IEC 60831-1

Edition 3.0 2014-02

REDLINE VERSION

colour inside

Shunt power capacitors of the self-healing type for a.c. systems having a rated voltage up to and including 1 000 V –
Part 1: General – Performance, testing and rating – Safety requirements – Guide for installation and operation



IEC 60831-1:2014-02 RLV(EN)



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CONTENTS

FOREWORD 5

~~SECTION 1: GENERAL~~

1 Scope ~~and object~~ 7
2 Normative references 8
3 Terms and definitions 8
4 Service conditions 12
4.1 Normal service conditions 12
4.2 Unusual service conditions 13

~~SECTION 2: QUALITY REQUIREMENTS AND TESTS~~

5 Test requirements 13
5.1 General 13
5.2 Test conditions 13
6 Classification of tests 13
6.1 Routine tests 13
6.2 Type tests 14
6.3 Acceptance tests 14
7 Capacitance measurement and output calculation 15
7.1 Measuring procedure 15
7.2 Capacitance tolerances 15
8 Measurement of the tangent of the loss angle (tan δ) of the capacitor 15
8.1 Measuring procedure 15
8.2 Loss requirements 16
9 Voltage tests between terminals 16
9.1 Routine test 16
9.2 Type test 16
10 Voltage tests between terminals and container 16
10.1 Routine test 16
10.2 Type test 17
11 Test of internal discharge device 17
12 Sealing test 18
13 Thermal stability test 18
14 Measurement of the tangent of the loss angle (tan δ) of the capacitor at elevated temperature 19
14.1 Measuring procedure 19
14.2 Requirements 19
15 Lightning impulse voltage test between terminals and container 20
16 Discharge test 20
17 Ageing test 21
18 Self-healing test 21
19 Destruction test 21

~~SECTION 3: OVERLOADS~~

20 Maximum permissible voltage 21
20.1 Long-duration voltages 21
20.2 Switching voltages 21
21 Maximum permissible current 22

~~SECTION 4: SAFETY REQUIREMENTS~~

22 Discharge device 22
23 Container connections 22
24 Protection of the environment 22
25 Other safety requirements 23

~~SECTION 5: MARKINGS~~

26 Marking of the unit 23
26.1 Rating plate 23
26.2 Standardized connection symbols 24
26.3 Warning plate 24
27 Marking of the bank 24
27.1 Instruction sheet or rating plate 24
27.2 Warning plate 24

~~SECTION 6: GUIDE FOR INSTALLATION AND OPERATION~~

28 General 24
29 Choice of the rated voltage 25
30 Operating temperature 26
30.1 General 26
30.2 Installation 26
30.3 High ambient air temperature 26
30.4 Evaluation of losses 26
31 Special service conditions 26
32 Overvoltages 27
33 Overload currents 28
34 Switching and protective devices and connections 28
35 Choice of creepage distance 29
36 Capacitors connected to systems with audio-frequency remote control 29
37 Electromagnetic compatibility (EMC) 30
37.1 Emission 30
37.2 Immunity 30
37.2.1 General 30
37.2.2 Low-frequency disturbances 30
37.2.3 Conducted transients and high-frequency disturbances 30
37.2.4 Electrostatic discharges 30
37.2.5 Magnetic disturbances 30
37.2.6 Electromagnetic disturbances 31

Annex A (normative) Additional definitions, requirements and tests for power filter capacitors 32
A.1 Terms and definitions 32
A.2 Quality requirements and tests 32
A.2.1 Capacitance tolerance 32
A.2.2 Voltage test between terminals (see Clause 9) 33
A.2.3 Thermal stability test (see Clause 13) 33
A.3 Overloads – Maximum permissible current (see Clause 21) 33
A.4 Markings – Instruction sheet or rating plate (see 27.1) 33
A.5 Guide for installation and operation – Choice of the rated voltage (see Clause 29) 33
Annex B (informative) Formulae for capacitors and installations 34
B.1 Computation of the output of three-phase capacitors from three single-phase capacitance measurements 34
B.2 Resonance frequency 34
B.3 Voltage rise 34
B.4 Inrush transient current 35
B.4.1 Switching in of single capacitor 35
B.4.2 Switching of capacitors in parallel with energized capacitor(s) 35
B.4.3 Discharge resistance in single-phase units or in one-phase or polyphase units 35
Bibliography 37

Figure B.1 – k values depending on the method of connection of the resistors with the capacitor units 36

Table 1 – Letter symbols for upper limit of temperature range 12
Table 2 – Ambient air temperature for the thermal stability test 18
Table 3 – Admissible voltage levels in service 21

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SHUNT POWER CAPACITORS OF THE SELF-HEALING TYPE FOR A.C. SYSTEMS HAVING A RATED VOLTAGE UP TO AND INCLUDING 1 000 V –

Part 1: General – Performance, testing and rating – Safety requirements – Guide for installation and operation

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International Standard IEC 60831-1 has been prepared by IEC technical committee 33: Power capacitors and their applications.

This third edition cancels and replaces the second edition published in 1996 and Amendment 1:2002. This edition constitutes a technical revision.

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

a) Updating of the normative references;
b) Test conditions have been clarified;
c) Thermal stability test has been clarified;
d) Maximum permissible voltage and current have been clarified;
e) The protection of the environment has been amended with safety concerns and plastic quality requirements.

The text of this standard is based on the following documents:

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33/543/FDIS	33/550/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 60831 series, published under the general title *Shunt power capacitors of the self-healing type for a.c. systems having a rated voltage up to and including, 1 000 V* can be found on the IEC website.

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SHUNT POWER CAPACITORS OF THE SELF-HEALING TYPE FOR A.C. SYSTEMS HAVING A RATED VOLTAGE UP TO AND INCLUDING 1 000 V –

Part 1: General – Performance, testing and rating – Safety requirements – Guide for installation and operation

~~Section 1: General~~

1 Scope ~~and object~~

This part of the IEC 60831 series is applicable to both capacitor units and capacitor banks intended to be used, particularly, for power-factor correction of a.c. power systems having a rated voltage up to and including 1 000 V and frequencies of 15 Hz to 60 Hz.

This part of IEC 60831 also applies to capacitors intended for use in power filter circuits. Additional definitions, requirements, and tests for power filter capacitors are given in Annex A.

The following capacitors are excluded from this part of IEC 60831:

– Shunt power capacitors of the non-self-healing type for a.c. systems having a rated voltage up to and including 1 000 V (IEC 60931-1, -2 and -3).

– Shunt capacitors for a.c. power systems having a rated voltage above 1 000 V (IEC 60871-1, -2, -3 and -4).

– Capacitors for inductive heat-generating plants operating at frequencies between 40 Hz and 24 000 Hz (IEC 60110-1 and -2).

– Series capacitors (IEC60143-1, -2, -3 and -4).

– ~~Capacitors for motor applications and the like~~ AC motor capacitors (IEC 60252-1 and -2).

– Coupling capacitors and capacitor dividers (IEC 60358-1).

– Capacitors ~~to be used in~~ for power electronic circuits (IEC 61071).

– Small a.c. capacitors to be used for fluorescent and discharge lamps (IEC 61048 and IEC 61049).

– Capacitors for suppression of radio interference (under consideration).

– Capacitors intended to be used in various types of electrical equipment, and thus considered as components.

– Capacitors intended for use with d.c. voltage superimposed on the a.c. voltage.

Accessories such as insulators, switches, instrument transformers, fuses, etc., should be in accordance with the relevant IEC standards and are not covered by the scope of this part of IEC 60831.

The object of this part of IEC 60831 is to:

a) formulate uniform rules regarding performances, testing and rating;

b) formulate specific safety rules;

c) provide a guide for installation and operation.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

~~IEC 60050(436):1990, *International Electrotechnical Vocabulary (IEV) – Chapter 436: Power capacitors*~~

IEC 60060-1:~~1989~~2010, *High-voltage test techniques – Part 1: General definitions and test requirements*

~~IEC 60110:1973, *Recommendation for capacitors for inductive heat generating plants operating at frequencies between 40 and 24 000 Hz*~~

~~IEC 60143:1992, *Series capacitors for power systems*~~

~~IEC 60252:1993, *A.C. motor capacitors*~~

IEC 60269-1:~~1986~~2006, *Low-voltage fuses – Part 1: General requirements*

~~IEC 60358:1990, *Coupling capacitors and capacitor dividers*~~

IEC 60695-2-12:2010, *Fire hazard testing – Part 2-12: Glowing/hot-wire based test methods – Glow-wire flammability index (GWFI) test method for materials*

IEC 60831-2:~~1995~~2013, *Shunt power capacitors of the self-healing type for a.c. systems having a rated voltage up to and including 1 000 V – Part 2: Ageing test, self-healing test and destruction test*

~~IEC 60871-1:1987, *Shunt capacitors for a.c. power systems having a rated voltage above 1000 V** – Part 1: General – Performance, testing and rating – Safety requirements – Guide for installation and operation~~

~~IEC 60931-1:1996, *Shunt power capacitors of the non-self-healing type for a.c. systems having a rated voltage up to and including 1000 V – Part 1: General – Performance, testing and rating – Safety requirements – Guide for installation and operation*~~

~~IEC 60931-3:1996, *Shunt power capacitors of the non-self-healing type for a.c. systems having a rated voltage up to and including 1000 V – Part 3: Internal fuses*~~

IEC 61000-2-2:~~1990~~2002, *Electromagnetic compatibility (EMC) – Part 2-2: Environment – Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems*

IEC 61000-4-1:~~1992~~2006, *Electromagnetic compatibility (EMC) – Part 4-1: Testing and measurement techniques – ~~Overview of immunity tests: Basic EMC publication~~ Overview of IEC 61000-4 series*

~~IEC 61048:1991, *Capacitors for use in tubular fluorescent and other discharge lamp circuits – General and safety requirements*~~

~~IEC 61049:1991, *Capacitors for use in tubular fluorescent and other discharge lamp circuits – Performance requirements*~~

~~IEC 61071-1:1993, *Power electronic capacitors – Part 1: General*~~

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~~* According to Amendment 1 (1991).~~

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Shunt power capacitors of the self-healing type for a.c. systems having a rated voltage up to and including 1 000 V – Part 1: General – Performance, testing and rating – Safety requirements – Guide for installation and operation

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IEC 60831-1:2014-02(EN-FR)

CONTENTS

FOREWORD 5
1 Scope 7
2 Normative references 8
3 Terms and definitions 8
4 Service conditions 11
4.1 Normal service conditions 11
4.2 Unusual service conditions 12
5 Test requirements 12
5.1 General 12
5.2 Test conditions 13
6 Classification of tests 13
6.1 Routine tests 13
6.2 Type tests 13
6.3 Acceptance tests 14
7 Capacitance measurement and output calculation 14
7.1 Measuring procedure 14
7.2 Capacitance tolerances 14
8 Measurement of the tangent of the loss angle (tan δ) of the capacitor 15
8.1 Measuring procedure 15
8.2 Loss requirements 15
9 Voltage tests between terminals 15
9.1 Routine test 15
9.2 Type test 15
10 Voltage tests between terminals and container 16
10.1 Routine test 16
10.2 Type test 16
11 Test of internal discharge device 17
12 Sealing test 17
13 Thermal stability test 17
14 Measurement of the tangent of the loss angle (tan δ) of the capacitor at elevated temperature 19
14.1 Measuring procedure 19
14.2 Requirements 19
15 Lightning impulse voltage test between terminals and container 19
16 Discharge test 19
17 Ageing test 20
18 Self-healing test 20
19 Destruction test 20
20 Maximum permissible voltage 20
20.1 Long-duration voltages 20
20.2 Switching voltages 21
21 Maximum permissible current 21
22 Discharge device 21
23 Container connections 22

24 Protection of the environment 22
25 Other safety requirements 22
26 Marking of the unit 22
26.1 Rating plate 22
26.2 Standardized connection symbols 23
26.3 Warning plate 23
27 Marking of the bank 23
27.1 Instruction sheet or rating plate 23
27.2 Warning plate 23
28 General 24
29 Choice of the rated voltage 24
30 Operating temperature 25
30.1 General 25
30.2 Installation 25
30.3 High ambient air temperature 25
30.4 Evaluation of losses 25
31 Special service conditions 26
32 Overvoltages 26
33 Overload currents 27
34 Switching and protective devices and connections 27
35 Choice of creepage distance 28
36 Capacitors connected to systems with audio-frequency remote control 29
37 Electromagnetic compatibility (EMC) 29
37.1 Emission 29
37.2 Immunity 29
37.2.1 General 29
37.2.2 Low-frequency disturbances 29
37.2.3 Conducted transients and high-frequency disturbances 29
37.2.4 Electrostatic discharges 29
37.2.5 Magnetic disturbances 30
37.2.6 Electromagnetic disturbances 30
Annex A (normative) Additional definitions, requirements and tests for power filter capacitors 31
A.1 Terms and definitions 31
A.2 Quality requirements and tests 31
A.2.1 Capacitance tolerance 31
A.2.2 Voltage test between terminals (see Clause 9) 32
A.2.3 Thermal stability test (see Clause 13) 32
A.3 Overloads – Maximum permissible current (see Clause 21) 32
A.4 Markings – Instruction sheet or rating plate (see 27.1) 32
A.5 Guide for installation and operation – Choice of the rated voltage (see Clause 29) 32
Annex B (informative) Formulae for capacitors and installations 33
B.1 Computation of the output of three-phase capacitors from three single-phase capacitance measurements 33
B.2 Resonance frequency 33
B.3 Voltage rise 33

B.4 Inrush transient current 34
B.4.1 Switching in of single capacitor 34
B.4.2 Switching of capacitors in parallel with energized capacitor(s) 34
B.4.3 Discharge resistance in single-phase units or in one-phase or polyphase units 34
Bibliography 36

Figure B.1 – k values depending on the method of connection of the resistors with the capacitor units 35

Table 1 – Letter symbols for upper limit of temperature range 12
Table 2 – Ambient air temperature for the thermal stability test 18
Table 3 – Admissible voltage levels in service 20

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IEC 60269-1:2006, *Low-voltage fuses – Part 1: General requirements*

IEC 60831-2:2013, *Shunt power capacitors of the self-healing type for a.c. systems having a rated voltage up to and including 1 000 V – Part 2: Ageing test, self-healing test and destruction test*

IEC 60695-2-12:2010, *Fire hazard testing – Part 2-12: Glowing/hot-wire based test methods – Glow-wire flammability index (GWFI) test method for materials*

IEC 61000-2-2:2002, *Electromagnetic compatibility (EMC) – Part 2-2: Environment – Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems*

IEC 61000-4-1:2006, *Electromagnetic compatibility (EMC) – Part 4-1: Testing and measurement techniques – Overview of IEC 61000-4 series*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
capacitor element
element
device consisting essentially of two electrodes separated by a dielectric

[SOURCE: IEC 60050-436:1990, 436-01-03]

3.2
capacitor unit
unit
assembly of one or more capacitor elements in the same container with terminals brought out

[SOURCE: IEC 60050-436:1990, 436-01-04]

3.3
self-healing capacitor
capacitor of which the electrical properties, after local breakdown of the dielectric, are rapidly and essentially restored

[SOURCE: IEC 60050-436:1990, 436-03-12]

3.4
capacitor bank
bank
number of capacitor units connected so as to act together

SOMMAIRE

AVANT-PROPOS 41
1 Domaine d'application 43
2 Références normatives 44
3 Termes et définitions 44
4 Conditions de service 47
4.1 Conditions normales de service 47
4.2 Conditions de service inhabituelles 48
5 Exigences relatives aux essais 49
5.1 Généralités 49
5.2 Conditions d'essais 49
6 Classification des essais 49
6.1 Essais individuels 49
6.2 Essais de type 49
6.3 Essais d'acceptation 50
7 Mesure de la capacité et calcul de la puissance 50
7.1 Modalités de mesure 50
7.2 Tolérances sur la capacité 51
8 Mesure de la tangente de l'angle de pertes (tan δ) du condensateur 51
8.1 Modalités de mesure 51
8.2 Exigences concernant les pertes 51
9 Essais diélectriques entre bornes 51
9.1 Essai individuel 51
9.2 Essai de type 52
10 Essais diélectriques entre bornes et cuve 52
10.1 Essai individuel 52
10.2 Essai de type 53
11 Essai du dispositif interne de décharge 53
12 Essai d'étanchéité 53
13 Essai de stabilité thermique 54
14 Mesure de la tangente de l'angle de pertes (tan δ) du condensateur à température élevée 55
14.1 Modalités de mesure 55
14.2 Exigences 55
15 Essai diélectrique en choc de foudre entre bornes et cuve 55
16 Essai de décharge 56
17 Essai de vieillissement 56
18 Essai d'autorégénération 56
19 Essai de destruction 57
20 Tension maximale admissible 57
20.1 Tensions de longue durée 57
20.2 Surtensions de manœuvre 57
21 Courant maximal admissible 58
22 Dispositif de décharge 58
23 Connexions à l'enveloppe 58

24 Protection de l'environnement 58
25 Autres exigences de sécurité 59
26 Marquage du condensateur unitaire 59
26.1 Plaque signalétique 59
26.2 Symboles de couplage normalisés 60
26.3 Plaque d'avertissement 60
27 Marquage des batteries 60
27.1 Notice d'instruction ou plaque signalétique 60
27.2 Plaque d'avertissement 60
28 Généralités 60
29 Choix de la tension assignée 61
30 Température de service 62
30.1 Généralités 62
30.2 Conditions d'installation 62
30.3 Température élevée de l'air ambiant 62
30.4 Evaluation des pertes 62
31 Conditions spéciales de service 63
32 Surtension 63
33 Courants de surcharge 64
34 Appareils de coupure et de protection et raccordement 65
35 Choix des lignes de fuite 66
36 Condensateurs raccordés à des réseaux pourvus de télécommande à fréquence acoustique 66
37 Compatibilité électromagnétique (CEM) 66
37.1 Emission 66
37.2 Immunité 66
37.2.1 Généralités 66
37.2.2 Perturbations à basse fréquence 67
37.2.3 Perturbations transitoires conduites et perturbations à haute fréquence 67
37.2.4 Décharges électrostatiques 67
37.2.5 Perturbations magnétiques 67
37.2.6 Perturbations électromagnétiques 67
Annexe A (normative) Définitions, exigences et essais supplémentaires concernant les condensateurs de puissance pour filtrage en courants forts 68
A.1 Termes et définitions 68
A.2 Exigences de qualité et essais 68
A.2.1 Tolérances sur la capacité 68
A.2.2 Essai diélectrique entre bornes (voir Article 9) 69
A.2.3 Essai de stabilité thermique (voir Article 13) 69
A.3 Surcharges – Courant maximal admissible (voir Article 21) 69
A.4 Marquages – Notice d'instructions ou plaque signalétique (voir 27.1) 69
A.5 Guide d'installation et d'exploitation – Choix de la tension assignée (voir Article 29) 69
Annexe B (informative) Formules pour les condensateurs et les installations 70
B.1 Calcul de la puissance de condensateurs triphasés à partir de trois mesures de capacité monophasées 70
B.2 Fréquence de résonance 70

B.3 Elévation de tension 70
B.4 Courant d'appel transitoire 71
B.4.1 Mise sous tension d'un seul condensateur 71
B.4.2 Enclenchement de condensateurs en parallèle avec un/des condensateur(s) sous tension 71
B.4.3 Résistance de décharge dans un condensateur monophasé ou dans une phase de condensateurs polyphasés 71
Bibliographie 73

Figure B.1 – Valeurs du coefficient k dépendant du mode de connexion des résistances avec les condensateurs unitaires 72

Tableau 1 – Symboles littéraux de la limite supérieure de la plage de température 48
Tableau 2 – Température de l'air ambiant pour l'essai de stabilité thermique 54
Tableau 3 – Niveaux de tension admissibles en service 57

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

CONDENSATEURS SHUNT DE PUISSANCE AUTOREGÉNÉRATEURS POUR RÉSEAUX À COURANT ALTERNATIF DE TENSION ASSIGNÉE INFÉRIEURE OU ÉGALE À 1 000 V –

Partie 1: Généralités – Caractéristiques fonctionnelles, essais et valeurs assignées – Règles de sécurité – Guide d'installation et d'exploitation

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La Norme internationale CEI 60831-1 a été établie par le comité d'études 33 de la CEI: Condensateurs de puissance et leurs applications.

Cette troisième édition annule et remplace la seconde édition parue en 1996 et l'Amendement 1:2002. Cette édition constitue une révision technique.

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

a) mise à jour des références normatives;

b) clarification des conditions d'essai;

c) clarification de l'essai de stabilité thermique;

d) clarification de la tension maximale et du courant maximal autorisés;

e) modification des mesures de sécurité et des exigences en matière de qualité du plastique pour la protection de l'environnement.

Le texte de cette norme est issu des documents suivants:

FDIS	Rapport de vote
33/543/FDIS	33/550/RVD

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

Cette publication a été rédigée selon les Directives ISO/CEI, Partie 2.

Une liste de toutes les parties de la série CEI 60831, publiées sous le titre général *Condensateurs shunt de puissance autorégénérateurs pour réseaux à courant alternatif de tension assignée inférieure ou égale à 1 000 V*, peut être consultée sur le site web de la CEI.

Le comité a décidé que le contenu de cette publication ne sera pas modifié avant la date de stabilité indiquée sur le site web de la CEI sous "http://webstore.iec.ch" dans les données relatives à la publication recherchée. A cette date, la publication sera

- reconduite,
- supprimée,
- remplacée par une édition révisée, ou
- amendée.

Le contenu du corrigendum de mai 2014 a été pris en considération dans cet exemplaire.

CONDENSATEURS SHUNT DE PUISSANCE AUTOREGÉNÉRATEURS POUR RÉSEAUX À COURANT ALTERNATIF DE TENSION ASSIGNÉE INFÉRIEURE OU ÉGALE À 1 000 V –

Partie 1: Généralités – Caractéristiques fonctionnelles, essais et valeurs assignées – Règles de sécurité – Guide d'installation et d'exploitation

1 Domaine d'application

La présente partie de la série CEI 60831 s'applique aux condensateurs unitaires et aux batteries de condensateurs autorégénérateurs destinés plus particulièrement à la correction du facteur de puissance des réseaux à courant alternatif de tension assignée inférieure ou égale à 1 000 V et de fréquence comprise entre 15 Hz et 60 Hz.

Cette partie de la CEI 60831 s'applique également aux condensateurs destinés à être utilisés dans des circuits de filtrage. Les définitions, les exigences et les essais complémentaires pour les condensateurs de filtrage en courants forts sont indiqués dans l'Annexe A.

Les condensateurs suivants sont exclus de cette partie de la CEI 60831:

– Condensateurs shunt de puissance non autorégénérateurs destinés à être installés sur des réseaux à courant alternatif de tension assignée inférieure ou égale à 1 000 V (CEI 60931-1, -2 et -3).
– Condensateurs shunt de puissance destinés à être installés sur des réseaux à courant alternatif de tension assignée supérieure à 1 000 V (CEI 60871-1, -2, -3 et -4).
– Condensateurs destinés à des installations de génération de chaleur par induction, soumis à des fréquences comprises entre 40 Hz et 24 000 Hz (CEI 60110-1 et -2).
– Condensateurs série (CEI 60143-1, -2, -3 et -4).
– Condensateurs des moteurs à courant alternatif (CEI 60252-1 et -2).
– Condensateurs de couplage et diviseurs capacitifs (CEI 60358-1).
– Condensateurs destinés aux circuits électroniques de puissance (CEI 61071).
– Petits condensateurs à courant alternatif destinés aux lampes à fluorescence et à décharge (CEI 61048 et CEI 61049).
– Condensateurs d'antiparasitage (à l'étude).
– Condensateurs conçus pour être utilisés dans différents types d'équipements électriques et considérés de ce fait comme des composants.
– Condensateurs destinés à être utilisés sous tension continue superposée à la tension alternative.

Il convient que les accessoires tels que les isolateurs, les interrupteurs, les transformateurs de mesure, les fusibles, etc., soient conformes aux normes particulières de la CEI; ils ne sont pas couverts par le domaine d'application de la présente partie de la CEI 60831.

La présente partie de la CEI 60831 a pour objet:

a) de formuler des règles uniformes pour les performances, les essais et les caractéristiques assignées;
b) de formuler des règles spécifiques de sécurité;
c) de fournir un guide pour l'installation et l'utilisation.

2 Références normatives

Les documents suivants sont cités en référence de manière normative, en intégralité ou en partie, dans le présent document et sont indispensables pour son application. 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).

CEI 60060-1:2010, *Technique des essais à haute tension – Partie 1: Définitions et exigences générales*

CEI 60269-1:2006, *Fusibles basse tension – Partie 1: Exigences générales*

CEI 60831-2:2013, *Condensateurs shunt de puissance autorégénérateurs destinés à être installés sur des réseaux à courant alternatif de tension assignée inférieure ou égale à 1 000 V – Partie 2: Essais de vieillissement, d'autorégénération et de destruction*

CEI 60695-2-12:2010, *Essais relatifs aux risques du feu – Partie 2-12: Essais au fil incandescent/chauffant – Méthode d'essai d'indice d'inflammabilité au fil incandescent (GWFI) pour matériaux*

CEI 61000-2-2:2002, *Compatibilité électromagnétique (CEM) – Partie 2-2: Environnement – Niveaux de compatibilité pour les perturbations conduites basse fréquence et la transmission des signaux sur les réseaux publics d'alimentation basse tension*

CEI 61000-4-1:2006, *Compatibilité électromagnétique (CEM) – Partie 4-1: Techniques d'essai et de mesure – Vue d'ensemble de la série CEI 61000-4*

3 Termes et définitions

Pour les besoins du présent document, les termes et définitions suivants s'appliquent.

3.1
élément de condensateur
élément
dispositif constitué essentiellement par deux électrodes séparées par un diélectrique

[SOURCE: CEI 60050-436:1990, 436-01-03]

3.2
condensateur unitaire
unité
ensemble d'un ou de plusieurs éléments de condensateurs placés dans une même enveloppe et reliés à des bornes de sortie

[SOURCE: CEI 60050-436:1990, 436-01-04]

3.3
condensateur autorégénérateur
condensateur dont les propriétés électriques sont rapidement et pratiquement rétablies après une perforation locale du diélectrique

[SOURCE: CEI 60050-436:1990, 436-03-12]