

# INTERNATIONAL STANDARD

**Ferrite cores – Guidelines on dimensions and the limits of surface  
irregularities –  
Part 8: E-cores**

IECNORM.COM : Click to view the full PDF of IEC 63093-8:2018



## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2018 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

### About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

### About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

#### IEC Catalogue - [webstore.iec.ch/catalogue](http://webstore.iec.ch/catalogue)

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

#### IEC publications search - [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary of electronic and electrical terms containing 21 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

#### 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 Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [sales@iec.ch](mailto:sales@iec.ch).

IECNORM.COM : Click to view the PDF of IEC 60393-2:2018

# INTERNATIONAL STANDARD

---

**Ferrite cores – Guidelines on dimensions and the limits of surface irregularities –  
Part 8: E-cores**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

---

ICS 29.100.10

ISBN 978-2-8322-5835-4

**Warning! Make sure that you obtained this publication from an authorized distributor.**

## CONTENTS

FOREWORD.....	4
1 Scope.....	6
2 Normative references .....	6
3 Terms and definitions .....	6
4 Primary dimensions .....	6
4.1 General.....	6
4.2 Dimensions of E-cores .....	7
4.2.1 Main dimensions.....	7
4.2.2 Effective parameter and $A_{min}$ values .....	9
4.3 Dimensional limits for coil formers .....	11
5 Limits of surface irregularities .....	15
5.1 General.....	15
5.2 Examples of surface irregularities .....	15
5.3 Chips and ragged edges .....	15
5.3.1 General .....	15
5.3.2 Chips and ragged edges on the mating surfaces.....	15
5.3.3 Chips and ragged edges on the other surfaces.....	15
5.4 Cracks .....	18
5.5 Flash .....	18
5.6 Pull-outs .....	18
5.7 Crystallites.....	19
5.8 Pores.....	19
Annex A (normative) Derived standards.....	21
Annex B (normative) Example of dimensions for gauges to check the dimensions of E-cores complying with this document .....	22
B.1 General.....	22
B.2 Procedure and requirements.....	24
Annex C (informative) Reference of allowable areas of chips .....	25
Bibliography.....	26
Figure 1 – Dimensions of E-cores with rectangular cross-section .....	7
Figure 2 – Main dimensions of coil formers .....	12
Figure 3 – Examples of surface irregularities .....	15
Figure 4 – Chip location for E-cores .....	16
Figure 5 – Crack and pull-out locations for E-cores .....	18
Figure 6 – Crystallite location for E-cores .....	19
Figure 7 – Pore location for E-cores.....	20
Figure B.1 – Gauge dimensions .....	22
Table 1 – Dimensions of E-cores with rectangular cross-section .....	8
Table 2 – Effective parameter and $A_{min}$ values.....	10
Table 3 – Dimensional limits for coil formers .....	13
Table 4 – Area and length reference for visual inspection .....	17
Table 5 – Limits for cracks .....	19

Table B.1 – Gauge dimensions ..... 23  
Table C.1 – Allowable areas of chips for E-cores ..... 25

IECNORM.COM : Click to view the full PDF of IEC 63093-8:2018

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**FERRITE CORES – GUIDELINES ON DIMENSIONS  
AND THE LIMITS OF SURFACE IRREGULARITIES –****Part 8: E-cores**

## 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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 63093-8 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 62317-8 published in 2006 and the second edition of IEC 60424-3 published in 2015. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to IEC 62317-8:2006 and IEC 60424-3:2015:

- a) This document integrates IEC 62317-8:2006 and IEC 60424-3:2015;
- b) Table 4 – Allowable areas of chips for E-cores, of IEC 60424-3:2015, has been moved to Annex C (informative) of this document.

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

CDV	Report on voting
51/1213/CDV	51/1235/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.

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.

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.

IECNORM.COM : Click to view the full PDF of IEC 63093-8:2018

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

## Part 8: E-cores

### 1 Scope

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

The specifications contained in this document are useful in 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 standard, is discussed in Annex A.

### 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 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

For the purpose 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

#### 4.1 General

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

## 4.2 Dimensions of E-cores

### 4.2.1 Main dimensions

The main dimensions of E-cores with rectangular cross-section shall be those given in Table 1.

The dimensions of the cores can be checked by means of gauges, an example of which is given in Annex B. In order to facilitate production it can be necessary to use gauges with dimensions differing from those given in Annex B, although no relaxation of the requirements for the dimensions of the cores given in Table 1 is thereby permitted. The dimensions specified in Table 1 are illustrated in Figure 1.

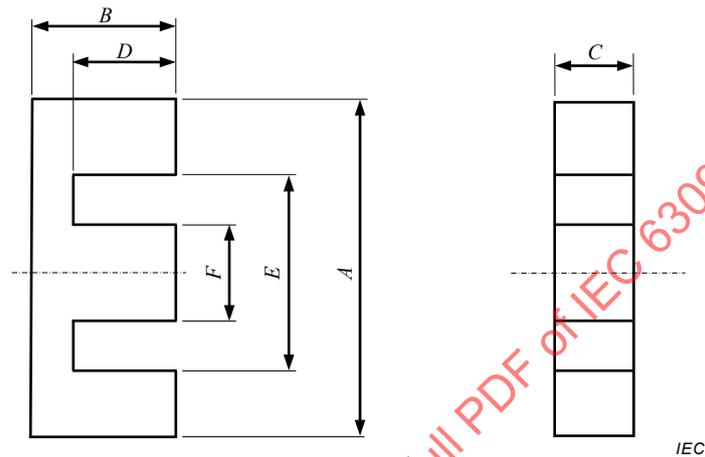


Figure 1 – Dimensions of E-cores with rectangular cross-section

**Table 1 – Dimensions of E-cores with rectangular cross-section**

Size	A mm		B mm		C mm		D mm		E mm		F mm		IEC 61246 <sup>a</sup> references	Industrial references
	Min.	Max.	Min.	Max.										
E5,3/2	5,15	5,35	2,57	2,73	1,90	2,00	1,92	2,08	3,80	4,00	1,30	1,40	E5,3/2	FEE5,25; EE5
E6,3/2	6,05	6,30	2,80	2,90	1,90	2,00	1,85	2,05	3,60	3,80	1,30	1,40	E6,3/2	FEE6,18
E8/2	7,85	8,15	3,95	4,05	2,30	2,40	2,85	2,95	5,60	5,80	2,30	2,40	E8/2	FEE8
E8,3/4	8,10	8,60	3,90	4,10	3,40	3,80	2,90	3,10	6,10	6,50	1,60	2,00		FEE8,3; EE8
E8,8/2	8,60	9,40	3,85	4,15	1,78	2,02	2,03	2,40	5,07	5,33	1,78	2,02	E8,8/2	FEE9
E10/3	9,80	10,2	4,88	5,00	2,88	3,00	3,50	3,62	7,00	7,30	2,88	3,00	E10/3	FEE10
E10,2/5	10,0	10,5	5,35	5,65	4,50	4,90	4,05	4,35	7,60	8,00	2,20	2,60		FEE10,2; EE10/11
E13/4	12,2	13,1	6,30	6,50	3,40	3,70	4,50	4,80	8,90	9,50	3,40	3,70	E13/4	FEE12,7A; EF12,6
E13/6	12,8	13,2	5,85	6,15	6,00	6,30	4,50	4,70	10,00	10,4	2,60	2,90		EE13
E16/4,8	15,7	16,3	7,00	7,30	4,60	5,00	5,00	5,40	11,7	12,3	3,80	4,20		FEE16A; EE16
E16/5	15,5	16,7	7,90	8,20	4,30	4,70	5,70	6,10	11,3	11,9	4,40	4,70	E16/5	FEE16,1; EF16
E19/5	18,6	19,4	7,80	8,20	4,80	5,20	5,40	5,80	14,2	14,8	4,30	4,70		FEE19A; EE19
E19,3/4,8	18,97	19,61	7,92	8,28	4,63	4,88	5,59	5,84	14,05	14,7	4,67	4,83		EE-187; EE19/16
E20/6	19,4	20,8	9,80	10,2	5,40	5,90	7,00	7,40	14,1	14,7	5,50	5,90	E20/6	FEE20,1; EF20
E25/7	24,3	25,8	12,3	12,8	6,90	7,50	8,70	9,20	17,5	18,3	7,00	7,50	E25/7	FEE25,1; EF25
E25,4/6	24,9	25,9	9,30	9,70	6,05	6,65	6,20	6,60	18,6	19,4	6,05	6,65		FEE25,4A
E25,4/6,3	24,9	25,9	9,27	9,65	6,10	6,48	6,22	6,60	18,55	19,81	6,10	6,60		EE24/25; EE25/19
E30/11	29,5	30,6	12,9	13,5	10,4	11,0	7,90	8,50	19,5	20,5	10,4	11,0		FEE30A; EE30
E32/9	31,3	32,9	15,8	16,4	8,80	9,50	11,2	11,8	22,7	23,7	8,90	9,50	E32/9	FEE32,1; EF32
E33/13	32,5	33,9	13,5	14,1	12,4	13,0	9,00	9,60	23,1	24,1	9,40	10,0		FEE33A; EE33
E34,6/9	33,9	35,3	13,9	14,64	8,90	9,72	9,51	10,05	25,0	26,2	9,10	9,70		EE375; EE35/28B
E35/10	34,5	35,7	15,2	15,8	9,70	10,3	9,20	9,80	24,5	25,5	9,70	10,3		FEE35A; EE35
E40/11	39,5	40,7	16,7	17,3	10,4	11,0	10,0	10,6	27,5	28,5	9,70	11,0		FEE40A; EE40
E41/13	40,27	41,87	16,38	17,18	12,19	12,95	10,08	10,68	28,55	29,59	12,19	13,1		EE21; EE41/33C

Size	A mm		B mm		C mm		D mm		E mm		F mm		IEC 61246 <sup>a</sup> references	Industrial references
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
E42/15	41,3	43,0	20,8	21,2	14,7	15,2	14,8	15,5	29,5	30,7	11,7	12,2	E42/15	FEE42A
E42/20	41,3	43,0	20,8	21,2	19,2	20,0	14,8	15,5	29,5	30,7	11,7	12,2	E42/20	FEE42B
E47/16	46,1	47,88	19,4	19,83	15,35	15,87	12,07	12,5	31,72	32,56	15,35	15,87		EE625; EE47/39
E50/15	49,3	51,0	21,0	21,6	14,2	15,0	12,5	13,1	34,3	35,7	14,2	15,0		EE50A; EE50
E55/21	54,1	56,2	27,2	27,8	20,4	21,0	18,5	19,3	37,5	38,7	16,7	17,2	E55/21	FEE55,2A
E55/25	54,1	56,2	27,2	27,8	24,2	25,0	18,5	19,3	37,5	38,7	16,7	17,2	E55/25	FEE55,2B
E60/16	59,2	61,1	22,0	22,6	15,2	16,0	13,7	14,0	43,7	45,3	15,2	16,0		FEE60A; EE60
E65/27	63,8	66,5	32,2	32,8	26,6	27,4	22,2	23,0	44,2	45,7	19,3	20,0	E65/27	FEE65,2

<sup>a</sup> Withdrawn publication.

#### 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, reference shall be made to IEC 60205.

IECNORM.COM : Click to view the full PDF of IEC 63093-8:2018

Table 2 – Effective parameter and  $A_{\min}$  values

Size <sup>a</sup>	$C_1$ mm <sup>-1</sup>	$C_2$ mm <sup>-3</sup>	$l_e$ mm	$A_e$ mm <sup>2</sup>	$V_e$ mm <sup>3</sup>	$A_{\min}^b$ mm <sup>2</sup>	IEC 61246 <sup>c</sup> references	Industrial references
E5,3/2	4,850 4	1,863 0	12,6	2,60	32,9	2,54 B		
E6,3/2	3,764 6	1,148 7	12,3	3,28	40,4	2,63 C	E6,3/2	FEE6,18
E8/2	3,439 7	0,639 76	18,5	5,38	99,4	5,17 B	E8/2	FEE8
E8,3/4	2,800 3	0,401 68	19,5	6,97	136	6,48 C		FEE8,3; EE8
E8,8/2	3,154 0	0,635 22	15,7	4,97	77,8	3,61 C	E8,8/2	FEE9
E10/3	2,726 6	0,324 93	22,9	8,40	192	8,11 B	E10/3	FEE10
E10,2/5	2,250 3	0,193 83	26,1	11,6	303	11,3 C		FEE10,2; EE10/11
E13/4	2,394 6	0,192 77	29,7	12,4	369	12,2 L	E13/4	FEE12,7A; EF12,6
E13/6	1,766 3	0,103 21	30,2	17,1	517	16,9 C		EE13
E16/4,8	1,837 9	9,651 2 × 10 <sup>-2</sup>	35,0	19,0	667	18,7 B		FEE16A; EE16
E16/5	1,872 4	9,333 3 × 10 <sup>-2</sup>	37,6	20,1	754	19,4 B	E16/5	FEE16,1; EF16
E19/5	1,726 4	7,512 0 × 10 <sup>-2</sup>	39,7	23,0	912	22,5 C		FEE19A; EE19
E19,3/4,8	1,751 0	7,661 8 × 10 <sup>-2</sup>	40,0	22,9	914	22,6 C		EE-187; EE19/16
E20/6	1,447 3	4,516 8 × 10 <sup>-2</sup>	46,4	32,0	1 490	31,6 B	E20/6	FEE20,1; EF20
E25/7	1,114 2	2,149 5 × 10 <sup>-2</sup>	57,8	51,8	2 990	51,5 L	E25/7	FEE25,1; EF25
E25,4/6	1,198 6	2,984 8 × 10 <sup>-2</sup>	48,1	40,2	1 930	39,4 B		FEE25,4A
E25,4/6,3	1,232 8	3,153 8 × 10 <sup>-2</sup>	74,2	39,1	1 880	38,4 B		EE24/25; EE25/19
E30/11	0,529 47	4,828 8 × 10 <sup>-3</sup>	58,1	110	6 370	107 B		FEE30A; EE30
E32/9	0,893 64	10,746 × 10 <sup>-3</sup>	74,3	83,2	6 180	81,4 L	E32/9	FEE32,1; EF32
E33/13	0,548 84	4,585 3 × 10 <sup>-3</sup>	65,7	120	7 860	114 B		FEE33A; EE33
E34,6/9	0,819 44	9,651 6 × 10 <sup>-3</sup>	69,5	84,9	5 910	83,6 B		EE375; EE35/28B
E35/10	0,660 20	6,229 0 × 10 <sup>-3</sup>	70,0	106	7 420	100 C		FEE35A; EE35
E40/11	0,606 50	4,749 4 × 10 <sup>-3</sup>	77,5	128	9 890	114 C		FEE40A; EE40
E41/13	0,495 37	3,161 1 × 10 <sup>-3</sup>	77,6	157	12 200	151 L		EE21; EE41/33C

Size <sup>a</sup>	$C_1$ mm <sup>-1</sup>	$C_2$ mm <sup>-3</sup>	$l_e$ mm	$A_e$ mm <sup>2</sup>	$V_e$ mm <sup>3</sup>	$A_{\min}^{b}$ mm <sup>2</sup>	IEC 61246 <sup>c</sup> references	Industrial references
E42/15	0,546 63	$3,069\ 3 \times 10^{-3}$	97,4	178	17 300	175 B	E42/15	FEE42A
E42/20	0,416 95	$1,785\ 7 \times 10^{-3}$	97,4	233	22 700	229 B	E42/20	FEE42B
E47/16	0,379 69	$1,618\ 1 \times 10^{-3}$	89,1	235	20 900	229 B		EE625; EE47/39
E50/15	0,425 62	$1,880\ 2 \times 10^{-3}$	96,3	226	21 800	213 C		EE50A; EE50
E55/21	0,350 12	$9,917\ 4 \times 10^{-4}$	124	353	43 600	350 C	E55/21	FEE55,2A
E55/25	0,294 62	$7,022\ 1 \times 10^{-4}$	124	420	51 900	417 C	E55/25	FEE55,2B
E60/16	0,441 67	$17,708 \times 10^{-4}$	110	249	27 300	243 C		FEE60A; EE60
E65/27	0,273 57	$5,095\ 4 \times 10^{-4}$	147	537	78 900	530 C	E65/27	FEE65,2

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

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

<sup>a</sup> The core size designation contains a combination of two numbers; the first one indicates the length  $l_e$  of the core and the second one its thickness  $C$  (see Table 1).

<sup>b</sup> IEC 60205 shall be referred to for definition of  $A_{\min}$ . The letters after the  $A_{\min}$  values give the location of  $A_{\min}$ : C is centre leg, L is outer leg, B is back wall.

<sup>c</sup> Withdrawn publication.

### 4.3 Dimensional limits for coil formers

The dimensional limits for coil formers suitable for use with a pair of E-cores of size greater than E8/2 shall be as given in Table 3. See Figure 2 for main dimensions of coil formers.

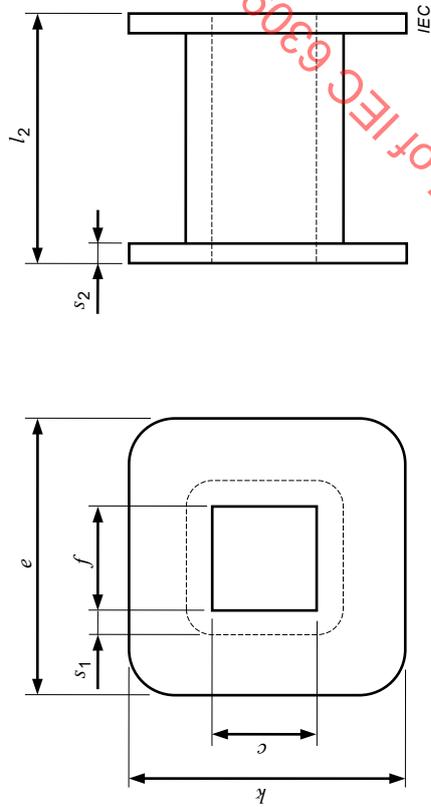


Figure 2 – Main dimensions of coil formers

IECNORM.COM : Click to view the full PDF of IEC 63093-8:2018

Table 3 – Dimensional limits for coil formers

Size	c mm		e mm	f mm	k mm	I <sub>2</sub> mm		s <sub>1</sub> mm	s <sub>2</sub> mm		IEC 61246 <sup>a</sup> references	Industrial references
	Min.	Max.				Max.	Min.		Min.	Min.		
E8/2	2,55	5,40	2,55	5,40	5,40	5,50	0,35	0,4	E8/2	FEE8		
E8,3/4	3,95	5,90	2,15	5,90	5,90	5,60	0,35	0,4		FEE8,3; EE8		
E8,8/2	2,17	4,87	2,17	4,87	4,87	3,86	0,35	0,4	E8,8/2	FEE9		
E10/3	3,15	6,80	3,15	6,80	6,80	6,80	0,4	0,4	E10/3	FEE10		
E10,2/5	5,05	7,40	2,75	7,40	7,40	7,90	0,4	0,5		FEE10,2; EE10/11		
E13/4	3,90	8,70	3,90	8,70	8,70	8,80	0,5	0,5	E13/4	FEE12,7A; EF12,6		
E13/6	6,45	9,80	3,05	9,80	9,80	8,80	0,4	0,5		EE13		
E16/4,8	5,15	11,5	4,35	11,5	11,5	9,80	0,5	0,5		FEE16A; EE16		
E16/5	4,90	11,1	4,90	11,1	11,1	11,2	0,5	0,5	E16/5	FEE16,1; EF16		
E19/5	5,35	14,0	4,85	14,0	14,0	10,6	0,8	0,8		FEE19A; EE19		
E19,3/4,8	5,98	13,85	5,98	13,85	13,85	11,0	0,8	0,8		EE-187; EE19/16		
E20/6	6,10	13,9	6,10	13,9	13,9	13,8	0,6	0,6	E20/6	FEE20,1; EF20		
E25/7	7,70	17,3	7,70	17,3	17,3	17,2	0,6	0,7	E25/7	FEE25,1; EF25		
E25,4/6	6,80	18,4	6,80	18,4	18,4	12,2	0,8	0,8		FEE25,4A		
E25,4/6,3	6,63	18,35	6,75	18,35	18,35	12,2	0,8	0,8		EE24/25; EE25/19		
E30/11	11,2	19,3	11,2	19,3	19,3	15,6	0,8	0,8		FEE30A; EE30		
E32/9	9,80	22,4	9,80	22,4	22,4	22,1	0,7	0,8	E32/9	FEE32,1; EF32		
E33/13	13,2	22,9	10,2	22,9	22,9	17,7	0,8	0,8		FEE33A; EE33		
E34,6/9	9,95	24,8	9,90	24,8	24,8	18,7	0,8	0,8		EE375; EE35/28B		
E35/10	10,5	24,3	10,5	24,3	24,3	18,1	0,8	0,8		FEE35A; EE35		
E40/11	11,3	27,3	11,3	27,3	27,3	19,7	0,8	0,8		FEE40A; EE40		
E41/13	13,3	28,3	13,4	28,3	28,3	19,9	0,8	0,8		EE21; EE41/33C		
E42/15	15,7	29,2	12,6	29,2	29,2	29,3	0,9	1,0	E42/15	FEE42A		
E42/20	20,5	29,2	12,6	29,2	29,2	29,3	0,9	1,0	E42/20	FEE42B		

Size	c mm		e mm		f mm		k mm		l <sub>2</sub> mm		s <sub>1</sub> mm		s <sub>2</sub> mm		IEC 61246 <sup>a</sup> references	Industrial references
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
E47/16	16,2	31,4	16,2	31,4	16,2	31,4	31,4	31,4	23,8	23,8	0,8	0,8	0,8	0,8	EE625; EE47/39	
E50/15	15,3	34,0	15,3	34,0	15,3	34,0	34,0	34,0	24,7	24,7	0,8	0,8	0,8	0,8	EE50A; EE50	
E55/21	21,7	37,1	17,6	37,1	17,6	37,1	37,1	37,1	36,7	36,7	1,0	1,0	1,0	1,0	E55/21 FEE55,2A	
E55/25	25,7	37,1	17,6	37,1	17,6	37,1	37,1	37,1	36,7	36,7	1,0	1,0	1,0	1,0	E55/25 FEE55,2B	
E60/16	16,3	43,3	16,3	43,3	16,3	43,3	43,3	43,3	27,1	27,1	0,8	0,8	0,8	0,8	FEE60A; EE60	
E65/27	27,8	43,7	20,5	43,7	20,5	43,7	43,7	43,7	44,1	44,1	1,0	1,0	1,0	1,0	E65/27 FEE65,2	

<sup>a</sup> Withdrawn publication.

IECNORM.COM : Click to view the full PDF of IEC 63093-8:2018

## 5 Limits of surface irregularities

### 5.1 General

Surface irregularities are defined in IEC 60424-1.

### 5.2 Examples of surface irregularities

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

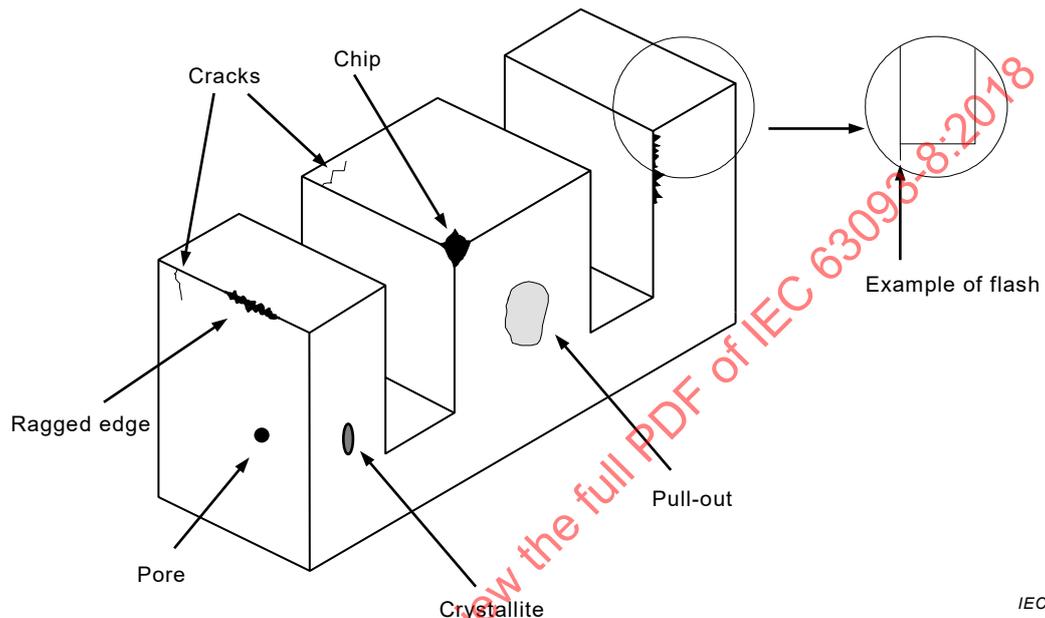


Figure 3 – Examples of surface irregularities

### 5.3 Chips and ragged edges

#### 5.3.1 General

The minimum area is taken as 0,5 mm<sup>2</sup>, to be distinguishable to the naked eye, and the maximum allowable area is 30 mm<sup>2</sup>.

Examples of allowable areas of chips are given in Annex C.

#### 5.3.2 Chips and ragged edges on the mating surfaces

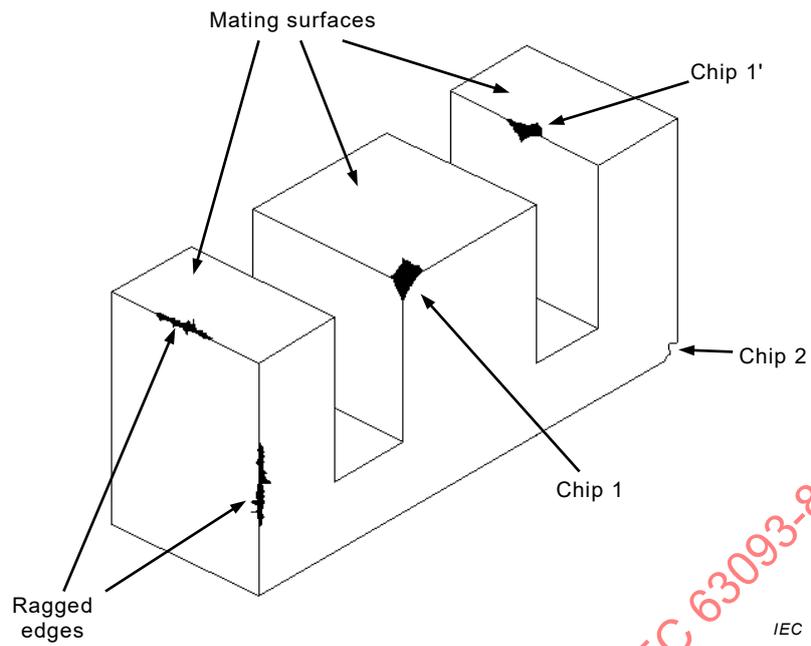
The areas of the chips located on the mating surfaces (chip 1 and chip 1' irregularities in Figure 4) shall not exceed the following limits:

- 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.

#### 5.3.3 Chips and ragged edges on the other surfaces

The allowable areas of chips on the other surfaces are doubled as compared to the limits for the mating surface (see Figure 4).

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



**Figure 4 – Chip location for E-cores**

Area and length reference for visual inspection is given in Table 4.

Examples of allowable areas of chips are given in Annex C.

IECNORM.COM : Click to view the full PDF of IEC 63093-8:2018

**Table 4 – Area and length reference for visual inspection**

Area	A	B	C	D	E	Area	A	B	C	D	E
0,5 mm <sup>2</sup>	•	■	-	-	▲	12,5 mm <sup>2</sup>	●	■	▬	▬	▲
1,0 mm <sup>2</sup>	•	■	-	-	▲	15,0 mm <sup>2</sup>	●	■	▬	▬	▲
1,5 mm <sup>2</sup>	•	■	-	-	▲	17,5 mm <sup>2</sup>	●	■	▬	▬	▲
2,0 mm <sup>2</sup>	•	■	-	-	▲	20,0 mm <sup>2</sup>	●	■	▬	▬	▲
2,5 mm <sup>2</sup>	•	■	-	-	▲	25,0 mm <sup>2</sup>	●	■	▬	▬	▲
3,0 mm <sup>2</sup>	•	■	-	-	▲	30,0 mm <sup>2</sup>	●	■	▬	▬	▲
3,5 mm <sup>2</sup>	•	■	-	-	▲	35,0 mm <sup>2</sup>	●	■	▬	▬	▲
4,0 mm <sup>2</sup>	•	■	-	-	▲	40,0 mm <sup>2</sup>	●	■	▬	▬	▲
4,5 mm <sup>2</sup>	•	■	-	-	▲	45,0 mm <sup>2</sup>	●	■	▬	▬	▲
5,0 mm <sup>2</sup>	•	■	-	-	▲	50,0 mm <sup>2</sup>	●	■	▬	▬	▲
6,0 mm <sup>2</sup>	•	■	-	-	▲						
7,0 mm <sup>2</sup>	•	■	-	-	▲						
8,0 mm <sup>2</sup>	•	■	-	-	▲						
9,0 mm <sup>2</sup>	•	■	-	-	▲						
10,0 mm <sup>2</sup>	•	■	-	-	▲						

Scale 1:1

1 mm -                      2 mm -                      3 mm -                      4 mm -

5 mm —                      7,5 mm —                      10 mm —

### 5.4 Cracks

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

### 5.5 Flash

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

### 5.6 Pull-outs

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

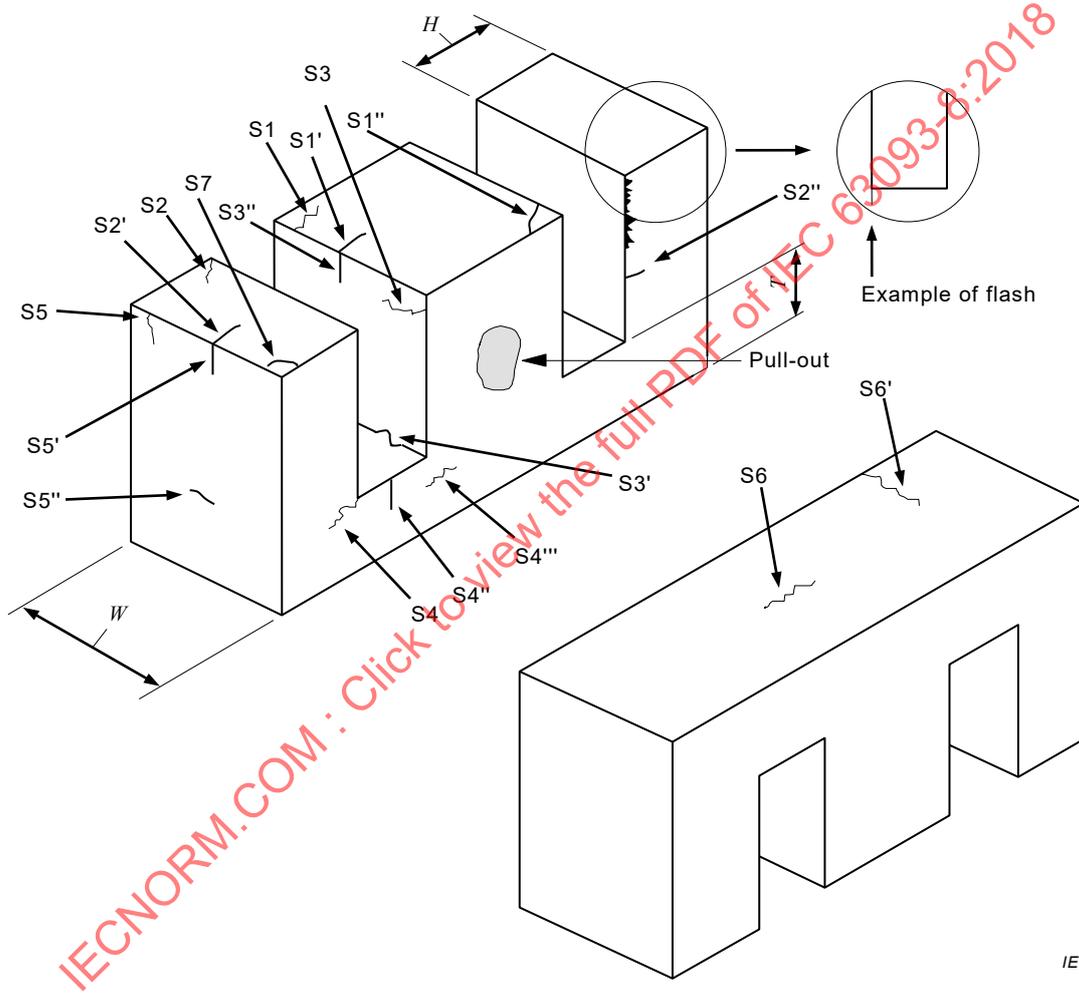


Figure 5 – Crack and pull-out locations for E-cores

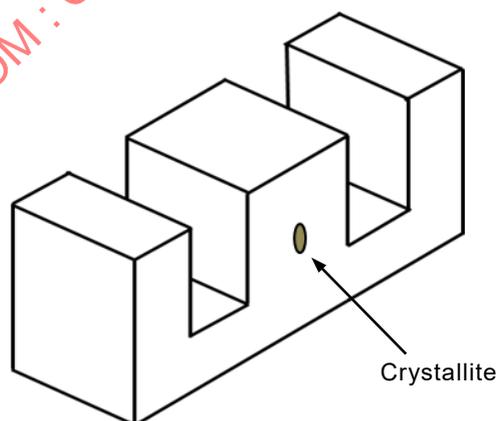
**Table 5 – Limits for cracks**

Type	Location	Limits for single crack	Limits for multiple cracks
S1 and S1'	Mating surface of centre pole	< 25 % of dimension $W$	< 50 % of dimension $W$
S1''	Corner of centre pole	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 pole	< 25 % of dimension $W$	< 25 % of dimension $W$
S3'	Bottom corner of centre pole / 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''	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

## 5.7 Crystallites

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

- a single area of the crystallites located on any surface shall be less than 2 % of the respective surface area;
- the cumulative area of the crystallites located on any surface shall be less than 4 % of the respective surface area.



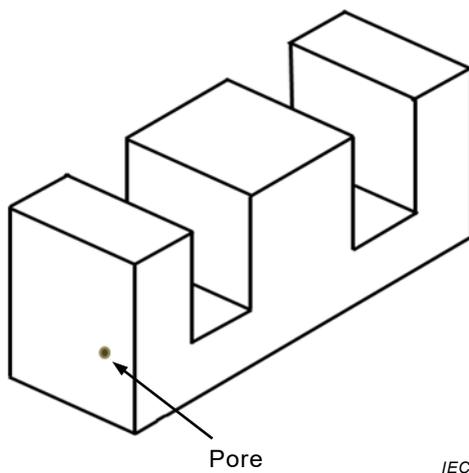
IEC

**Figure 6 – Crystallite location for E-cores**

## 5.8 Pores

Figure 7 shows an example of pore location on E-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<sup>2</sup> on any surface is not acceptable.



**Figure 7 – Pore location for E-cores**

IECNORM.COM : Click to view the full PDF of IEC 63093-8:2018

## **Annex A** (normative)

### **Derived standards**

This document establishes values for the main dimensions of E-cores and coil formers and enables full interchangeability to be achieved for components complying with its provisions.

Parties interested in making or using E-cores may find it desirable to lay down local standards for everyday use that show the dimensions and tolerances in greater detail than those in Clause 4, and correspond to the state of the art in that area. These are known as derived standards. When doing so, care should be taken not to exclude any other type of E-core meeting the requirements in this document that 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 document, 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) the national standard is in accordance with the dimensional requirements of IEC 63093-8, but that more details are given in order to promote the practical use of the standard;
- b) other solutions are possible within the framework of IEC 63093-8, and should not be excluded if the resulting cores and coil formers are functionally interchangeable with those in accordance with the national standard.

IECNORM.COM : Click to view the full PDF of IEC 63093-8:2018

### Annex B (normative)

#### Example of dimensions for gauges to check the dimensions of E-cores complying with this document

##### B.1 General

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

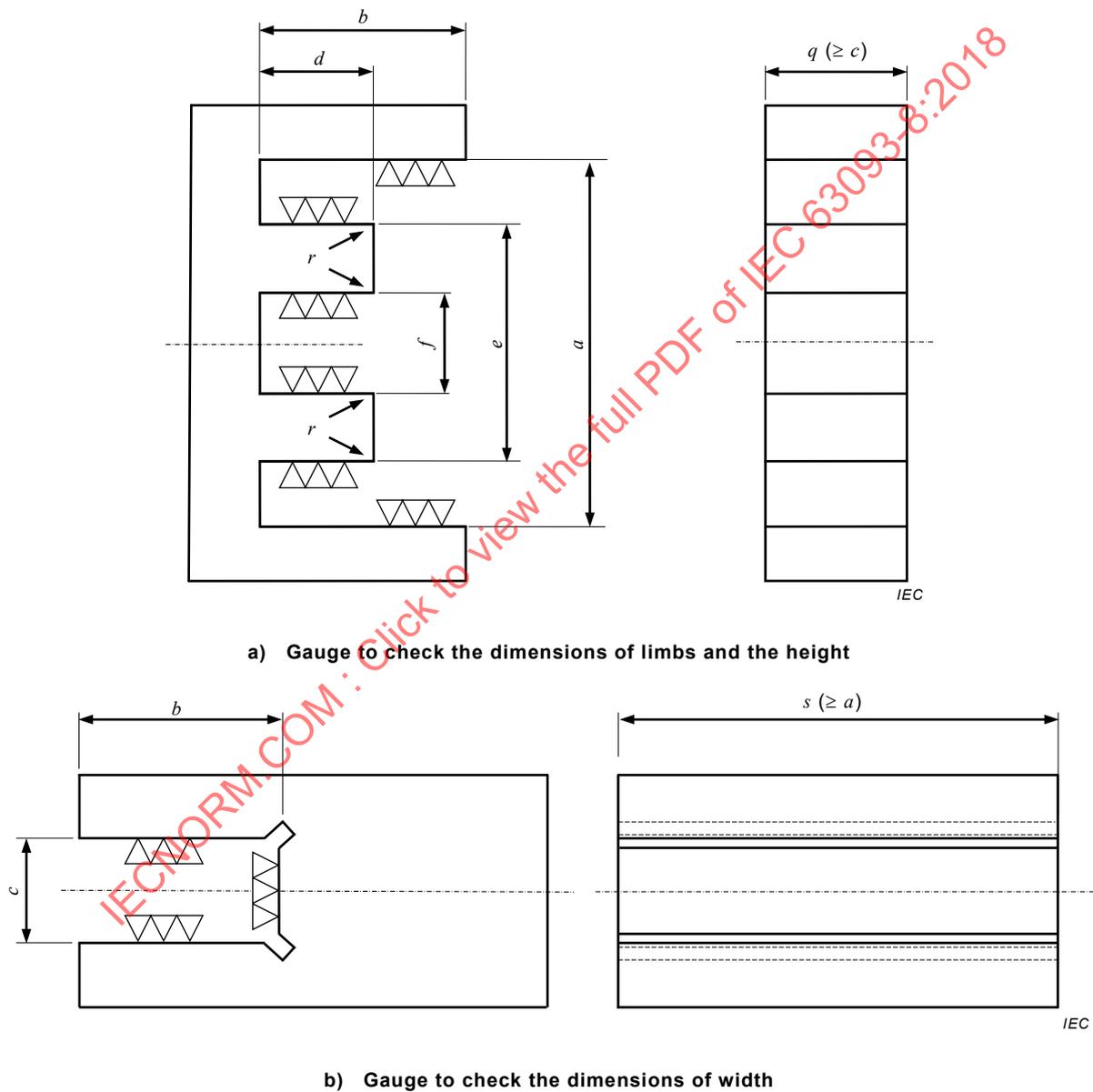


Figure B.1 – Gauge dimensions