BS EN 140402:2015+A1:2016

BSI Standards Publication

Blank Detail Specification: Fixed low power wirewound surface mount (SMD) resistors

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Full document details: BS EN 140402:2015+A1:2016

National foreword

This British Standard is the UK implementation of EN 140402:2015+A1:2016. It supersedes BS EN 140402:2015 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee EPL/40X, Capacitors and resistors for electronic equipment.

A list of organizations represented on this committee can be obtained on request to its secretary.

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English Version

Blank Detail Specification: Fixed low power wirewound surface mount (SMD) resistors

Spécification particulière cadre: Résistances fixes bobinées à faible dissipation pour montage en surface (CMS)

Vordruck für Bauartspezifikation: Oberflächenmontierbare drahtgewickelte Festwiderstände (SMD) niedriger Belastbarkeit

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Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

This document (EN 140402:2015) has been prepared by CLC/TC 40XB, "Resistors".

The following dates are fixed:

• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2015-12-15
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2017-12-15

This document supersedes EN 140402:1998.

EN 140402:2015 includes the following significant technical changes with respect to EN 140402:1998:

– introduction of a test on the resistance to electrostatic discharge (ESD) in 1.7 and Annex A;

– introduction of code letters for the temperature coefficient (TCR) as in EN 60062:2005;

– revision of ordering information in 1.10.4;

– adoption of the IECQ rules of procedure according to QC 001002-3:2005;

– revision of the sample quantities and the sequence of tests in Annex A;

– editorial revision.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This specification supports the building of a series of documents describing fixed low power wire wound surface mount (SMD) resistors as follows:

– EN 60115-1, *Fixed resistors for use in electronic equipment — Part 1: Generic specification (IEC 60115-1, modified)*

– EN 60115-8, *Fixed resistors for use in electronic equipment — Part 8: Sectional specification — Fixed surface mount resistors (IEC 60115-8, modified)*

– EN 140402-8xx, *Detail specification: Fixed low power wirewound surface mount (SMD) resistors — .....*

Any detail specification within this series is written on the basis of this blank detail specification.

Foreword to amendment A1

This document (EN 140402:2015/A1:2016) has been prepared by CLC/TC 40XB "Resistors".

The following dates are fixed:

• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2017-09-19
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2019-09-19

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

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Introduction

Blank detail specification

A blank detail specification is a supplementary document to the sectional specification and contains requirements for style and layout and minimum content of detail specifications. Detail specifications not complying with these requirements should not be considered as being in accordance with European Standards nor should they be so described.

In the preparation of the detail specification the content of EN 60115-8:2012, 1.4 should be taken into account.

The detail specification should be written by using the preferred values given in EN 60115-8.

The detail specification should contain a table of contents prior the first page of the actual specification. For the use of SI units refer to EN ISO 80000-1, for the use of letter symbols to be used in electrical technology, refer to EN 60027-1.

This Blank Detail Specification uses two different kinds of notes:

– NOTE for notes which give additional information intended to assist the understanding or use of the resulting document and therefore should be copied as NOTE into the drafted Detail Specification.

– NOTE (ed) for editorial notes which are intended to aid and direct the specification writer and therefore should not be copied into the drafted Detail Specification.

Identification of the detail specification and the component

The first page of the detail specification should have the layout recommended on page 6.

The numbers in square brackets correspond to the indications to be completed thereunder:

[1] the name of the Standardisation Organisation under whose authority the detail specification is published and if applicable, the organisation from whom the detail specification is available;

[2] the CECC symbol and the number allocated to the detail specification by the CENELEC General Secretariat;

[3] the number and issue number of the EN generic and sectional specification as relevant; also national reference if different;

[4] the national number of the detail specification, date of issue and any further information required by the national system, together with any amendment numbers, if different from the EN number;

[5] a brief description of the component or range of components;

[6] information on typical construction (where applicable);

[7] an outline drawing with the main dimensions which are of importance for interchangeability and/or reference to the appropriate national or international document for outlines. Alternatively, this drawing may be given in an annex to the detail specification;

[8] the level of quality assessment covered by the detail specification.

For [5] and [6] the text to be given in the detail specification should be suitable for an entry in a register of approvals and the “CENELEC Catalogue of European Standards”.

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Specification available from: **[1]**	**EN 140402- . . .** (Specification number) **[2]**
Electronic components of assessed quality in accordance with: **[3]** EN 60115-1:2011 EN 60115-8:2012 EN 140402:2015	**Issue . . .** **[4]** April 2015
[7]	Fixed low power wire wound resistors **[5]**
	(Description of the component) **[6]**
	Assessment level EZ [a] **[8]** Level P: with 100 %-test Level R: with failure rate level and 100 %-test Stability classes . . .
Other shapes are permitted within the given dimensions. **Figure 1 — Outline and dimensions (see Table 1)**	
[a] See 2.1.1 for an explanation on the assessment level EZ.	

NOTE 1 (ed) Level R is optional.

NOTE 2 (ed) The title block shown above is not part of the specification's foreword or introduction and therefore needs to appear on top of a new page. The remainder of that page is intentionally left empty in order to start Clause 1 on top of the next page.

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1 Characteristics and ratings

1.1 General

Various parameters of this component are precisely defined in this specification. Unspecified parameters may vary from one component to another.

1.2 Dimensions and ratings

The shape and dimensions of the resistors covered by this specification are shown in Figure 1, with the specific styles and their respective dimensions given in Table 1. Other shapes are permissible within the given dimensions.

Table 1 — Style and dimensions

Style [a]		Length L		Width W								Mass [a]
		mm		mm		mm		mm		mm		mg
metric	X [a]	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	max.

[a] For information only.

NOTE 1 (ed) Column X is optional for additional information (e.g. size code), which is for information only.

NOTE 2 (ed) See EN 60115-8:2012, 1.4.2.

NOTE 3 Information about manufacturers who have components qualified to this detail specification is available in the approvals section of the website http://www.iecq.org.

Table 2 — Ratings

Style	Rated dissipation P_{70} W	X	Limiting element voltage d.c. or a.c. (r.m.s.) U_{max} V	Insulation voltage d.c. or a.c. (peak) U_{ins} V	
				1 min	continuous

NOTE 4 (ed) Column X is an optional column for additional information, e.g. an additional maximum dissipation at another ambient temperature than 70 °C, hence e.g. at 25 °C or at 40 °C.

NOTE 5 (ed) See EN 60115-8:2012, 1.4.8, 1.4.9 and 1.4.10.

Should it be necessary to control further parameters, a more detailed specification should be used. Then the additional test method(s) shall be fully described and appropriate limits and inspection levels (IL) shall be specified.

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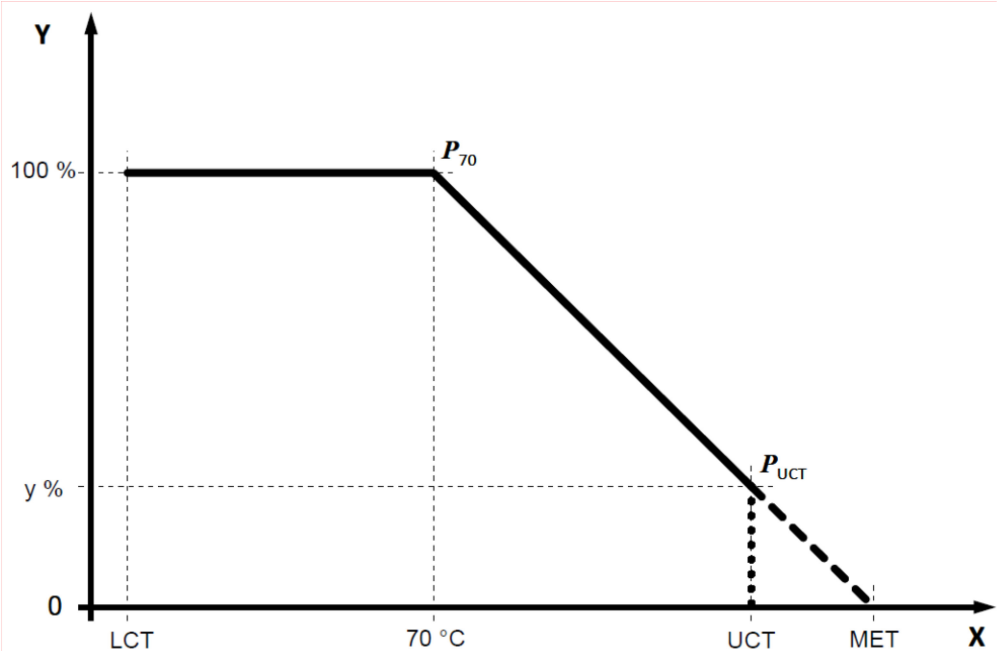
1.3 Derating curve

The permissible dissipation of resistors covered by this detail specification is the rated dissipation as given in Table 2, which is derated for an ambient temperature above the rated temperature 70 °C according to the diagram in Figure 2.

NOTE 1 (ed) See EN 60115-8:2012, 1.4.8.

NOTE 2 (ed) A larger area of operation may be given in the detail specification, provided it includes all the area given above. In such case the following paragraph applies.

The manufacturer of the resistors covered by this detail specification may uprate the products by specification of an increased dissipation up to the maximum dissipation given in Table 2, which is derated for an ambient temperature above the reference temperature of … according to the diagram in Figure 2. The manufacturer shall support such uprating with respective test results.



Key

X ambient temperature ϑ_{amb}

Y fraction of the rated dissipation P_{70}

Figure 2 — Derating curve

NOTE 3 Climatic tests and the assessment of the temperature coefficient of resistance apply the upper category temperature, UCT, as the highest temperature, whereas the loads applied under endurance testing aim to subject the resistive element to the maximum element temperature, MET.

NOTE 4 (ed) The following paragraph applies if the maximum element temperature is specified above 155 °C

The use of the full specified dissipation and temperature range results in a high temperature on the substrate (PCB) and in the solder joints. It may hence be required to select suitable substrate material and suitable solder material in order to maintain the reliability of the assembly.

1.4 Resistance range and tolerance on rated resistance

1.4.1 Level P

NOTE 1 Product classification to Level P adopts and succeeds the former Version A as used in prior revisions of this detail specification.

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Table 3 gives the combinations of temperature coefficient, tolerance on resistance and resistance range which may be approved to Level P according to this detail specification. The respective E Series are specified as a recommendation only for Level P.

Products from the extent given in Table 3 shall be used for the initial product qualification approval to Level P according to 2.2.2, and for the quality conformance inspection according to 2.3.

The qualification of resistances below or above the specified resistance ranges is permissible if they fulfil the requirements of the stability class prescribed for the closest resistance within a specified range; e.g. resistors of Style RW0704M, 1 %, > 2,43 kΩ shall fulfil the requirements of stability class 1.

Table 3 — Resistance range and tolerance on rated resistance for Level P

Style	Tolerance on rated resistance		Temperature coefficient		Resistance range	Stability class	E Series [b]
	%	Code [a]	10^{-6}/K	Code [a]			

[a] Code letters according to EN 60062.

[b] E Series according to IEC 60063.

NOTE 2 (ed) Limits of the resistance ranges should only be values from an E Series, which is suitable for the considered tolerance.

NOTE 3 (ed) Information on the temperature coefficient may be given in Table 5, if it is distinctively linked with fixed resistance ranges and does not provide any ordering options.

The range of resistors approved in each style, together with the associated temperature coefficient and tolerance, shall be given in the register of approvals, as available for example on the website http://www.iecq.org.

1.4.2 Level R

NOTE 1 Product classification to Level R adopts and succeeds the former Version E as used in prior revisions of this detail specification.

Table 4 gives the combinations of temperature coefficient, tolerance on resistance, resistance range and mandatory E Series which may be approved to Level R according to this detail specification.

Products from the extent given in Table 4 shall be used for the initial product qualification approval to Level R according to 2.2.3, and for the quality conformance inspection according to 2.3.

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Table 4 — Resistance range and tolerance on rated resistance for Level R

Style	Tolerance on rated resistance		Temperature coefficient		Resistance range	Stability class	E Series [b]
	%	Code [a]	10^{-6}/K	Code [a]			

[a] Code letters according to EN 60062.

[b] E Series according to IEC 60063.

NOTE 2 (ed) Subclause 1.4.2 with Table 4 is only required if the drafted Detail Specification includes Level R and should be a subset of Table 3.

NOTE 3 (ed) Information on the temperature coefficient may be given in Table 5, if it is distinctively linked with fixed resistance ranges and does not provide any ordering options.

The range of resistors approved in each style, together with the associated temperature coefficient and tolerance, shall be given in the register of approvals, as available for example on the website http://www.iecq.org.

1.5 Variation of resistance with temperature and temperature rise

The permissible limits for the reversible change of resistance at variation of resistance with temperature tests are given in Table 5 for the category temperatures applied in this detail specification.

Table 5 — Temperature coefficients and permissible change of resistance

Temperature coefficient			X	Limit of resistance change $\Delta R/R$ %	
				Lower TCR	Upper TCR
10^{-6}/K	Code [a]	Code [b]		LCT / Reference temperature -55 °C / 20 °C	Reference temperature / UCT 20 °C / 200 °C

[a] Code letters according to EN 60062.

[b] Historical code letters according to …. , for information only.

NOTE 1 (ed) The second code column with historical code references is optional.

NOTE 2 (ed) Column X is an optional column for resistance ranges, if the ranges are distinctively linked with temperature coefficients and this relationship does not provide any ordering options.

NOTE 3 (ed) See EN 60115-8:2012, 1.4.7.

The permissible temperature rise $(\Delta\vartheta)_{max}$ for the temperature rise test according to EN 60115-1:2011, 4.14 is given in Table 6.

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