



SLOVENSKI STANDARD
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Generic specification: Passive filter units for electromagnetic interference suppression

Generic Specification: Passive filter units for electromagnetic interference suppression

Fachgrundspezifikation: Passive Filter für die Unterdrückung von elektromagnetischen Störungen

Spécification générique: Filtres passifs d'antiparasitage

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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

This European Standard was prepared by CLC/TC CECC/SC 40XA (former WG3), Capacitors.

The text of Specification CECC 33 000 was submitted to the formal vote; together with the voting report, circulated as CECC(Secretariat)3628 it was approved as EN 133000 on 1994-12-28.

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) 1997-10-24
 - latest date by which the national standards
conflicting with the EN have to be withdrawn (dow) 1998-10-24
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1 SCOPE

This standard relates to passive filter units for electromagnetic interference suppression for use within, or associated with, electronic or electrical equipment and machines.

Both single- and multi-channel filters within one enclosure are included within the scope of this specification.

Filters constructed of capacitive elements where the inductance is inherent in the construction of the filter are within the scope of this specification. Similarly filters constructed of inductive elements where the capacitance is inherent in the construction of the filter are also within the scope of this specification. The manufacturer shall state whether a given component is to be designed as a capacitor, an inductor or a filter.

The filter units within the scope of this specification are further distinguished as those for which safety tests are appropriate (e.g. those connected to mains supplies) and those for which such tests are not appropriate. Separate sectional specifications cover the requirements for these two general application classes.

This generic specification establishes standard terms, inspection procedures and methods of test for use in sectional and detail specifications within the CECC System for electronic components.

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2 GENERAL**2.1 Related documents**

EN 130000	Generic Specification: Fixed Capacitors
EN 140000	Generic Specification: Fixed Resistors
EN 100114-1	Rules of Procedure 14: Quality Assessment Procedures Part 1: Approval of manufacturers and other organizations
prEN 100114-2:1996	Rules of Procedure 14: Quality Assessment Procedures Part 2: CECC requirements for the qualification approval, the release for delivery and the validity of release of electronic components
CECC 00 114-3 (1993)	Rules of Procedure 14: Quality Assessment Procedures Part 3: Capability approval of an electronic component manufacturing activity (with amendments 1, 2 and erratum)
EN 60335-1	Safety of household and similar electrical appliances Part 1: General requirements (IEC 335-1, modified)
ECQAC 1220 (1992)	ECQAC Policy on Uncertainty of Measurement
ISO 497	Guide of the choice of series of preferred numbers and of series containing more rounded values of preferred numbers
ISO 1000	SI units and recommendations for the use of their multiples and of certain other units
IEC 27-1	Letter symbols to be used in electrical technology Part 1: General
IEC 50	International Electrotechnical Vocabulary (IEV)
IEC 60-2	High-voltage test techniques Part 1: General definitions and test requirements
IEC 62	Marking codes for resistors and capacitors
IEC 63 Amendment 1 (1967) Amendment 2 (1977)	Preferred number series for resistors and capacitors
IEC 68	Environmental testing
IEC 68-1 (1988) Amendment 1 (1992)	Part 1: General
IEC 68-2-1 (1990) Amendment 1 (1993) Amendment 2 (1994)	Part 2: Tests - Tests A: Cold
IEC 68-2-2 (1974) Amendment 1 (1993) Amendment 2 (1994)	Part 2: Tests - Tests B: Dry heat

IEC 68-2-3 (1985)	Part 2: Tests - Test Ca: Damp heat, steady state
IEC 68-2-6 (1995)	Part 2: Tests - Test Fc: Vibration (Sinusoidal)
IEC 68-2-13 (1983)	Part 2: Tests - Test M: Low air pressure
IEC 68-2-14 (1984) Amendment 1 (1986)	Part 2: Tests - Test N: Change of temperature
IEC 68-2-17 (1994)	Part 2: Tests - Test Q: Sealing
IEC 68-2-20 (1979) Amendment 1 (1986) Amendment 2 (1987)	Part 2: Tests - Test T: Soldering
IEC 68-2-21 (1983) Amendment 1 (1985) Amendment 2 (1991) Amendment 3 (1993)	Part 2: Tests - Test U: Robustness of terminations and integral mounting devices
IEC 68-2-27 (1987)	Part 2: Tests - Test Ea: Shock
IEC 68-2-29 (1987)	Part 2: Tests - Test Eb: Bump
IEC 68-2-30 (1980) Amendment 1 (1985)	Part 2: Tests - Test Db: Damp heat, cyclic (12 + 12 hour cycle)
IEC 68-2-45 (1980) Amendment 1 (1993)	Part 2: Tests - Test XA and guidance - Immersion in cleaning solvents
IEC 68-2-47 (1982)	Part 2: Tests - Mounting of components, equipment and other articles for dynamic tests, including shock (Ea), bump (Eb), vibration (Fc and Fd) and steady-state acceleration (Ga) and guidance)
IEC 85	Thermal evaluation and classification of electrical insulation
IEC 294	Measurement of the dimensions of a cylindrical component having two axial terminations
IEC 410	Sampling plans and procedures for inspection by attributes
IEC 695-2-2	Fire hazard testing - Part 2: Test methods, Needle flame test
CISPR 17 (1981)	Methods of measurement of the suppression characteristics of passive radio interference filters and suppression components

NOTE - The above references apply to the current editions, except for IEC 68, for which the referenced edition must be used.

2.2 Units, symbols and terminology

2.2.1 General

Units, graphical symbols, letter symbols and terminology shall, wherever possible, be taken from the following publications:

ISO Standard 1000
IEC 27
IEC 50

When further items are required they shall be derived in accordance with the principles of the documents listed above.

2.2.2 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.

2.2.3 Style

A sub-division of a type, generally based on dimensional factors.

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

2.2.4 Electromagnetic interference suppression filter unit (filter) Radio interference suppression filter unit

An assembly of piece-parts and inductive, capacitive and resistive elements to be used for the reduction of electromagnetic interference caused by electrical or electronic equipment, or other sources.

2.2.5 Rated voltage (U_R)

The rated voltage is either the maximum r.m.s. operating voltage at rated frequency or the maximum d.c. operating voltage which may be applied continuously to the terminations of the filter unit at any temperature between the lower category temperature and the rated temperature.

2.2.6 Category voltage (U_C)

The maximum voltage which may be applied to a filter at its upper category temperature.

2.2.7 Lower category temperature

The minimum ambient temperature for which the filter has been designed to operate continuously.

2.2.8 Upper category temperature

The maximum ambient temperature for which the filter unit has been designed to operate continuously.

2.2.9 Rated temperature

The maximum ambient temperature at which a filter can carry its rated current.

2.2.10 Rated current

The maximum r.m.s. operating current at rated frequency or maximum d.c. operating current which allows continuous operation of the filter at the rated temperature. It is assigned by the manufacturer for one or both of the following conditions:

- a) free air (I_{RO})
- b) with a specified heat sink (I_{RH})

2.2.11 Rated capacitance (C_R)

The capacitance value for which a capacitor has been designed and which may be indicated upon it.

2.2.12 Rated inductance (L_R)

The inductance value for which the inductor has been designed and which may be indicated upon it.

2.2.13 Insertion loss

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The ratio of the voltage before and after the insertion of the filter in the circuit as measured at the terminations. The insertion loss can be measured either with a symmetrical or an asymmetrical test circuit.

NOTE - It is normally expressed in decibels, when the insertion loss is 20 times the logarithm to base 10 of this ratio.

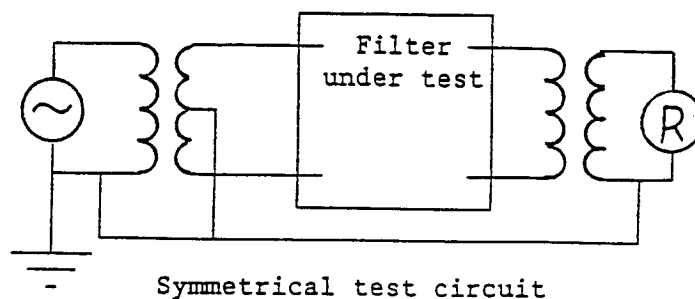
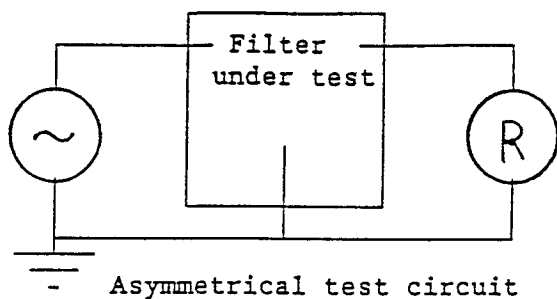
2.2.13.1 Asymmetrical test circuit

A test circuit in which the filter under test is connected as a 3-terminal network, one terminal of which is connected to earth. The signal is applied between the input terminal and earth, and the output is measured between the output terminal and earth. There is a common (earth) connection between generator, filter and receiver.

2.2.13.2 Symmetrical test circuit

A test circuit in which the filter under test is connected as a 4-terminal network; the test signal applied to the two input terminals is symmetrical about earth, i.e. equal in magnitude but of opposite phase on the two terminals. The output is measured between the other two terminals.

It is usual to perform symmetrical tests using an asymmetrical generator and receiver with suitable balance-to-unbalance transformers connected between them and the filter under test.



2.2.14 Visible damage

Visible damage which reduces the usability of the filter for its intended purpose.

2.2.15 Passive flammability

The ability of a filter to burn with a flame as a consequence of the application of an external source of heat.

2.2.16 Active flammability

The ability of a filter to burn with a flame as a consequence of electrical loading.

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2.3 Preferred values

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Each sectional specification shall give the preferred values for ratings and characteristics appropriate to the sub-family covered by that sectional specification.

2.4 Marking

2.4.1 General

The sectional specification shall indicate the identification criteria and other information to be shown on the filters and the packing.

The order of priority for marking small filters shall be specified.

2.4.2 Coding

When coding is used for tolerance or date of manufacture, the method shall be selected from those given in IEC 62.

3 QUALITY ASSESSMENT PROCEDURES

3.1 General

Before filters are qualified according to the procedures of this clause the manufacturer shall obtain approval of his organisation following the provisions of EN 100114-1.

Two methods are available for the approval of filters of assessed quality. These are Qualification Approval according to the provisions of EN 100114-2 and Capability Approval according to the provisions of CECC 00 114-3. For a given sub-family of filters separate sectional specifications for Qualification Approval and Capability Approval are necessary, and Capability Approval is therefore available only when a relevant sectional specification has been published.

3.1.1 Applicability of qualification approval

Qualification approval is appropriate for a range of filters manufactured to similar design and production processes and conforming to a published detail specification.

The programme of tests defined in the detail specification for the appropriate assessment and performance levels applies directly to the filter range to be qualified, as prescribed in 3.5 and the relevant sectional specification.

3.1.2 Applicability of capability approval

Capability approval is appropriate when filters based on common design rules are fabricated by a group of common processes. It is particularly appropriate when filters are manufactured to a user's specific requirements.

Under capability approval detail specifications fall into the following three categories for:

3.1.2.1 Capability Qualifying Components (CQCs), including process validation test vehicles

A detail specification shall be prepared for each CQC as agreed with the ONS. It shall identify the purpose of the CQC and include all relevant test severities and limits.

3.1.2.2 Components for listing in the Register of Approvals (Standard catalogue items)

When the manufacturer desires that a filter covered by the capability approval procedure should be listed in the CECC Register of Approvals, a capability approval detail specification complying with the blank detail specification shall be written. Such specifications shall be registered by the CECC and the component may be listed in CECC 00 200: Register of Firms, Products and Services Approved under the CECC System (Register of Approvals). See § 4.3 of CECC 00 114-3.

3.1.2.3 Customer specified filters

The content of the detail specification (often known as a Customer Detail Specification CDS) shall be by agreement between the manufacturer and customer in accordance with § 4.3 of CECC 00 114-3.