



**SLOVENSKI STANDARD**  
**SIST EN 140200:2002**  
**01-september-2002**

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**Blank detail specification: Fixed power resistors**

Sectional Specification: Fixed power resistors

Rahmenspezifikation: Hochbelastbare Festwiderstände

Spécification intermédiaire: Résistances fixes à forte dissipation

**Ta slovenski standard je istoveten z: EN 140200:1996**

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**ICS:**

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EUROPEAN STANDARD  
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English version

**Sectional Specification:  
Fixed power resistors**

Spécification intermédiaire:  
Résistances fixes à forte dissipation

Rahmenspezifikation:  
Hochbelastbare Festwiderstände

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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 the Technical Committee CENELEC TC/CECC SC40XB, Resistors (former CECC/WG 4A)

The text of the draft based on document CECC(Secretariat)3480 was submitted to the formal vote; together with the voting report, circulated as document CECC(Secretariat)3679, it was approved as EN 140200 on 1996-03-14.

This European Standard supersedes CECC 40 200:1981.

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) 1997-02-15
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1998-02-15

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## 1 Scope

This sectional specification prescribes the preferred values for characteristics and ratings and also the inspection requirements for fixed power resistors of assessed quality having a rated dissipation of up to 1 000 W. 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 a CECC 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 granting 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

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)	-10 °C to -55 °C
Dry heat (Test B)	+85 °C to +200 °C
Damp heat, steady state (Test C)	4 days 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*

The preferred limits of change in resistance for the temperature characteristics of resistance test are given in table 1. Each line in table 1 gives the temperature coefficient quoted in parts per million per °C and per cent per °C and limits of change in resistance for the measurement of temperature characteristics 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 $10^{-6}/^{\circ}\text{C}$	Reference temperature/ Lower category temperature  °C				Reference temperature/ Upper category temperature  °C				
	+ 20/-55 %	+ 20/-40 %	+ 20/-25 %	+ 20/-10 %	20/85 %	20/100 %	20/125 %	20/155 %	20/200 %
± 500	± 3,75	± 3,0	± 2,25	± 1,5	± 3,25	± 4,0	± 5,25	± 6,75	± 9,0
± 250	± 1,88	± 1,5	± 1,125	± 0,75	± 1,625	± 2,0	± 2,62	± 3,38	± 4,5
-50/+250	+0,375/ -1,88	+0,3/ -1,5	+0,225/ -1,125	+0,15/ -0,75	+0,325/ -1,625	-0,4/ +2,0	-0,525/ +2,62	-0,675/ +3,38	-0,90/ +4,5
± 100	± 0,75	± 0,6	± 0,45	± 0,3	± 0,65	± 0,80	± 1,05	± 1,35	± 1,80
± 50	± 0,375	± 0,3	± 0,225	± 0,15	± 0,325	± 0,40	± 0,525	± 0,675	± 0,90
± 25	± 0,188	± 0,150	± 0,113	± 0,075	± 0,163	± 0,200	± 0,262	± 0,338	± 0,450
± 10	± 0,075	± 0,060	± 0,045	± 0,030	± 0,065	± 0,080	± 0,105	± 0,135	± 0,180
± 5	± 0,038	± 0,030	± 0,023	± 0,015	± 0,033	± 0,040	± 0,053	± 0,068	± 0,090 *

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

\* NOTE: Text different to IEC 115-2.



**2.1.3 Limits for change in resistance**

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 the table refer to EN 140000.

**Table 2: Limits of change in resistance**

Stability Class	4.23 Climatic sequence 4.24 Damp heat, steady state 4.25 Endurance	4.16 Robustness of terminations 4.18 Resistance to solder heat 4.19 Rapid temperature change 4.20 Bump 4.21 Shock 4.22 Vibration	4.13 Overload
10	$\pm (10 \% R + 0,1 \text{ ohm})$	$\pm (1 \% R + 0,05 \text{ ohm})$	$\pm (2 \% R + 0,1 \text{ ohm})$
5	$\pm (5 \% R + 0,1 \text{ ohm})$	$\pm (1 \% R + 0,05 \text{ ohm})$	$\pm (1 \% R + 0,05 \text{ ohm})$
3	$\pm (3 \% R + 0,1 \text{ ohm})$	$\pm (1 \% R + 0,05 \text{ ohm})$	$\pm (1 \% R + 0,05 \text{ ohm})$
2	$\pm (2 \% R + 0,1 \text{ ohm})$	$\pm (0,5 \% R + 0,05 \text{ ohm})$	$\pm (0,5 \% R + 0,05 \text{ ohm})$
1	$\pm (1 \% R + 0,05 \text{ ohm})$	$\pm (0,25 \% R + 0,05 \text{ ohm})$	$\pm (0,25 \% R + 0,05 \text{ ohm})$
0,5	$\pm (0,5 \% R + 0,05 \text{ ohm})$	$\pm (0,25 \% R + 0,05 \text{ ohm})$	$\pm (0,25 \% R + 0,05 \text{ ohm})$

## 2.2 Preferred value ratings

### 2.2.1 Rated resistance

See 2.3.2 of EN 140000.

### 2.2.2 Tolerances on rated resistance

The preferred tolerances on rated resistance are:

$\pm 20\%$ ;  $\pm 10\%$ ;  $\pm 5\%$ ;  $\pm 2\%$ ;  $\pm 1\%$ ;  $\pm 0,5\%$ ;  $\pm 0,25\%$ ;  $\pm 0,1\%$ ;  $\pm 0,05\%$ ;  $\pm 0,02\%$ ;  $\pm 0,01\%$ .

### 2.2.3 Rated dissipation

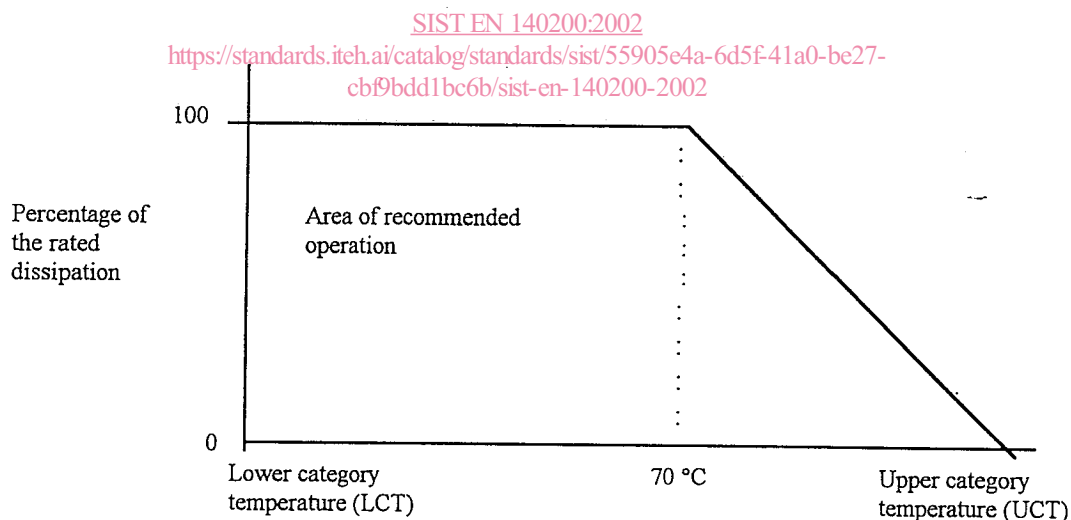
**Ambient rated resistors.** The preferred values of rated dissipation, in W at 70 °C shall be taken from the R5 series of ISO 3.

**Heat sink resistors.** The preferred values of rated dissipation in an ambient temperature of 25 °C, when mounted on a reference heat sink as defined in 4.25.2.4 of EN 140000, shall be taken from the R10 series of ISO 3.

### Derating curve

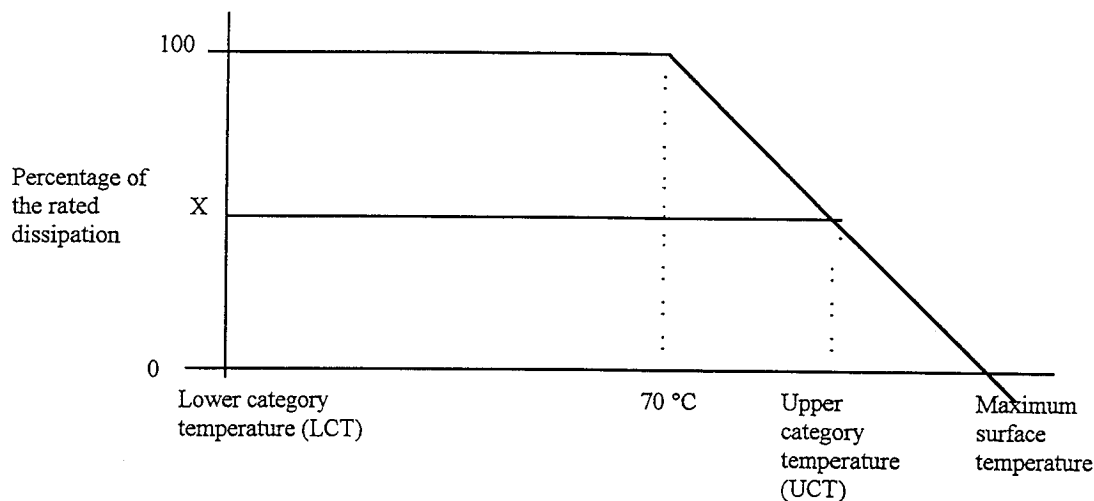
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The detail specification shall state the maximum allowable dissipation at temperatures other than 70 °C. All break points on the curve shall be verified by test.



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

An EXAMPLE of a derating curve having a larger area of operation is given below. In the example the maximum surface temperature (zero rating temperature) is higher than the upper category temperature.



#### 2.2.4 Limiting element voltage

The preferred values of limiting element voltage, in V d.c. or in a.c. r.m.s., shall be taken from R5 series of ISO 3.

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#### 2.2.5 Insulation resistance

The standard limits for insulation resistance shall be 1 G $\Omega$  minimum or, after humidity tests, 100 M $\Omega$ .

#### 2.2.6 Insulation voltage

See 2.2.17 of EN 140000.

### 2.3 Severities for environmental and overload tests

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

#### 2.3.1 Drying

Procedure I of 4.3 of EN 140000 shall be used.