



**SLOVENSKI STANDARD**  
**SIST EN 133100:2002**  
**01-september-2002**

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**Sectional specification: Passive filter units for electromagnetic interference suppression - Filters for which safety tests are not required**

Sectional Specification: Passive filter units for electromagnetic interference suppression - Filters for which safety tests are not required

Rahmenspezifikation: Passive Filter für die Unterdrückung von elektromagnetischen Störungen - Filter für die keine Sicherheitsprüfungen vorgeschrieben sind

Spécification intermédiaire: Filtres passifs d'antiparasitage - Filtres pour lesquels des essais de sécurité ne sont pas exigés

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**Ta slovenski standard je istoveten z: EN 133100:1998**

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**ICS:**

31.160	Električni filtri	Electric filters
33.100.20	Imunost	Immunity

**SIST EN 133100:2002** en

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 133100**

March 1998

Descriptors: Quality, electronic components, capacitors

English version

**Sectional Specification:**  
**Passive filter units for electromagnetic interference suppression**  
**Filters for which safety tests are not required**

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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 WG 3), Capacitors.

The text of the draft based on document CECC(Secretariat)2676 was submitted to the formal vote; together with the voting report, circulated as document CECC(Secretariat)2869, it was approved as EN 133100 on 1991-09-15.

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) 1998-10-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 1998-10-01

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## 1 General

### 1.1 Scope

This specification applies to passive filter units for electromagnetic interference suppression which fall within the scope of the Generic Specification, EN 133000.

The scope of this specification is restricted to passive filter units for which safety tests are not appropriate. This implies that filters specified according to this specification will not be connected to mains supplies that such tests are required.

### 1.2 Related documents

EN 130400		Sectional Specification: Fixed metallized polyethylene-terephthalate film dielectric capacitors for direct current
EN 130500		Sectional Specification: Fixed metallized polycarbonate film dielectric capacitors for direct current
EN 130600		Sectional Specification: Fixed capacitors with ceramic dielectric, class 1
EN 130700		Sectional Specification: Fixed capacitors with ceramic dielectric, class 2
EN 133000	1995	Passive filter units for electromagnetic interference suppression: Generic Specification
IEC 60062	1992	Marking codes for resistors and capacitors (harmonized as EN 60062:1993)
IEC 60063	1963	Preferred number series for resistors and capacitors
Amendment N° 1	1967	
Amendment N° 2	1977	
IEC 60068	Series	Environmental testing (harmonized as EN 60068 series)
IEC 60279	1969	Measurement of the winding resistance of an a.c. machine during operation at alternating voltage
IEC 60410	1973	Sampling plans and procedures for inspection by attributes
IEC 60940	1988	Guidance information on the application of capacitors, resistors, inductors and complete filter units for radio interference suppression

ISO 3                      1973           Preferred numbers - Series of preferred numbers

NOTE: The above references are to the editions current at the date of publication of this specification except for IEC 60068, for which the referenced edition in the applicable test clauses of the generic specification shall be used.

### 1.3 Information to be given in a detail specification

The detail specification 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 1.3.1 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 the appropriate clause of this sectional specification.

#### 1.3.1 Outline drawing and dimensions

There shall be an illustration of the filter as an aid to easy recognition and for comparison of the filter 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 range of filters is covered by a single detail specification, their dimensions and their associated tolerances shall be placed in a table following the drawing.

In addition the detail specification shall state such other dimensional information as will adequately describe the filter outline.

#### 1.3.2 Mounting

The detail specification shall specify the method of mounting recommended for normal use and the method which is mandatory for the application of the vibration, bump, shock and endurance tests. The design of the filter may be such that special mounting fixtures or heat sinks 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, bump or shock tests. The specified heat sink shall be used in the application of the endurance test.

#### 1.3.3 Ratings and characteristics

The ratings and characteristics shall be in accordance with the relevant clauses of this specification.

### 1.3.3.1 *Particular characteristics*

Additional characteristics may be listed when they are considered necessary to specify adequately the filter for design or application purposes.

### 1.3.4 *Marking*

The detail specification shall specify the content of the marking on the filter and the package.

## 1.4 Terminology

See 2.2 of EN 133000.

## 1.5 Marking

1.5.1 See 2.4 of EN 133000 with the following details:

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:

- a) Manufacturer's name or trademark;
- b) Manufacturer's type designation or the type designation given in the detail specification;
- c) Rated voltage; [SIST EN 133100:2002](https://standards.iteh.ai/catalog/standards/sist/a1340930-6f81-4ebd-af2b-f6bd16c97d5c/sist-en-133100-2002)
- d) Rated current; <https://standards.iteh.ai/catalog/standards/sist/a1340930-6f81-4ebd-af2b-f6bd16c97d5c/sist-en-133100-2002>
- e) Identification of termination or circuit diagram;
- f) Rated temperature;
- g) Climatic category;
- h) Year and month (or week) of manufacture (may be indicated by the code given in IEC 60062);
- i) Reference to the detail specification.

1.5.2 Marking on the filter may be omitted when the manufacturer considers that there is insufficient space, and this fact is recorded in the detail specification. When present the marking shall be sufficient to provide a clear identification of the filter.

1.5.3 The package containing the filter(s) shall be clearly marked with all the information listed in 1.5.1.

1.5.4 Any additional marking shall be so applied that no confusion can arise.



## 2 Preferred ratings and characteristics

### 2.1 Preferred climatic categories

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

The preferred values of lower and upper category temperature and the duration of the damp heat, steady state test are:

Lower category temperature: - 65°C, - 55°C, - 40°C, - 25°C and - 10°C

Upper category temperature: + 85°C, + 100°C, + 125°C and + 155°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.

For guidance on the application of the categories described above, see IEC 60940.

### 2.2 Preferred values of ratings

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#### 2.2.1 Rated voltage ( $U_R$ )

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The preferred values of a.c. and d.c. rated voltages are: 25 - 40 - 63 - 100 - 160 - 250 - 400 - 630 - 1 000 - 1 600 V. These values conform to the basic series of preferred values R5 given in ISO 3: Preferred values R given in ISO 3: Preferred numbers.

#### 2.2.2 Rated temperature

The rated temperature shall not be less than + 40 °C.

## 3 Quality assessment procedures

### 3.1 Primary stage of manufacture

See 3.2 of EN 133000.

### 3.2 Structurally similar filters

See 9 of EN 100114 Part 1 and 3.3 of EN 133000.

In addition to these provisions, filters may be considered as structurally similar only when for their range of component values they have the same capacitor, inductor and resistor technologies.

### 3.3 Certified records of released lots

The information required in 3.5.1 of EN 133000 shall be made available when prescribed in the detail specification and when requested by a customer. After the endurance test the parameters for which variables information is required are insertion loss change and insulation resistance.

### 3.4 Qualification approval

The procedures for qualification approval testing are given in 3.4 of the Generic Specification, EN 133000. The schedule to be used for qualification approval testing on the basis of lot-by-lot and periodic tests is given in 3.5 of this specification. The procedure using a fixed sample size schedule is given in 3.4.1 and 3.4.2 below. For the two procedures the sample sizes and the number of permissible defectives shall be of comparable order. The test conditions and requirements shall be the same. Qualification approval according to the fixed sample size procedure is preferred.

#### 3.4.1 Sampling

The sample shall be representative of the range of filters for which approval is sought. This may or may not be the complete range covered by the detail specification.

When there are not more than four rated voltages in the range the sample shall consist of specimens of four values, chosen as follows:

- a) The highest voltage and highest total capacitance;
- b) The highest voltage and lowest total capacitance;
- c) The lowest voltage and highest total capacitance;
- d) The lowest voltage and lowest total capacitance

When there are more than four rated voltages in the range the sample shall contain two additional values, chosen as follows:

- e) An intermediate voltage and highest total capacitance;
- f) The same intermediate voltage and lowest total capacitance.

NOTE: "Total capacitance" in the clause above means the capacitance measured at low frequency between the input terminations of the filter.

Spare specimens are permitted as follows:

- a) One per value which may be used to replace the permitted defective in Group 0;
- b) One per value which may be used as replacements for specimens which are defective because of incidents not attributable to the manufacturer.

The numbers given in Group 0 assume that all subgroups are applicable. If this not so, the numbers given in Group 0 may also be reduced if, for example for expensive filters, the manufacturer chooses to carry out the tests of a number of groups in sequence on the same specimens.

When additional groups are introduced into the qualification approval test schedule, the number of specimens required for Group 0 shall be increased by the same number as that required for the additional groups.

Table 1 gives the number of specimens to be tested in each group or subgroup together with the permissible number of defectives for qualification approval tests.

### 3.4.2 Tests

The complete series of tests indicated in table 1 and annex A is required for the approval of filters covered by one detail specification. The tests of each group shall be carried out in the order given.

The whole sample shall be subjected to the tests of Group 0 and then subdivided for the other groups.

A specimen found to be defective during the tests of Group 0 shall not be used for other groups.

"One defective" is counted when a filter has not satisfied the whole or part of the tests of a group.

The approval is granted when the number of defectives does not exceed the specified number of permissible defectives for each group and sub-group and the total number of permissible defectives.

NOTE: Table 1 and annex A together form the fixed sample size test schedule, where table 1 includes the details for the sampling and permissible defectives for the different tests or groups of tests, whereas annex A together with the details of test contained in clause 4 gives a complete summary of the test conditions and performance requirements and indicates where for test methods or conditions of test a choice has to be made in the detail specification.

The conditions of test and performance requirements for the fixed sample size schedule shall be identical to those prescribed in the detail specification for the quality conformance inspection.

**Table 1: Sampling plan**

Qualification approval - Assessment level E

Group	Test	Sub-clause No. of this specifi- cation	Number of specimens (n) and number of permissible defectives (pd)						
			Per value (7)	For four or less values (7) to be tested (4)			For six values (7) to be tested (4)		
				n	4n	pd (9)	pd total	6n	pd (9)
0	Dimensions (gauging)	4.1	24	96	2		144	3	
	Visual examination	4.1	19	76	2		114	3	
	d.c. line resistance or voltage drop	4.4	12	48	1		72	2	
	Insertion loss (no load)	4.5	9	36	1		54	1	
	Voltage proof	4.2							
	Insulation resistance	4.3							
	Shunt resistance (1)	4.6							
	Spares		2	8			12		
1A	Dimensions (detail)	4.1							
	Robustness of terminations	4.7	2	8	1		12	1	
	Resistance to soldering heat (1)	4.8	1	4	0		6	0	
	Component solvent resistance (2)	4.23	1	4	0		6	0	
	Solvent resistance of the marking (2)	4.22	4	16	1		24	2	
	Rapid change of temperature	4.10	3	12	1		18	1	
	Vibration	4.11	1	4	0		6	0	
	Bump or Shock	4.12							
	Container sealing (2)	4.14	6	24	2	3	36	3	4
	Climatic sequence	4.15	3	12	1	2	18	1	3
2	Damp heat, steady state	4.16	4	16	1	1	24	2	2
3A	Temperature rise or Endurance - current (5)	4.17	2	8	0	1	12	1	1
	Endurance - current (6)	4.18.1	1	4	0	1	6	0	
3B	Endurance - voltage terminations/case (8)	4.18.2	2	8	0	1	12	1	
	Endurance - voltage between terminations (8)	4.18.3	4	16	1	2	24	2	
4	Charge/discharge (1)	4.19	2	8	0	1	12	1	
	Insertion loss (load/temperature) (2)	4.5	2	8	0	1	12	1	
5	Current overload (2)	4.21	2	8	0	1	12	1	
	Passive flammability (2)	4.20	See 4.20		0	0	See 4.20	0	0
8	Solderability (1) (10)	4.9	2	8	0	0	12	1	
			1	4	0	0	6	0	

Notes to tables 1, 2 and 3

- (1) If applicable.
- (2) If required in the detail specification.
- (3) Whichever is required in the detail specification.
- (4) The four numbers in each box of the table indicate in descending order the numbers applicable for specimens within the following mass limits:

≤ 4 g  
> 4 g and ≤ 25 g  
> 25 g and ≤ 250 g  
> 250 g

Where a range is qualified which contains filters within more than one of the mass classifications listed above, the number of specimens selected shall be that for the classification in which the majority or the values in the range fall.

These numbers exclude the number of specimens required for the passive flammability test (Group 6), which are calculated on a different basis as described in 4.20.

- (5) For filters of mass > 25 g only.
- (6) For filters of mass ≤ 25 g only.
- (7) For the purpose of this table a value is a filter with a given combination of capacitance, inductance, rated voltage and rated current.
- (8) See 4.17.4 for the option of combining the test of subgroups 3A and 3C.
- (9) Except for Groups 7 and C7, when zero defectives are required and one defective is obtained, all the tests of the group shall be repeated on a fresh sample and then no further defectives are permitted. For table 1 the defective obtained in the first sample shall be counted for the total defectives permitted in the seventh or tenth column.
- (10) This test may be carried out on electrically defective filters or detached terminations provided they have received all the processing which would be carried out on a completed filter. Group O or Group A tests may be omitted for filters intended to be submitted to this test.