

INTERNATIONAL STANDARD

IEC
60384-4-1

QC 300301

Second edition
2000-05

Fixed capacitors for use in electronic equipment –

Part 4: Blank detail specification – Aluminium electrolytic capacitors with non-solid electrolyte – Assessment level E

*Condensateurs fixes utilisés dans les équipements
électroniques –*

*Partie 4:
Spécification particulière-cadre –
Condensateurs électrolytiques à l'aluminium
à électrolyte non solide –
Niveau d'assurance E*



Reference number
IEC 60384-4-1:2000(E)

Numbering

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- **IEC web site***
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- **IEC Bulletin**
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For general terminology, readers are referred to IEC 60050: *International Electrotechnical Vocabulary* (IEV).

For graphical symbols, and letter symbols and signs approved by the IEC for general use, readers are referred to publications IEC 60027: *Letter symbols to be used in electrical technology*, IEC 60417: *Graphical symbols for use on equipment. Index, survey and compilation of the single sheets* and IEC 60617: *Graphical symbols for diagrams*.

* See web site address on title page.

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Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT –

**Part 4: Blank detail specification –
Aluminium electrolytic capacitors with non-solid electrolyte –
Assessment level E**

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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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- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
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International Standard IEC 60384-4-1 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment.

This second edition cancels and replaces the first edition published in 1985, amendment 1 (1992) and amendment 2 (1996). This second edition constitutes a technical revision.

The text of this standard is based on the first edition, amendment 1, amendment 2 and the following documents:

FDIS	Report on voting
40/1123/FDIS	40/1169/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 3.

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

The committee has decided that the contents of this publication will remain unchanged until 2003. 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.

Withdawn

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FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT –

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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. Detail specifications not complying with these requirements may not be considered as being in accordance with IEC specifications nor shall they be so described.

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

The numbers between brackets on the first page correspond to the following information which shall be inserted in the position indicated.

Identification of the detail specification

- [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, data of issue and any further information required by the national system.
- [3] The number and issue number of the IEC or national generic specification.
- [4] The IEC number of the blank detail specification.

Identification of the capacitor

- [5] A short description of the type of capacitor.
- [6] Information on typical construction (when applicable).
NOTE When the capacitor is not designed for use in printed board applications, this is clearly stated in the detail specification in this position.
- [7] Outline drawing with main dimensions which are of importance for interchangeability and/or reference to the national or international documents for outlines. Alternatively, this drawing may be given in an annex to the detail specification.
- [8] Application or group of applications covered and/or assessment level.
NOTE The assessment level(s) to be used in a detail specification are selected from 3.5.4 of the sectional specification. This implies that one blank detail specification may be used in combination with several assessment levels, provided the grouping of the tests does not change.
- [9] Reference data on the most important properties, to allow comparison between the various capacitor types.

[1]	IEC 60384-4-1-XXX QC 300301-XXX	[2]
ELECTRONIC COMPONENTS OF ASSESSED QUALITY IN ACCORDANCE WITH:	IEC 60384-4-1 QC 300301	[4]
[3]	ALUMINIUM ELECTROLYTIC CAPACITORS WITH NON-SOLID ELECTROLYTE	[5]
Outline drawing: (see table 1) (..... angle projection)		[6]
[7]		[8]
(Other shapes are permitted within the dimensions given.)	Assessment level(s): E Performance grade:	[8]

Information on the availability of components qualified to this detail specification is given in the Qualified Products List.

[9]

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1 General data

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

(See 1.4.2 of IEC 60384-4.)

1.2 Dimensions

Table 1

Case size reference	Dimensions mm or in and mm				
	Ø	L	H	d

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

NOTE 2 The dimensions are given as maximum dimensions or as nominal dimensions with a tolerance.

1.3 Ratings and characteristics

Capacitance range (see table 2a)

Tolerance on rated capacitance

Rated voltage (see table 2a)

Category voltage (if applicable) (see table 2a)

Climatic category

Rated temperature

Rated ripple current (see table 2b)

Tangent of loss angle (see table 2b)

NOTE Instead of the tangent of loss angle ($\tan \delta$), the equivalent series resistance ESR may be specified in accordance with 4.3.3.2 d) of IEC 60384-4.

Leakage current

Impedance (if applicable) (see table 2b)

Reverse voltage (if required)

Insulation resistance (if applicable)

Table 2a – Values of capacitance and of voltage related to case sizes

Rated voltage				
Category voltage*				
	Case size	Case size	Case size	Case size
Rated capacitance µF				

* If different from the rated voltage.

Table 2b – Tangent of loss angle, impedance and rated ripple current

U_R V	C_R μF	Tangent of loss angle at °C, Hz	Impedance at °C, Hz (if applicable) Ω	Rated ripple current at °C, Hz A

1.4 Rated documents

Generic specification: IEC 60384-1

Sectional specification: IEC 60384-4

1.5 Marking

The marking of the capacitor and the package shall be in accordance with the requirements of 1.6 of IEC 60384-4.

NOTE The details of the marking of the component and package are 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 minimum information:

- Rated capacitance.
- Tolerance on rated capacitance.
- Rated d.c. voltage.
- 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 Additions 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.

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, IEC 60384-4.

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 4 – Test schedule

Subclause number and test (see Note 1)	D or ND	Conditions of test (see Note 1)	IL (see Note 2)	AQL	Performance requirements (see Note 1)
Group A inspection (lot-by-lot)					
<i>Subgroup A1</i>	ND		S-4	2,5 %	
4.2 Visual examination					As in 4.2 Legible marking and as specified in 1.5 of this specification
4.2 Dimensions (gauging)					As specified in table 1 of this specification
<i>Subgroup A2</i>	ND		II	1,0 %	
4.3.1 Leakage		Protective resistance: Ω			As in 4.3.1.2
4.3.2 Capacitance		Frequency: Hz			Within specified tolerance
4.3.3 Tangent of loss angle		Frequency: Hz			As in 4.3.3.2
4.3.4 Impedance (if applicable)		Frequency: Hz			Within limit specified in the detail specification