

INTERNATIONAL STANDARD

QC 300000

**Fixed capacitors for use in electronic equipment –
Part 1: Generic specification**

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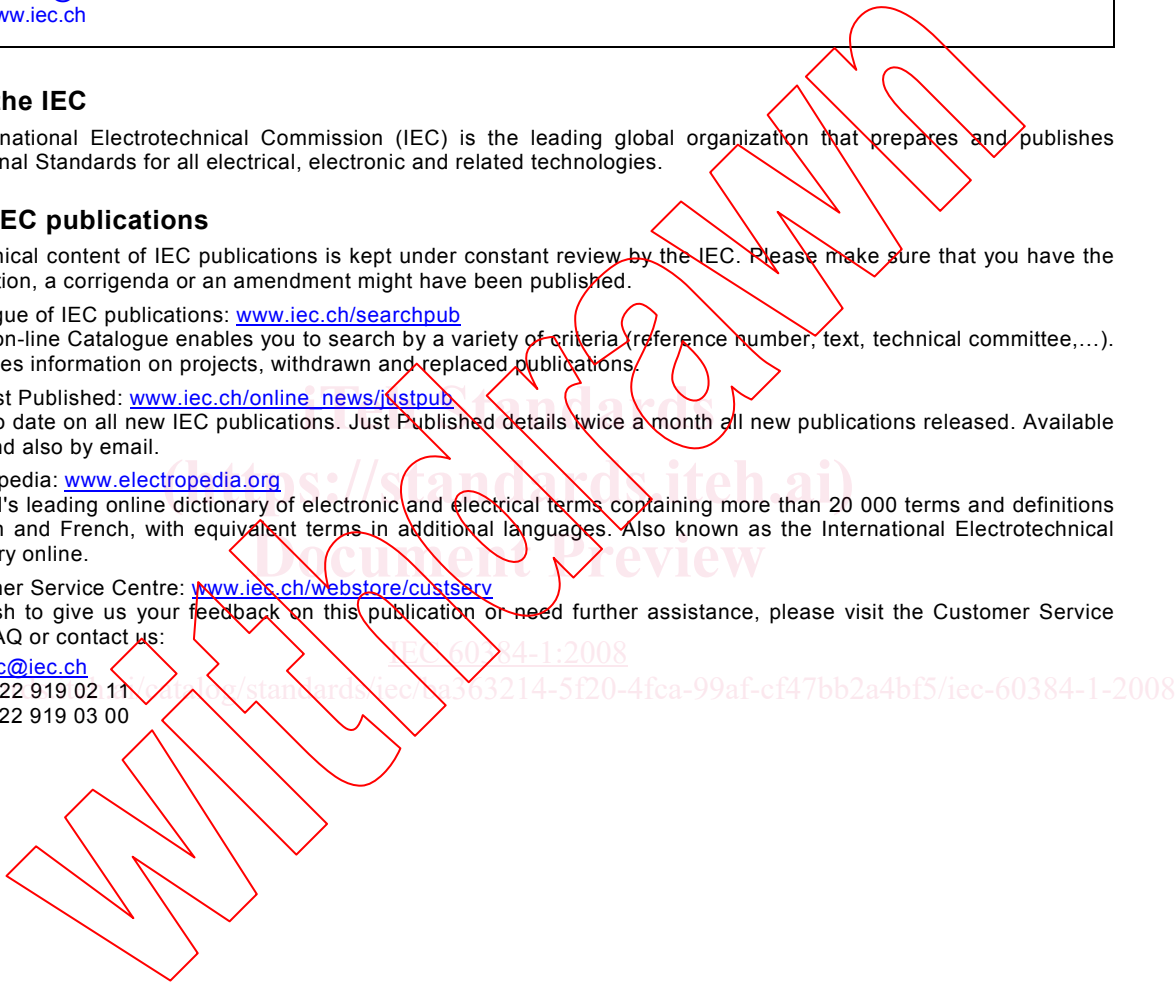
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INTERNATIONAL STANDARD

QC 300000

**Fixed capacitors for use in electronic equipment –
Part 1: Generic specification**

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ELECTROTECHNICAL
COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT –**Part 1: Generic specification**

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

This fourth edition cancels and replaces the third edition issued in 1999 and constitutes a technical revision, including minor revisions related to tables, figures and references.

This edition contains the following significant technical changes with respect to the previous edition:

- implementation of Annex Q which replaces Clause 3.

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

| | |
|--------------|------------------|
| FDIS | Report on voting |
| 40/1915/FDIS | 40/1924/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.

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

A list of all the parts of the IEC 60384 series, under the general title *Fixed capacitors for use in electronic equipment*, can be found on the IEC website.

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- withdrawn,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 publication may be issued at a later stage.

The contents of the corrigendum of November 2008 have been included in this copy.

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FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT –

Part 1: Generic specification

1 General

1.1 Scope

This part of IEC 60384 is a generic specification and is applicable to fixed capacitors for use in electronic equipment.

It establishes standard terms, inspection procedures and methods of test for use in sectional and detail specifications of electronic components for quality assessment or any other purpose.

1.2 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 60027, *Letter symbols to be used in electrical technology*

IEC 60050 (all parts), *International Electrotechnical Vocabulary (IEV)*

IEC 60062, *Marking codes for resistors and capacitors*

IEC 60063, *Preferred number series for resistors and capacitors*

IEC 60068-1:1988, *Environmental testing – Part 1: General and guidance*

IEC 60068-2-1:2007, *Environmental testing – Part 2-1: Tests – Tests A: Cold*

IEC 60068-2-2:2007, *Environmental testing – Part 2-2: Tests – Tests B: Dry heat*

IEC 60068-2-6:2007, *Environmental testing – Part 2: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-13:1983, *Environmental testing – Part 2: Tests – Test M: Low air pressure*

IEC 60068-2-14:1984, *Environmental testing – Part 2: Tests – Test N: Change of temperature*

IEC 60068-2-17:1994, *Environmental testing – Part 2-17: Tests – Test Q: Sealing*

IEC 60068-2-20:1979, *Environmental testing – Part 2-20: Tests – Test T: Soldering*

IEC 60068-2-21:2006, *Environmental testing – Part 2-21: Tests – Test U: Robustness of terminations and integral mounting devices*

IEC 60068-2-27:2008, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

IEC 60068-2-29:1987, *Environmental testing – Part 2-29: Tests – Test Eb and guidance: Bump*

IEC 60068-2-30:2005, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60068-2-45:1980, *Environmental testing – Part 2-45: Tests – Test XA and guidance: Immersion in cleaning solvents*

IEC 60068-2-54:2006, *Environmental testing – Part 2-54: Tests – Test Ta: Solderability testing of electronic components by the wetting balance method*

IEC 60068-2-58:2004, *Environmental testing – Part 2-58: Tests – Test Td: Test methods for solderability, resistance to dissolution of metallization and to soldering heat of surface mounting devices (SMD)*

IEC 60068-2-69:2007, *Environmental testing – Part 2: Tests – Test Te: Solderability testing of electronic components for surface mounting devices (SMD) by the wetting balance method*

IEC 60068-2-78:2001, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC 60294, *Measurement of the dimensions of a cylindrical component having two axial terminations*

IEC 60410:1973, *Sampling plans and procedures for inspection by attributes*

IEC 60617, *Graphical symbols for diagrams*

IEC 60695-11-5:2004, *Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance*

IEC 60717, *Method for the determination of the space required by capacitors and resistors with unidirectional terminations*

IEC 61193-2, *Quality assessment systems – Part 2: Selection and use of sampling plans for inspection of electronic components and packaging¹*

IEC 61249-2-7:2002, *Materials for printed boards and other interconnecting structures – Part 2-7: Reinforced base materials clad and unclad – Epoxide woven E-glass laminated sheet of defined flammability (vertical burning test), copper-clad*

IEC QC 001002-3, *Rules of Procedure – Part 3: Approval procedures*

ISO 3, *Preferred numbers – Series of preferred numbers*

ISO 1000, *SI units and recommendations for the use of their multiples and of certain other units*

ISO 9000, *Quality management systems – Fundamentals and vocabulary*

2 Technical data

2.1 Units and symbols

Units, graphical symbols and letter symbols should, whenever possible, be taken from the following publications:

¹ To be published.

- IEC 60027;
- IEC 60050 (series);
- IEC 60617;
- ISO 1000.

When further items are required, they should be derived in accordance with the principles of the publications listed above.

2.2 Terms and definitions

For the purposes of this document, the following terms and definitions apply, in alphabetical order.

2.2.1

a.c. capacitor

capacitor designed essentially for application with alternating voltages

2.2.2

bipolar capacitor (for electrolytic capacitors)

electrolytic capacitor designed to withstand an alternating voltage and/or reversal of the applied direct voltage

2.2.3

category of passive flammability

category of passive flammability is given by the maximum burning time after a specified time of flame application

2.2.4

category temperature range

range of ambient temperatures for which the capacitor has been designed to operate continuously; this is given by the lower and upper category temperature

2.2.5

category voltage (U_c)

maximum voltage which may be applied continuously to a capacitor at its upper category temperature

2.2.6

d.c. capacitor

capacitor designed essentially for application with direct voltage

NOTE A d.c. capacitor may not be suitable for use on a.c. supplies.

2.2.7

family (of electronic components)

group of components which predominantly displays a particular physical attribute and/or fulfils a defined function

2.2.8

grade

term to indicate an additional general characteristic concerning the intended application of the component

2.2.9

insulated capacitor

capacitor in which all terminations of a section may be raised to a potential different (but not less than the rated voltage) from that of any conducting surface with which the case is liable to come into contact in normal use

2.2.10

lower category temperature

minimum ambient temperature for which a capacitor has been designed to operate continuously

2.2.11

maximum storage temperature

maximum ambient temperature which the capacitor withstands in the non-operating condition without damage

2.2.12

maximum temperature of a capacitor

temperature at the hottest point of its external surface

NOTE The terminations are considered to be part of the external surface.

2.2.13

minimum storage temperature

minimum ambient temperature which the capacitor withstands in the non-operating condition without damage

2.2.14

minimum temperature of a capacitor

temperature at the coldest point of the external surface

NOTE The terminations are considered to be part of the external surface.

2.2.15

nominal capacitance (C_N)

designated capacitance value usually indicated on the capacitor

2.2.16

passive flammability

ability of a capacitor to burn with a flame as a consequence of the application of an external source of heat

2.2.17

polar capacitor (for electrolytic capacitors)

capacitor intended for use with a unidirectional voltage connected according to the polarity indication

2.2.18

pulse capacitor

capacitor for use with pulses of current or voltage

NOTE The definitions of IEC 60469-1 and IEC 60469-2 apply.

2.2.19

pulse equivalent circuit of a capacitor

equivalent circuit consisting of an ideal capacitor in series with its residual inductance and the equivalent series resistance (ESR)