

**SLOVENSKI STANDARD
SIST EN IEC 60115-4:2026****01-junij-2026****Nadomešča:****SIST EN 140200:2002****SIST EN 140200:2002/A1:2002**

Stalni upori za elektronsko opremo - 4. del: Področna specifikacija: Močnostni upori za montažo skozi prehodne luknje tiskanih vezij ali za pritrditev na šasijo (IEC 60115-4:2022)

Fixed resistors for use in electronic equipment - Part 4: Sectional specification: Power resistors for through hole assembly on circuit boards (THT) or for assembly on chassis (IEC 60115-4:2022)

Festwiderstände zur Verwendung in Geräten der Elektronik - Teil 4:
Rahmenspezifikation: Hochbelastbare Festwiderstände für Durchsteckmontage auf Leiterplatten (THT) oder zur Befestigung auf Montagerahmen (IEC 60115-4:2022)

Résistances fixes utilisées dans les équipements électroniques - Partie 4: Spécification intermédiaire: Résistances de puissance pour assemblage par trous traversants sur cartes de circuit imprimé (carte THT) ou pour assemblage sur châssis (IEC 60115-4:2022)

Ta slovenski standard je istoveten z: EN IEC 60115-4:2026

ICS:

31.040.10 Fiksni upor Fixed resistors

SIST EN IEC 60115-4:2026 **en**

Sample Document

get full document from standards.iteh.ai

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN IEC 60115-4

April 2026

ICS 31.040.10

Supersedes EN 140200:1996; EN 140200:1996/A1:2001

English Version

Fixed resistors for use in electronic equipment - Part 4: Sectional specification: Power resistors for through hole assembly on circuit boards (THT) or for assembly on chassis (IEC 60115-4:2022)

Résistances fixes utilisées dans les équipements électroniques - Partie 4: Spécification intermédiaire: Résistances de puissance pour assemblage par trous traversants sur cartes de circuit imprimé (carte THT) ou pour assemblage sur châssis (IEC 60115-4:2022)

Festwiderstände zur Verwendung in Geräten der Elektronik - Teil 4: Rahmenspezifikation: Hochbelastbare Festwiderstände für Durchsteckmontage auf Leiterplatten (THT) oder zur Befestigung auf Montagerahmen (IEC 60115-4:2022)

This European Standard was approved by CENELEC on 2026-02-09. CENELEC members are bound to comply with the 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

© 2026 CENELEC All rights of exploitation in any form and by any means reserved worldwide for CENELEC Members.

Ref. No. EN IEC 60115-4:2026 E

EN IEC 60115-4:2026 (E)**European foreword**

This document (EN IEC 60115-4:2026) consists of the text of document IEC 60115-4:2022, prepared by IEC/TC 40 "Capacitors and resistors for electronic equipment".

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) 2027-04-30
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2029-04-30

This document supersedes EN 140200:1996 and all of its amendments and corrigenda (if any).

This document is read in conjunction with EN IEC 60115-4:2026/A11:2026.

This edition contains the following significant technical changes with respect to the previous edition:

- a) this edition employs a new document structure of the generic specification EN 60115-1:2023, where the tests of prior Clause 4 are given in Clauses 6 to 12 now;
- b) the definitions of product technologies and product classification levels of the generic specification, IEC 60115-1:2020, have been adopted;
- c) a basis for the optional specification of the lead eccentricity of axial leaded resistors has been amended in 4.2;
- d) the 'period-pulse high-voltage overload test' of IEC 60115-1:2020, 8.3 has been adopted as default test method in 5.3.9, thereby replacing the legacy test 'periodic-pulse overload test' of IEC 60115-1:2020, 8.4;
- e) the revised solderability test of IEC 60115-1:2020, 11.1 has been adopted in 5.3.22 and 5.3.23;
- f) the combined solvent resistance test of IEC 60115-1:2020, 11.3 has been adopted in 5.3.25;
- g) the 'endurance at room temperature test' of IEC 60115-1:2020, 7.2 has been reworked and adopted in 5.3.5;
- h) the 'single-pulse high-voltage overload test' of IEC 60115-1:2020, 8.2, applied with the pulse shape 10/700 in 5.3.8, is complemented with the optional alternative provided by the pulse shape 1,2/50 in 5.4.1;
- i) climatic tests for 'operation at low temperature' of IEC 60115-1:2020, 10.2, and for 'damp heat, steady state, accelerated' of IEC 60115-1:2020, 10.4, have been adopted as optional tests in 5.4.5 and 5.4.6, respectively;
- j) inclusion of an optional flammability test as 5.4.8;
- k) new guidance is provided in 6.2 on the presentation of stability requirements with their permissible absolute and relative deviations;
- l) acceptance criteria for the visual inspection have been added in 6.5 and in Annex B;
- m) visual inspection for the primary and proximity packaging has been added in 6.5.3 and in 7.2
- n) the periodical evaluation of termination platings has been added as a new topic of quality assessment in 9.8;

- o) a new Annex C has been added to summarize workmanship requirements for the assembly of leaded power resistors, e.g. as given in the prior IEC 61192 series of standards;
- p) the informative Annex F on radial formed styles has been amended with details on a formed Z-bend style for surface-mount assembly;
- q) furthermore, this edition cancels and replaces the old CECC based EN edition published in 1996 and constitutes revisions related to tables and figures. (see Annex X)

Preceding documents on the subject covered by this specification have been:

- EN 140200:1996 + EN 140200/A1:2001;
- CECC 40 200:1981-00, 1973-00

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

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 60115-4:2022 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standard indicated:

IEC 60027-1	NOTE	Approved as EN 60027-1
IEC 60060-1	NOTE	Approved as EN IEC 60060-1
IEC 60068-2-13	NOTE	Approved as EN IEC 60068-2-13
IEC 60068-2-14	NOTE	Approved as EN IEC 60068-2-14
IEC 60068-2-21	NOTE	Approved as EN IEC 60068-2-21
IEC 60068-2-30	NOTE	Approved as EN IEC 60068-2-30
IEC 60068-2-45	NOTE	Approved as EN 60068-2-45
IEC 60068-2-67:1995	NOTE	Approved as EN 60068-2-67:1996 (not modified)
IEC 60068-2-78	NOTE	Approved as EN IEC 60068-2-78
IEC 60115-8	NOTE	Approved as EN 60115-8
IEC 60195	NOTE	Approved as EN 60195
IEC 60286-2	NOTE	Approved as EN IEC 60286-2
IEC 60440	NOTE	Approved as EN 60440
IEC 60695-11-5	NOTE	Approved as EN 60695-11-5
IEC 60717	NOTE	Approved as EN 60717
IEC 61760-1:2020	NOTE	Approved as EN IEC 61760-1:2020 (not modified)
ISO 80000 series	NOTE	Approved as EN ISO 80000 series

Sample Document

get full document from standards.iteh.ai



IEC 60115-4

Edition 3.0 2022-11

INTERNATIONAL STANDARD



**Fixed resistors for use in electronic equipment –
Part 4: Sectional specification: Power resistors for through hole assembly on
circuit boards (THT) or for assembly on chassis**

get full document from standards.iteh.ai

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 31.040.10

ISBN 978-2-8322-6088-3

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	8
1 Scope.....	11
2 Normative references	11
3 Terms, definitions, product types, product technologies and product classification.....	12
3.1 Terms and definitions.....	12
3.2 Product types.....	13
3.2.1 General	13
3.2.2 Axial type	13
3.2.3 Radial type	13
3.2.4 Vertical type	14
3.2.5 Tubular types.....	14
3.2.6 Metal housed wire-wound resistors	15
3.2.7 Any other type	15
3.3 Resistor encapsulation and material of termination	15
3.3.1 Conformal lacquer coat.....	15
3.3.2 Silicone cement coating.....	15
3.3.3 Enamel coating.....	16
3.3.4 Ceramic housed resistor	16
3.3.5 Wire termination	16
3.4 Product technologies	16
3.4.1 General	16
3.4.2 Metal film technology.....	17
3.4.3 Metal glaze technology	17
3.4.4 Metal oxide technology	17
3.4.5 Wire-wound technology	17
3.4.6 Metal strip technology.....	17
3.4.7 Any other technology	18
3.5 Product classification	18
4 Preferred characteristics.....	18
4.1 General.....	18
4.2 Preferred types, styles and dimensions.....	18
4.2.1 Axial type	18
4.2.2 Ceramic housed type with axial lead wires.....	22
4.2.3 Ceramic housed type with radial lead wires	23
4.2.4 Radial or vertical ceramic housed type and dimensions	25
4.2.5 Tubular type of power resistors.....	26
4.2.6 Other types.....	27
4.3 Preferred climatic categories.....	27
4.4 Resistance.....	28
4.5 Tolerances on resistance	28
4.6 Rated dissipation P_T	28
4.7 Limiting element voltage U_{\max}	30
4.8 Insulation voltage U_{ins}	30
4.9 Insulation resistance R_{ins}	30
5 Tests and test severities.....	30
5.1 General provisions for tests invoked by this specification.....	30

5.2	Preparation of specimen	31
5.2.1	Drying.....	31
5.2.2	Mounting of power resistors on test boards.....	31
5.2.3	Mounting of power resistors on test racks.....	32
5.2.4	Specification of test boards/ racks for any other type of high-power resistors	34
5.3	Details of applicable tests	34
5.3.1	Resistance	34
5.3.2	Temperature coefficient of resistance	34
5.3.3	Temperature rise	35
5.3.4	Endurance at the rated temperature 70 °C.....	35
5.3.5	Endurance at room temperature	36
5.3.6	Endurance at a maximum temperature: UCT with category dissipation	37
5.3.7	Short-term overload	37
5.3.8	Single-pulse high-voltage overload test	38
5.3.9	Periodic-pulse high-voltage overload test	38
5.3.10	Visual examination	40
5.3.11	Gauging of dimensions	40
5.3.12	Detail dimensions	41
5.3.13	Robustness of the resistor body.....	41
5.3.14	Robustness of terminations	41
5.3.15	Bump.....	42
5.3.16	Shock	42
5.3.17	Vibration.....	42
5.3.18	Rapid change of temperature.....	43
5.3.19	Rapid change of temperature, ≥ 100 cycles	43
5.3.20	Climatic sequence	43
5.3.21	Damp heat, steady state	44
5.3.22	Solderability, with lead-free solder.....	45
5.3.23	Solderability, with SnPb solder	46
5.3.24	Resistance to soldering heat.....	46
5.3.25	Solvent resistance	47
5.3.26	Insulation resistance.....	47
5.3.27	Voltage proof.....	47
5.4	Optional and/or additional tests.....	48
5.4.1	Single-pulse high-voltage overload test	48
5.4.2	Periodic-pulse overload test	48
5.4.3	Electrostatic discharge (ESD).....	49
5.4.4	Robustness of threaded stud or screw terminations	49
5.4.5	Operation at low temperature.....	50
5.4.6	Damp heat, steady state, accelerated	50
5.4.7	Accidental overload test.....	51
5.4.8	Flammability	51
6	Performance requirements.....	52
6.1	General.....	52
6.2	Limits for change of resistance at test.....	52
6.3	Temperature coefficient of resistance	54
6.4	Temperature rise	54
6.5	Visual inspection.....	55

6.5.1	General visual criteria.....	55
6.5.2	Visual criteria after tests.....	55
6.5.3	Visual criteria for the packaging.....	55
6.6	Solderability.....	55
6.7	Insulation resistance.....	56
6.8	Flammability.....	56
6.9	Accidental overload test.....	56
7	Marking, packaging and ordering information.....	56
7.1	Marking of the component.....	56
7.2	Packaging.....	56
7.3	Marking of the packaging.....	57
7.4	Ordering information.....	57
8	Detail specifications.....	57
8.1	General.....	57
8.2	Information to be specified in a detail specification.....	58
8.2.1	Outline drawing or illustration.....	58
8.2.2	Type, style, and dimensions.....	58
8.2.3	Climatic category.....	58
8.2.4	Resistance range.....	58
8.2.5	Tolerances on rated resistance.....	58
8.2.6	Rated dissipation P_{70}	58
8.2.7	Limiting element voltage U_{max}	59
8.2.8	Insulation voltage U_{ins}	59
8.2.9	Insulation resistance R_{ins}	59
8.2.10	Tests and test severities.....	59
8.2.11	Limits of resistance change after testing.....	59
8.2.12	Temperature coefficient of resistance.....	59
8.2.13	Marking.....	59
8.2.14	Ordering information.....	59
8.2.15	Mounting.....	59
8.2.16	Storage.....	60
8.2.17	Transportation.....	60
8.2.18	Additional information.....	60
8.2.19	Quality assessment procedures.....	60
9	Quality assessment procedures.....	60
9.1	General.....	60
9.2	Definitions.....	60
9.2.1	Primary stage of manufacture.....	60
9.2.2	Structurally similar components.....	60
9.2.3	Assessment level EZ.....	61
9.3	Formation of inspection lots.....	61
9.4	Approved component (IECQ AC) procedures.....	62
9.5	Qualification approval (QA) procedures.....	62
9.5.1	General.....	62
9.5.2	Qualification approval.....	62
9.5.3	Quality conformance inspection.....	62
9.6	Capability certification (IECQ AC-C) procedures.....	63
9.7	Technology certification (IECQ-AC-TC) procedures.....	63

9.8	Periodical evaluation of termination platings	63
9.9	Delayed delivery	63
9.10	Certified test records.....	63
9.11	Certificate of conformity (CoC).....	63
Annex A	(normative) Symbols and abbreviated terms	74
A.1	Symbols.....	74
A.2	Abbreviated terms.....	77
Annex B	(normative) Visual inspection acceptance criteria.....	79
B.1	General.....	79
B.2	Acceptance criteria for a general visual inspection of body of specimens	79
B.3	Acceptance criteria for a general visual inspection of the terminals	79
B.4	Acceptance criteria for a general visual inspection of specimen after test	79
Annex C	(normative) Workmanship requirements for the assembly of power resistors.....	80
C.1	General.....	80
C.2	Lead forming.....	80
C.2.1	General	80
C.2.2	Means for support of mounting height	81
C.3	Mounting.....	82
C.3.1	General	82
C.3.2	Lateral mounting.....	83
C.3.3	Upright mounting	84
C.4	Lead trimming	85
Annex D	(informative) Zero ohm resistors (jumpers)	87
Annex E	(informative) Guide on the application of optional and/or additional tests	88
E.1	General.....	88
E.2	Endurance at room temperature.....	88
E.3	Single-pulse high-voltage overload test.....	89
E.4	Periodic-pulse overload test.....	90
E.5	Operation at low temperature.....	91
E.6	Damp heat, steady state, accelerated	92
E.7	Accidental overload test.....	93
E.8	Flammability test.....	94
E.9	Electrostatic discharge test (ESD).....	95
E.10	Robustness of threaded stud or screw terminations	96
Annex F	(informative) Radial formed types from axial styles	98
F.1	General.....	98
F.1.1	Applicability of this annex	98
F.1.2	Denomination of radial formed styles	98
F.1.3	Coated lead wires	100
F.1.4	Means for support of mounting height	100
F.1.5	Means for retention.....	101
F.2	Radial formed types for through hole assembly.....	101
F.2.1	Radial formed style with lateral body position	101
F.2.2	Radial formed style with upright body position	103
F.3	Radial formed types for surface-mount assembly	105
F.4	Packaging.....	106
F.4.1	Packaging of resistors formed for through-hole assembly	106
F.4.2	Packaging of resistors formed for surface-mount assembly.....	107

F.5	Quality assessment.....	107
F.5.1	General	107
F.5.2	Quality assessment of formed resistors	107
F.5.3	Forming of finished resistors of assessed quality	108
F.5.4	Special inspection requirements	108
Annex X (informative)	Cross references for the prior revision of this specification	109
Bibliography.....		112
Figure 1	– Illustrations of typical axial leaded power resistors	13
Figure 2	– Illustrations of typical radial leaded power resistors.....	13
Figure 3	– Illustrations of typical vertical leaded power resistors with punched terminals.....	14
Figure 4	– Illustrations of typical tubular type power resistors	14
Figure 5	– Illustrations of typical metal housed power resistors.....	15
Figure 6	– Shape and dimensions of cylindrical axial leaded resistors.....	19
Figure 7	– Alternative methods for specification of the length of excessive protective coating or welding beads on axial leaded resistors	20
Figure 8	– Lead-wire spacing of axial leaded resistors with bent leads.....	21
Figure 9	– Specification of the lead eccentricity of axial leaded resistors	22
Figure 10	– Shape and dimensions of axial leaded ceramic housed resistors.....	22
Figure 11	– Shape and dimensions of radial type ceramic resistors	24
Figure 12	– Shape and dimensions of radial leaded ceramic resistors.....	25
Figure 13	– Shape and dimensions of tubular resistors	26
Figure 14	– Typical derating curve for MET > UCT.....	29
Figure 15	– Typical derating curve for power wire-wound resistors	29
Figure 16	– Assembly of specimen to the test board	32
Figure 17	– Mounting of axial leaded specimens on a rack, top view.....	33
Figure 18	– Examples of specimen lead fixation devices	34
Figure C.1	– Lead forming dimensions	80
Figure C.2	– Examples of mounting height support	82
Figure C.3	– Clearance between coating and solder	83
Figure C.4	– Lateral mounting.....	83
Figure C.5	– Upright mounting	84
Figure C.6	– Lead protrusion	85
Figure C.7	– Lead end distortion	86
Figure F.1	– Production flow and different scopes of quality assurance.....	99
Figure F.2	– Shape and dimensions of radial formed resistor for lateral body position.....	101
Figure F.3	– Shape and dimensions of radial formed resistor for lateral body position with kinked lead wires	101
Figure F.4	– Shape and dimensions of radial formed resistor for upright body position.....	103
Figure F.5	– Shape and dimensions of radial formed resistor for upright body position and wide spacing	103
Figure F.6	– Shape and dimensions of radial formed resistor for upright body position and wide spacing, with kinked lead wire.....	104
Figure F.7	– Shape and dimensions of radial formed resistor for surface-mount assembly (Z-bend).....	105

Figure F.8 – Land pattern dimensions for surface-mount assembly	106
Table 1 – Examples of preferred styles of cylindrical axial leaded power resistors	19
Table 2 – Examples of preferred styles of axial leaded ceramic housed resistors	23
Table 3 – Examples of preferred styles of radial type ceramic resistors.....	24
Table 4 – Preferred styles of radial or vertical mount ceramic resistors	26
Table 5 – Example of preferred styles of tubular types of power resistors	27
Table 6 – Preferred alternative overload conditions	40
Table 7 – Limits for resistance variations at tests	53
Table 8 – Permitted change of resistance due to the temperature coefficient of resistance	54
Table 9 – Test schedule for the qualification approval of power resistors	64
Table 10 – Test schedule for quality conformance inspection of power resistors	69
Table C.1 – Lead bend radius	81
Table C.2 – Recommended circuit board bore diameters	82
Table C.3 – Clearance of lateral mounted resistors	84
Table E.1 – Implementation of the test endurance at room temperature	89
Table E.2 – Implementation of the single-pulse high-voltage overload test.....	90
Table E.3 – Implementation of the periodic-pulse overload test.....	91
Table E.4 – Implementation of the operation at low temperature test	92
Table E.5 – Implementation of the test damp heat, steady state, accelerated.....	93
Table E.6 – Implementation of the test accidental overload test	94
Table E.7 – Implementation of the test flammability	95
Table E.8 – Implementation of the test Electrostatic discharge (ESD)	96
Table E.9 – Implementation of the test Robustness of threaded stud or screw terminations	97
Table F.1 – Feasible lead-wire spacing of radial formed resistor for lateral body position.....	102
Table F.2 – Feasible lead-wire spacing of radial formed resistor for upright body position.....	105
Table X.1 – Cross reference for references to clauses	110
Table X.2 – Cross reference for references to figures	111
Table X.3 – Cross reference for references to tables	111

INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIXED RESISTORS FOR USE IN ELECTRONIC EQUIPMENT –**Part 4: Sectional specification: Power resistors for through hole assembly on circuit boards (THT) or for assembly on chassis**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 60115-4 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment. It is an International Standard.

This third edition cancels and replaces the second edition published in 1982 and Amendment 1:1993. This edition constitutes a technical revision and includes test conditions and requirements for lead-free soldering and assessment procedures meeting the requirements of a "zero defect" approach.

This edition includes the following significant technical changes with respect to the previous edition:

- a) the definitions of product technologies and product classification levels of the generic specification, IEC 60115-1:2020, have been adopted;
- b) a basis for the optional specification of the lead eccentricity of axial leaded resistors has been amended in 4.2;

- c) the 'period-pulse high-voltage overload test' of IEC 60115-1:2020, 8.3 has been adopted as default test method in 5.3.9, thereby replacing the legacy test 'periodic-pulse overload test' of IEC 60115-1:2020, 8.4;
- d) the revised solderability test of IEC 60115-1:2020, 11.1 has been adopted in 5.3.22 and 5.3.23;
- e) the combined solvent resistance test of IEC 60115-1:2020, 11.3 has been adopted in 5.3.25;
- f) the 'endurance at room temperature test' of IEC 60115-1:2020, 7.2 has been reworked and adopted in 5.3.5;
- g) the 'single-pulse high-voltage overload test' of IEC 60115-1:2020, 8.2, applied with the pulse shape 10/700 in 5.3.8, is complemented with the optional alternative provided by the pulse shape 1,2/50 in 5.4.1.
- h) climatic tests for 'operation at low temperature' of IEC 60115 1:2020, 10.2, and for 'damp heat, steady state, accelerated' of IEC 60115-1:2020, 10.5, have been adopted as optional tests in 5.4.5. and 5.4.6, respectively;
- i) inclusion of an optional flammability test as 5.4.8;
- j) new guidance is provided in 6.2 on the presentation of stability requirements with their permissible absolute and relative deviations;
- k) acceptance criteria for the visual inspection have been added in 6.5 and in Annex B;
- l) visual inspection for the primary and proximity packaging has been added in 6.5.3 and in 7.2;
- m) the periodical evaluation of termination platings has been added as a new topic of quality assessment in 9.8;
- n) the revised test clause numbering of IEC 60115-1:2020 has been applied;
- o) a new Annex C has been added to summarize workmanship requirements for the assembly of leaded power resistors, e.g. as given in the prior IEC 61192 series of standards;
- p) the informative Annex F on radial formed styles has been amended with details on a formed Z-bend style for surface-mount assembly;
- q) furthermore, the informative Annex X has been added to show the cross-references to the prior edition of this document.

The text of this International Standard is based on the following documents:

Draft	Report on voting
40/2920/CDV	40/2963/RVC

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

A list of all parts in the IEC 60115 series, published under the general title *Fixed resistors for use in electronic equipment*, can be found on the IEC website.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.