

INTERNATIONAL STANDARD

IEC
60384-14-3

First edition
2004-10

**Fixed capacitors for use in electronic
equipment –**

**Part 14-3:
Blank detail specification –
Fixed capacitors for electromagnetic
interference suppression and connection
to the supply mains –
Assessment level DZ**



Reference number
IEC 60384-14-3:2004(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.

Further information on IEC publications

The technical content of IEC publications is kept under constant review by the IEC, thus ensuring that the content reflects current technology. Information relating to this publication, including its validity, is available in the IEC Catalogue of publications (see below) in addition to new editions, amendments and corrigenda. Information on the subjects under consideration and work in progress undertaken by the technical committee which has prepared this publication, as well as the list of publications issued, is also available from the following:

- **IEC Web Site** (www.iec.ch)

- **Catalogue of IEC publications**

The on-line catalogue on the IEC web site (www.iec.ch/searchpub) enables you to search by a variety of criteria including text searches, technical committees and date of publication. On-line information is also available on recently issued publications, withdrawn and replaced publications, as well as corrigenda.

- **IEC Just Published**

This summary of recently issued publications (www.iec.ch/online_news/justpub) is also available by email. Please contact the Customer Service Centre (see below) for further information.

- **Customer Service Centre**

If you have any questions regarding this publication or need further assistance, please contact the Customer Service Centre:

Email: custserv@iec.ch
Tel: +41 22 919 02 11
Fax: +41 22 919 03 00

INTERNATIONAL STANDARD

IEC
60384-14-3

First edition
2004-10

Fixed capacitors for use in electronic equipment –

Part 14-3: Blank detail specification – Fixed capacitors for electromagnetic interference suppression and connection to the supply mains – Assessment level DZ

© IEC 2004 — Copyright - all rights reserved

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 the publisher.

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



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE

M

For price, see current catalogue

INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT –

Part 14-3: Blank detail specification – Fixed capacitors for electromagnetic interference suppression and connection to the supply mains – Assessment level DZ

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 provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 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 60384-14-3 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment.

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

FDIS	Report on voting
40/1464/FDIS	40/1485/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.

It should be read in conjunction with IEC 60384-1.

This standard forms Part 14-3 of IEC 60384, which is published under the general title *Fixed capacitors for use in electronic equipment*.

Part 14 is composed as follows:

- Part 14: Sectional specification – Fixed capacitors for electromagnetic interference suppression and connection to the supply mains
- Part 14-1: Blank detail specification – Fixed capacitors for electromagnetic interference suppression and connection to the supply mains – Assessment level D
- Part 14-2: Blank detail specification – Fixed capacitors for electromagnetic interference suppression and connection to the supply mains – Safety tests only
- Part 14-3: Blank detail specification – Fixed capacitors for electromagnetic interference suppression and connection to the supply mains – Assessment level DZ

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 standard may be issued at a later date.

INTRODUCTION

Blank detail specification

This blank detail specification forms the basis for a uniform procedure for a common International Safety Mark. It implements the approval schedule for safety tests in IEC 60384-14, requires a declaration of design for parameters relevant to safety and prescribes conformance tests to be conducted on every lot prior to its release and requalification tests depending on changes to the declared design.

In comparison with IEC 60384-14-1 which provides quality conformance and safety tests, this specification offers the assessment level DZ (zero defects).

The use of IEC 60384-14-1 may be more appropriate for components manufactured in mass production, whereas the employment of this specification may be necessary in those cases where approval and requalification tests contribute considerably to the costs of the product.

A blank detail specification is a supplementary document to the sectional specification and contains requirements for style, layout and minimum content of detail specifications. Detail specifications not complying with these requirements may not be considered as being in accordance with IEC specifications, nor shall they so be described.

In the preparation of detail specifications the content of 1.4 of the sectional specification shall be taken into account.

Identification of the detail specification

The first page of the detail specification should have the layout recommended on the next page of this blank detail specification. The numbers between square brackets correspond to the following information which shall be inserted at the position indicated:

- [1] The "International Electrotechnical Commission" or the National Standards Organization under whose authority the detail specification is drafted.
- [2] The IEC or National Standards number of the detail specification, date of issue and any further information required by the national system.
- [3] The number and issue number of the IEC, or national, generic, or sectional specification, as relevant.
- [4] If different from the IEC number, the national number of the detail specification, date of issue and any further information required by the national system, together with any amendment numbers.

Identification of the capacitor

- [5] A short description of the type of capacitor or range of capacitors.
- [6] Information on typical construction (when applicable).

NOTE For [5] and [6] the text to be given in the detail specification should be suitable for an entry in the IECQ Register of Approvals.

- [7] Outline drawing with main dimensions which are of importance for interchangeability and/or reference to the appropriate national or international documents for outlines. Alternatively, the drawing may be given in an annex to the detail specification, but [7] should always contain an illustration of the general outer appearance of the component.
- [8] The level(s) of quality assessment covered by the detail specification, as appropriate.
- [9] Reference data giving information on the most important properties of the component which allow comparison between the various component types intended for the same or similar applications.

[1]	IEC 60384-14-3-XXX QC 30240X-XXX [2]
ELECTRONIC COMPONENTS OF ASSESSED QUALITY IN ACCORDANCE WITH: IEC 60384-1 IEC 60384-14 [3]	IEC 60384-14-3 QC 30240X [4]
	FIXED CAPACITORS FOR ELECTROMAGNETIC INTERFERENCE SUPPRESSION AND CONNECTION TO THE SUPPLY MAINS (ASSESSMENT LEVEL DZ) [5]
	TYPICAL CONSTRUCTION (Examples) [6]
Outline drawing: [see Table 1] [first angle projection] [7] [Other shapes are permitted within the dimensions given]	Class/subclass [8] Safety tests only
	NOTE For [1] to [9] see preceding this table.

Information on the availability of components qualified to this detail specification is given in the IEC QC 001005.

[9]

FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT –

Part 14-3: Blank detail specification – Fixed capacitors for electromagnetic interference suppression and connection to the supply mains – Assessment level DZ

1 General data

1.1 Recommended method(s) of mounting (to be inserted)

See 1.4.2 of IEC 60384-14.

1.2 Dimensions

Table 1 – Dimensions

Case size reference	Dimensions mm						
	L_1	W	H	L_2	L_3	L_4	...

When there is no case size reference, Table 1 may be omitted and the dimensions shall be given in Table 2, which then becomes Table 1.

The dimensions shall be given as maximum dimensions or as nominal dimensions with a tolerance.

1.3 Ratings and characteristics

Capacitance range (see Table 2)

Tolerance on rated capacitance

Rated voltage (see Table 2)

Climatic category

Rated temperature

Tangent of loss angle

Insulation resistance

Table 2 – Values of capacitance related to voltages and case sizes

Rated voltage				
	Case size	Case size	Case size	Case size
Rated capacitance pF and/or nF				

1.4 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 amendments) applies.

IEC 60384-14, *Fixed capacitors for use in electronic equipment – Part 14: Sectional specification – Fixed capacitors for electromagnetic interference suppression and connection to the supply mains*¹

IEC 60384-14-1, *Fixed capacitors for use in electronic equipment – Part 14: Sectional specification – Fixed capacitors for electromagnetic interference suppression and connection to the supply mains – Assessment level D*

1.5 Marking

The marking of the capacitor, if any, and the packing shall be in accordance with 1.6 of IEC 60384-14.

The details of the marking of the component and packing shall be given in full in the detail specification.

1.6 Ordering information

Orders for capacitors covered by this specification shall contain, in clear or in coded form, the following information:

- a) rated capacitance;
- b) tolerance on rated capacitance;
- c) rated voltage;
- d) manufacturer's type designation;
- e) number and issue reference of the detail specification and style reference.

1.7 Certified records of released lots

Required/not required.

1.8 Additional information (not for inspection purposes)

1.9 Additional or increased severities or requirements to those specified in the generic and/or sectional specification

NOTE Additional or increased requirements should be specified only when essential.

Table 3 – Other characteristics

This table is to be used for defining characteristics which are additional to or more severe than those given in the sectional specification.

¹ A third edition is currently in preparation.

2 Inspection requirements

2.1 Procedures

2.1.1 For qualification approval the procedures shall be in accordance with 3.4 of the sectional specification.

2.1.2 For quality conformance inspection the test schedule (Table 4) includes sampling, periodicity, severities and requirements. The formation of inspection lots is covered by 3.5.1 of the sectional specification.

Table 4a – Test schedule for lot-by-lot tests (Group A and B inspection) – Assessment level DZ

Subclause number and test ¹⁾	D or ND	Conditions of test ¹⁾	IL ²⁾	c	Performance requirements ¹⁾
Group A1	ND		S-4	0	
4.1 Visual examination					No visible damage Any marking shall be legible and correct
4.1 Dimensions (gauging)					As specified in Table 1 of this specification
Group A2	ND		I	0	
4.2.2 Capacitance					Within specified tolerance
4.2.4 Resistance (if applicable)					Within specified tolerance
4.2.3 Tangent of loss angle (metallized and ceramic capacitors only)		Frequency: ... Hz			Within specified limits
4.2.1 Voltage proof ³⁾ (Test A)		Method: ...			No permanent breakdown or flashover
4.2.5 Insulation resistance (Test A)		Method: ...			See Table 10
Group B1	D		S-3	0	
4.5 Solderability (if applicable)		Without ageing Method: ...			Methods 1 and 2: good tinning Method 3: < 3 s
¹⁾ Subclause numbers of tests and performance requirements as well as the table numbers refer to the sectional specification, IEC 60384-14. ²⁾ IL = inspection level; c = acceptance criterion (permitted number of non-conforming items). ³⁾ The voltage proof test shall be combined with a suitable monitoring method to detect defects in insulation resistance.					

**Table 4b – Test schedule for periodic tests (Group C inspection) –
Assessment level DZ**

Subclause number and test ¹⁾	D or ND	Conditions of test ¹⁾	Sample size and acceptance criterion ²⁾			Performance requirements ¹⁾
			<i>p</i>	<i>n</i>	<i>c</i>	
Group C1A	D		6	6	0	
4.1 Dimensions (detail)						See Table 7 and Table 1 of this specification
4.4.1 Initial measurements		Capacitance Tan δ (if applicable) Resistance (if applicable)				
4.3 Robustness of terminations		Severity: ... Visual examination				No visible damage
4.4. Resistance to soldering heat		No pre-drying Method: 1A or 1B				
4.19 Component solvent resistance (if applicable)		Solvent: ... Solvent temperature: ... Method 2 Recovery: ...				
4.4.2 Final measurements		Visual examination Capacitance Tan δ (if applicable) Resistance (if applicable)				No visible damage See Table 11 For reference See Table 11
Group C1B	D		6	12	0	
4.5 Solderability (if applicable)		Without ageing Method: ...				Methods 1 and 2: good tinning Method 3: < 3 s
4.20 Solvent resistance of the marking		Solvent: ... Solvent temperature: ... Method 1 Rubbing material: cotton wool Recovery: ...				Marking shall remain legible
4.6 Rapid change of temperature		T_A = lower category temperature T_B = upper category temperature Five cycles Duration: $t = 30$ min				
4.6.1 Inspection		Visual examination				No visible damage
4.7 Vibration ³⁾		Mounting as 1.1 of this specification Severity: ...				
4.7.2 Inspection		Visual examination				No visible damage
4.8 Bump ³⁾		Mounting as for 4.9 of this specification				
or 4.9 Shock ³⁾		Severity: ...				

Table 4b (continued)

Subclause number and test ¹⁾	D or ND	Conditions of test ¹⁾	Sample size and acceptance criterion ²⁾			Performance requirements ¹⁾
			<i>p</i>	<i>n</i>	<i>c</i>	
4.8.2 Final measurements or 4.9.2		Visual examination Capacitance Tan δ (if applicable) Resistance (if applicable)				No visible damage See 4.8.2 Specify limit
Group C1	D		6	18	0	
4.10 Container sealing (if applicable, if required)		Test Qc or Test Qd, as applicable				No evidence of leakage
4.11 Climatic sequence						
4.11.1 Initial measurements		Measurements made in 4.4.2, 4.8.2 or 4.9.2 as appropriate				
4.11.2 Dry heat		No measurements				
4.11.3 Damp heat, cyclic, first cycle						
4.11.4 Cold		No measurements				
4.11.5 Damp heat, cyclic, remaining cycles		No measurements				
4.11.6 Final measurements		Visual examination Capacitance Resistance (if applicable) Tan δ (if applicable) Voltage proof Insulation resistance				No visible damage Any marking shall be legible See Table 12 See Table 12 See Table 12 See Table 12 See Table 12
Group C 2	D		6	10	0	
4.12 Damp heat, steady state						
4.12.1 Initial measurements		Capacitance Resistance (if applicable) Tan δ (metallized capacitors only)				
4.12.2 Test conditions		Ceramic capacitors: half the sample U_R applied; other half no voltage applied Other capacitors: No voltage applied				