values to be used in calculations involving them, and gives guidelines on allowable limits of surface irregularities applicable to EER-cores.

This document is a specification useful in the negotiations between ferrite core manufacturers and customers about surface irregularities.

The use of "derived" standards which give more detailed specifications of component parts while still permitting compliance with this document is discussed in Annex A.

2 Normative references 规范性引用文件

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 60205, *Calculation of the effective parameters of magnetic piece parts*

IEC 60401-1, *Terms and nomenclature for cores made of magnetically soft ferrites – Part 1: Terms used for physical irregularities*

IEC 60424-1, *Ferrite cores – Guidelines on the limits of surface irregularities – Part 1: General specification*

3 Terms and definitions 术语和定义

For the purposes of this document, the terms and definitions given in IEC 60401-1 and IEC 60424-1 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

4 Primary dimensions 技术内容. 主要尺寸

4.1 General

Compliance with the following requirements ensures mechanical interchangeability of complete assemblies and coil formers.

4.2 Dimensions of EER-cores

4.2.1 Principal dimensions

The principal dimensions of EER-cores shall be those given in Table 1. The dimensions of the cores may be checked by means of gauges. By way of example, possible dimensions for these gauges are given in Annex B. In order to facilitate production, it may be necessary to use gauges having dimensions that differ from those given in Annex B, although no relaxation of the requirements for the dimensions of the cores given in Table 1 is permitted. The dimensions specified in Table 1 are illustrated in Figure 1.

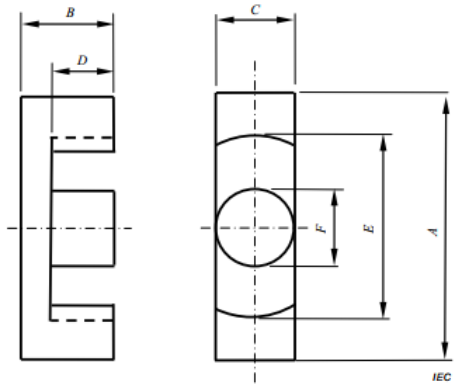


Figure 1 – Dimensions of EER-cores

Table 1 – Dimensions of EER-cores

Size	*A* mm		*B* mm		*C* mm		*D* mm		*E* mm		*F* mm	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
EER25,5	24,9	26,1	9,05	9,55	7,25	7,75	5,95	6,45	19,7	20,9	7,25	7,75
EER28	27,9	29,1	13,7	14,3	11,1	11,7	9,3	9,9	21,1	22,3	9,6	10,2
EER28L	27,9	29,1	16,6	17,2	11,1	11,7	12,2	12,8	21,1	22,3	9,6	10,2
EER35	34,2	35,8	20,4	21,0	11,0	11,6	14,4	15,0	25,3	26,9	11,0	11,6
EER39	38,2	39,8	21,8	22,6	12,5	13,1	16,6	17,4	28,4	30,0	12,5	13,1
EER40	39,5	40,5	22,2	22,6	13,05	13,55	15,1	15,7	29,0	30,8	13,05	13,55
EER42	41,1	42,9	20,8	21,6	14,8	15,6	14,9	15,7	29,2	31,0	14,8	15,6
EER49	47,9	50,1	30,8	31,6	16,8	17,6	22,3	23,1	36,0	38,2	16,8	17,6

4.2.2 Effective parameter and A_{min} values

The effective parameter values of a pair of cores whose dimensions comply with 4.2.1 shall be as given in Table 2. For the definitions of these parameters and their calculations, see IEC 60205.

Table 2 – Effective parameter values of EER-cores

Size	C_1 mm^{-1}	C_2 mm^{-3}	l_e mm	A_e mm^2	V_e mm^3	A_{min}[a] mm^2
EER25,5	1,070 0	$2{,}408\ 7 \times 10^{-2}$	47,5	44,4	2 110	42,5
EER28	0,728 16	$0{,}843\ 36 \times 10^{-2}$	62,9	86,4	5 430	77,0
EER28L	0,868 36	$1{,}013\ 8 \times 10^{-2}$	74,4	85,7	6 370	77,0
EER35	0,815 66	$0{,}738\ 15 \times 10^{-2}$	90,1	111	9 960	100
EER39	0,762 91	$0{,}573\ 84 \times 10^{-2}$	101	133	13 500	129
EER40	0,643 21	$0{,}424\ 31 \times 10^{-2}$	97,5	152	14 800	139
EER42	0,510 64	$0{,}272\ 52 \times 10^{-2}$	95,7	187	17 900	179
EER49	0,557 95	$0{,}231\ 33 \times 10^{-2}$	134	241	32 400	228

NOTE 1 The manufacturers can indicate in their catalogues more precise values than those given in Table 2.

NOTE 2 The above values have been calculated using the method given in IEC 60205.

[a] See IEC 60205 for the definition of A_{min}.

4.3 Dimensional limits for coil formers

The essential dimensions of coil formers suitable for use with a pair of EER-cores shall be as given in Table 3. The dimensions specified in Table 3 are illustrated in Figure 2.

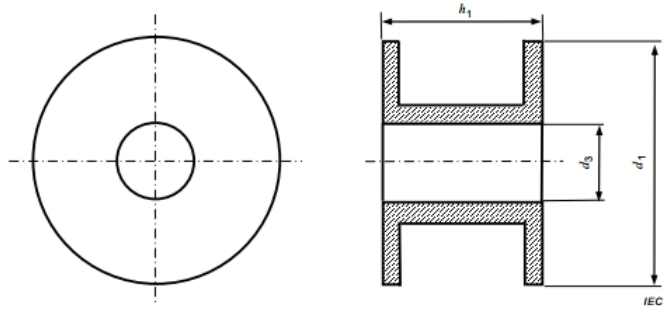


Figure 2 – Essential dimensions of coil formers

Table 3 – Dimensional limits for coil formers

Size	d_1 mm	d_3 mm	h_1 mm
	Max.	Min.	Max.
EER 25,5	19,3	8,0	11,7
EER 28	20,7	10,4	18,4
EER 28L	20,7	10,4	24,2
EER 35	24,9	11,8	28,6
EER 39	27,9	13,3	33,0
EER 40	28,5	13,8	30,0
EER 42	28,6	15,8	29,6
EER 49	35,4	17,9	44,3

5 Limits of surface irregularities

技术内容. 表面缺陷极限

5.1 General

Surface irregularities are defined in IEC 60424-1.

Figure 3 shows different examples of surface irregularities of an EER-core.

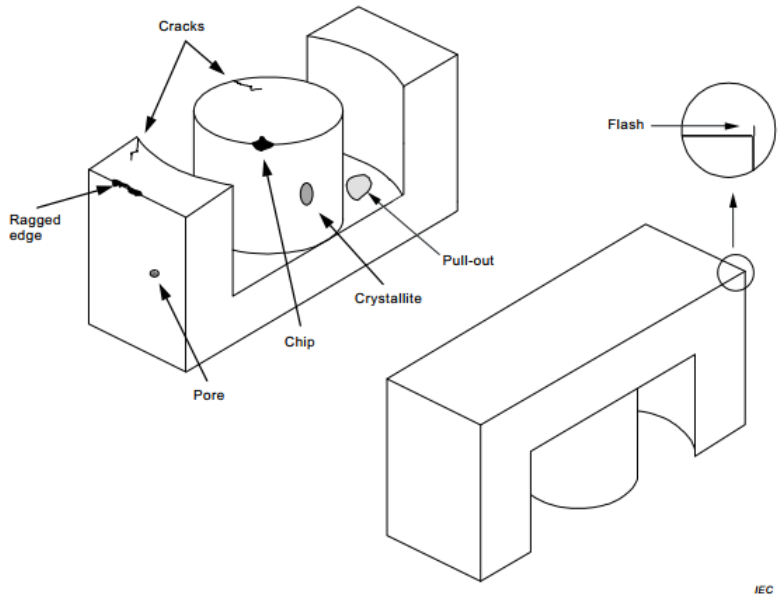


Figure 3 – Examples of surface irregularities

5.2 Chips and ragged edges

5.2.1 General

The minimum area is taken as 0,5 mm^2, to be distinguishable to the naked eye.

5.2.2 Chips and ragged edges on the mating surfaces (see Figure 4)

The areas of the chips located on the mating surfaces (chip1 and chip1′ irregularities of Figure 4) shall not exceed the following limits:

- the cumulative area of the chips shall be less than 6 % of the mating surface (whether gapped or ungapped) of the centre leg;
- the total length of the ragged edges shall be less than 25 % of the perimeter of the relevant surface.

5.2.3 Chips and ragged edges on the other surfaces (see Figure 4)

The allowable areas of chips are doubled as compared to the limits for the mating surfaces.

The rule for ragged edges is the same as that for the mating surfaces.

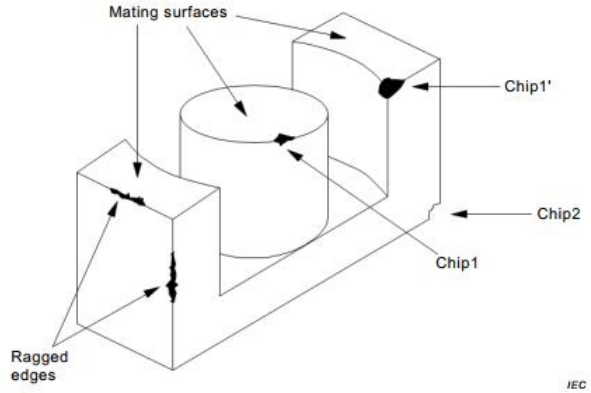
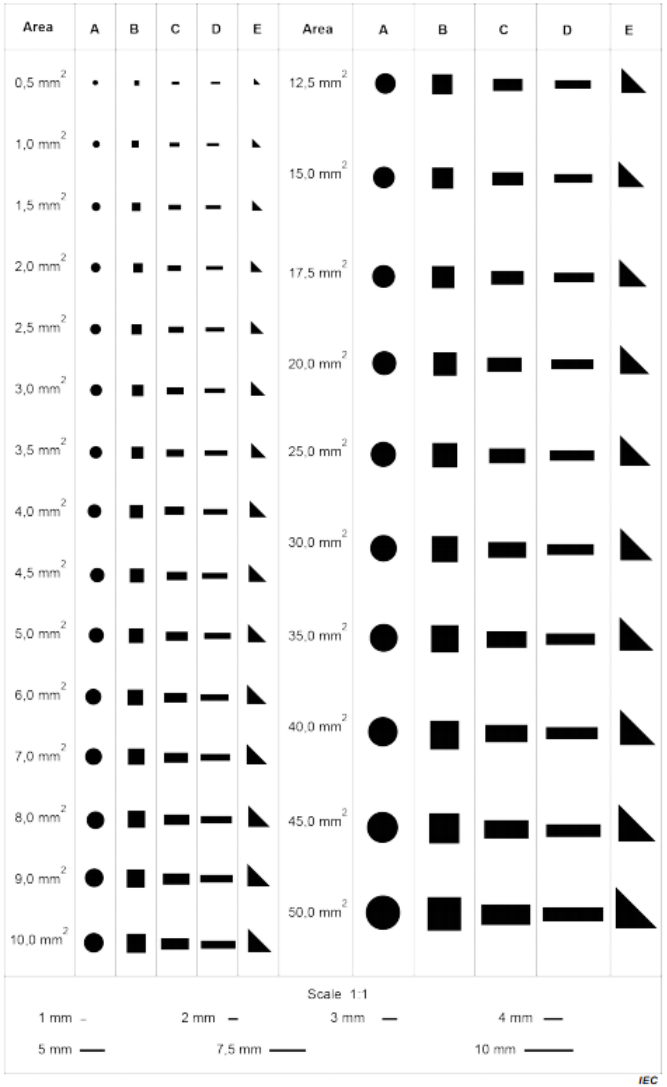


Figure 4 – Chip locations for EER-cores

Area and length reference for visual inspection is given in Table 4. Examples of allowable areas of chips are given in Annex C.

Table 4 – Area and length reference for visual inspection



5.3 Cracks

The limits for cracks at various locations shown in Figure 5 are given in Table 5.

5.4 Flash

There shall be no flash extending from the core into the wire-slot (see Figure 5).

5.5 Pull-outs

For EER-cores, the cumulative area of pull-outs of the core shall be less than 25 % of the total respective surface area (see Figure 5).

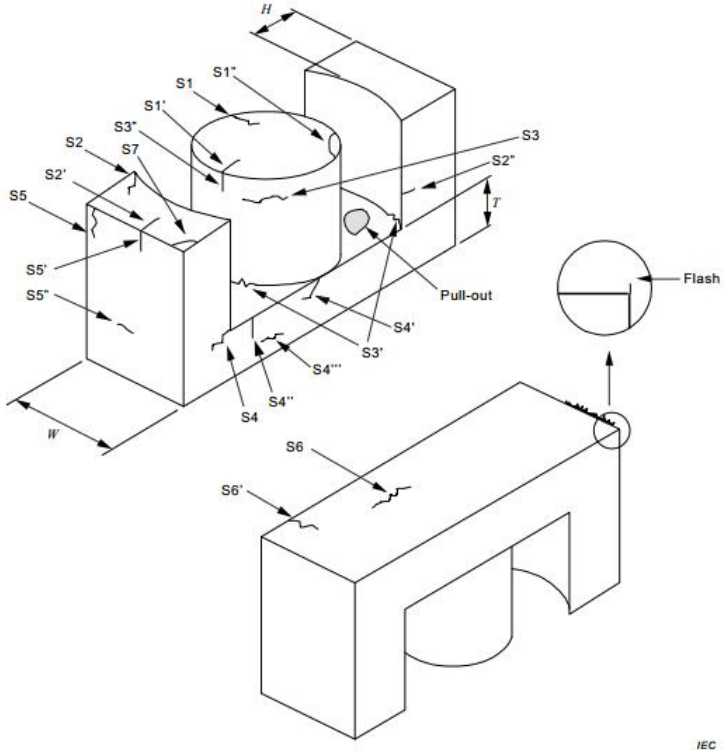


Figure 5 – Cracks and pull-out locations for EER-cores

Table 5 – Limits for cracks

Type	Location	Limits for single crack	Limits for multiple cracks
S1 and S1'	Mating surface of centre post	< 25 % of dimension *W*	< 50 % of dimension *W*
S1"	Corner of centre post	Not acceptable	Not acceptable
S2 and S2'	Mating surface of outer leg	< 25 % of dimension *H*	< 25 % of dimension *H*
S2"	Side of outer leg	< 25 % of dimension *H*	< 25 % of dimension *H*
S3 and S3"	Centre post	< 25 % of dimension *W*	< 25 % of dimension *W*
S3'	Bottom corner of centre post/back wall and outer leg/back wall	< 25 % of dimension *W*	< 25 % of dimension *W*
S4	Bottom corner of outer leg/back wall	< 25 % of dimension *T*	< 25 % of dimension *T*
S4' and S4"	Back wall	< 25 % of dimension *T*	< 25 % of dimension *T*
S4""	Back wall	< 50 % of dimension *W*	< 100 % of dimension *W*
S5, S5' and S5"	Outer leg	< 50 % of dimension *W*	< 100 % of dimension *W*
S6	Back surface	< 50 % of dimension *W*	< 100 % of dimension *W*
S6'	Back surface	< 25 % of dimension *W*	< 25 % of dimension *W*
S7	Corner of outer leg	Not acceptable	Not acceptable

5.6 Crystallites

Figure 6 shows an example of crystallite location on EER-cores:

- A single area of crystallites located on any surface shall be less than 2 % of the respective surface area.
- The cumulative area of crystallites located on any surface shall be less than 4 % of the respective surface area (see Figure 6).

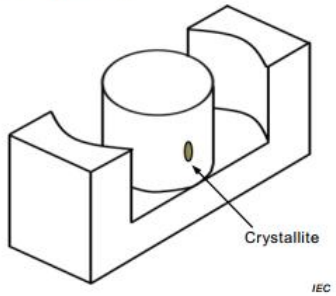


Figure 6 – Crystallite location for EER-cores

5.7 Pores

Figure 7 shows an example of pore location on EER cores:

- The number of pores located on the same surface shall not exceed two. The total number of pores located on all surfaces shall not exceed five.
- A hole with an area larger than 1 mm^2 on any surface is not acceptable.

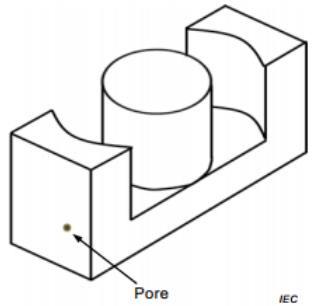


Figure 7 – Pore location for EER-cores

Annex A
(normative)

Derived standards

附录

Clauses 1 to 4 of this document establish the values for the principal dimensions of core assemblies and coil formers and enable full interchangeability for components complying with this primary standard to be achieved.

Parties interested in making or using EER-cores may find it desirable to lay down local standards for everyday use, which show the dimensions and tolerances in greater detail than Clause 4, and which correspond to the state of the art in that area. These specifications are known as "derived standards". When doing so, care should be taken not to exclude any other type of EER-core meeting this primary standard, which would also satisfy the performance specification valid for a specific case.

It should be noted that even if a component complies with a derived standard and with the requirements of Clause 4 of this primary standard, therefore permitting core assemblies and coil formers to be freely interchanged, its constituent parts may not necessarily be interchangeable.

When requirements lead to the establishment of a national standard, the relevant national standardization body is strongly requested to insert a note in such a national standard stating that:

a) it is in accordance with the dimensional requirements of this present primary standard but that more details are given in order to promote its practical use;

b) other solutions are possible within the framework of this primary standard and should not be excluded if the resulting core and coil formers are functionally interchangeable with those of the national standard.

Annex B
(normative)

Example of dimensions for gauges to check the dimensions of EER-cores meeting this primary standard

附录

B.1 General

The gauges shall be in accordance with Table B.1 and its associated Figure B.1.

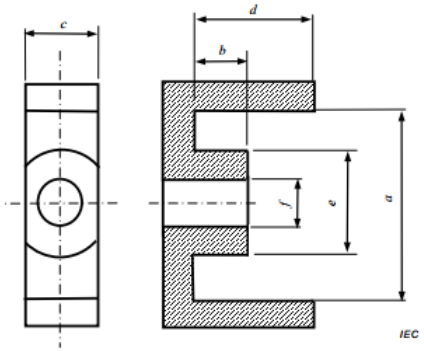


Figure B.1 – Gauge dimensions

Table B.1 – Gauge dimensions

Size	*a* mm		*b* mm		*c* mm	*d* mm	*e* mm		*f* mm	
	Min.	Max.	Min.	Max.	Min.	Min.	Min.	Max.	Min.	Max.
EER 25,5	26,105	26,115	5,95	5,96	14,0	7,0	19,685	19,695	7,755	7,765
EER 28	29,105	29,115	9,30	9,31	18,0	11,0	21,085	21,095	10,205	10,215
EER 28L	29,105	29,115	12,2	12,3	18,0	14,0	21,085	21,095	12,805	12,815
EER 35	35,805	35,815	14,4	14,5	18,0	16,0	25,285	25,295	11,605	11,615
EER 39	39,805	39,815	16,6	16,7	20,0	18,0	28,385	28,395	13,105	13,115
EER 40	40,505	40,515	15,1	15,2	20,0	17,0	28,985	28,995	13,555	13,565
EER 42	42,905	42,915	14,9	15,0	22,0	17,0	29,185	29,195	15,605	15,615
EER 49	50,105	50,115	22,3	22,4	24,0	24,0	35,985	35,995	17,605	17,615

B.2 Procedure and requirements

To check the winding space, the gauge shall be fully inserted into the core without forcing; when fully inserted, the gauge shall meet the mating surface of the outer legs of the core under test.

Annex C
(informative)

Examples of allowable areas of chips

附录

Reference of allowable areas of chips for a given core is summarized in Table C.1.

NOTE Table C.1 is taken from IEC 60424-3:2015, Table 2, and is included in Annex C for ease of reference.

Table C.1 – Allowable areas of chips for EER-cores

Core size	Mating surfaces mm^2	Other surfaces mm^2
EER25,5	< 2,5	< 5
EER28	< 4	< 8
EER28L	< 4	< 8
EER35	< 6	< 12,5
EER39	< 7	< 15
EER40	< 8	< 15
EER42	< 10	< 20
EER49	< 12,5	< 25

Bibliography

参考文献

IEC 60424-3:2015, *Ferrite cores – Guidelines on the limits of surface irregularities – Part 3: ETD-cores, EER-cores, EC-cores and E-cores*

中国参与IEC/TC 51工作情况

- 尽管中国在本世纪初已成为磁性材料大国，但长期以来几乎未参与TC 51的工作，在相关国际标准制定方面为空白。
- 2009年10月IEC/TC 51全会及工作组会议在深圳召开，这是中国首次承办TC 51国际会议。
- 2011年11月在日本奈良召开的IEC/TC 51 会议上，中国获得了 IEC 60424-8 *FERRITE CORES – GUIDELINES ON THE LIMITS OF SURFACE IRREGULARITIES – PART 8: PQ-CORES* 新提案起草任务。该标准于2015年颁布实施，实现了中国在TC51领域国际标准化工作 “零” 的突破。
- 2013年3月在美国洛杉矶召开的IEC/TC 51会议上，中国又获得了IEC 62317-13 *FERRITE CORES – DIMENSIONS – PART 13: PQ-CORES FOR USE IN POWER SUPPLY APPLICATIONS* 的修订任务。该标准于2015年颁布实施，进一步提高了中国在TC 51的影响力。

- 2015年10月IEC/TC 51 全会再次在深圳召开。会上中国争取到7项国际标准的新提案起草任务：

— IEC 60401-1: 2002 *TERMS AND NOMENCLATURE FOR CORES MADE OF MAGNETICALLY SOFT FERRITES – PART 1: TERMS USED FOR PHYSICAL IRREGULARITIES* 修订；

— IEC 63093-4 ED1 *FERRITE CORES – GUIDELINES ON DIMENSIONS AND THE LIMITS OF SURFACE IRREGULARITIES PART 4: RM-CORES* 制定；

— IEC 63093-13 ED1 *FERRITE CORES – GUIDELINES ON DIMENSIONS AND THE LIMITS OF SURFACE IRREGULARITIES PART 13: PQ-CORES* 制定；

— IEC 63093-14 ED1 *FERRITE CORES – GUIDELINES ON DIMENSIONS AND THE LIMITS OF SURFACE IRREGULARITIES PART 14: EFD-CORES* 制定；

— *STANDARD SYSTEM OF POWDER CORES* 制定；

— DUAL LOGO (IEC/IEEE) STANDARD TO COMBINE IEC 61007 AND IEEE 389 制定；

— *NEAR FIELD NOISE MEASURING METHOD OF INDUCTORS* 制定。

- 2016年11月在德国慕尼黑召开的 IEC/TC 51工作组会议上，中国提交了构建金属磁粉心标准体系和永磁铁氧体标准体系的提案。其中，金属磁粉心标准体系提案已于2017年初获得TC 51投票通过。此次会议上，中国还争取到4项金属磁粉心和1项铁氧体国际标准的新提案起草任务：

— IEC 63182-1 ED1 *MAGNETIC POWDER CORES - GUIDELINES ON DIMENSIONS AND THE LIMITS OF SURFACE IRREGULARITIES – PART 1: GENERAL SPECIFICATION* 制定;

— IEC 63182-2 ED1 *MAGNETIC POWDER CORES - GUIDELINES ON DIMENSIONS AND THE LIMITS OF SURFACE IRREGULARITIES - PART 2: RING-CORES* 制定;

— IEC 63182-X ED1 *CLASSIFICATION OF POWDER CORES' MATERIALS* 制定;

— IEC 63182-X ED1 *TEST METHODS FOR MAGNETIC POWDER CORES* 制定;

— IEC 61333 ED2 *MARKING ON FERRITE CORES* 修订。

- 2017年11月在俄罗斯海参崴召开的IEC/TC 51全会上，中国又获得国际标准 IEC 61631-2 *TEST METHOD FOR THE MECHANICAL STRENGTH OF CORES MADE OF MAGNETIC OXIDES PART 2：RING-CORES* 的新提案起草任务。

- 中国目前有9人担任IEC/TC 51注册专家（EXPERT）：

  崔莹、张瑞标、赵淳、李晓英、颜毅鹏、邵峰、周少雄、赵光、张爱国

- 2014年11月在日本东京召开的 IEC/TC51全会上，张瑞标先生被推举为WG1的召集人。2017年10月在俄罗斯海参崴召开的 IEC/TC51全会由张瑞标先生担任会议代理主席，颜毅鹏先生担任WG9召集人并主持工作组会议。

- 鉴于中国专家在国际标准化工作中所作出的突出贡献，IEC分别于2010年、2013年和2018年授予天通控股股份有限公司张瑞标先生、中国电子技术标准化研究院崔莹女士、安泰科技股份有限公司周少雄先生和南京新康达磁业股份有限公司赵光先生“IEC 1906大奖”。

- 为了加强对国内各单位参加IEC标准化工作的组织和领导，2016年初由工信部中国电子技术标准化研究院牵头，成立了IEC国际标准中国专家组，共有34家单位的55名专业人士成为专家组成员。对应TC51的WG1、WG9和WG10，也设立了三个工作组，牵头单位和组长分别为天通股份张瑞标先生、福州大学陈为先生和电科九所的张明先生。后续IEC国际标准的许多相关工作，如IEC标准的讨论、起草、征求意见及修订、对现有国际标准的跟踪、回复TC 51征询意见等均由中国专家组组织开展。
- 为了提高中国在金属磁粉心国际标准制修订方面的话语权和竞争力，2017年12月在绵阳召开的IEC/TC 51中国专家组会议决定，由安泰科技、七星飞行、东睦科达、铂科、新康达、瑞德等企业分别承担磁粉心用粉末规范、E型、EQ型、ER型、U型、块状、圆柱形、椭圆形等磁粉心尺寸和表面缺陷极限导则分规范起草的前期准备工作，以便在争取相关国际标准制定权时取得更大的主动。目前各承担任务的单位正在积极开展相关工作，力争拿出高质量的标准草案文本，参与国际竞争。

谢 谢

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