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Edition 3.0 2025-02
COMMENTED VERSION

INTERNATIONAL STANDARD

Insulators for overhead lines – Composite suspension and tension insulators with AC voltage greater than 1 000 V and DC voltage greater than 1 500 V – Definitions, test methods and acceptance criteria

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INSULATORS FOR OVERHEAD LINES COMPOSITE SUSPENSION AND TENSION INSULATORS ~~FOR A.C. SYSTEMS~~ WITH ~~A NOMINAL~~ AC VOLTAGE GREATER THAN 1 000 V AND DC VOLTAGE GREATER THAN 1 500 V 1 – DEFINITIONS, TEST METHODS AND ACCEPTANCE CRITERIA

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.
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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.
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This commented version (CMV) of the official standard IEC 61109:2025 edition 3.0 allows the user to identify the changes made to the previous IEC 61109:2008 edition 2.0. Furthermore, comments from IEC TC 36 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 61109 has been prepared by subcommittee 36B: Insulators for overhead lines, of IEC technical committee 36: Insulators. It is an International Standard.

This third edition cancels and replaces the second edition published in 2008. This edition constitutes a technical revision.

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

a) extension of this document to apply both to AC and DC systems;
b) modifications of Clause 3, Terms, definitions and abbreviations;
c) removal of Clause 7, Hybrid insulators, from this document;
d) modifications of tests procedures recently included in IEC 62217 (hydrophobicity transfer test, stress corrosion, water diffusion test on the core with housing);
e) modifications on environmental conditions;
f) modifications on classification of tests and include the relevance of the interfaces;
g) clarification and modification of the parameters determining the need to repeat design and type tests;
h) revision of Table 1;
i) revision of electrical type tests;
j) revision of re-testing procedure of sample test;
k) addition of a new Annex D on electric field control for AC;
l) addition of a new Annex E on typical sketch for composite insulators assembly;
m) addition of a new Annex F on mechanical evaluation of the adhesion between core and housing;
n) addition of a new Annex G on applicability of design- and type tests for DC applications.

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

Draft	Report on voting
36/609/FDIS	36/611/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.

This International Standard is to be used in conjunction with IEC 62217:2012.

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.

INTRODUCTION

Composite suspension and tension **2** insulators (in the following the term "composite insulator" is used) consist of fibreglass insulating core, bearing the mechanical load protected by a polymeric housing, the load being transmitted to the core by metallic end fittings. Despite these common features, the materials used and the ~~construction~~ design details and manufacturing process used by different manufacturers may differ.

Some tests have been grouped together as "Design tests", to be performed only once on insulators which satisfy the same design conditions. For all design tests of these composite ~~suspension and tension~~ insulators, the appropriate common clauses defined in IEC 62217 are applied. As far as practical, the influence of time on the electrical and mechanical properties of its components (core ~~material~~, housing, interfaces etc.) and of the complete composite insulators has been considered in specifying the design tests to ensure a satisfactory lifetime under normally known stress conditions of transmission lines. Explanation of the principles of the damage limit, load coordination and testing are presented in Annex A.

It has not been considered useful to specify a power arc test as a mandatory test. The test parameters are manifold and can have very different values depending on the configurations of the network and the supports and on the design of arc-protection devices. The heating effect of power arcs ~~should~~ need to be considered in the design of metal fittings. Critical damage to the metal fittings resulting from the magnitude and duration of the short-circuit current can be avoided by properly designed arc-protection devices. This document, however, does not exclude the possibility of a power arc test by agreement between the ~~user and~~ manufacturer and customer. IEC 61467 gives details on AC power arc testing of complete insulator sets, that match their configuration with actual protective and string fittings, to recreate the real electromagnetic field affecting the arc movement.

~~Composite insulators are used in both a.c. and d.c. applications. In spite of this fact, a specific tracking and erosion test procedure for d.c. applications as a design test has not yet been defined and accepted. The 1 000 h a.c. tracking and erosion test of IEC 62217 is used to establish a minimum requirement for the tracking resistance of the housing material.~~

~~The mechanism of brittle fracture has been investigated by CIGRE B2.03[1] and conclusions are published in [2, 3]. Brittle fracture is a result of stress corrosion induced by internal or external acid attack on the resin bonded glass fibre core. CIGRE D1.14 has developed a test procedure for core materials based on time-load tests on assembled cores exposed to acid, along with chemical analysis methods to verify the resistance against acid attack [4]. In parallel IEC TC36WG 12 is studying preventive and predictive measures.~~

This document covers both AC and DC composite insulators. Before the appropriate standard for DC applications is issued, the majority of tests listed in this document can also be applicable for DC (Annex G). Due to the difference in AC and DC tracking performance, a specific tracking and erosion test procedure for DC applications as a design test is planned to be developed. The 1 000 h AC tracking and erosion test of IEC 62217 can be used only to establish a minimum requirement for the tracking and erosion resistance. This 1 000 h salt fog tracking and erosion test is considered as a screening test intended to reject materials in combination with the design which are inadequate. Tracking and erosion tests are not intended to evaluate long term performance of insulators. Such tests, e.g. the 5 000 h multiple stress test and wheel test in IEC TR 62730 [1][2], or other tests intended for research or sometimes used as a supplementary design test, are not considered in this document.

Composite suspension and tension insulators are, in general, not intended for torsion or other non-tensile loads. However, due to consideration to non-standard applications (interphase

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~~[1] International Council on Large High Voltage Electric Systems: Working Group B2.03.~~

[2] Numbers in square brackets refer to the bibliography.

spacers etc.) loads during handling and installation have to be considered in the design. Guidance on non-standard loads is given in Annex C.

Wherever possible, IEC Guide 111 [2] has been followed for the drafting of this document.

INSULATORS FOR OVERHEAD LINES COMPOSITE SUSPENSION AND TENSION INSULATORS ~~FOR A.C. SYSTEMS~~ WITH ~~A NOMINAL~~ AC VOLTAGE GREATER THAN 1 000 V AND DC VOLTAGE GREATER THAN 1 500 V – DEFINITIONS, TEST METHODS AND ACCEPTANCE CRITERIA

1 Scope ~~and object~~

This International Standard applies to composite ~~suspension/tension~~ insulators for overhead lines consisting of a load-bearing cylindrical insulating solid core consisting of fibres – usually glass – in a resin-based matrix, a housing (~~outside~~ surrounding the insulating core) made of polymeric material and metal end fittings permanently attached to the insulating core.

Composite insulators covered by this document are intended for use as suspension/tension line insulators, but ~~it should be noted that~~ these insulators ~~can~~ could occasionally be subjected to compression or bending, for example when used as ~~phase~~ interphase-spacers. Guidance on such loads is outlined in Annex C.

~~This standard can be applied in part to hybrid composite insulators where the core is made of a homogeneous material (porcelain, resin), see Clause 8.~~

The object of this document is to

– define the terms used,

– ~~prescribe~~ specify test methods,

– ~~prescribe~~ specify acceptance criteria.

This document does not include requirements dealing with the choice of insulators for specific operating conditions or environments beyond normal environmental conditions defined in Table 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 60060-1, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60383-1, *Insulators for overhead lines with a nominal voltage above 1000 V – Part 1: Ceramic or glass insulator units for AC systems – Definitions, test methods and acceptance criteria*

IEC 60383-2, *Insulators for overhead lines with a nominal voltage above 1 000 V – Part 2: Insulator strings and insulator sets for AC systems – Definitions, test methods and acceptance criteria*

IEC 60437, *Radio interference test on high-voltage insulators*

IEC 61284, *Overhead lines – Requirements and tests for fittings*

IEC 61466-1, *Composite string insulator units for overhead lines with a nominal voltage greater than 1 000 V – Part 1: Standard strength classes and end fittings*

IEC 61467, *Insulators for overhead lines – Insulator strings and sets for lines with a nominal voltage greater than 1 000 V – AC power arc tests*

IEC 62217:~~2005~~[3], *Polymeric HV insulators for indoor and outdoor use ~~with a nominal voltage > 1 000 V~~ – General definitions, test methods and acceptance criteria*

IEC 62231, *Composite station post insulators for substations with AC voltages greater than 1 000 V up to 245 kV – Definitions, test methods and acceptance criteria*

ISO 3452 (all parts), *Non-destructive testing – Penetrant testing*

[3] Under preparation. Stage at the time of publication: IEC/RFDIS 62217:2025.

IEC 61109

Edition 3.0 2025-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Insulators for overhead lines – Composite suspension and tension insulators with AC voltage greater than 1 000 V and DC voltage greater than 1 500 V – Definitions, test methods and acceptance criteria

Isolateurs pour lignes aériennes – Isolateurs composites de suspension et d'ancrage de tension supérieure à 1 000 V en courant alternatif et à 1 500 V en courant continu – Définitions, méthodes d'essai et critères d'acceptation

IEC 61109:2025-02(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INSULATORS FOR OVERHEAD LINES COMPOSITE SUSPENSION AND TENSION INSULATORS WITH AC VOLTAGE GREATER THAN 1 000 V AND DC VOLTAGE GREATER THAN 1 500 V – DEFINITIONS, TEST METHODS AND ACCEPTANCE CRITERIA

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Composite suspension and tension insulators are, in general, not intended for torsion or other non-tensile loads. However, due to consideration to non-standard applications (interphase spacers etc.) loads during handling and installation have to be considered in the design. Guidance on non-standard loads is given in Annex C.

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INSULATORS FOR OVERHEAD LINES COMPOSITE SUSPENSION AND TENSION INSULATORS WITH AC VOLTAGE GREATER THAN 1 000 V AND DC VOLTAGE GREATER THAN 1 500 V – DEFINITIONS, TEST METHODS AND ACCEPTANCE CRITERIA

1 Scope

This International Standard applies to composite insulators for overhead lines consisting of a load-bearing cylindrical insulating solid core consisting of fibres – usually glass – in a resin-based matrix, a housing (surrounding the insulating core) made of polymeric material and metal end fittings permanently attached to the insulating core.

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IEC 62217:—[2], *Polymeric HV insulators for indoor and outdoor use – General definitions, test methods and acceptance criteria*

IEC 62231, *Composite station post insulators for substations with AC voltages greater than 1 000 V up to 245 kV – Definitions, test methods and acceptance criteria*

ISO 3452 (all parts), *Non-destructive testing – Penetrant testing*

[2] Under preparation. Stage at the time of publication: IEC/RFDIS 62217:2025.

SOMMAIRE

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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ISOLATEURS POUR LIGNES AÉRIENNES – ISOLATEURS COMPOSITES DE SUSPENSION ET D'ANCRAGE DE TENSION SUPÉRIEURE À 1 000 V EN COURANT ALTERNATIF ET À 1 500 V EN COURANT CONTINU – DÉFINITIONS, MÉTHODES D'ESSAI ET CRITÈRES D'ACCEPTATION

AVANT-PROPOS

1) La Commission Électrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. À cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
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7) Aucune responsabilité ne doit être imputée à l'IEC, à ses administrateurs, employés, auxiliaires ou mandataires, y compris ses experts particuliers et les membres de ses comités d'études et des Comités nationaux de l'IEC, pour tout préjudice causé en cas de dommages corporels et matériels, ou de tout autre dommage de quelque nature que ce soit, directe ou indirecte, ou pour supporter les coûts (y compris les frais de justice) et les dépenses découlant de la publication ou de l'utilisation de cette Publication de l'IEC ou de toute autre Publication de l'IEC, ou au crédit qui lui est accordé.
8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
9) L'IEC attire l'attention sur le fait que la mise en application du présent document peut entraîner l'utilisation d'un ou de plusieurs brevets. L'IEC ne prend pas position quant à la preuve, à la validité et à l'applicabilité de tout droit de brevet revendiqué à cet égard. À la date de publication du présent document, l'IEC n'avait pas reçu notification qu'un ou plusieurs brevets pouvaient être nécessaires à sa mise en application. Toutefois, il y a lieu d'avertir les responsables de la mise en application du présent document que des informations plus récentes sont susceptibles de figurer dans la base de données de brevets, disponible à l'adresse https://patents.iec.ch. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets.

L'IEC 61109 a été établie par le sous-comité 36B: Isolateurs pour lignes aériennes, du comité d'études 36 de l'IEC: Isolateurs. Il s'agit d'une Norme internationale.

Cette troisième édition annule et remplace la deuxième édition parue en 2008. Cette édition constitue une révision technique.

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

a) élargissement du présent document pour inclure les systèmes à courant alternatif et à courant continu;
b) modifications de l'Article 3, Termes, définitions et abréviations;
c) suppression de l'Article 7, Isolateurs hybrides, dans le présent document;
d) modifications des procédures d'essai récemment incluses dans l'IEC 62217 (essai de transfert d'hydrophobie, essai de corrosion sous contrainte, essai de pénétration d'eau sur le noyau avec le revêtement);
e) modifications des conditions d'environnement;
f) modifications de la classification des essais et ajout de la pertinence des interfaces;
g) clarification et modification des paramètres qui déterminent la nécessité de répéter les essais de conception et de type;
h) révision du Tableau 1;
i) révision des essais électriques de type;
j) révision de la procédure de contre-épreuve de l'essai sur prélèvement;
k) ajout d'une nouvelle Annexe D sur la maîtrise des champs électriques pour les applications en courant alternatif;
l) ajout d'une nouvelle Annexe E sur les croquis types pour l'assemblage des isolateurs composites;
m) ajout d'une nouvelle Annexe F sur l'évaluation mécanique de l'adhérence entre le noyau et le revêtement;
n) ajout d'une nouvelle Annexe G sur l'applicabilité des essais de conception et de type pour les applications en courant continu.

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

Projet	Rapport de vote
36/609/FDIS	36/611/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/standardsdev/publications.

La présente Norme internationale doit être utilisée conjointement avec l'IEC 62217:2012.

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,
- supprimé, ou
- révisé.

INTRODUCTION

Les isolateurs composites de suspension et d'ancrage (ci-après désignés par le terme "isolateur composite") consistent en un noyau isolant en fibres de verre, qui supporte les charges mécaniques et qui est protégé par un revêtement en polymère, les charges étant transmises au noyau par les armatures d'extrémité métalliques. Malgré ces caractéristiques communes, les matériaux, les détails de conception et le procédé de fabrication utilisés par les fabricants peuvent différer.

Certains essais ont été regroupés dans la classe des "essais de conception" et ne doivent être effectués qu'une seule fois sur des isolateurs présentant les mêmes conditions de conception. Pour tous les essais de conception de ces isolateurs composites, les articles communs appropriés définis dans l'IEC 62217 sont appliqués. Dans la mesure du possible, l'influence du temps sur les propriétés électriques et mécaniques de ses composants (noyau, revêtement, interfaces, etc.) et des isolateurs composites complets a été prise en compte lors de la spécification des essais de conception, afin de procurer une durée de vie satisfaisante des isolateurs dans les conditions de charge normalement connues pour les lignes de transport. L'Annexe A explique les principes de la limite d'endommagement, la coordination des charges et les essais associés.

Il n'a pas été jugé pertinent de spécifier un essai d'arc de puissance comme obligatoire. Les paramètres d'essai sont multiples et peuvent avoir des valeurs très différentes selon les configurations du réseau et des supports et la conception des dispositifs de protection contre les arcs. L'effet thermique des arcs de puissance doit être pris en compte dans la conception des armatures métalliques. Des dommages majeurs sur les armatures métalliques causés par l'amplitude et la durée du courant de court-circuit peuvent être évités par l'emploi de dispositifs de protection contre les arcs bien dimensionnés. Néanmoins, le présent document n'exclut pas la possibilité d'un essai d'arc de puissance sous réserve d'un accord entre le fabricant et le client. L'IEC 61467 donne des détails sur les essais d'arc de puissance en courant alternatif de chaînes équipées complètes, qui reproduisent fidèlement leur configuration avec des dispositifs de protection et de fixation réels, afin de recréer les champs électromagnétiques réels qui agissent sur le mouvement des arcs.

Le présent document couvre les isolateurs composites à courant alternatif et à courant continu. En attendant la publication de la norme pertinente pour les applications en courant continu, la majorité des essais définis dans le présent document peuvent également s'appliquer au courant continu (Annexe G). En raison de la différence entre les performances de cheminement en courant alternatif et en courant continu, il est prévu d'élaborer une procédure d'essai de cheminement et d'érosion spécifique pour les applications en courant continu dans le cadre d'un essai de conception. L'essai de cheminement et d'érosion en courant alternatif de 1 000 h de l'IEC 62217 peut être utilisé afin de définir une exigence minimale pour la résistance au cheminement et à l'érosion. Cet essai de cheminement et d'érosion au brouillard salin de 1 000 h est considéré comme un essai de sélection destiné à rejeter les matériaux associés à la conception qui ne sont pas appropriés. Les essais de cheminement et d'érosion ne sont pas destinés à évaluer les performances à long terme des isolateurs. Ces essais, par exemple l'essai sous contraintes multiples de 5 000 h et l'essai à la roue de l'IEC TR 62730 [1][1] ou d'autres essais, destinés à la recherche ou parfois utilisés comme essai de conception supplémentaire, ne sont pas pris en compte dans le présent document.

Les isolateurs composites de suspension et d'ancrage ne sont généralement pas prévus pour supporter des charges de torsion ou d'autres charges autres que la traction. Toutefois, pour les applications non normalisées (entretoises interphases, etc.), la conception doit prendre en compte les charges induites par la manipulation et l'installation. L'Annexe C fournit des recommandations pour les charges non normalisées.

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1 Les chiffres entre crochets renvoient à la Bibliographie.

Le Guide 111 de l'IEC [2] a été suivi autant que possible pour l'élaboration du présent document.

ISOLATEURS POUR LIGNES AÉRIENNES – ISOLATEURS COMPOSITES DE SUSPENSION ET D'ANCRAGE DE TENSION SUPÉRIEURE À 1 000 V EN COURANT ALTERNATIF ET À 1 500 V EN COURANT CONTINU – DÉFINITIONS, MÉTHODES D'ESSAI ET CRITÈRES D'ACCEPTATION

1 Domaine d'application

La présente Norme internationale s'applique aux isolateurs composites pour lignes aériennes qui sont constitués d'un noyau isolant plein cylindrique réalisé en fibres – généralement de verre – qui supporte les charges. Ces isolateurs possèdent une matrice en résine, un revêtement (recouvrant le noyau isolant) en matériau élastomère et des armatures d'extrémité métalliques fixées au noyau isolant.

Les isolateurs composites couverts par le présent document sont destinés à être utilisés pour la suspension ou l'ancrage de lignes, mais ces isolateurs peuvent parfois être sollicités en compression ou en flexion, par exemple lorsqu'ils sont utilisés comme entretoises interphases. L'Annexe C fournit des recommandations pour ces types de charges.

L'objet du présent document est de:

– définir les termes utilisés;
– spécifier les méthodes d'essai;
– spécifier les critères d'acceptation.

Le présent document ne définit pas d'exigences concernant le choix des isolateurs destinés à des conditions ou des environnements d'exploitation spécifiques, qui diffèrent des conditions normales d'environnement indiquées dans le Tableau 1.

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 60060-1, *Techniques d'essai à haute tension – Partie 1: Définitions générales et exigences d'essai*

IEC 60383-1, *Isolateurs pour lignes aériennes de tension nominale supérieure à 1 000 V – Partie 1: Éléments d'isolateurs en matière céramique ou en verre pour systèmes à courant alternatif – Définitions, méthodes d'essai et critères d'acceptation*

IEC 60383-2, *Isolateurs pour lignes aériennes de tension nominale supérieure à 1 000 V – Partie 2: Chaînes d'isolateurs et chaînes d'isolateurs équipées pour systèmes à courant alternatif – Définitions, méthodes d'essai et critères d'acceptation*

IEC 60437, *Essai de perturbations radioélectriques des isolateurs pour haute tension*

IEC 61284, *Lignes aériennes – Exigences et essais pour le matériel d'équipement*

IEC 61466-1, *Éléments de chaîne d'isolateurs composites pour lignes aériennes de tension nominale supérieure à 1 000 V – Partie 1: Classes mécaniques et armatures d'extrémité normalisées*

IEC 61467, *Isolateurs pour lignes aériennes – Chaînes d'isolateurs et chaînes d'isolateurs équipées pour lignes de tension nominale supérieure à 1 000 V – Essais d'arc de puissance en courant alternatif*

IEC 62217:—[2], *Isolateurs polymériques à haute tension pour usage intérieur ou à l'extérieur – Définitions générales, méthodes d'essai et critères d'acceptation*

IEC 62231, *Isolateurs supports composites rigides à socle destinés aux postes à courant alternatif de tensions supérieures à 1 000 V jusqu'à 245 kV – Définitions, méthodes d'essai et critères d'acceptation*

ISO 3452 (toutes les parties), *Essais non destructifs – Examen par ressuage*

[2] En preparation. Stade au moment de la publication: IEC/RFDIS 62217:2025.