

**Harmonized system of quality
assessment for electronic components**

Sectional specification — Fixed power resistors — Capability approval

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British Standard

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The preparation of this British Standard was entrusted to Technical Committee EPL/40, Capacitors and resistors for electronic equipment, upon which the following bodies were represented:

- Federation of the Electronics Industry
- Ministry of Defence
- National Supervising Inspectorate (BSI QA)

The following body was also represented in the drafting of the standard, through subcommittees and panels:

BEAMA Ltd.

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 June 1995

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The following BSI references relate to the work on this standard:
Committee reference EPL/40
Draft for comment 93/30899 DC

ISBN 0 580 24305 2

Amendments issued since publication

Amd. No.	Date	Comments

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National foreword

This British Standard has been prepared by Technical Committee EPL/40 and is the English language version of EN 140210:1994, *Sectional specification: Fixed power resistors — Capability approval* and its Corrigendum: 1994, published by the European Committee for Electrotechnical Standardization (CENELEC) Electronic Components Committee (CECC).

Cross-references

Publication referred to	Corresponding British Standard
EN 140000	BS EN 140000:1995 <i>Generic specification: Fixed resistors</i>
ISO 3:1973	BS 2045:1965 <i>Preferred numbers</i>
IEC 62	BS EN 60062:1994 <i>Specification for marking codes for resistors and capacitors</i>
IEC 63:1963	BS 2488:1966 <i>Schedule of preferred numbers for the resistance of resistors and capacitance of capacitors for telecommunication equipment</i>
IEC 68	{ BS 2011: <i>Environmental testing</i> BS EN 60068 <i>Environmental testing</i>
CECC 00114-1	BS EN 10014-1 <i>Rule of Procedure 14: Quality assessment procedures</i> Part 1:1994 <i>Approval of manufacturers and other organizations</i>
CECC 00114-3	Part 3:1993 <i>Capability approval of an electronic component manufacturing activity</i>
CECC 40200	BS CECC 40200:1981 <i>Harmonized system of quality assessment for electronic components: sectional specification: Fixed power resistors</i>

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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 28, an inside back cover 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.

Descriptors: Quality, electronic components, fixed power resistors

English version

Sectional specification: Fixed power resistors — Capability approval

Spécification intermédiaire:
Résistances fixes — Agrément de
savoir-faire

Rahmenspezifikation:
Hochbelastbare Festwiderstände —
Befähigungsanerkennung

This European Standard was approved by the CENELEC Electronic Components Committee (CECC) on 13 February 1993. CENELEC members are bound to comply with CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the General Secretariat of the CECC 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 CECC General 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. The membership of the CECC is identical, with the exception of the national electrotechnical committees of Greece, Iceland and Luxembourg.

CECC

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

The CENELEC Electronic Components Committee (CECC) is composed of those member countries of the European Committee for Electrotechnical Standardization (CENELEC) who wish to take part in a harmonized System for electronic components of assessed quality.

The object of the System is to facilitate international trade by the harmonization of the specifications and quality assessment procedures for electronic components, and by the grant of an internationally recognized Mark, or Certificate, of conformity. The components produced under the System are thereby acceptable in all member countries without further testing.

This specification was prepared by CECC WG 4A, Fixed resistors.

The text of the draft based on document CECC(Secretariat)3164 was submitted to the formal vote; together with the voting report, circulated as document CECC(Secretariat)3288, it was approved by CECC as EN 140210 on 13 February 1993.

The following dates were fixed:

- latest date of announcement of the EN at national level (doa) 1994-03-22
- latest date of publication of an identical national standard (dop) 1994-09-22
- latest date of declaration of national standards obsolescence 1994-09-22
- latest date of withdrawal of conflicting national standards (dow) 2004-03-22

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Section 1. General

1.1 Scope

This specification applies to fixed power resistors with related dissipation not less than 2 W, primarily intended for applications in electronic equipment. These resistors may be either manufactured to customers' requirements or manufacturers' standard catalogue items.

It gives preferred ratings and characteristics and selects from the generic specification EN 140000 the appropriate capability approval procedures.

1.2 Related documents

ISO 3	<i>Preferred numbers — Series of preferred numbers</i>
IEC 62	<i>Marking codes for resistors and capacitors</i>
IEC 63	<i>Preferred number series for resistors and capacitors</i> Amendment No.1 (1967) Amendment No.2 (1977)
IEC 68	<i>Basic environmental testing procedures</i>
IEC 410	<i>Sampling plans and procedures for inspection by attributes</i>
CECC 00114-I	<i>Rule of Procedure 14: Quality Assessment Procedure</i> <i>Part 1: Approval of manufacturers and other organizations</i>
CECC 00114-III	<i>Rule of Procedure 14: Quality Assessment Procedures</i> <i>Part 3: Capability approval of an electronic component activity</i>
EN 140000	<i>Generic specifications: Fixed resistors</i>
CECC 40200	<i>Sectional Specifications: Fixed power resistors</i> (Issue 2 with amendments 1 and 2)

NOTE The above references apply to the current editions except for IEC 68.

1.3 Information to be prescribed in detail specifications

The requirements of this sub-clause apply to detail specifications for both customer specified and standard catalogue items.

The requirements for the preparation and layout of detail specifications are given by the capability approval blank detail specification EN 140211.

A manufacturer wishing to supply a resistor or range of resistors covered by his capability as standard catalogue items shall produce a detail specification in accordance with the capability approval blank detail specification EN 140211.

The following minimum information shall be given in each detail specification.

1.3.1 Outline drawing and dimensions

There shall be an illustration of the resistor as an aid to easy recognition and for comparison of the resistor with others. Dimensions and their associated tolerances, which affect interchangeability and mounting, shall be given. All dimensions shall 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 number of items (resistance values/voltage ranges) are covered by a detail specification, their dimensions and their associated tolerances shall be placed in a table below the drawing.

When the configuration is other than that described above, the detail specification shall state such dimensional information as will adequately describe the resistor. It shall be clearly stated in the detail specification whether or not the resistor is designed for use on printed boards.

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 or shock tests. The design of the resistor may be such that special mounting fixtures 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.

1.3.3 Marking

The detail specification shall specify the content of the marking on the resistor and on the package. See 2.4 of EN 140000.

1.3.4 Ordering information

The detail specification shall prescribe that the following information is required when ordering a resistor:

- 1) Quantity;
- 2) Detail specification number, issue and date;
- 3) Rated resistance(s);
- 4) Tolerance on rated resistance(s);

and where applicable:

- 5) Rated dissipation;
- 6) Temperature coefficient of resistance;
- 7) Manufacturer's type number.

1.3.5 Additional information (not for inspection purposes)

The detail specification may include information which is not normally required to be verified by the inspection procedure, such as temperature rise, circuit diagrams, curves, drawings and notes.

1.4 Units, symbols and terminology

See 2.2 of EN 140000.

1.5 Marking of component and package

See 2.4 of EN 140000.

Section 2. Preferred ratings and characteristics

2.1 Preferred climatic categories

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

The lower and upper category temperature and the duration of the damp heat, steady state test should be chosen from the following:

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

Upper category temperature: $+125^{\circ}\text{C}$, $+155^{\circ}\text{C}$ and $+200^{\circ}\text{C}$;

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.

2.2 Preferred values of ratings

2.2.1 Rated resistance

See 2.3.2 of EN 140000.

2.2.2 Tolerance on rated resistance

Preferred values of tolerance on rated resistance are:

$\pm 10\%$, $\pm 5\%$, $\pm 1\%$, $\pm 0,5\%$, $\pm 0,25\%$
and $\pm 0,1\%$.

2.2.3 Rated dissipation

For ambient-rated resistors the preferred values of rated dissipation, in W at 70°C , are taken from the R5 series of ISO 3.

For heat-sink resistors the preferred values of rated dissipation in W at an ambient temperature of 25°C and when mounted on a referee heat sink as defined in D.2.2 of EN 140000, are taken from the R10 series of ISO 3.

2.2.4 Limiting element voltage

Preferred values of limiting element voltage, in d.c. or a.c. r.m.s. are taken from the R5 series of ISO 3.

2.3 Preferred values of characteristics

2.3.1 Temperature coefficient of resistance

Preferred values of temperature coefficient of resistance are as follows, in $10^{-6}/^{\circ}\text{C}$

± 500 , ± 250 , $-50/+250$, ± 100 , ± 50 , ± 25 , ± 10 .

2.3.2 Limits of change in resistance

For each stability class, the preferred limits for change in resistance for each of the tests listed in the heading of Table 0.1 are as indicated.

NOTE The subclause numbers in the heading of Table 0.1 refer to EN 140000.

Table 0.1

Stability class in %	Long-term tests		Short-term tests	
	4.23	Climatic sequence	4.13	Overload
	4.24	Damp heat, steady state	4.16	Robustness of terminations
	4.25.2	Endurance at room temperature	4.18	Resistance to soldering heat
	4.25.3	Endurance at upper category temperature	4.19	Rapid change of temperature
			4.20	Bump
			4.21	Shock
			4.22	Vibration
5	$\pm (5\% + 0,1\ \Omega)$		$\pm (1\% + 0,05\ \Omega)$	
2	$\pm (2\% + 0,1\ \Omega)$		$\pm (0,5\% + 0,05\ \Omega)$	
1	$\pm (1\% + 0,05\ \Omega)$		$\pm (0,25\% + 0,05\ \Omega)$	
0,5	$\pm (0,5\% + 0,05\ \Omega)$		$\pm (0,1\% + 0,01\ \Omega)$	