

Power electronic capacitors —

Part 1: General

The European Standard EN 61071-1:1996 has the status of a
British Standard

ICS 31.060.70

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National foreword

This British Standard is the English language version of EN 61071-1:1996. It was derived by CENELEC from IEC 61071-1:1991.

The CENELEC common modifications have been implemented at the appropriate places in the text and are indicated by a side line in the margin.

From 1 January 1997, all IEC publications have the number 60000 added to the old number. For instance, IEC 27-1 has been renumbered as IEC 60027-1. For a period of time during the change over from one numbering system to the other, publications may contain identifiers from both systems.

The UK participation in its preparation was entrusted to Technical Committee PEL/33, Power capacitors, 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 the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

Attention is drawn to the fact that CEN and CENELEC Standards normally include an annex which lists normative references to international publications with their corresponding European publications. The British Standards which implement these international or European publications may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index” or by using the “Find” facility of the BSI Standards Electronic Catalogue.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 26 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

This British Standard, having been prepared under the direction of the Electrotechnical Sector Board, was published under the authority of the Standards Board and comes into effect on 15 October 1997

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Descriptors: Electronic equipment, power capacitors, definitions, operating requirements, tests, classifications, quality, safety requirements, installation, marking

English version

Power electronic capacitors Part 1: General

(IEC 1071-1:1991, modified)

Condensateurs pour l'électronique de puissance
Partie 1: Généralités
(CEI 1071-1:1991, modifiée)

Kondensatoren der Leistungselektronik
Teil 1: Allgemeines
(IEC 1071-1:1991, modifiziert)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

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Foreword

The text of the International Standard IEC 1071-1:1995, prepared by IEC TC 33, Power capacitors, was submitted to the formal vote.

Following a decision by the 86th Technical Board, a draft amendment, prepared by Reporting Secretariat SR 33, was submitted to the formal vote.

The two texts were combined and approved by CENELEC as EN 61071-1 on 1996-07-02.

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) 1997-06-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1997-06-01

For products which have complied with the relevant national standard before 1997-06-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2002-06-01.

Annexes designated “normative” are part of the body of the standard. In this standard, Annex A, Annex B, Annex C and Annex ZA are normative.

Annex ZA has been added by CENELEC.

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Section 1. General

1.1 Scope and object

This part of IEC 1071 applies to capacitors intended to be used in power electronic equipment, particularly for:

- semiconductor switching and protection,
- filtering and energy storage.

The rated voltage of capacitors covered by this part is limited to 10 000 V.

The operating frequency of the systems in which these capacitors are used is usually below 1 000 Hz, while the pulse frequencies may go up to several 1 000 Hz in some cases beyond 10 000 Hz.

It distinguishes between a.c. capacitors and d.c. capacitors.

They are considered as components mounted in enclosures.

Capacitors within the scope of this part include those capacitors intended for use in power electronic equipment such as: Semiconductor converters according to IEC 146 or IEC 411.

NOTE 1 The following are excluded from this part:

- Capacitors for induction heat-generating plants operating at frequencies between 40 and 24 000 Hz (IEC 110).
- Capacitors for motor applications and the like (IEC 252).
- Capacitors to be used in circuits for blocking one or more harmonics in power supply networks.
- Small a.c. capacitors as used for fluorescent and discharge lamps (IEC 566).
- Capacitors for suppression of radio interference (IEC 384-14).
- Shunt capacitors for a.c. power systems having a rated voltage above 1 000 V (IEC 871-1, 2).
- Shunt power capacitors of the self-healing type for a.c. systems having a rated voltage up to and including 1 000 V (IEC 831-1, 2).
- Shunt power capacitors of the non self-healing type for a.c. systems having a rated voltage up to and including 1 000 V (IEC 931-1, 2).
- Electronic capacitors not used in power circuits, (IEC 80 and IEC 166).
- Series capacitors for power systems (IEC 143).
- Coupling capacitors and capacitor dividers (IEC 358).
- Capacitors for applications requiring energy storage/high current discharge such as photocopiers and lasers.
- Capacitors for microwave ovens.

NOTE 2 Additional requirements for capacitors to be protected by internal fuses and internal disconnecting devices, as well as requirements for self-healing tests, endurance tests and destruction tests are under consideration.

NOTE 3 This standard covers an extremely wide range of capacitor technologies for numerous applications.

Examples are given in section 6.

The object of this standard is:

- a) to formulate uniform rules regarding performances, testing and rating;
- b) to formulate specific safety rules;
- c) to provide a guide for installation and operation.

1.2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of IEC 1071. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of IEC 1071 are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 68, *Environmental testing*.

IEC 68-2-6:1982, *Environmental testing — Part 2: Tests — Test Fc and guidance: Vibration (sinusoidal)*.

IEC 146, *Semiconductor converters*.

IEC 411, *Power converters for electric traction*.

IEC 664A:1981, *Insulation co-ordination within low-voltage systems, including clearances and creepage distances for equipment. First supplement*.

1.3 Definitions

1.3.1

capacitor element (or element)

an indivisible part of a capacitor consisting of two electrodes separated by a dielectric

1.3.2

capacitor unit (or unit)

an assembly of one or more capacitor elements in the same container with terminals brought out

1.3.3

capacitor bank

an assembly of two or more capacitor units, electrically connected to each other

1.3.4

capacitor

a general term used when it is not necessary to state whether reference is made to an element, a unit or a capacitor bank

1.3.5

capacitor equipment

an assembly of capacitor units and their accessories intended for connection to a network

1.3.6

power electronic capacitor

a power capacitor intended to be used in power electronic equipment and capable of operating continuously under non-sinusoidal current and voltage

1.3.7

metal-foil capacitor (non self-healing)

a capacitor in which the electrodes usually consist of metal foils separated by a dielectric, in the event of breakdown of the dielectric, the capacitor does not restore itself

1.3.8

self-healing metallized dielectric capacitor

a capacitor, the electrodes of which are metallized (usually by evaporation); in the event of dielectric breakdown, the capacitor restores itself

1.3.9

a.c. capacitor

a capacitor essentially designed for operation with alternating voltage

NOTE A.C. capacitors may be used with d.c. voltage up to the rated voltage only where authorized by the capacitor manufacturer.

1.3.10

d.c. capacitor

a capacitor essentially designed for operation with direct voltage

NOTE D.C. capacitors may be used with a.c. voltages only where authorized by the capacitor manufacturer.

1.3.11

model capacitor

a smaller unit which simulates a complete unit or element in an electrical test, without reducing the severity of the electrical, thermal or mechanical conditions

NOTE The combined sum of stresses should always be considered, for instance the sum of temperature, mechanical conditions and electrical stresses.

1.3.12 internal (element) fuse

a device incorporated in the capacitor which disconnects an element or a group of elements in the event of breakdown