



INTERNATIONAL STANDARD



**Fixed capacitors for use in electronic equipment –
Part 21: Sectional specification – Fixed surface mount multilayer capacitors of
ceramic dielectric, Class 1**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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CONTENTS

FOREWORD	6
1 Scope	9
2 Normative references	9
3 Terms and definitions	10
4 Preferred ratings and characteristics	11
4.1 Preferred characteristics	11
4.2 Preferred values of ratings	11
4.2.1 Rated temperature (T_R)	11
4.2.2 Rated voltage (U_R)	11
4.2.3 Category voltage (U_C)	11
4.2.4 Preferred values of nominal capacitance and associated tolerance values	11
4.2.5 Temperature coefficient (α)	12
4.2.6 Dimensions	14
5 Test and measurement procedures	14
5.1 General	14
5.2 Preliminary drying	15
5.3 Measuring conditions	15
5.4 Mounting	15
5.5 Visual examination and check of dimensions	15
5.5.1 General	15
5.5.2 Visual examination	15
5.5.3 Requirements	15
5.6 Electrical tests	17
5.6.1 Capacitance	17
5.6.2 Tangent of loss angle ($\tan \delta$)	17
5.6.3 Insulation resistance	18
5.6.4 Voltage proof	19
5.7 Temperature coefficient (α) and temperature cyclic drift	19
5.7.1 General	19
5.7.2 Preliminary drying	19
5.7.3 Measuring conditions	19
5.7.4 Requirements	20
5.8 Shear test	20
5.9 Substrate bending test	20
5.9.1 General	20
5.9.2 Initial measurement	20
5.9.3 Final inspection	20
5.10 Resistance to soldering heat	21
5.10.1 General	21
5.10.2 Initial measurement	21
5.10.3 Test conditions	21
5.10.4 Recovery	22
5.10.5 Final inspection, measurements and requirements	22
5.11 Solderability	23
5.11.1 General	23

5.11.2	Test conditions	23
5.11.3	Recovery.....	24
5.11.4	Final inspection, measurements and requirements.....	24
5.12	Rapid change of temperature	24
5.12.1	General.....	24
5.12.2	Initial measurement	24
5.12.3	Number of cycles.....	24
5.12.4	Recovery.....	24
5.12.5	Final inspection, measurements and requirements.....	24
5.13	Climatic sequence	25
5.13.1	General.....	25
5.13.2	Initial measurement	25
5.13.3	Dry heat.....	25
5.13.4	Damp heat, cyclic, Test Db, first cycle	25
5.13.5	Cold	25
5.13.6	Damp heat, cyclic, Test Db, remaining cycles	25
5.13.7	Final inspection, measurements and requirements.....	25
5.14	Damp heat, steady state	26
5.14.1	General.....	26
5.14.2	Initial measurement	26
5.14.3	Test conditions	26
5.14.4	Recovery.....	27
5.14.5	Final inspection, measurements and requirements.....	27
5.15	Endurance.....	27
5.15.1	General.....	27
5.15.2	Initial measurement	27
5.15.3	Test conditions	27
5.15.4	Recovery.....	28
5.15.5	Final inspection, measurements and requirements.....	28
5.16	Robustness of terminations (only for capacitors with strip termination)	28
5.16.1	General.....	28
5.16.2	Test conditions.....	28
5.16.3	Final inspection and requirements.....	29
5.17	Component solvent resistance (if required).....	29
5.18	Solvent resistance of the marking (if required).....	29
5.19	Accelerated damp heat, steady state (if required)	29
5.19.1	General.....	29
5.19.2	Initial measurement	29
5.19.3	Conditioning	29
5.19.4	Recovery.....	30
5.19.5	Final measurements	30
6	Marking	30
6.1	General	30
6.2	Information for marking.....	30
6.3	Marking on the body	30
6.4	Requirements for marking	30
6.5	Marking of the packaging	31
6.6	Additional marking	31
7	Information to be given in a detail specification	31

7.1	General	31
7.2	Outline drawing and dimensions	31
7.3	Mounting	31
7.4	Rating and characteristics	31
7.4.1	General	31
7.4.2	Nominal capacitance range	31
7.4.3	Particular characteristics	32
7.4.4	Soldering	32
7.5	Marking	32
8	Quality assessment procedures	32
8.1	Primary stage of manufacture	32
8.2	Structurally similar components	32
8.3	Certified records of released lots	32
8.4	Qualification approval	32
8.4.1	General	32
8.4.2	Qualification approval on the basis of the fixed sample size procedures	32
8.4.3	Tests	33
	Annex A (normative) Guidance for the specification and coding of dimensions of fixed surface mount multilayer capacitors of ceramic dielectric, Class 1	42
	Annex B (informative normative) Combination of temperature coefficients and tolerances for the reference temperature of 25 °C	43
	Annex C (normative) Quality conformance inspection	44
C.1	Formation of inspection lots	44
C.1.1	Groups A and B inspection	44
C.1.2	Group C inspection	44
C.2	Test schedule	44
C.3	Delayed delivery	44
C.4	Assessment levels	44
C.5	Test schedule for quality conformance inspection	45
	Annex X (informative) Cross-reference for reference to IEC 60384-21:2011/2019	50
	Bibliography	52
	List of comments	53
	Figure 1 – Fault: crack or fissure	15
	Figure 2 – Fault: crack or fissure	16
	Figure 3 – Separation or delamination	16
	Figure 4 – Exposed electrodes	16
	Figure 5 – Principal faces	17
	Figure 6 – Reflow temperature profile	22
	Figure A.1 – Dimensions	42
	Table 1 – Preferred tolerances on nominal capacitance	12
	Table 2 – Nominal temperature coefficient and tolerance (for reference temperature 20 °C)	12
	Table 3 – Combination of temperature coefficient and tolerance	13
	Table 4 – Tangent of loss angle limits	18
	Table 5 – Test voltages	19

Table 6 – Temperature cyclic drift limits.....	20
Table 7 – Reflow temperature profiles for Sn-Ag-Cu alloy.....	22
Table 8 – Maximum capacitance change.....	23
Table 9 – Maximum capacitance change.....	24
Table 10 – Number of damp heat cycles	25
Table 11 – Final inspection, measurements and requirements	26
Table 12 – Test conditions for damp heat, steady state	26
Table 13 – Final inspection, measurements and requirements	27
Table 14 – Endurance test conditions ($U_C = U_R$).....	27
Table 15 – Endurance test conditions ($U_C \neq U_R$).....	28
Table 16 – Final inspection, measurements and requirements	28
Table 17 – Initial requirements	29
Table 18 – Conditioning.....	30
Table 19 – Fixed sample size test plan for qualification approval Assessment level EZ.....	34
Table 20 – Tests schedule for qualification approval	35
Table A.1 – Dimensions	42
Table B.1 – Combination of temperature coefficients and tolerances for the reference temperature of 25 °C.....	43
Table C.1 – Lot by lot inspection.....	45
Table C.2 – Periodic tests inspection	45
Table C.3 – Test schedule for quality conformance inspection (lot by lot).....	46
Table C.4 – Test schedule for quality conformance inspection (Periodic test).....	47
Table X.1 – Reference to IEC 60384-21 for clause/ subclause annex.....	50
Table X.2 – Reference to IEC 60384-21 for figure/table.....	51

INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT –

Part 21: Sectional specification – Fixed surface mount multilayer capacitors of ceramic dielectric, Class 1

FOREWORD

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This commented version (CMV) of the official standard IEC 60384-21:2024 edition 4.0 allows the user to identify the changes made to the previous IEC 60384-21:2019 edition 3.0. Furthermore, comments from IEC TC 40 experts are provided to explain the reasons of the most relevant changes, or to clarify any part of the content.

A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text. Experts' comments are identified by a blue-background number. Mouse over a number to display a pop-up note with the comment.

This publication contains the CMV and the official standard. The full list of comments is available at the end of the CMV.

IEC 60384-21 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2019. This edition constitutes a technical revision.

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

- a) the document has been completely restructured to comply with the ISO/IEC Directives, Part 2 and to make it more useable; tables, figures and references have been revised accordingly; Annex X contains all cross-references of changes in clause/subclause numbers;
- b) the terms have been replaced by the letter symbols in Table 3;
- c) code of temperature coefficient and tolerance of C0G, U2J have been added in Table 4, Table 6, Table 8, Table 9, Table 11, Table 13, Table 16 and Annex B;
- d) the requirement in 5.5.2(visual examination) has been repeated in 5.9.3, 5.10.5, 5.11.4, 5.11.4, 5.13.7, 5.14.5 and 5.15.5;
- e) the deflection D in the very robust designs has been added in 5.9.1;
- f) Annex B has been changed informative into normative;
- g) Clause C.5 (Test schedule for quality conformance inspection) has been newly added to withdraw the blank detail specification: IEC 60384-21-1.

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

Draft	Report on voting
40/3119/FDIS	40/3138/RVD

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.

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.

A list of all parts in the IEC 60384 series, published under the general title *Fixed capacitors for use in electronic equipment*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

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FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT –

Part 21: Sectional specification – Fixed surface mount multilayer capacitors of ceramic dielectric, Class 1

1 Scope

This part of IEC 60384 is applicable to fixed unencapsulated surface mount multilayer capacitors of ceramic dielectric with a defined temperature coefficient (dielectric Class 1), intended for use in electronic equipment. These capacitors have metallized connecting pads or soldering strips and are intended to be mounted on printed boards, or directly onto substrates for hybrid circuits.

Capacitors for electromagnetic interference suppression are not included, but are covered by IEC 60384-14.

The object of this document is to ~~prescribe~~ specify preferred ratings and characteristics and to select from IEC 60384-1:2021 the appropriate quality assessment procedures, tests and measuring methods and to give general performance requirements for this type of capacitor. ~~Test severities and requirements prescribed in detail specifications referring to this sectional specification are of equal or higher performance levels; lower performance levels are not permitted.~~ Test severities and requirements specified in detail specifications referring to this document provide specific test severities and requirements of an equal or higher performance level. Further information on the conception of generic, sectional and detail specifications can be found in the Introduction of IEC 60384-1:2021. **1**

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

~~IEC 60063, Preferred number series for resistors and capacitors~~

~~IEC 60068-1:2013, Environmental testing – Part 1: General and guidance~~

~~IEC 60068-2-58:2015, Environmental testing – Part 2-58: Tests – Test Td – Test methods for solderability, resistance to dissolution of metallization and to soldering heat of surface mounting devices (SMD)~~

~~IEC 60068-2-58:2015/AMD1:2017~~

~~IEC 60384-1:2016~~2021, Fixed capacitors for use in electronic equipment – Part 1: Generic specification

IEC 61193-2:2007, Quality assessment systems – Part 2: Selection and use of sampling plans for inspection of electronic components and packages

~~ISO 3:1973, Preferred numbers – Series of preferred numbers~~

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Fixed capacitors for use in electronic equipment –
Part 21: Sectional specification – Fixed surface mount multilayer capacitors of
ceramic dielectric, Class 1**

**Condensateurs fixes utilisés dans les équipements électroniques –
Partie 21: Spécification intermédiaire – Condensateurs multicouches fixes à
diélectriques en céramique pour montage en surface, de Classe 1**

CONTENTS

FOREWORD.....	6
1 Scope.....	8
2 Normative references	8
3 Terms and definitions	8
4 Preferred ratings and characteristics	9
4.1 Preferred characteristics	9
4.2 Preferred values of ratings.....	10
4.2.1 Rated temperature (T_R).....	10
4.2.2 Rated voltage (U_R).....	10
4.2.3 Category voltage (U_C).....	10
4.2.4 Preferred values of nominal capacitance and associated tolerance values.....	10
4.2.5 Temperature coefficient (α).....	11
4.2.6 Dimensions.....	13
5 Test and measurement procedures.....	13
5.1 General.....	13
5.2 Preliminary drying.....	13
5.3 Measuring conditions	13
5.4 Mounting.....	13
5.5 Visual examination and check of dimensions	13
5.5.1 General	13
5.5.2 Visual examination	13
5.5.3 Requirements	13
5.6 Electrical tests	15
5.6.1 Capacitance	15
5.6.2 Tangent of loss angle ($\tan \delta$)	15
5.6.3 Insulation resistance.....	16
5.6.4 Voltage proof.....	17
5.7 Temperature coefficient (α) and temperature cyclic drift.....	17
5.7.1 General	17
5.7.2 Preliminary drying.....	18
5.7.3 Measuring conditions.....	18
5.7.4 Requirements	18
5.8 Shear test.....	18
5.9 Substrate bending test.....	18
5.9.1 General	18
5.9.2 Initial measurement	18
5.9.3 Final inspection	19
5.10 Resistance to soldering heat.....	19
5.10.1 General	19
5.10.2 Initial measurement	19
5.10.3 Test conditions	19
5.10.4 Recovery	20
5.10.5 Final inspection, measurements and requirements.....	20
5.11 Solderability.....	21
5.11.1 General	21

5.11.2	Test conditions	21
5.11.3	Recovery	21
5.11.4	Final inspection, measurements and requirements.....	21
5.12	Rapid change of temperature	22
5.12.1	General	22
5.12.2	Initial measurement	22
5.12.3	Number of cycles	22
5.12.4	Recovery	22
5.12.5	Final inspection, measurements and requirements.....	22
5.13	Climatic sequence.....	22
5.13.1	General	22
5.13.2	Initial measurement	22
5.13.3	Dry heat	23
5.13.4	Damp heat, cyclic, Test Db, first cycle	23
5.13.5	Cold.....	23
5.13.6	Damp heat, cyclic, Test Db, remaining cycles	23
5.13.7	Final inspection, measurements and requirements.....	23
5.14	Damp heat, steady state	24
5.14.1	General	24
5.14.2	Initial measurement	24
5.14.3	Test conditions	24
5.14.4	Recovery	24
5.14.5	Final inspection, measurements and requirements.....	24
5.15	Endurance	25
5.15.1	General	25
5.15.2	Initial measurement	25
5.15.3	Test conditions	25
5.15.4	Recovery	26
5.15.5	Final inspection, measurements and requirements.....	26
5.16	Robustness of terminations (only for capacitors with strip termination).....	26
5.16.1	General	26
5.16.2	Test conditions	26
5.16.3	Final inspection and requirements	27
5.17	Component solvent resistance (if required)	27
5.18	Solvent resistance of the marking (if required)	27
5.19	Accelerated damp heat, steady state (if required)	27
5.19.1	General	27
5.19.2	Initial measurement	27
5.19.3	Conditioning	27
5.19.4	Recovery	28
5.19.5	Final measurements	28
6	Marking	28
6.1	General.....	28
6.2	Information for marking	28
6.3	Marking on the body	28
6.4	Requirements for marking	28
6.5	Marking of the packaging	29
6.6	Additional marking	29
7	Information to be given in a detail specification.....	29

7.1	General.....	29
7.2	Outline drawing and dimensions	29
7.3	Mounting.....	29
7.4	Rating and characteristics.....	29
7.4.1	General	29
7.4.2	Nominal capacitance range.....	29
7.4.3	Particular characteristics	30
7.4.4	Soldering.....	30
7.5	Marking.....	30
8	Quality assessment procedures	30
8.1	Primary stage of manufacture	30
8.2	Structurally similar components	30
8.3	Certified records of released lots	30
8.4	Qualification approval	30
8.4.1	General	30
8.4.2	Qualification approval on the basis of the fixed sample size procedures	30
8.4.3	Tests	31
	Annex A (normative) Guidance for the specification and coding of dimensions of fixed surface mount multilayer capacitors of ceramic dielectric, Class 1	36
	Annex B (normative) Combination of temperature coefficients and tolerances for the reference temperature of 25 °C.....	37
	Annex C (normative) Quality conformance inspection	38
C.1	Formation of inspection lots	38
C.1.1	Groups A and B inspection	38
C.1.2	Group C inspection	38
C.2	Test schedule	38
C.3	Delayed delivery	38
C.4	Assessment levels	38
C.5	Test schedule for quality conformance inspection	39
	Annex X (informative) Cross-reference for reference to IEC 60384-21:2019.....	44
	Bibliography.....	45
	Figure 1 – Fault: crack or fissure.....	14
	Figure 2 – Fault: crack or fissure.....	14
	Figure 3 – Separation or delamination	14
	Figure 4 – Exposed electrodes.....	14
	Figure 5 – Principal faces	15
	Figure 6 – Reflow temperature profile	20
	Figure A.1 – Dimensions.....	36
	Table 1 – Preferred tolerances on nominal capacitance	10
	Table 2 – Nominal temperature coefficient and tolerance (for reference temperature 20 °C)	11
	Table 3 – Combination of temperature coefficient and tolerance	12
	Table 4 – Tangent of loss angle limits	16
	Table 5 – Test voltages.....	17

Table 6 – Temperature cyclic drift limits.....	18
Table 7 – Reflow temperature profiles for Sn-Ag-Cu alloy	20
Table 8 – Maximum capacitance change.....	20
Table 9 – Maximum capacitance change.....	22
Table 10 – Number of damp heat cycles	23
Table 11 – Final inspection, measurements and requirements	23
Table 12 – Test conditions for damp heat, steady state.....	24
Table 13 – Final inspection, measurements and requirements	25
Table 14 – Endurance test conditions ($U_C = U_R$)	25
Table 15 – Endurance test conditions ($U_C \neq U_R$)	26
Table 16 – Final inspection, measurements and requirements	26
Table 17 – Initial requirements.....	27
Table 18 – Conditioning	28
Table 19 – Fixed sample size test plan for qualification approval Assessment level EZ.....	32
Table 20 – Tests schedule for qualification approval.....	33
Table A.1 – Dimensions	36
Table B.1 – Combination of temperature coefficients and tolerances for the reference temperature of 25 °C	37
Table C.1 – Lot by lot inspection.....	39
Table C.2 – Periodic inspection.....	39
Table C.3 – Test schedule for quality conformance inspection (lot by lot).....	40
Table C.4 – Test schedule for quality conformance inspection (Periodic test)	41
Table X.1 – Reference to IEC 60384-21 for clause/annex	44
Table X.2 – Reference to IEC 60384-21 for figure/table	44

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FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT –

Part 21: Sectional specification – Fixed surface mount multilayer capacitors of ceramic dielectric, Class 1

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- d) the requirement in 5.5.2(visual examination) has been repeated in 5.9.3, 5.10.5, 5.11.4, 5.11.4, 5.13.7, 5.14.5 and 5.15.5;
- e) the deflection D in the very robust designs has been added in 5.9.1;
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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.

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The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT –

Part 21: Sectional specification – Fixed surface mount multilayer capacitors of ceramic dielectric, Class 1

1 Scope

This part of IEC 60384 is applicable to fixed unencapsulated surface mount multilayer capacitors of ceramic dielectric with a defined temperature coefficient (dielectric Class 1), intended for use in electronic equipment. These capacitors have metallized connecting pads or soldering strips and are intended to be mounted on printed boards, or directly onto substrates for hybrid circuits.

Capacitors for electromagnetic interference suppression are not included but are covered by IEC 60384-14.

The object of this document is to specify preferred ratings and characteristics and to select from IEC 60384-1:2021 the appropriate quality assessment procedures, tests and measuring methods and to give general performance requirements for this type of capacitor. Test severities and requirements specified in detail specifications referring to this document provide specific test severities and requirements of an equal or higher performance level. Further information on the conception of generic, sectional and detail specifications can be found in the Introduction of IEC 60384-1:2021.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-2-58, *Environmental testing – Part 2-58: Tests – Test Td – Test methods for solderability, resistance to dissolution of metallization and to soldering heat of surface mounting devices (SMD)*

IEC 60384-1:2021, *Fixed capacitors for use in electronic equipment – Part 1: Generic specification*

IEC 61193-2:2007, *Quality assessment systems – Part 2: Selection and use of sampling plans for inspection of electronic components and packages*

SOMMAIRE

AVANT-PROPOS	52
1 Domaine d'application	54
2 Références normatives	54
3 Termes et définitions	55
4 Valeurs assignées et caractéristiques préférentielles	56
4.1 Caractéristiques préférentielles	56
4.2 Valeurs assignées préférentielles	56
4.2.1 Température assignée (T_R)	56
4.2.2 Tension assignée (U_R)	56
4.2.3 Tension de catégorie (U_C)	57
4.2.4 Valeurs préférentielles de la capacité nominale et des valeurs de tolérance associées	57
4.2.5 Coefficient de température (α)	57
4.2.6 Dimensions	59
5 Procédures d'essai et de mesure	59
5.1 Généralités	59
5.2 Séchage préliminaire	60
5.3 Conditions de mesure	60
5.4 Montage	60
5.5 Examen visuel et contrôle des dimensions	60
5.5.1 Généralités	60
5.5.2 Examen visuel	60
5.5.3 Exigences	60
5.6 Essais électriques	62
5.6.1 Capacité	62
5.6.2 Tangente de l'angle de perte ($\tan \delta$)	62
5.6.3 Résistance d'isolement	63
5.6.4 Tenue en tension	64
5.7 Coefficient de température (α) et dérive après cycle thermique	64
5.7.1 Généralités	64
5.7.2 Séchage préliminaire	65
5.7.3 Conditions de mesure	65
5.7.4 Exigences	65
5.8 Essai de cisaillement	65
5.9 Essai de pliage du substrat	65
5.9.1 Généralités	65
5.9.2 Mesure initiale	66
5.9.3 Contrôle final	66
5.10 Résistance à la chaleur de brasage	66
5.10.1 Généralités	66
5.10.2 Mesure initiale	66
5.10.3 Conditions d'essai	66
5.10.4 Rétablissement	67
5.10.5 Inspection finale, mesures et exigences	67
5.11 Brasabilité	68
5.11.1 Généralités	68

5.11.2	Conditions d'essai	68
5.11.3	Rétablissement.....	69
5.11.4	Inspection finale, mesures et exigences.....	69
5.12	Variations rapides de température	69
5.12.1	Généralités	69
5.12.2	Mesure initiale	69
5.12.3	Nombre de cycles	69
5.12.4	Rétablissement.....	69
5.12.5	Inspection finale, mesures et exigences.....	69
5.13	Séquence climatique.....	70
5.13.1	Généralités	70
5.13.2	Mesure initiale	70
5.13.3	Chaleur sèche	70
5.13.4	Chaleur humide, cyclique, essai Db, premier cycle	70
5.13.5	Froid.....	70
5.13.6	Chaleur humide, cyclique, essai Db, cycles restants.....	70
5.13.7	Inspection finale, mesures et exigences.....	70
5.14	Chaleur humide, essai continu	71
5.14.1	Généralités	71
5.14.2	Mesure initiale	71
5.14.3	Conditions d'essai	71
5.14.4	Rétablissement.....	72
5.14.5	Inspection finale, mesures et exigences.....	72
5.15	Endurance	72
5.15.1	Généralités	72
5.15.2	Mesure initiale	72
5.15.3	Conditions d'essai	72
5.15.4	Rétablissement.....	73
5.15.5	Inspection finale, mesures et exigences.....	73
5.16	Robustesse des sorties (uniquement pour les condensateurs avec sorties à lamelle).....	74
5.16.1	Généralités	74
5.16.2	Conditions d'essai	74
5.16.3	Inspection finale et exigences.....	74
5.17	Résistance du composant aux solvants (si cela est exigé)	74
5.18	Résistance au solvant du marquage (si cela est exigé)	74
5.19	Chaleur humide, essai continu accéléré (si cela est exigé).....	74
5.19.1	Généralités	74
5.19.2	Mesure initiale	74
5.19.3	Conditionnement	75
5.19.4	Rétablissement.....	75
5.19.5	Mesures finales	75
6	Marquage	75
6.1	Généralités	75
6.2	Informations pour le marquage.....	76
6.3	Marquage sur le corps	76
6.4	Exigences relatives au marquage.....	76
6.5	Marquage de l'emballage	76
6.6	Marquage supplémentaire.....	76

7	Informations à spécifier dans une spécification particulière.....	76
7.1	Généralités	76
7.2	Dessin d'encombrement et dimensions	77
7.3	Montage.....	77
7.4	Valeurs assignées et caractéristiques	77
7.4.1	Généralités	77
7.4.2	Gamme de capacités nominales	77
7.4.3	Caractéristiques particulières	77
7.4.4	Brasure.....	77
7.5	Marquage	77
8	Procédures d'assurance de la qualité	78
8.1	Étape initiale de fabrication.....	78
8.2	Modèles associables.....	78
8.3	Enregistrements certifiés de lots livrés	78
8.4	Homologation.....	78
8.4.1	Généralités	78
8.4.2	Homologation fondée sur les procédures avec un effectif d'échantillons fixe	78
8.4.3	Essais	79
	Annexe A (normative) Recommandations pour la spécification et le codage des dimensions des condensateurs multicouches fixes à diélectriques en céramique pour montage en surface, Classe 1.....	84
	Annexe B (normative) Combinaison de coefficients de température et de tolérances pour la température de référence de 25 °C	85
	Annexe C (normative) Contrôle de conformité de la qualité	86
C.1	Constitution des lots de contrôle	86
C.1.1	Inspection des Groupes A et B	86
C.1.2	Inspection du groupe C.....	86
C.2	Programme d'essais	86
C.3	Livraison différée	86
C.4	Niveaux d'assurance.....	86
C.5	Programme d'essais pour les contrôles de conformité de la qualité.....	87
	Annexe X (informative) Références croisées pour référence à l'IEC 60384-21:2019	93
	Bibliographie.....	94
	Figure 1 – Défaut: craquelure ou fissure	60
	Figure 2 – Défaut: craquelure ou fissure	61
	Figure 3 – Séparation ou décollement interlaminaire.....	61
	Figure 4 – Électrodes exposées	61
	Figure 5 – Faces principales	62
	Figure 6 – Profil de température de refusion	67
	Figure A.1 – Dimensions.....	84
	Tableau 1 – Tolérances préférentielles sur la capacité nominale.....	57
	Tableau 2 – Coefficient de température nominal et tolérance (pour température de référence 20 °C)	58

Tableau 3 – Combinaisons de coefficient de température et de tolérance	58
Tableau 4 – Limites de la tangente de l'angle de perte	63
Tableau 5 – Tensions d'essai.....	64
Tableau 6 – Limites de dérive après cycle thermique	65
Tableau 7 – Profils de température de refusion pour alliage Sn-Ag-Cu.....	67
Tableau 8 – Variation maximale de capacité	68
Tableau 9 – Variation maximale de capacité	69
Tableau 10 – Nombre de cycles de chaleur humide	70
Tableau 11 – Exigences, mesures et contrôle final	71
Tableau 12 – Conditions d'essai continu de chaleur humide	71
Tableau 13 – Exigences, mesures et contrôle final	72
Tableau 14 – Conditions d'essai d'endurance ($U_C = U_R$).....	73
Tableau 15 – Conditions d'essai d'endurance ($U_C \neq U_R$).....	73
Tableau 16 – Exigences, mesures et contrôle final	73
Tableau 17 – Exigences initiales.....	75
Tableau 18 – Conditionnement	75
Tableau 19 – Plan d'essais avec un nombre d'échantillons fixe pour homologation Niveau d'assurance EZ.....	80
Tableau 20 – Programme d'essais pour l'homologation.....	81
Tableau A.1 – Dimensions	84
Tableau B.1 – Combinaison de coefficients de température et de tolérances pour la température de référence de 25 °C	85
Tableau C.1 – Contrôle lot par lot	87
Tableau C.2 – Contrôle périodique.....	87
Tableau C.3 – Programme d'essais pour le contrôle de conformité de la qualité (lot par lot).....	88
Tableau C.4 – Programme d'essais pour le contrôle de conformité de la qualité (essai périodique)	89
Tableau X.1 – Référence à l'article/annexe de l'IEC 60384-21	93
Tableau X.2 – Référence à la figure/au tableau de l'IEC 60384-21.....	93

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

CONDENSATEURS FIXES UTILISÉS DANS LES ÉQUIPEMENTS ÉLECTRONIQUES –

Partie 21: Spécification intermédiaire – Condensateurs multicouches fixes à diélectriques en céramique pour montage en surface, de Classe 1

AVANT-PROPOS

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L'IEC 60384-21 a été établie par le comité d'études 40 de l'IEC: Condensateurs et résistances pour équipements électroniques. Il s'agit d'une Norme internationale.

Cette quatrième édition annule et remplace la troisième édition parue en 2019. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- a) le document a été entièrement restructuré pour se conformer aux directives ISO/IEC, Partie 2, et pour en faciliter l'utilisation; les tableaux, les figures et les références ont été révisés en conséquence; l'Annexe X comporte toutes les références croisées des changements de numérotation des articles/paragraphes;
- b) les termes ont été remplacés par des symboles littéraux dans le Tableau 3;
- c) le codage de coefficient de température et tolérance de C0G et U2J a été ajouté dans le Tableau 4, le Tableau 6, le Tableau 8, le Tableau 9, le Tableau 11, le Tableau 13, le Tableau 16 et à l'Annexe B;
- d) l'exigence de 5.5.2 (examen visuel) a été répétée en 5.9.3, en 5.10.5, en 5.11.4, en 5.11.4, en 5.13.7, en 5.14.5 et en 5.15.5;
- e) la flèche D dans les modèles très robustes a été ajoutée en 5.9.1;
- f) l'Annexe B est passée d'informatrice à normative;
- g) l'Article C.5 (Programme d'essais pour le contrôle de conformité de la qualité) a été ajouté pour retirer la spécification particulière-cadre: IEC 60384-21-1.

Le texte de cette Norme internationale est issu des documents suivants:

Projet	Rapport de vote
40/3119/FDIS	40/3138/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

La langue employée pour l'élaboration de cette Norme internationale est l'anglais.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2, il a été développé selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles sous www.iec.ch/members_experts/refdocs. Les principaux types de documents développés par l'IEC sont décrits plus en détail sous www.iec.ch/publications.

Une liste de toutes les parties de la série IEC 60384, publiées sous le titre général *Condensateurs fixes utilisés dans les équipements électroniques*, se trouve sur le site Web de l'IEC.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site Web de l'IEC sous webstore.iec.ch dans les données relatives au document recherché. À cette date, le document sera:

- reconduit,
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- révisé.

CONDENSATEURS FIXES UTILISÉS DANS LES ÉQUIPEMENTS ÉLECTRONIQUES –

Partie 21: Spécification intermédiaire – Condensateurs multicouches fixes à diélectriques en céramique pour montage en surface, de Classe 1

1 Domaine d'application

La présente partie de l'IEC 60384 s'applique aux condensateurs multicouches fixes à diélectriques en céramique pour montage en surface non encapsulés, avec un coefficient de température défini (diélectrique de Classe 1), destinés à être utilisés dans les équipements électroniques. Ces condensateurs possèdent des pastilles de connexion métallisées ou des bandes de brasure et sont destinés à être montés sur des cartes imprimées ou directement sur des substrats de circuits hybrides.

Les condensateurs d'antiparasitage ne sont pas inclus, mais sont couverts par l'IEC 60384-14.

Le présent document a pour objet de spécifier les valeurs assignées et caractéristiques préférentielles, de sélectionner, en se référant à l'IEC 60384-1:2021, les procédures d'assurance qualité appropriées, les essais et les méthodes de mesure et de donner les exigences de performances générales pour ce type de condensateur. Les sévérités et les exigences des essais spécifiées dans les spécifications particulières se référant au présent document fournissent des sévérités et des exigences d'essai d'un niveau de performance supérieur ou égal. Pour plus d'informations sur la conception des spécifications génériques, intermédiaires et particulières, voir l'Introduction de l'IEC 60384-1:2021.

2 Références normatives

Les documents suivants sont cités dans le texte de sorte qu'ils constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60068-2-58, *Essais d'environnement – Partie 2-58: Essais – Essai Td: Méthodes d'essai de la soudabilité, résistance de la métallisation à la dissolution et résistance à la chaleur de brasage des composants pour montage en surface (CMS)*

IEC 60384-1:2021, *Condensateurs fixes utilisés dans les équipements électroniques – Partie 1: Spécification générique*

IEC 61193-2:2007, *Quality assessment systems – Part 2: Selection and use of sampling plans for inspection of electronic components and packages* (disponible en anglais seulement)