

Fixed capacitors for use in electronic equipment —

Part 1: Methods of test

[IEC title: Fixed capacitors for use in electronic equipment —
Part 1: Terminology and methods of test]

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Cooperating organizations

The Electronic Components Standards Committee, under whose direction this British Standard was prepared, consists of representatives from the following:

- British Electrical and Allied Manufacturers Association (BEAMA)
- Department of Industry (Computers Systems and Electronics)
- Electricity Supply Industry in England and Wales
- Electronic Components Industry Federation*
- Electronic Engineering Association*
- Institution of Electronic and Radio Engineers
- Ministry of Defence*
- National Supervising Inspectorate*
- Post Office*
- Society of British Aerospace Companies Limited*
- Telecommunication Engineering and Manufacturing Association (TEMA)*

The organizations marked with an asterisk in the above list, together with the following, were directly represented on the Technical Committee entrusted with the preparation of this British Standard:

British Broadcasting Corporation

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National foreword

This Part of this British Standard has been prepared under the direction of the Electronic Components Standards Committee. It is identical with IEC Publication 384-1:1972 “*Fixed capacitors for use in electronic equipment — Part 1: Terminology and methods of test*”, published by the International Electrotechnical Commission (IEC).

It incorporates Amendment No. 1:1979 to IEC 384-1, First supplement 384-1A:1973, Second supplement 384-1B:1975 and Third supplement 384-1C:1977. Since the IEC pagination has been substantially altered with the inclusion of the Supplements, the usual BSI convention of indicating IEC page numbers at the foot of each page has not been followed.

Terminology and conventions. The text of the International Standard has been approved as suitable for publication as a British Standard without deviation. Some terminology and certain conventions are not identical with those used in British Standards.

Wherever the word “Recommendation” appears, referring to this standard, it should be read as “British Standard”.

Cross-references

International Standard	Corresponding British Standard
	BS 2011 <i>Basic environmental testing procedures</i>
IEC 68-1:1978	Part 1.1:1980 <i>General</i> (Identical)
IEC 68-2-1:1974	Part 2.1A:1977 <i>Tests A. Cold</i> (Identical)
IEC 68-2-2:1974	Part 2.1B:1977 <i>Test B. Dry heat</i> (Identical)
IEC 68-2-3:1969	Part 2.1Ca:1977 <i>Test Ca. Damp heat, steady state</i> (Identical)
IEC 68-2-4:1960	Part 2.1Da:1977 <i>Test Da. Accelerated damp heat</i> (Identical)
IEC 68-2-6:1970	Part 2.1Fc:1977 <i>Test Fc. Vibration (sinusoidal)</i> (Identical)
IEC 68-2-13:1966	Part 2.1M:1977 <i>Test M. Low air pressure</i> (Identical)
IEC 68-2-14:1974	Part 2.1N:1977 <i>Test N. Change of temperature</i> (Identical)
IEC 68-2-17:1978	Part 2.1Q:1981 <i>Test Q. Sealing</i> (Identical)
IEC 68-2-20:1979 (including IEC 68-2-20A)	Part 2.1T:1981 <i>Test T. Soldering</i> (Identical)
IEC 68-2-21:1975	Part 2.1U:1977 <i>Test U. Robustness of terminations and integral mounting devices</i> (Identical)
IEC 68-2-29:1968	Part 2.1Eb:1977 <i>Test Eb. Bump</i> (Identical)
IEC 294:1969	BS 5692:1979 <i>Method for measurement of the dimensions of a cylindrical electronic component having two axial terminations</i> (Identical)

NOTE *Textual errors*

- a) In the figure in **9.1**, the resistor and capacitor symbols " R_1 ", " R_2 ", " C_1 " and " C_X " should be read as " R_1 ", " R_2 ", " C_1 " and " C_X " respectively, to align with the text.
- b) In **12.4** the unit symbol " μA " should be read as " μA ".
- c) Clause **27** is wholly dependent on a reference to IEC Publication 68-2-8 which has subsequently been withdrawn. Hence, the text of clause **27** has been deleted.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 20, an inside back cover and a back cover.

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Section 1. General

1 Scope

This Recommendation applies to fixed capacitors for use in electronic equipment.

2 Object

To establish standard terms and methods of test for use in sectional and detail specifications.

Section 2. Terminology

3 General terms

3.1

general specification

a general specification gives terms and methods of test applicable to a family of components

3.2

sectional specification

a sectional specification gives methods of test, selected from the general specification, and the general requirements applicable to a sub-family or part of a sub-family of components

3.3

detail specification

a detail specification is derived from general and sectional specifications, and covers the requirements for a particular component or a recognized range of components

3.4

family (of electronic components)

a group of electronic components which predominantly displays a particular physical attribute and/or fulfills a determined function

3.5

sub-family (of electronic components)

a group of components within a family manufactured by similar technological methods

3.6

type

a group of components having similar design features and the similarity of whose manufacturing techniques enables them to be grouped together either for qualification approval or for quality conformance inspection

they are generally covered by a single detail specification

NOTE Components described in several detail specifications may, in some cases, be considered as belonging to the same type and may therefore be grouped together for approval and quality conformance inspection.

3.7

type test

the type test of a product is the complete series of tests to be carried out on a number of specimens representative of the type, with the object of determining whether a particular manufacturer can be considered to be able to produce products meeting the specification

3.8

type approval¹⁾

type approval is the decision by the proper authority (the customer himself or his nominee) that a particular manufacturer can be considered to be able to produce, in reasonable quantities, the type meeting the specification

¹⁾ As this Recommendation only covers type tests, these definitions are included solely for information.

3.9 **acceptance tests²⁾**

acceptance tests are carried out to determine the acceptability of a consignment on the basis of an agreement between customer and manufacturer

the agreement shall cover:

- a) the sample size;
- b) the selection of tests;
- c) the extent to which the test specimens shall conform to the requirements for the selected tests of the specification.

NOTE When differing test results are obtained by customer and manufacturer the IEC standard methods shall be used for referee purposes.

3.10 **factory tests²⁾**

factory tests are those tests carried out by the manufacturer to verify that his products meet the specification

3.11 **style**

a subdivision of a type, generally based on dimensional factors

a style may include several variants, generally of a mechanical order

3.12 **grade**

a term to indicate additional general characteristics concerning the intended application, e.g. long life applications

the term “grade” shall always be qualified and may be used only in combination with one or more words (e.g. long-life grade). It shall not be used on its own with a single letter or number

figures added after the qualified use of the term “grade” should be arabic numerals

4 Capacitor terms

For the purpose of this Recommendation the following definitions apply:

4.1 **d.c. capacitor**

a d.c. capacitor is a capacitor designed essentially for application with a direct voltage

NOTE A d.c. capacitor may not be suitable for use on a.c. supplies. For other applications, e.g. pulse or a.c., the operating voltage will have to be agreed upon between customer and manufacturer.

4.2 **polar capacitor (for electrolytic capacitors)**

a polar capacitor is a capacitor designed essentially for application with the positive polarity of a direct voltage on the identified terminal

4.3 **bipolar capacitor (for electrolytic capacitors)**

a bipolar capacitor is a capacitor designed to withstand reversal of the applied direct voltage

4.4 **a.c. capacitor**

an a.c. capacitor is a capacitor designed essentially for application with alternating voltages of stated frequency

²⁾ As this Recommendation only covers type tests, these definitions are included solely for information.

4.5**pulse capacitor**

a pulse capacitor is a capacitor designed essentially for application with intermittent charges or discharges at high values of the charge or discharge current

4.6**rated capacitance**

the rated capacitance of a capacitor is the value which is indicated upon it

4.7**category temperature range**

the category temperature range is the range of ambient temperatures for which the component has been designed to operate continuously; this is defined by the temperature limits of the appropriate category

4.8**upper category temperature**

the upper category temperature is the maximum ambient temperature for which a capacitor has been designed to operate continuously

4.9**lower category temperature**

the lower category temperature is the minimum ambient temperature for which a capacitor has been designed to operate continuously

4.10**rated voltage (U_R)**

the rated voltage is the maximum direct voltage or the maximum r.m.s. alternating voltage which may be applied continuously to the terminals of a capacitor at any temperature between the lower category temperature and the rated temperature (see Sub-clause 4.11)

4.11**rated temperature**

the rated temperature is the maximum ambient temperature at which the rated voltage is continuously applicable

4.12**category voltage (U_C)**

the category voltage (U_C) is the voltage which may be applied to a capacitor in use at its upper category temperature (see Sub-clause 4.8)

4.13**temperature derated voltage**

for any temperature between the rated temperature and the upper category temperature the temperature derated voltage is the maximum voltage that may be applied continuously to the terminals of a capacitor

NOTE The information for the voltage at temperatures between the temperature specified for rated voltage and the maximum category temperature shall be given by the manufacturer.

4.14**surge voltage ratio**

the surge voltage ratio of a capacitor is the quotient of the maximum instantaneous voltage which may be applied to the terminals of the capacitor for a specified time at any temperature within the category temperature range and the rated voltage or the temperature derated voltage as appropriate. The number of times per hour that this voltage may be applied must be specified

4.15**rated ripple voltage**

the rated ripple voltage is the r.m.s. value of the maximum allowable alternating voltage of a specified frequency superposed on the d.c. voltage at which the capacitor may be operated continuously at a specified temperature