

INTERNATIONAL STANDARD

IEC
60384-14-1

QC 302401

Second edition
2005-07

Fixed capacitors for use in electronic equipment –

Part 14-1:

Blank detail specification:

**Fixed capacitors for electromagnetic
interference suppression and connection
to the supply mains – Assessment level D**



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IEC 60384-14-1:2005(E)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT

**Part 14-1: Blank detail specification:
Fixed capacitors for electromagnetic interference suppression
and connection to the supply mains –
Assessment level D**

FOREWORD

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International Standard CEI 60384-14-1 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment.

This second edition of CEI 60384-14-1 cancels and replaces the first edition published in 1993. It constitutes a technical revision. All changes that have been agreed upon can be categorized as minor revisions.

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

FDIS	Report on voting
40/1553/FDIS	40/1587/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 and IEC 60384-14.

This standard forms Part 14-1 of IEC 60384, which is published under the general title *Fixed capacitors for use in electronic equipment*.

Part 1: Generic specification

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

NOTE For the complete list of all the parts, see IEC 60384-14.

The QC number that appears on the front cover of this publication is the specification number in the IEC Quality Assessment System for Electronic Components (IECQ).

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.

FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT

Part 14-1: Blank detail specification: Fixed capacitors for electromagnetic interference suppression and connection to the supply mains – Assessment level D

Blank detail specification

A blank detail specification is a supplementary document to the sectional specification and contains requirements for style and layout and minimum content of detail specifications. 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 and of the component

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

- [1] The name of the National Standards Organization under whose authority the detail specification is published and, if applicable, the organization from which the detail specification is available.
- [2] The IECQ symbol and the number allotted to the detail specification by the IECQ General Secretariat.
- [3] The number and issue number of the IECQ generic or sectional specification as relevant; also the national reference if different.
- [4] If different from the IECQ 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.
- [5] A brief description of the component or range of components.
- [6] Information on typical construction (when applicable).

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 inter-changeability 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]	[2] IEC 60384-14-1xx QC 302401-xxx
ELECTRONIC COMPONENTS OF ASSESSED QUALITY – DETAIL SPECIFICATION IN ACCORDANCE WITH: [3]	[4] IEC 60384-14-1 QC 302401
Outline drawing (...angle projection): [7] (Other shapes are permitted within the dimensions given, see Table 1)	[5] FIXED CAPACITORS FOR ELECTROMAGNETIC INTERFERENCE SUPPRESSION AND CONNECTION TO THE SUPPLY MAINS
	[6] TYPICAL CONSTRUCTION (Examples):
	[8] Assessment level D
For notes [], see preceding page.	

REFERENCE DATA:

[9]

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

1 General data

1.1 Method of mounting for vibration and bump or shock tests

See 1.4.2 of IEC 60384-14.

1.2 Dimensions

Table 1 – Case-size dimensions

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

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

NOTE 2 The dimensions should be given as maximum dimensions or as nominal dimensions with the 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 (in 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.

ICE 60384-1, *Fixed capacitors for use in electronic equipment – Part 1: Generic specification*

ICE 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*

1.5 Marking

The marking of the capacitor, if any, and the packing shall be in accordance with 1.6 of the sectional specification.

NOTE The details of the marking of the component and packing should 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 shall be used for defining characteristics which are additional to, or more severe than, those given in the sectional specification.

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 (Tables 4 and 5) includes sampling, periodicity, severities and requirements. The formation of inspection lots is covered by 3.5.1 of IEC 60384-14.

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

Subclause number and test ^a	Conditions of test ^a	IL ^b	AQL %	Performance requirements ^a
Group A1	Non-destructive	II	1,5	
4.1 Visual examination				No visible damage Any marking on the capacitor shall be legible and correct
4.1 Dimensions (gauging)				As specified in Table 1 of this specification
Group A2	Non-destructive	II	0,25	
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 ...			Within specified limits
4.2.1 Voltage proof (Test A)	Method ...			No permanent breakdown or flashover
4.2.5 Insulation resistance (Test A)	Method: ...			See Table 12
Group B1	Destructive	S-3	2,5	
4.5 Solderability (if applicable)	Without ageing Method ...			Methods 1 and 2: good tinning Method 3: < 3 s
^a Clause numbers of test and conditions/requirements refer to IEC 60384-14.				
^b IL = inspection level; AQL = acceptance quality level.				

Table 5 – Test schedule for periodic tests (Group C inspection)
Assessment level D

Subclause number and test ^a	Conditions of test ^a	b			Performance requirements ^a
		<i>p</i>	<i>n</i>	<i>c</i>	
Group C1A	Destructive	6	6	0	
4.1 Dimensions (detail)					See Tables 1 and 9 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 13 For reference See Table 13
Group C1B	Destructive	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 Final inspection	Visual examination				No visible damage
4.7 Vibration ^c	Mounting as in 1.1 of this specification Severity: ...				
4.7.2 Final inspection	Visual examination				No visible damage
4.8 Bump ^c or 4.9 Shock ^c	Mounting as in 1.1 of this specification Severity: ...				
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 or 4.9.2 Specify limit See Table 14

Table 5 (continued)

Subclause number and test ^a	Conditions of test ^a	b			Performance requirements ^a
		<i>p</i>	<i>n</i>	<i>c</i>	
Group C1	Destructive	6	18	1	
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				No visible damage Any marking shall be legible
	Capacitance				See Table 14
	Resistance (if applicable)				See Table 14
	Tan δ (if applicable)				See Table 14
	Voltage proof				See Table 14
	Insulation resistance				See Table 14
Group C2	Destructive	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				
4.12.3 Final inspection and measurements	Visual examination				No visible damage Marking legible
	Capacitance				See Table 15
	Resistance (if applicable)				See Table 15
	Tan δ (if applicable)				See Table 15
	Voltage proof				See Table 15
	Insulation resistance				See Table 15