SLOVENSKI STANDARD
SIST EN 140100:2002

01-september-2002

Sectional specification: Fixed low power non-wire wound resistors

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Rahmenspezifikation: Nicht drahtgewickelte Festwiderstände kleiner Belastbarkeit

Spécification intermédiaire: Résistances fixes non bobinées de faible puissance

Ta slovenski standard je istoveten z: **EN 140100:1996**

ICS:

31.040.10 Fiksni upor Fixed resistors

SIST EN 140100:2002 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 140100

November 1996

Supersedes CECC 40 100:1980

Descriptors: Electronic components, fixed low power resistors, non-wire wound resistors, sectional specification

English version

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CENELEC

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

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Foreword

This European Standard was prepared by the Technical Committee CENELEC TC/CECC SC40XB, Resistors (former CECC/WG 4A)

The text of the draft based on document CECC(Secretariat)3463 was submitted to the formal vote; together with the voting report, circulated as document CECC(Secretariat)3565, it was approved as EN 140100 on 1994-06-20.

This European Standard supersedes CECC 40 100:1980.

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- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1997-06-01

Contents

1 Scope

This sectional specification prescribes the preferred values for characteristics and ratings and also the inspection requirements for fixed low power non-wire wound resistors of assessed quality. It selects from the generic specification, EN 140000, the appropriate methods of test to be used in detail specifications derived from this specification.

Associated with this specification are one or more blank detail specifications each referenced by an EN number. A blank detail specification which has been completed as specified in 2.5 of this specification forms a detail specification. Such detail specifications may be used for the grant of qualification approval to a resistor and for the performance of quality conformance inspection in accordance with the CECC system.

2 Preferred characteristics, ratings and severities for environmental and overload tests

2.1 Characteristics

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

2.1.1 *Climatic severities (IEC 115-2 clause 2.1.1)*

The resistors covered by this document are classified into climatic categories according to the general rules given in the appendix to IEC 68-1.

The preferred severities for the cold, dry heat and damp heat, steady state, tests are within the following ranges:

Cold (Test A)	- 40 °C to - 55 °C
Dry heat (Test B)	+ 85 °C to + 155 °C
Damp heat, steady state (Test C)	4 to 56 days

Values selected within these ranges shall be chosen from those listed in the relevant tests of IEC 68-2.

The severities for the cold and dry heat tests are the lower and upper category temperatures. For some resistors, these temperatures will occur between two of the preferred temperatures given in IEC 68-2. In this case, the nearest preferred temperature within the category temperature range of the resistors shall be chosen for this severity.

2.1.2 *Temperature characteristics and temperature coefficients of resistance (IEC 115-2 clause 2.1.2)*

The preferred limits of change in resistance for the temperature characteristic of resistance test are given in table 1. Each line in table 1 gives the temperature coefficient and corresponding temperature characteristic for 20 °C to 70 °C and limits of change in resistance for the measurement of temperature characteristic of resistance (4.8 of EN 140000) on the basis of the category temperature ranges of 2.1.1 of this document.

Table 1: Percentage change in resistance

Temperature Coefficient 10^{-6}/°C	Temperature characteristic	Reference temperature / lower category temperature (°C)			Reference temperature / upper category temperature (°C)			
	20/70 %	+ 20/- 55 %	+ 20/- 40 %	+ 20/- 25 %	20/85 %	20/100 %	20/125 %	20/155 %
± 2500	± 12,5	± 18,75	± 15	± 11,25	± 16,25	± 20	± 26,25	± 33,75
- 800/ - 2500	- 4/ - 12,5	+ 6/ + 18,75	+ 4,8/ + 15	+ 3,6/ + 11,3	- 5,2/ - 16,25	- 6,4 - 20	- 8,4 - 26,25	- 10,8/ - 33,75
- 150/ - 1500	- 0,75/ - 7,5	+ 1,12/ + 11,2	+ 0,9/ + 9,0	+ 0,68/ + 6,8	- 0,98/ - 9,8	- 1,2/ - 12,0	- 1,58/ - 15,8	- 2,02/ - 20,2
± 1000	± 5	± 7,5	± 6	± 4,5	± 6,5	± 8	± 10,5	± 13,5
± 500	± 2,5	± 3,75	± 3	± 2,25	± 3,25	± 4	± 5,25	± 6,75
+ 200/ - 500	+ 1/ - 2,5	- 1,5/ + 3,75	- 1,2/ + 3	- 0,9 + 2,25	+ 1,3/ - 3,25	+ 1,6/ - 4	+ 2,1/ - 5,25	+ 2,7/ - 6,75
± 250	± 1,25	± 1,88	± 1,5	± 1,13	± 1,62	± 2	± 2,62	± 3,38
± 100	± 0,5	± 0,75	± 0,6	± 0,45	± 0,65	± 0,8	± 1,05	± 1,35
± 50	± 0,25	± 0,375	± 0,3	± 0,225	± 0,325	± 0,4	± 0,525	± 0,675
± 55	± 0,125	± 0,188	± 0,15	± 0,113	± 0,162	± 0,2	± 0,262	± 0,338
± 15	± 0,075	± 0,113	± 0,090	± 0,068	± 0,098	± 0,120	± 0,158	± 0,203
± 10	± 0,050	± 0,075	± 0,060	± 0,045	± 0,065	± 0,080	± 0,105	± 0,135[1)]
± 5	± 0,025	± 0,038	± 0,030	± 0,023	± 0,033	± 0,040	± 0,053	± 0,068[1)]

[1)] Text different to IEC 115-2

Resistors having an upper category temperature of + 85 °C need not be measured between 20 °C and 70 °C.

If measurements are required at additional temperatures, these shall be specified in the detail specification.

2.1.3 *Limits for change in resistance (IEC 115-2 clause 2.1.3)*

For each stability class the preferred limits for change in resistance in each of the tests listed in the heading of table 2 are as indicated.

NOTE: The subclause numbers in the heading of table 2 refer to EN 140000.

Table 2: Limits of change in resistance

Stability class	Long-term tests 4.23 Climatic sequence 4.24 Damp heat, steady state 4.25 Endurance at 70 °C 4.25.3 Endurance at upper category temperature	Short-term tests 4.13 Overload 4.16 Robustness of terminations 4.18 Resistance to soldering heat 4.19 Rapid change of temperature 4.22 Vibration
15	± (15 % R + 0,5 W)	± (2 % R + 0,1 W)
10	± (10 % R + 0,5 W)	± (2 % R + 0,1 W)
5	± (5 % R + 0,1 W)	± (1 % R + 0,05 W)
3	± (3 % R + 0,1 W)	± (0,5 % R + 0,05 W)
3	± (2 % R + 0,1 W)	± (0,5 % R + 0,05 W)
1	± (1 % R + 0,05 W)	± (0,25 % R + 0,05 W)
0,5	± (0,5 % R + 0,05 W)	± (0,1 % R + 0,01 W)
0,25	± (0,25 % R + 0,05 W)	± (0,1 % R + 0,01 W)
0,10	± (0,10 % R + 0,02 W)	± (0,05 % R + 0,01 W)
0,05	± (0,05 % R + 0,01 W)	± (0,05 % R + 0,01 W)

2.2 Preferred value ratings

2.2.1 *Rated resistance (IEC 115-2 clause 2.2.1)*

See 2.3.2. of EN 140000.

2.2.2 *Tolerances on rated resistance (IEC 115-2 clause 2.2.2)*

The preferred tolerances on rated resistance are:

± 20 %; ± 10 %; ± 5 %; ± 2 %; ± 1 %; ± 0,5 %; ± 0,25 %; ± 0,1 %,
[± 0,05 %; ± 0,02 %; ± 0,01 %,][1)]

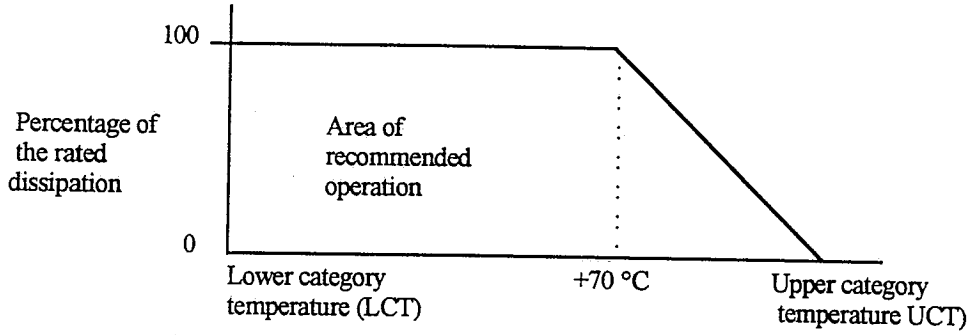
2.2.3 *Rated dissipation (IEC 115-2 clause 2.2.3)*

The preferred values of rated dissipation at 70 °C are:

[0,031 W][2)]; 0,063 W; 0,125 W; 0,25 W; 0,5 W; 1 W; 2 W; 3 W; and 4 W.

[1)] Text different to IEC 115-2.

The derated values of dissipation at temperatures in excess of 70 °C shall be as indicated by the following curve:



A large area of operation may be given in the detail specification provided it includes all the area given above.

The detail specification shall state the maximum dissipation at temperatures other than 70 °C. All break points on the curve shall be verified by test.

2.2.4 *Limiting element voltage (IEC 115-2 clause 2.2.4)*

The preferred values of limiting element voltage are:

[50 V][2)]; 75 V; 100 V; 150 V; [200][2)]; 250 V; 350 V; 500 V; 750 V; and 1 000 V d.c. or a.c.

2.2.5 *Limit for insulation resistance (IEC 115-2 clause 2.2.5)*

The standard limit for insulation resistance shall be 1 GΩ minimum or, after humidity tests, 100 MΩ.

2.2.6 *Insulation voltage (insulated styles only)*

See 2.2.17 of EN 140000. (IEC 115-2 clause 2.2.6).

2.3 Severities environmental and overload tests

Test severities given in detail specifications shall preferably be selected from the following:

2.3.1 *Drying (IEC 115-2 clause 2.3.1)*

Procedure I of 4.3 of EN 140000 shall be used.

[2)] Text different to IEC 115-2

2.3.2 *Vibration (IEC 115-2 clause 2.3.2)*

Test Fc (IEC 68-2-6A)	Procedure B4
Frequency range:	10 Hz to 500 Hz
Amplitude:	0,75 mm or 98 m/s^2 (whichever is the less severe)
Sweep endurance:	Total duration: 6 h

Resistors shall be mounted by their normal means. Where this is by axial wire terminations, the distance between the resistor body and the mounting point on the termination shall be 6 mm ± 1 mm.

2.3.3 *Low air pressure (IEC 115-2 clause 2.3.3)*

Test M (IEC 68-2-13)

8,5 kPa (85 mbar)

2.3.4 *Overload*

Applied voltage:	2,5 times the rated voltage or twice the limiting element voltage, whichever is the less.
Duration:	The detail specification shall state the load duration. Preferred values 0,5; 1; 2; 5; 10; 20 s. This time shall be fixed in such a way, that the max. temperature is 50 °C ± 20 °C above the upper category temperature.
Mounting:	As specified for endurance tests. Soldering to a glass-epoxy FR4 print board (thickness 1,6 mm) is preferred.

2.4 Information to be specified in a detail specification

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

NOTE: the information given in 2.5.1 to 2.5.5 may, for convenience, be presented in tabular form.

2.4.1 *Style (2.2.3 of EN 140000)*

The style is a combination of mechanical size and shape and temperature characteristic (or coefficient) of resistance. It shall be represented by a double-letter code e.g. AB, which is arbitrarily chosen for each detail specification. The style designation, therefore, has no meaning unless the number of the detail specification is also given.

2.4.2 *Rated dissipation*

See 2.2.3.