

Fixed capacitors for use in electronic equipment —

Part 17: Sectional specification: Fixed metallized polypropylene film dielectric a.c. and pulse capacitors

The European Standard EN 60384-17:2005 has the status of a
British Standard

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National foreword

This British Standard is the official English language version of EN 60384-17:2005. It is identical with IEC 60384-17:2005. It supersedes BS QC 301300:1989 which will be withdrawn on 1 November 2008.

The UK participation in its preparation was entrusted to Technical Committee EPL/40X, Capacitors and resistors for electronic equipment, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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Summary of pages

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Fixed capacitors for use in electronic equipment
Part 17: Sectional specification:
Fixed metallized polypropylene film dielectric a.c. and pulse capacitors
(IEC 60384-17:2005)

Condensateurs fixes utilisés
dans les équipements électroniques
Partie 17: Spécification intermédiaire:
Condensateurs fixes pour tension
alternative et pour impulsions à
diélectrique en film de polypropylène
métallisé
(CEI 60384-17:2005)

Festkondensatoren zur Verwendung in
Geräten der Elektronik
Teil 17: Rahmenspezifikation:
Festkondensatoren mit metallisierter
Polypropylen-Folie als Dielektrikum für
Wechselspannungs- und Impulsbetrieb
(IEC 60384-17:2005)

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 40/1597/FDIS, future edition 2 of IEC 60384-17, prepared by IEC TC 40, Capacitors and resistors for electronic equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60384-17 on 2005-11-01.

The following dates were fixed:

- | | | |
|--|-------|------------|
| – latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement | (dop) | 2006-08-01 |
| – latest date by which the national standards conflicting
with the EN have to be withdrawn | (dow) | 2008-11-01 |

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60384-17:2005 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60065	NOTE	Harmonized as EN 60065:2002 (modified).
IEC 60384-14	NOTE	Harmonized as EN 60384-14:2005 (not modified).

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FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT –

Part 17: Sectional specification: Fixed metallized polypropylene film dielectric a.c. and pulse capacitors

1 General

1.1 Scope

This part of IEC 60384 applies to fixed capacitors with metallized electrodes and polypropylene dielectric for use in electronic equipment.

NOTE Capacitors which have mixed foil and metallized electrodes are also within the scope of this standard.

These capacitors may have "self-healing" properties depending on conditions of use.

Capacitors covered by this specification are mainly intended for use with alternating voltage and/or for pulse applications. The maximum reactive power applicable is 10 000 var and the maximum peak voltage is 3 000 V.

Capacitors for reactive power exceeding 500 var and to which a maximum peak voltage of 2 500 V at 50 Hz can be applied are not covered by this standard, except when they are the highest part of a range of reactive power mainly situated below 500 var at 50 Hz.

This standard is not intended to cover capacitance values higher than 20 μ F.

Two performance grades of capacitors are covered, Grade 1 for long-life application and Grade 2 for general application.

Capacitors for electromagnetic interference suppression are not included, but are covered by IEC 60384-14.

Capacitors for electrical shock hazard protection (covered by IEC 60065) and fluorescent lamp and motor capacitors (covered by IEC technical committee 33, and IEC technical committee 34) are also excluded.

1.2 Object

The object of this standard is to prescribe preferred ratings and characteristics and to select from IEC 60384-1, the appropriate quality assessment procedures, tests and measuring methods and to give general performance requirements for this type of capacitor. Test severities and requirements prescribed in detail specifications referring to this sectional specification shall be of an equal or higher performance level, because lower performance levels are not permitted.

1.3 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 60063:1963, *Preferred number series for resistors and capacitors*
Amendment 1 (1967)
Amendment 2 (1977)

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

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

IEC 60384-17-1, *Fixed capacitors for use in electronic equipment – Part 17: Blank detail specification: Fixed metallized polypropylene film dielectric a.c. and pulse capacitors. Assessment level E*

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

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

1.4 Information to be given in a detail specification

Detail specifications shall be derived from the relevant blank detail specification.

Detail specifications shall not specify requirements inferior to those of the generic, sectional or blank detail specification. When more severe requirements are included, they shall be listed in 1.9 of the detail specification and indicated in the test schedules, for example by an asterisk.

NOTE The information given in 1.4.1 may for convenience, be presented in tabular form.

The following information shall be given in each detail specification and the values quoted shall preferably be selected from those given in the appropriate clause of this sectional specification.

1.4.1 Outline drawing and dimensions

There shall be an illustration of the capacitor as an aid to easy recognition and for comparison of the capacitor with others. Dimensions and their associated tolerances, which affect interchangeability and mounting, shall be given in the detail specification. All dimensions shall preferably be stated in millimetres.

Normally, the numerical values shall be given for the length of the body, the width and height of the body and the wire spacing, or for cylindrical types, the body diameter, and the length and diameter of the terminations. When necessary, for example when a number of items (capacitance values/voltage ranges) are covered by a detail specification, the dimensions and their associated tolerances shall be placed in a table below the drawing.

When the configuration is other than described above, the detail specification shall state such dimensional information as will adequately describe the capacitor. When the capacitor is not designed for use on printed boards, this shall be clearly stated in the detail specification

1.4.2 Mounting

The detail specification shall specify the method of mounting to be applied for normal use and for the application of the vibration and the bump or shock tests. The capacitors shall be mounted by their normal means. The design of the capacitor may be such that special mounting fixtures are required in its use. In this case, the detail specification shall describe the mounting fixtures and they shall be used in the application of the vibration and bump or shock tests.

1.4.3 Ratings and characteristics

The ratings and characteristics shall be in accordance with the relevant clauses of this specification, together with the following:

1.4.3.1 Rated capacitance range

See 2.2.1.

NOTE When products approved to the detail specification have different ranges, the following statement should be added:

"The range of values available in each voltage range is given in IEC QC 001005."

1.4.3.2 Sinusoidal current (if applicable)

The detail specification shall state the derating curve of the sinusoidal current versus temperature with reference to 70 °C, and the derating curve of the sinusoidal current versus frequency and of the sinusoidal current versus capacitance.

1.4.3.3 Particular characteristics

Additional characteristics may be listed, when they are considered necessary to specify adequately the component for design and application purposes.

1.4.3.4 Soldering

The detail specification shall prescribe the test methods, severities and requirements applicable for the solderability and the resistance to soldering heat test.

1.4.4 Marking

The detail specification shall specify the content of the marking on the capacitor and on the package. Deviations from 1.6 of this sectional specification, shall be specifically stated.

1.5 Terms and definitions

For the purposes of this document the terms and definitions given in IEC 60384-1 and the following apply.

1.5.1

Performance grades

1.5.1.1

performance grade 1 capacitors (long-life)

capacitors intended for long-life applications with stringent requirements for the electrical parameters

1.5.1.2

performance grade 2 capacitors (general purpose)

capacitors for general application where the stringent requirements of performance grade 1 are not necessary

1.5.2

stability grade

capacitance drift after climatic and mechanical tests and after endurance tests.

NOTE The performance grade and the stability grade must be noted in the detail specification

1.5.3

performance grade and stability grade combinations (if stability grade is required for a.c. and pulse capacitors)

see the table below for preferred values:

Table 1 – Preferred values

Performance grades	Stability grades	Combination designations
1	1	1.1
	2	1.2
2	–	2

The three combinations concern capacitance stability and $\tan \delta$ values. Distinction in performance of the three combinations is shown in Table 4.

1.5.4 rated voltages

NOTE The sum of the d.c. voltage and the peak a.c. voltage or the peak pulse voltage applied to the capacitor must not exceed the rated voltage. The value of the peak a.c. voltage allowed at different frequencies is under consideration.

1.5.4.1 rated d.c. voltage

maximum d.c. voltage which may be applied continuously to a capacitor at the rated temperature

1.5.4.2 rated a.c. voltage

maximum r.m.s. alternating voltage which may be applied continuously to a capacitor at the rated temperature and at a given frequency

1.5.4.3 rated pulse voltage

peak value of the pulse voltage which may be applied continuously to a capacitor at the rated temperature and at a given frequency

1.5.5 rated voltage pulse slope $\frac{(dU)}{(dt)_R}$ (if applicable)

maximum admissible value of the voltage slope $\frac{dU}{dt}$ of a pulse, at the rated temperature at such a repetition frequency that no significant increase of temperature occurs

1.6 Marking

See 2.4 of IEC 60384-1, with the following details:

1.6.1 The information given in the marking is normally selected from the following list; the relative importance of each item is indicated by its position in the list:

- rated capacitance;
- rated a.c. and/or pulse voltage (a.c. voltage may be indicated by the symbol ~) and the corresponding frequency if different from 50 Hz;
- tolerance on rated capacitance;
- rated voltage pulse slope (if applicable);
- rated current and corresponding frequency (if applicable);
- year and month (or week) of manufacture;

- g) manufacturer's name or trade mark;
- h) climatic category;
- i) manufacturer's type designation;
- j) reference to the detail specification.

1.6.2 The capacitor shall be clearly marked with a), b) and c) above and with as many as possible of the remaining items as is considered necessary. Any duplication of information in the marking on the capacitor should be avoided.

1.6.3 The package containing the capacitor(s) shall be clearly marked with all the information listed in 1.6.1.

1.6.4 Any addition marking shall be so applied that no confusion can arise.

2 Preferred ratings and characteristics

2.1 Preferred characteristics

The values given in detail specifications shall preferably be selected from the following:

2.1.1 Preferred climatic categories

The capacitors covered by this specification are classified into climatic categories according to the general rules given in IEC 60068-1.

The lower and upper category temperatures and the duration of the damp heat, steady state test shall be chosen from the following:

Lower category temperature:	–55 °C, –40 °C, –25 °C and –10 °C
Upper category temperature:	+70 °C, +85 °C; +100 °C and +105 °C
Duration of the damp heat, steady state test:	4, 10, 21 and 56 days

The severities for the cold and dry heat tests are the lower and upper category temperatures respectively.

2.2 Preferred values of ratings

2.2.1 Rated capacitance (C_R)

Preferred values of rated capacitance are values chosen from the E series of preferred values given in IEC 60063.

2.2.2 Tolerances on rated capacitance

The preferred tolerances on the rated capacitance are $\pm 20\%$; $\pm 10\%$; $\pm 5\%$; $\pm 2\%$; $\pm 1\%$.

2.2.3 Rated capacitance with associated tolerance values

For preferred combinations of capacitance series and tolerances see the table below: